SECTION 2.0 PROBLEM ORIENTATION

Most archaeologists would probably agree that the discipline is experiencing a dramatic change in academic orientation, which in turn, has a profound effect on the way in which sites and material remains are examined. Processual archaeology, and its positivist approach towards human adaptation, provided the initial stimulus and the growth of cultural resources management (CRM) from the 1970s to the present. The burgeoning of different theoretical approaches in the 1980s and 1990s has led to re-evaluations of the means by which the past is interpreted. The growth of many schools of thought--processual, behavioral, evolutionary, neo-Darwinism and postprocessual, among others--has led to new avenues to discern and interpret human behavior and past phenomena.

While theory guides the conduct of archaeological research, the operationalization of concepts in field and analytical stages remains a major challenge. This is especially the case for CRM investigators who routinely conduct archaeological site investigations. While general theory and conscious attempts to address paradigm conflicts provide for stimulating dialogue, few theorists have roundly applied their expectations to the comprehensive study of actual prehistoric sites.

The following section reviews major schools of thought operating in archaeology today. The approaches are outlined with a goal to identify common ground and areas where the most productive research may take place. Current Mid-Atlantic practices are outlined to examine the state of current research contexts. The following discussion then turns toward a general conceptual framework that may be applied to the archaeological record and a specific research strategy for analysis of Hickory Bluff.

CURRENT SCHOOLS OF THOUGHT AND MAJOR TENETS

Processualism

Processual archaeology began as a scientific undertaking in reaction against a traditional approach which emphasized descriptive culture histories (Willey and Sabloff 1993). Processual archaeology employed a positivistic approach, a method designed to explain human behavior through empirical observations of archaeological data to test broad theories of behavior and construct cross-cultural generalizations. In this research framework, relations between material culture and human behavior were used to explain cultural systems and evolutionary changes, viewing human responses to be adaptations to natural environments and ecological alterations (Binford 1977; Binford and Binford 1968). Culture change was considered a process of adaptation to the environment, where settlement, subsistence, technology, and elements of social organization were linked with adaptation. Much of the growth of the New Archaeology became dominated by an ecological approach, and in such a framework, environmental variations were considered to be a stimulant to changes in human behavior and thus, the material fallout of systems.

In the processual paradigm, the material record was also considered to be an amalgam of technomic, sociotechnic, and ideotechnic phenomena, with the idea that a scientific study of system-wide organization would provide information about cross-cultural adaptation (Binford

1962). However, in practice, less tangible factors of culture (e.g., religion, ritual, art) have been treated as either unrecoverable or secondary in nature; thus, these topics have not been pursued analytically. Most attempts to move beyond economic systems have involved burial contexts where social and symbolic meanings could be more readily inferred (Binford 1971; Braun 1981; Brown 1971; Chapman et al. 1981). At the same time, the central importance of social, ritual, and cosmological influences were recognized by those who worked with living hunting and gathering peoples (e.g., Lewis-Williams 1982) or complex societies (e.g., Flannery and Marcus 1983).

Processual archaeology matured and became more sophisticated during the 1980s and 1990s through the development of new ideas about human behavior. This maturation linked diverse sets of archaeological data to human adaptational systems. Several other approaches, such as behavioral archaeology and evolutionary archaeology, developed as a consequence of the more mature processual orientation. Behavioral archaeology advocated that human actions and material could be studied "in all times and all places" and past phenomena could be described in *both* historical and nomothetic perspective (Reid et al. 1975:864). While behavioral archaeology advocated a social theory (Schiffer 1988) and the incorporation of ideology in understanding material systems (Skibo et al. 1995), research of this kind was not traditionally pursued as more focus was placed on the establishment of detailed technological correlations. Researchers working under a processual framework have advocated an evolutionary archaeology, which placed emphasis on selectionism in neo-Darwinian evolutionary-ecology perspective (e.g., Barton and Clark 1997; Broughton and O'Connell 1999; Dunnell 1980). While mechanisms for change are viewed differently in behavioral and evolutionary archaeology, the study of relations between ecology, economic, technological, and adaptive responses have been core research areas.

Most efforts to understand the archaeological record of past behavior have been directed towards understanding causation, and the construction of middle range research which includes study of actualistic and site formation research (Binford 1978, 1981; Schiffer 1976, 1987). This process involves making observations on the archaeological record, formulating hypotheses to account for observed patterning, and testing those hypotheses against independent empirical data. To understand causation, middle range studies examine contexts where the production, use and discard of material culture may be observed, and where theories may be developed to test against the archaeological record.

Postprocessualism

Postprocessual archaeologies are composed of different intellectual pursuits, although at their outset, the approaches shared a common critique of processual archaeology (Hodder 1986; Leone et al. 1987; Shanks and Tilley 1987). Postprocessualists have pointed out that processual archaeology, in adopting a particular view of positivism, virtually ignored the widening spheres of intellectual changes that occurred in social science, philosophy, and anthropology (Hodder 1986; Whitley 1998). The most popularized postprocessual approach, the Hermeneutic approach, seeks to achieve an understanding of past actions, eliciting meaning through interpretation; therefore, in this view, culture can be read in ways analogous to the reading of literary texts (Hodder 1999). Postprocessualism has had an important effect in archaeology in that it has emphasized the role of individuals in actively negotiating in their own culture, and it

placed emphasis on contextualism, where local factors, the individual, and the agent led to particular historic events within networks. Artifacts are therefore interpreted within their extinct context of meaning, a meaning which is historically constituted (Hodder 1986, 1999; Hodder et al. 1995). Historical-materialism, with its concern for ideology and belief, as well as postprocessual concerns with symbolism and meaning, share in the view that individuals are agents of creation and change (Whitley 1998).

With respect to increased societal complexity, postprocessualism has had special appeal as it recognizes the role of human choice, power relations, and social structure, asserting that people are active agents in the creation of a social world. Continuity is not sought since people as prime movers of change make a variety of choices, and these choices, tempered by historical contingencies, are not necessarily rational and with precedent. The growth of approaches which incorporate gender as a main topic have opened up evaluations of relations between people (e.g., Gero and Conkey 1991). Interpretive approaches are also guided by the careful construction of methodology and critical examination (Wylie 1995; Schmidt and Patterson 1995).

Among postprocessual approaches, Cognitive and Critical Theory have also been advocated, although they are not in the mainstream. Cognitive archaeology recognizes that the human mind, internal actions, and emotions are factors in the creation of the archaeological record, and these agencies must be considered in interpreting past behavior (e.g., Flannery and Marcus 1993; Whitley 1998). Culture is influenced by the perception, description and classification of the universe (cosmology), the nature of the supernatural (religion), the principles and philosophies by which societies are governed (ideology), and the way in which human values are conveyed in art (iconography) (Flannery and Marcus 1993). Critical Theory has the goal to emancipate the individual, and to self-consciously analyze one's own social and political context and to understand the history of ideology (e.g., Leone 1984; Leone et al. 1987; Tilley 1989). Critical archaeology seeks to provide self-understanding of the archaeologist, thus permitting moral action of how one individual acts upon another. This involves examining oneself with respect to why particular questions are raised and exposing the nature of any intellectual investment in a particular answer. Critical archaeology has been especially useful in evaluating the ways in which history is portrayed to the public.

Study of Native American Perspectives

Despite the oft-repeated tenet, "Archaeology is Anthropology or it is nothing," it has been pointed out that this framework is not in fact operational in most archaeological investigations in North America, and a wide disjuncture remains in the methods and practice of modern ethnology and archaeology (Hodder 1991). This divide is due, in part, to the fact that processual archaeologists shied away from non-material aspects of culture, rejecting human thoughts and decisions, spiritual orientations, and experiential meanings. A broadening of archaeology has begun through the incorporation of Native American perspectives and the re-evaluation of ethnographies for a better understanding of ideology and religion (e.g., Bruchac 1997; Swidler et al. 1997). Paralleling the archaeological changes in approach, historians have realized that new sources and methods of information collection are needed to understand the wider range of factors that influenced and shaped Native American communities and cultures for millennia (Fixico 1997a).

In considering social and religious realms in Native American society and material culture, researchers are fortunate in having an extensive ethnographic and ethnohistoric record. Ethnohistories provide detailed information on the history of communities and their social and political environment, oral traditions concerning legend, worldview, myth, the physical and metaphysical, and wider studies such as the Native peoples' relationship to the natural world (Fixico 1997b). Ethnographies provide information on many analytical levels, including the worldview and influence of spiritual leaders (e.g., Brown 1953, 1982; Hultkrantz 1967), regional medicinal plant use and ritual (Tooker 1979), and cross-cultural theories of religious behavior (Rappaport 1999).

The advent of the Native American Graves Protection and Repatriation Act (NAGPRA) in 1990 was a formal recognition of traditional values and concerns. NAGPRA may be viewed as a reflection of the dominant American culture's respect for Native Americans, inserting non-western orientations and religion into archaeology (Whitley 1998:20). In this sense, this burial legislation recognized alternative modes of knowledge and means for gaining knowledge apart from classic western science and processual positivism (Whitley 1998). NAGPRA has provided a forum for the incorporation of Native American worldviews and oral traditions to account for archaeological patterns (Echo-Hawk 1997, 2000; Swidler et al. 1997; Dongoske et al. 2000; Thomas 2000). NAGPRA, combined with postprocessual concerns for meaning, has turned attention on more comprehensive, humanistic views.

Bridging the Divide

While processualists and postprocessualists were pitted against each another in animated debate, some researchers began to seek more productive alternatives. Archaeologists have begun to expand their research, examining multiple view points and areas of intellectual agreement, bridging the divide between humanism and science (e.g., Kelly 1992; Preucel 1991; Reid 1995; Watson 1991; Whitley 1998; Hodder 1999). The general result of the development of postprocessualism is the realization that there are many ways of exploring the past and that processual archaeology, as traditionally defined, can no longer be viewed as the exclusive way for conducting archaeological research. In this view, postprocessual archaeology may be considered as an expansion of processual archaeology, leading to a more comprehensive way to view the past.

An intellectual widening of archaeology may entail study of both pattern and process as well as social actions. In doing so, archaeologists may also self consciously evaluate their work. Preucel (1991:28) has nicely summarized how archaeologists may conceptualize these varied approaches in modern research:

> First, there is the project of explaining the past in term of patterns and processes. In order to achieve this, archaeology must adopt a subject-object relationship with the archaeological record. This is best accomplished through a form of neo-positivism that makes use of statistical rather than universal laws. Second, there is the project of understanding what happened in the past in terms of meanings and subjective intentions. This involves developing a subject-co-subject relationship between the interpreter and past actors, which only seems to be possible through a hermeneutic exercise. Third, there is the project of interacting

> with various interest groups to evaluate these explanations and interpretations. To do this, archaeology must adopt a subject-co-subject relationship between the practitioners of archaeology and the general public. This is effected by adopting a historically self-conscious, critical framework. Each of these three projects must be pursued simultaneously if archaeology is to continue to grow and develop as a social science.

If these three avenues can be successfully pursued and implemented, archaeology may concurrently incorporate alternative ways of evaluating the past. In conducting such an expansionist approach, it is clear that there are bound to be difficulties in application and practicality in scope, and thus investigators may have to consciously and methodically choose particular and favored methods for investigating the past. Nevertheless, given the most ideal situations, the best alternative would be to examine current data in light of each approach given the intellectual climate, the general lack of consensus in approach, and the struggle of each school in explaining the totality of past behavior.

Elements of expanded and combined methods are being made in archaeology today, examining external processes as well as experienced events in shaping the past (Cobb 1991; Peebles 1991). Archaeologists expanded on their views, examining the notion of worldview and sacredness (Hall 1977, 1997); cognition and symbolism (Fritz 1978; Renfrew 2001; Whitley 1994); ideology (Skibo et al. 1995); cosmology (e.g., Williamson and Farrer 1992); the multiple meaning of landscapes (e.g., Carmichael et al. 1994; Kelley and Francis 1994); gender relations (Watson and Kennedy 1991); heterarchy (Ehrenreich et al. 1995); craft and social identity (Costin and Wright 1998); ritual deposits (Walker 1996, 1998); and symbolism in technology (Schmidt and Mapunda 1997).

Chaos and Complexity

The study of human behavior and material culture may be viewed in the context of new theories concerning the operation of natural and social phenomena. Chaos Theory posits that non-lineal dynamical systems show order, but they never repeat and are often unpredictable (Gleick 1987; Lorenz 1993). In such a system, very slight differences in initial conditions produce different outcomes. In applying this concept to human behavioral studies, it should be expected that individual actions never repeat themselves and these actions are affected by small changes in initial conditions. In this sense, history is aperiodic in nature; broad patterns in the rise and fall of complex societies may be sketched, but no rise and fall events ever repeat exactly. Building on Chaos Theory, researchers have broadened their ideas about the operation of all physical and natural phenomena into a Complexity Theory which holds that at the root of all complex systems lies a basic set of rules (Pines 1988). Complexity Theory proposes that there is a single, unified way in which the world operates, positing that local interactions can be either random or ordered, and from these individual component interactions, global properties emerge, which in turn influence local conditions (Figure 2.1).

Both Chaos and Complexity Theory have been brought, in a general fashion, to behavioral studies (Briggs and Peat 1999; Lewin 1992; McKee 2000) and to archaeology (Grace 2000; MacLeod-Iredale 1998; McGlade and Van der Leeuw 1997; Schiffer 2000). Archaeologists have begun to explore the intrinsic complexity in material and behavioral realms.

Complexity Theory has been considered on the level of societal developments, considering forms to which complex systems evenly settle (e.g., city-states, bands) although it is recognized these will not necessarily be alike as local variations and options exist (Lewin 1992).

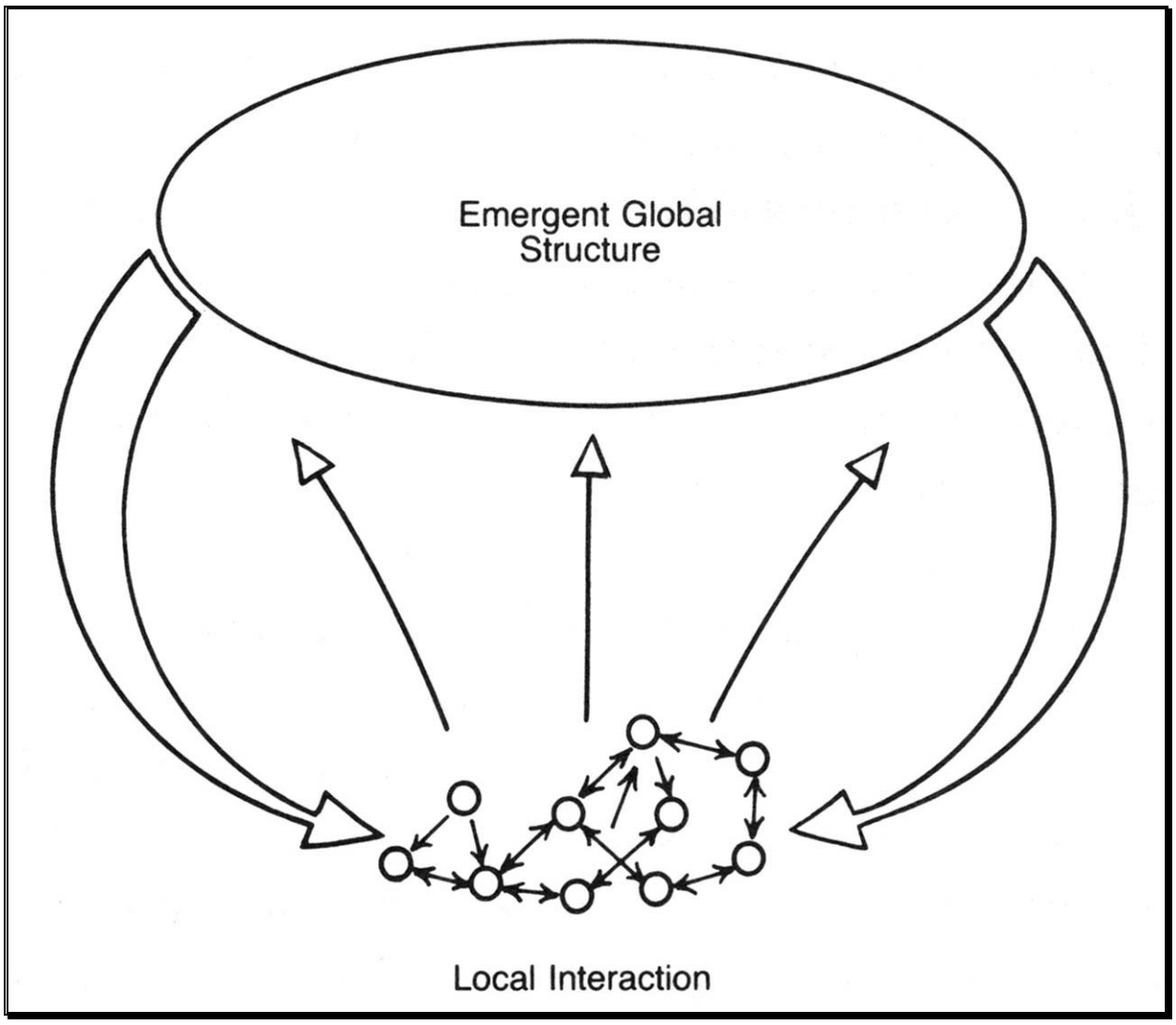

Figure 2.1 Feedback Mechanisms in Complexity Theory

The introduction of such theory to archaeology is at contrast with some earlier fundamental assumptions in the literature which has forcefully advocated the idea that behavior and the archaeological record is "organized" (e.g., Binford 1979), "regular", and "highly predictable" (e.g., Schiffer 1987:21). Nomothetic ideas of Complexity Theory are also at odds with postprocessual practices (e.g., Hodder 1986; Whitley 1998) which reject any unified approaches that reconcile heterogeneity of archaeological phenomena.

Mid-Atlantic Approaches

Since the 1970s, Native American archaeology in the Mid-Atlantic has typically been conducted under a processual framework, with cultural ecological anthropology at its center

(e.g., Gardner 1982, 1989; Custer 1989; Stewart 1980; Dent 1995:59-66). Mid-Atlantic archaeologists have tried to understand how humans adapted to a series of discrete ecological niches and natural resource types. The ecological-adaptive approach, based on changes in settlement and subsistence through time, is viewed as the most practical alternative. The culture ecology approach for the Delmarva is best illustrated in Gardner (1977) and his student's research, which sees sets of artifact assemblages as part of an adaptive response:

> The types of materials found in the archaeological record determine the ways in which archaeologists can study human behavior. Stone tools, house remains, living debris, and pottery fragments constitute the bulk of the archaeological record for the Delmarva Peninsula and, as a result, archaeologists have been best able to understand the technology and subsistence patterns of past groups. Plant food remains, pollen, and other data can also be used to reconstruct ancient environments. Consequently, many archaeologists are drawn to anthropological theories that focus on how human cultures adapt to their natural environments.

The adaptive approach was taken to its logical maximum, re-conceptualizing traditional temporal material trait taxonomies (based on material culture traits) to "adaptive" units (i.e., Paleoindian; Archaic; Early, Middle, and Late Woodland) which shared similar ecologically-induced cultural systems. As part of this approach, site types (e.g., macroband camps, microband camps, processing stations) were viewed as particular stations where groups coalesced in response to ecological conditions.

In the most modern and comprehensive evaluation of Chesapeake archaeology, Dent (1995) argued that a hybrid form of processualism and postprocessualism was sorely needed. In this vein, Dent argued that a more balanced approach to archaeology was desired, viewing people in the context of influences drawn from both their social and natural environment. In broad outline, from 12,000 to 5,000 years ago, the regional record is seen to operate more closely to the constraints and opportunities of the prevailing and influential natural environment. At about 4,200 years ago, with the intensified acceleration of wild resource procurement or the adoption of agriculture, an arena for social elaboration developed. Dent argues that social elaborations may be a consequence of sets of relations between people and the new ideas that sustained these relations. Societies began to actively transform and appropriate nature for its own ends, and societies of individuals created the conditions for the active transformation of their former ways of life through an invention of a new way of social reproduction. Following this line of argument, Dent argues the goal of archaeology is to isolate the artifacts that provide answers to how society initiated and maintained this new way of social reproduction. Therefore, in this view, Mid-Atlantic archaeologists have the opportunity to study the multitude of reasons for recorded changes in sites, landscape use, subsistence practices, mortuary ritual, and social and political systems.

Few Mid-Atlantic studies have incorporated a postprocessual perspective, although some regional studies stand out as exceptions to the dominant processual perspective (Dent 1995:10-16). In an analysis of Eastern Algonquian linguistic patterns, significant population disturbances in late prehistory were indicated, and considered the result of social relations in particular historic contexts (Luckenbach et al. 1982). The origin of the Powhatan chiefdom has been viewed as a consequence of human invention and agency (Haynes 1984), and studies of

Tidewater Virginia communities show the intricacies involved in social inequality and power variations between groups (Gallivan 1999; Hantman 1990). In a study of Potomac River ossuaries, communal burials were considered to be constructs of political and social forces within culture, and mortuary ritual is seen as reinforcement of group definition and negotiation of status, wealth, and power (Jirikowic 1990). Gender construction in the Powhatan worldview was found to be a part of a structured series of cultural oppositions (Williamson 1979) and study of Potomac Valley shell midden sites explored the role of women in subsistence, familial responsibilities, and technological byproducts (Klein 1999). In an analysis of trade and exchange in the Mid-Atlantic, certain artifacts and raw materials have been recognized to play important economic, symbolic and ritualistic roles, which are manipulated by individuals with different social and political standing in communities (Stewart 1989). In ceramic analysis, the role of symbolism and ritual are considered to be elements in pottery technology and to drive choices of tempering agents (Stewart 1998a, 1998b). Bead color choice has been related to aspects of cosmology and worldview, underscoring the role of certain individuals in the social group (Hamell 1983; Pietak 1999).

While these studies have incorporated elements of postprocessualism, no self-critical evaluations have been conducted apart from studies of historical archaeology of the Chesapeake (Leone et al. 1987). In this sense, the archaeology of marginalized groups, such as African Americans, may be of great utility to the conduct of Native American archaeology, since changes in approach and the display of material culture have emerged from such re-evaluations. Recently, exchanges between archaeologists and the Nanticoke Indian Tribe has resulted in discussion of the alternate perspectives about archaeology in Delaware (Clark 2000a; Petraglia 2000) and the social and political milieu of archaeology (Clark 2000b; Custer 2000a, 2000b).

OPERATIONALIZING HICKORY BLUFF: CONCEPTUAL FRAMEWORK AND RESEARCH STRATEGY

The level of dynamism in archaeology today may be disconcerting to those who have to navigate through the disparate views to constructively compose a useful site report. The Hickory Bluff excavations provide an opportunity to examine a site in the context of larger theoretical and methodological concerns. Therefore, the Hickory Bluff research strategy attempts to frame questions and explore possibilities about the past in a somewhat different fashion, examining what may and may not be feasible.

As indicated, the Hickory Bluff study takes place in the context of major disjunctures between theory and practice in archaeology today, with a result that theory and application sometimes appear unrelated. While our leading theorists do study particular *aspects* of material phenomena, they often do not provide concrete and comprehensive site evaluations. For example, Binford (1983a) has focused on faunal taphonomy and site structure almost exclusively; Schiffer (1987, 1995; Skibo and Schiffer 1995) constructs artifact life histories, correlates of ceramic technology, and behavioral narratives (e.g., the electric car); and Hodder (1999) examines highly particularistic artifacts and contexts. Since postprocessualism is a later entry into the archaeological mainstream, site interpretation is even more problematic as much of the theory has not been operationalized (Watson 1991) and while examples are emerging (Thomas 1991), there are serious problems in interpretation of contexts (Hodder 1999). Hence, while theorists show the utility of their favored approach, often in narrow perspective, there is

the need to apply these ideas in a more comprehensive manner. With respect to Mid-Atlantic archaeology, there is the dual problem of expanding the perspective away from a narrowly focused ecological-evolutionary perspective and application of this wider perspective in particular site situations.

Given these circumstances, Hickory Bluff is considered an experiment in examining relations between current theories and the interpretation of a single site. The main challenge is to examine how divergent theories can be operationalized on a site level and at various analytical levels. The Hickory Bluff investigations take place in a research environment where there is a lacunae in site-based publications which apply divergent perspectives in a coherent research strategy. The current approach is meant to be *one* demonstration of how the dominant processual paradigm may be applied and expanded in a CRM context of the Mid-Atlantic.

Chronological Units

Determination of temporal placement of occupations is critical to the organization of data, serving as a foundation for conducting additional analyses. Archaeologists working on Native American sites in Eastern North America have constructed culture history taxonomies based on changes in material traits over 11,000 years of documented history (e.g., Caldwell 1958; Griffin 1967; Stoltman 1978). Parallel with general changes in the Eastern Woodlands, Mid-Atlantic temporal sequences have been broadly established (Dent 1995). In recognition that artifact taxonomies were not entirely adequate to categorize cultures, an evolutionary sequence of human adaptation to the environment was proposed for the Delmarva, with breakdowns of chronological sub-periods and geographically separable cultural complex units (Figure 1.3) (Custer 1989, 1994). Regardless of orientation or nomenclature, the foundation for interpretation of Native American history rests heavily on the organization of material culture into temporal sequences and the accurate establishment of site occupation chronologies.

Delmarva temporal sequences have been established on the basis of projectile point styles (e.g., Broyles 1971; Coe 1964; Hranicky 1991; Gardner 1974; Ritchie 1971) and ceramic types (e.g., Artusy 1976; Griffith 1982; Griffith and Custer 1985; Wise 1975). Confidence in material culture as chronological indicators relies on analysis of site context, stratigraphy, associations, and correspondence with radiocarbon dates (Custer 1987a; Evans and Custer 1990; Petraglia and Knepper 1996). In addition to contextual concerns, problems have been raised about the reliability of points as temporal indicators. Recent excavations have provided evidence that various point types may be used at a single point in time and certain morphological types may be functional and not necessarily chronological (Custer and Bachman 1986; Rue and Bergman 1991). Delmarva point typologies have been revised to include various combinations of projectile point forms thought to be occurring at various frequencies at particular times (Custer 1994). Certain point types are considered to be temporally reliable as they co-occur with particular Woodland ceramic and radiocarbon dates (Custer and Silber 1995; Custer et al. 1995b). As a general rule, more confidence has been placed in ceramic typologies as chronological markers, although complications have been raised in establishing type sequences and geographic distributions (Stewart 1998a, 1998b).

Hickory Bluff Chronology

Chronological investigations at Hickory Bluff aimed to determine periods of site occupation. Chronological study entailed use of two methods for establishing temporal sequences: a) stylistic artifact analysis of projectile points and ceramics, and b) radiocarbon dating of stratigraphic levels, features, and ceramic sherd residues. The recovery of a large material data set provided the opportunity to examine the utility as well as the problems associated with chronologies based on stylistic criteria. The collection of radiocarbon samples provided a means to support and refine the temporal placement of established material culture traits by evaluating radiocarbon samples in light of projectile point and ceramic associations. In addition, the chronological data would be used to decipher the tempo of diachronic changes in site occupation and gain an overall understanding of the temporal placement of Hickory Bluff.

Paleoenvironments

Climatic and paleoenvironmental changes over the Late Pleistocene and Holocene have been examined in the context of Native American adaptations in the Eastern United States (e.g., Carbone 1976; Nicholas 1988). Investigators working in the Mid-Atlantic and in the Delmarva have shown how site contexts are correlated with paleoenvironments and ecological settings (e.g., Joyce 1988; Kellogg and Custer 1994; Kraft and John 1978; Thomas et al. 1975). Studies of environments have identified changes in geomorphologic landscapes and vegetative communities, and their impact on Native American groups. Particular emphasis has been placed on changes in alluvial systems, soil deposition, and aeolian erosion within the Delmarva Coastal Plain (e.g., Blume 1995; Curry and Custer 1982; Custer and Silber 1999; Custer and Watson 1985; Heite and Blume 1994; Petraglia et al. 1998a: 217-287; Ward and Bachman 1987).

Paleoenvironmental and climatic sequences have been established along the St. Jones River at the location of archaeological sites as a result of pollen and seed studies (Brush 1994; Pizzuto 1994 in Custer et al. 1995b; Daniels 1993). Changes have been recorded in estuarine wetland development including wet and dry climate intervals, and vegetative species and community variations. Archaeological research has indicated correspondence between site settlement intensity and maximum riverine resource productivity (Brush 1994; Pizzuto 1994 in Custer et al. 1995b). Coincident with brackish water and marsh development was an increase in Late Archaic to Middle Woodland occupation. Decrease in occupation after A.D. 900 occurred as the climate became moist and species diversity dropped. Contrary to expectations, no shifts in settlement along the St. Jones River were noted as the saltwater/freshwater interface on the St. Jones River moved upstream through time (Custer et al. 1995b).

Sedimentological characteristics are most useful in determining conditions of landform formation, while soil characteristics are most useful in determining conditions of postdepositional changes in landforms, both natural and cultural (Foss et al. 1995; Waters 1992). Important distinctions exist between sediments and soils: soils are pedogenically-modified sediments; sediments include unweathered and unconsolidated deposits (in this case, relic fluvial and near-shore sediments) and are not soils, even when derived from former eroded soils (Hassan 1978; Ferring 1986, 1992). Soils develop in sediments through processes of weathering (transformation, translocation, and removal of both physical and chemical components), and additions of new physical and chemical components (both geo- and biochemical) through

infusions of new sediment, organic matter, precipitation, and atmospheric gasses (Birkeland 1984; Holliday 1990).

The relative preservation of sedimentological and pedological characteristics is strongly influenced by the residence time a stratum is subjected to a near-surface environment. An actively aggrading landform environment favors preservation of sediment characteristics (including culturally deposited sediments). A relatively stable environment (with little net accumulation of sediment) favors increased pedogenic weathering and an increase in accumulation of anthropogenic debris, sometimes in a midden-like deposit. An actively degrading (or eroding) environment may include truncation of surfaces, selective erosion and displacement of both natural and anthropogenic sediments, and a general deflation of the stratigraphic record. These conditions often result in the development of a surface "lag" of archaeological material and destruction of all but deep features.

Particle-size differentiation is useful in determining characteristics of sediment deposition, including the environment of deposition and postdepositional changes attributable to soil transferals, biotic intrusions and cultural disturbances (Timpson and Foss 1993). In this study, all samples were subjected to particle-size analyses that included basic differentiation of sand, silt and clay fractions by hydrometer or pipette analysis. Select samples were subjected to sand and gravel fractionation by sieve analysis in an attempt to provide further differentiation of the nature of sediment deposition, particularly as these data may indicate possible eolian reworking of surface sediments, and provide some definition of processes responsible for basin-feature formation.

Geochemical analyses may indicate characteristics of constituent sediment, as well as changes to original sediments due to both pedogenic and cultural influences. Increasingly, geochemical characteristics are relied upon to provide indices of cultural modifications to archeological sites (Ahler 1973; Entwistle 1999; Middleton and Price 1996; Petraglia et al. 1998b; Proudfoot 1976; Sjoberg 1976; Stein 1992; Woods 1977). Beyond the base-level characteristics of the original sediment, chemical input is generally enhanced from the breakdown of introduced organic matter, much of which occurs naturally in a near-surface environment through the presence of a resident biotic community. Anthropogenic influences can intensify the additions of selective organic substances to a landscape, or discrete locations therein (such as hearths, storage basins, trash middens and burials). The introduction of plant and animal foodstuffs and waste, organic artifacts, building materials and wood ash can modify soil acidity (pH) and result in increased soil organic matter (OM) content. Organic matter weathers into its constitute elements. Most notably, these include phosphorus (P), potassium (K), magnesium (Mg), calcium (Ca) and strontium (Sr) and barium (Ba). At archeological sites, P enrichment is intensified by accumulation of animal material (i.e., bone, waste) (Monaghan and Schaetzl 1994). The amount and distribution of P and chemically similar elements (such as Ba, Ca and Sr) are deemed particularly important because of their association with bone and teeth (Burton and Price 1990; Fricke et al. 1995). Mollusks are high in strontium and calcium (Burton and Price 1999). Similarly, as wood, ash, or charcoal decay, they characteristically leave some of their principal elements such as K, Ca, and Mg as residuals in the soil (Kolb et al. 1990). Each of these chemical elements, however, interacts in the soil-weathering and plant-nutrient environment differently. Some are very mobile while others are relatively conservative. In particular, because of their chemical characteristics, K, Ca, and Mg are extremely mobile and

may quickly leach or be recycled from a near-surface environment. In contrast, some P compounds are relatively conservative and less readily transported. Additionally these elements are very reactive and easily adsorbed onto mineral surfaces. They are also readily absorbed into the interlattice of expandable clay minerals and are, thus, often associated with soil B-horizons. Thus, the background quantities of these elements, as well as their place in the soil environment, must be considered.

Macrobotanical remains from features have provided information on Mid-Atlantic ecological settings and dietary habits (McWeeney 1990; Moeller 1992). Charred materials are regularly recovered from feature fills in Delaware sites (Custer 1994). Valuable information has been extracted from sites such as Carey Farm, identifying climatic indicators such as hickory, butternut and acorn and the potential use of the materials as nut meat, oils, or as fuel in hearths (Custer et al. 1995b). Researchers have raised the problem of historic contamination, identifying uncharred and charred European seeds in prehistoric feature fills, reasoning that the charred component is problematic (Custer 1994). Contextual evaluations and radiocarbon dating of charred materials have been conducted to help alleviate reliability of archaeological samples (Petraglia et al. 1998a).

Hickory Bluff Environments

Various sources of information were examined in order to better understand the environmental context of the Hickory Bluff occupations. A variety of approaches were marshaled, including geoarchaeological investigations and natural resource studies, the latter including analyses of fauna and flora and documentation of historic changes in biotic communities.

Geoarchaeology. Investigations at Hickory Bluff aimed to examine the site relation to Delmarva paleoenvironments and the St. Jones River drainage history. The major goal of the geoarchaeological study was to place Hickory Bluff and its constituent matrices--sedimentological, pedological and cultural--into the framework of environmental and cultural changes occurring during the Late Pleistocene and Holocene. The study focused on landform developmental history and its articulation with human occupation. Occupations at Hickory Bluff occurred in an area that exhibited unique natural history characteristics, including resources such as gravels for stone tool manufacture. Emphasis was directed towards understanding burial and postdepositional processes from natural and cultural inputs. Sedimentological, pedological, and geochemical studies were conducted to examine soil weathering, aeolian deposition, feature formation, and spatial patterns in deposits.

Within the Hickory Bluff landform, a series of profile and feature exposures were examined, described, sampled and analyzed. Characteristics were identified pertinent to the disposition, content and context of the archaeological site within the overall landform.

Sediment and soil characteristics within the landform were recorded for a series of profile exposures. These characteristics included observations of lithology (texture) of each distinct stratum as well as bedding, sorting, and the contacts (boundaries) between strata. Elevation differences were measured as depths below the ground surface at each individual exposure: each exposure was also measured in relation to a site datum. Postdepositional weathering and soil

formation characteristics were recorded following standard soil descriptive terminology developed by the United States Department of Agriculture, Soil Conservation Service (USDA-SCS 1974b). These characteristics include descriptions of texture, color, mottling, structure, consistency, inclusions, intrusions, and transferals. Soil horizon nomenclature follows Birkeland (1984:7), and the U.S. Department of Agriculture Soil Survey Manual (USDA-SCS 1993). Soil-horizon designations represent modern conditions.

Natural Resources. Natural resource settings and the potential Native American subsistence base were explored through a diverse array of independent data sets, including a macrobotanical study, faunal analysis, residue analysis on ceramic sherds and scrapers, a floral study of the modern tree community, and archival investigations of the historic setting.

Macrobotanical information was retrieved from features with an aim to examine the environment and Native American subsistence. Flotation samples from basins and thermally altered stone (TAS) concentrations were expected to yield different types of species information and variable densities of charred material of potential use for examining feature integrity and disturbance. The potential reliability of the charred botanical information was further examined through radiocarbon dating.

Ancillary information on environments and subsistence was obtained by conducting analyses of calcined bone and organics on ceramics and stone tools. Although only a small number of small calcined bone fragments (1 gm or less) was found in features and in the deposit, they had the ability to yield information on the potential animals on site. Residue analyses on two ceramic sherds and protein residue analysis on fifty selected scrapers also had the possibility of providing information on animals and plants in the region contemporaneous with site occupation.

A study of the modern tree community at Hickory Bluff was undertaken to identify on-site species and define potential ecozone differences. Since the tree community had historic continuity (e.g., oak and hickory), a study of the variation in tree species was considered potentially valuable for providing insights into older settings. Historic land use was examined to document the level and magnitude of changes in the terrestrial and riverine resources and to examine the influence of these changes on site preservation. Among the changes that were thought to have an impact on the site during the nineteenth and twentieth centuries were agricultural plowing, deforestation, tree orchard plantings, and water channel cutting of the St. Jones River by the U.S. Army Corps of Engineers (USACE).

Stone Artifact Assemblages

Stone artifact assemblages are a plentiful source of behaviorally significant information (e.g., Carr 1994; Henry and Odell 1989; Odell 1996). In the Eastern United States, archaeologists typically recover and describe multiple classes of stone tool types, including chipped stone and ground-, battered- and pecked-stone. The variability of artifact forms and frequencies in these major artifact categories has been used to construct sub-periods in prehistory and to understand activity variation. To understand stone tool technology and related behaviors, archaeologists in the Mid-Atlantic have investigated stone tool procurement, manufacture,

reduction techniques, and use (e.g., Carr 1986; Custer and Silber 1992; Ebright 1987; Geier 1990; Hatch 1994; Kimball 1994; Petraglia 1994; Petraglia et al. 1996).

Delmarva stone tool assemblages and their attributes (e.g., raw material type and form, cortical percentages) have provided information on technology, site activity, and settlement behaviors (Custer 1989, 1994). Delaware sites contain variable mixtures of materials directly procured from Piedmont quarries and evidence for significant exploitation of Columbia Formation (Fm.) gravels (Custer 1994; Custer and Silber 1995; LeeDecker et al. 1996; Petraglia et al. 1998a; Watson and Riley 1993). Indicative of the importance of local procurement and manufacture from gravel sources, the Carey Farm site contains one of the highest cortical percentages of raw materials for Delaware (Custer et al. 1995b). In contrast, sites such as the St. Jones Adena, contain raw materials from as far away as the Ohio Valley. Delmarva mobility and territorial models have been constructed on the basis of analysis of differential use of material through direct quarry source procurement versus local extraction of secondary gravels.

Hickory Bluff Stone Artifacts

The Hickory Bluff stone artifact assemblages were examined in detail to describe what was present on site and to understand the types of activities occurring on site. Artifact types and raw materials were examined for information on technology, functions, and procurement patterns.

Artifact Classes. Stone tool attribute analysis and typology were undertaken on all stone artifacts. Analysis of chipped and non-chipped stone artifact types and frequencies can provide information on activities occurring at Hickory Bluff. Selected attributes and measurements of tools (e.g., projectile points, unifaces, battered and pitted stone) were undertaken to describe morphological variability. Certain special artifact types (e.g., gorgets and ulu) were described in detail since they are rare types and provide insights into manufacture and personal adornment.

Projectile Points. Projectile points formed a relatively large class of items at Hickory Bluff compared to many other Delaware sites (n=298). The projectile points were classified according to traditional typologies of Delaware and the Mid-Atlantic. Various measurements were taken on the points to more precisely define their morphology and to test the reliability of traditional typologies. The large corpus of point data allowed for the analysis of conventions in stone tool manufacture and the relative influence of physical properties (i.e., raw material type, size, and form) and rejuvenation behavior.

Unifaces. Since a relatively large number of unifaces were recovered (n=48), analysis of their attributes and use wear was undertaken to provide information on use and function. As unifaces were presumably heavily utilized, use residue was more likely to be preserved. A study of micro-flaking patterns and analysis of use wear (i.e., striations, scratches and polishes) resulting from use against animals and plants was implemented. The wear patterns would potentially indicate how the unifaces were used in activities and how they functioned in a subsistence context.

Non-Chipped Stone. The non-chipped stone tool class comprised battered, pecked, and ground artifacts (n=126). The non-chipped stone tools were classified, measured and described,

and analyses of the type and frequency of wear on the objects were conducted. Since relatively few studies have been conducted on this class of items in Delaware sites, detailed attribute analysis and use wear patterns were considered of potential use in understanding activity and behavior.

Raw Materials. The stone assemblage consisted of a variety of raw materials, providing information on technology and use. A mineralogy study of projectile points, bifaces and unifaces was initiated to identify material sources. Analysis of raw materials was considered critical; the nearby Carey Farm site showed a high reliance on local gravels and Hickory Bluff artifacts were considered to be from far distant quarries (i.e., Hunter Research hypothesized that some cherts were derived from Ohio). Since the Columbia Fm. gravels have been considered a potentially important raw material source for Delaware peoples, a field gravel characterization study was initiated to examine procurement and selective preference for local clasts. Comparison of on-site gravels and Hickory Bluff artifacts was considered important in assessing the availability of raw materials, raw material procurement patterns, and the potential for manufacturing certain morphological tool types and styles. Fieldwork indicated that Columbia pebbles and cobbles were tested and reduced on-site, and the small flake and cores potentially manufactured into specific tool types (e.g., unifaces, bifaces, and projectile points).

Ceramic Assemblages

Ceramics play an important role in understanding technology, function, artistic expression, and social relations (e.g., Braun 1983; Rice 1987; Sassaman 1993). The adoption and integration of ceramic technology is considered one of the most important innovations in Eastern Woodlands history (e.g., Custer 1987a; Egloff and Potter 1982; Sassaman 1993; Stewart 1982, 1998a). Although broad typologies have been created for Eastern Woodland pottery, more recent and detailed analysis of ceramic assemblages have revealed a large degree of variability in manufacturing techniques, shape, size, temper, surface treatments, and decoration (Chilton 1996, 1998; Goodby 1998; Stewart 1998a). While few regional applications of ceramic residue studies have been prepared, organic materials derived from vessel walls have provided some clues as to function (Fie et al. 1990).

Archaeologists working in Delaware have established a general ceramic typology and sequence (e.g., Artusy 1976; Custer 1989; Griffith 1982; Griffith and Custer 1985; Wise 1975), although classificatory issues have been raised (Custer 1987a). The Delaware ceramic types are both consistent with general typologies established for the Mid-Atlantic (e.g., Marcey Creek) as well as locally restricted on the basis of particular attributes (e.g., Coulbourn and Minguannan). While the ceramic types are generally employed, few studies have examined inter- and intra-regional variations in the introduction of certain traits (Stewart 1998a, 1998b). Variation is certainly expressed in early ceramic wares (Wise 1975), and at sites such as Snapp, Marcey Creek and Dames Quarter wares show much variability in tempers, shapes, and construction methods (Custer and Silber 1995).

Ceramic assemblages have been recovered at the Carey Farm site on the St. Jones River. The ceramic assemblages at that site were dominated by the Middle Woodland Mockley and Hell Island types (Custer et al. 1995b). The Carey Farm vessels had a low incidence of sooting and a large container volume compared to other assemblages, and were thought to function as storage

vessels rather than cooking vessels. Net impressions on Carey Farm vessels suggested the potential importance of fish and fowl procurement in subsistence economies. Cordage twist variations have been seen between ceramics produced during Early and Middle Woodland time periods, perhaps signaling differences in function, gender, or ethnicity.

Hickory Bluff Ceramics

A large number and wide variety of ceramic sherds were recovered from Hickory Bluff, including types associated with the entire Woodland sequence. The numerically large and diverse data set (n=7,635) provided an unprecedented opportunity to examine Native American ceramic technology, domestic activity, and social relations. A major goal of the study was to characterize the assemblage and compare it to others in Delaware and the Mid-Atlantic, establishing the comparative utility of the temporal and stylistic framework. Since several sherds displayed charred residue on their interiors, samples also were submitted for radiocarbon dating and residue analysis.

A number of attributes were recorded for each sherd, including thickness, temper, interior and exterior surface treatment, and presence of smudging. Manufacturing methods (e.g., slab, coil) were noted when possible. Particular unique features were recorded (e.g., fingerprints, botanical impressions, and breakage patterns). The ceramic assemblage was divided into minimum vessel lots, and detailed attributes were recorded, including paste, color, surface treatment, decoration, and form (lip, rim and base/body). Spatial distribution studies were conducted to examine the distribution of ceramic lots.

The Hickory Bluff ceramic data set was examined to identify and refine potential variations within established regional ceramic types. A sample of representative sherds from major types were thin-sectioned to characterize major and minor differences in composition and paste. The ceramic thin sections were compared against natural clay samples taken from two sources (i.e., Puncheon Run and Blackbird Creek). The goal of this analysis was to determine if ceramics were locally manufactured on the Delmarva or if they were made in the Piedmont. Thin sections of clay tempered sherds were taken to address the question of whether the clay pellet inclusions were unfired, dried clay that was incorporated into a more plastic clay during processing, or fragments of previously fired clay (or grog) sherds that were crushed and added as temper.

Site Formation Processes

The holistic concept of “site formation” provides the framework for investigating the multitude of processes which create archaeological sites (Schiffer 1976, 1987). A suite of cultural and natural processes are responsible for the arrangement of material remains in deposits (e.g., Goldberg et al. 1993; Nash and Petraglia 1987; Schiffer 1987; Waters 1992). Spatial research and pattern recognition studies are employed to characterize the feature and artifact context, and aid in the interpretation of human space use and post-occupation alterations by human and natural agents (Binford 1983b; Kent 1987; Kroll and Price 1991; Wandsnider 1996). Mid-Atlantic archaeologists have begun to explicitly consider and take account of site formation processes (Blume 1995; Petraglia et al. 1998a; Petraglia 2000).

Feature Formation

"Structural features," or constructs that are readily observable in excavated context (Leroi-Gourhan 1972), provide valuable cultural information. Eastern Woodland features and their contents provide detailed information about paleoecology and subsistence (Moeller 1992). Analysis of the physical structure of features (i.e., size and shape) and their layout can yield information related to life history functions and settlement histories (Hatch and Stevenson 1980; Knepper and Petraglia 1994; Petraglia et al. 1998b; Petraglia and Knepper 2001; Snyder and Fehr 1984; M. Stewart 1977; Stewart 1988).

General typologies have been created for the diverse array of features recorded at sites in Delaware (e.g., Custer 1994; Thomas 1981). Feature types may include basins of various morphology and shape, clustered or dispersed TAS clusters, or caches of material remains. A controversy has developed in Delaware concerning the interpretation of large "basin" features. Some analysts have interpreted large basins to be "pithouses" or architectural components of pithouses (e.g., basement and sub-basement storage pits) (Figure 2.2).

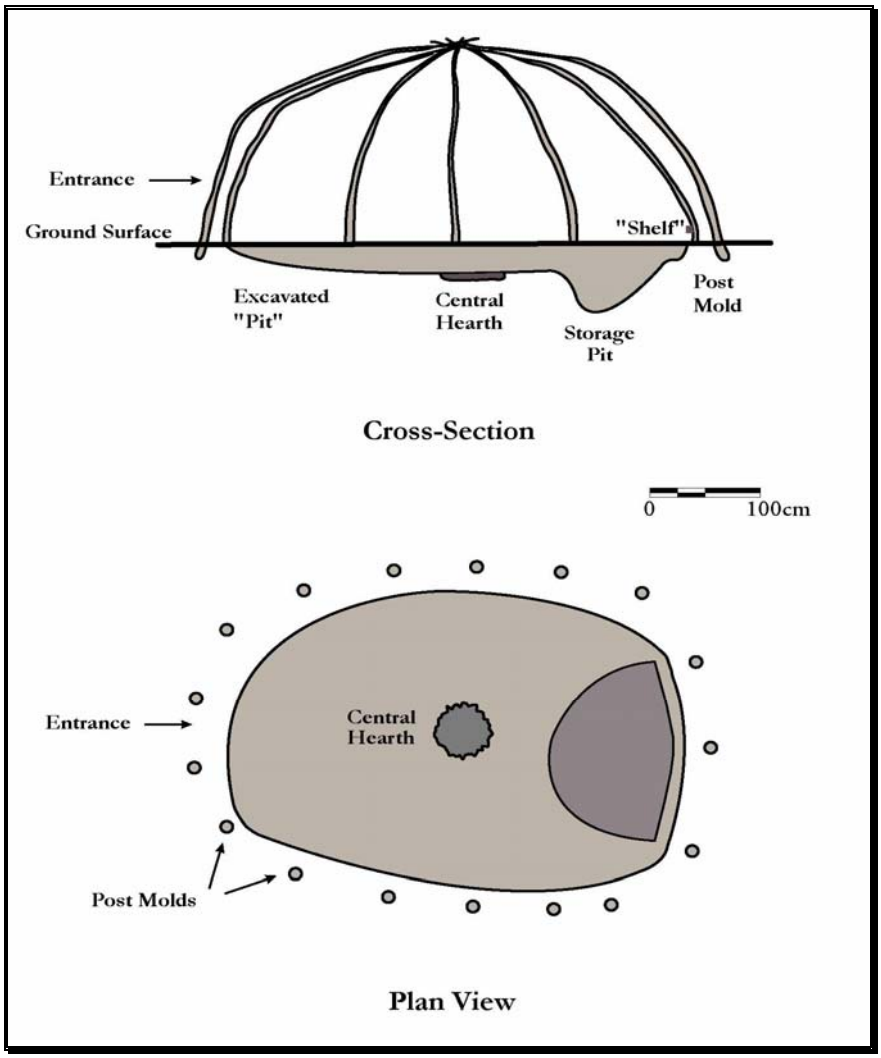

Figure 2.2 Woodland Pithouse Model (Custer 1994: Figure 30**)**

Based on the earlier identification of "semi-subterranean dwellings" (Artusy and Griffith 1975), pithouses were subsequently identified at numerous sites including Clyde Farm (Custer et al. 1985), the Hockessin Valley Site (Custer and Hodny 1989), the Snapp site (Custer and Silber 1995), Pollack (Custer et al. 1994), Leipsic (Custer et al. 1996), Wrangle Hill (Custer et al. 1995a), Carey Farm, and Island Farm (Custer et al. 1995b). A detailed model was proposed regarding the structure and layout of pithouses, the functional use of interior and exterior features, the taphonomy of pithouses as they degrade and are altered by plowing, and the organization of familial units who used them (Custer 1994) (Figure 2.3). At several sites, such as at the Snapp site, community patterns consisting of pithouses, storage and refuse pits, and possible sweat lodges were reconstructed (Custer and Silber 1995) (Figure 2.4). While the original proponents of the pithouse model identified certain features as "non-cultural" and "tree-related," some argued that "pithouse" attributions could be mistaken for tree throws (Mueller and Cavallo 1995; Mueller et al. 1996, 1997; Thomas and Payne 1981). In the Lums Pond excavation, a series of silo-like basin features were interpreted to be contemporaneous storage features that were secondarily infilled, and one large basin was interpreted to be natural in origin based on various lines of evidence including dating, material culture associations, and geochemistry (Petraglia et al. 1998a).

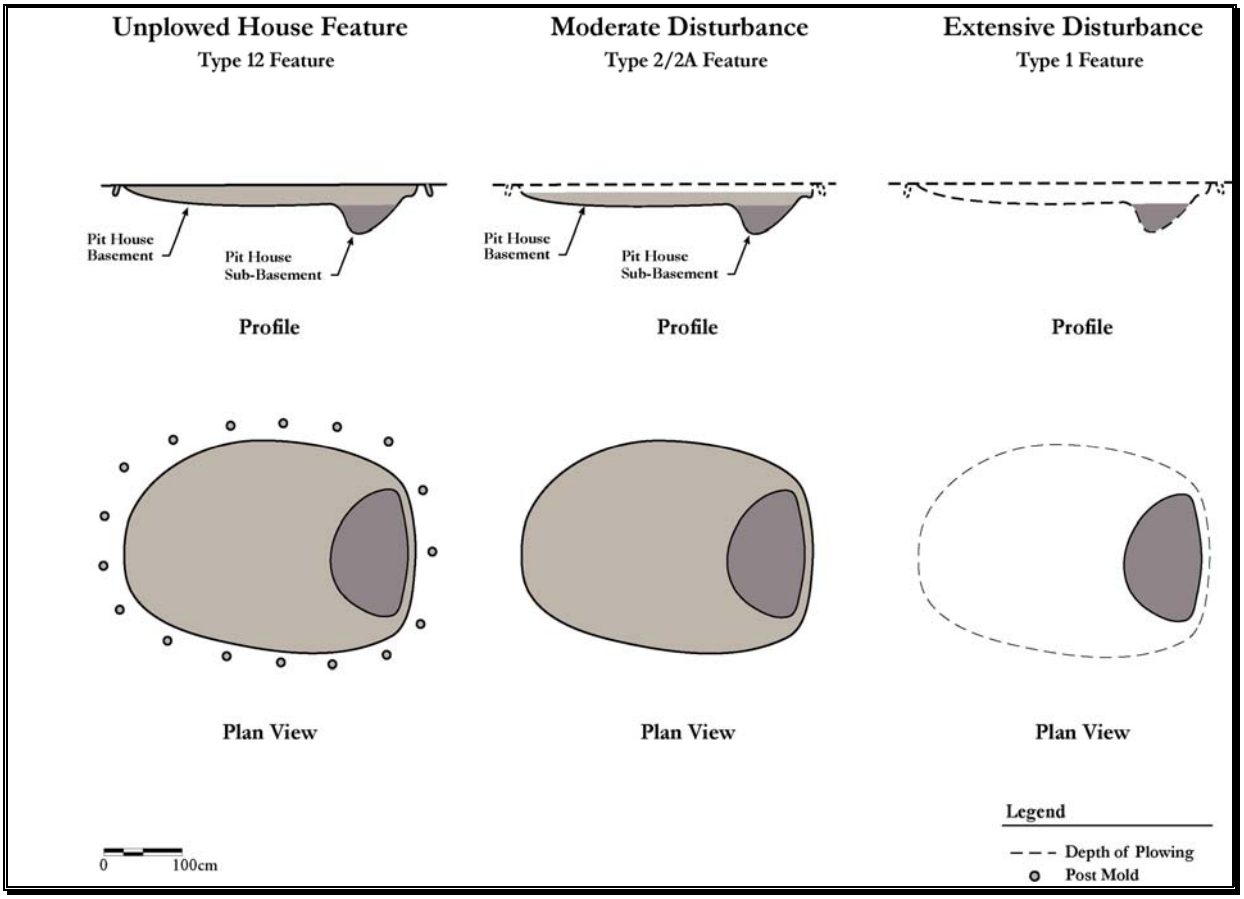

Figure 2.3 Taphonomy of Pithouse Features (Custer 1994: Figure 30**)**

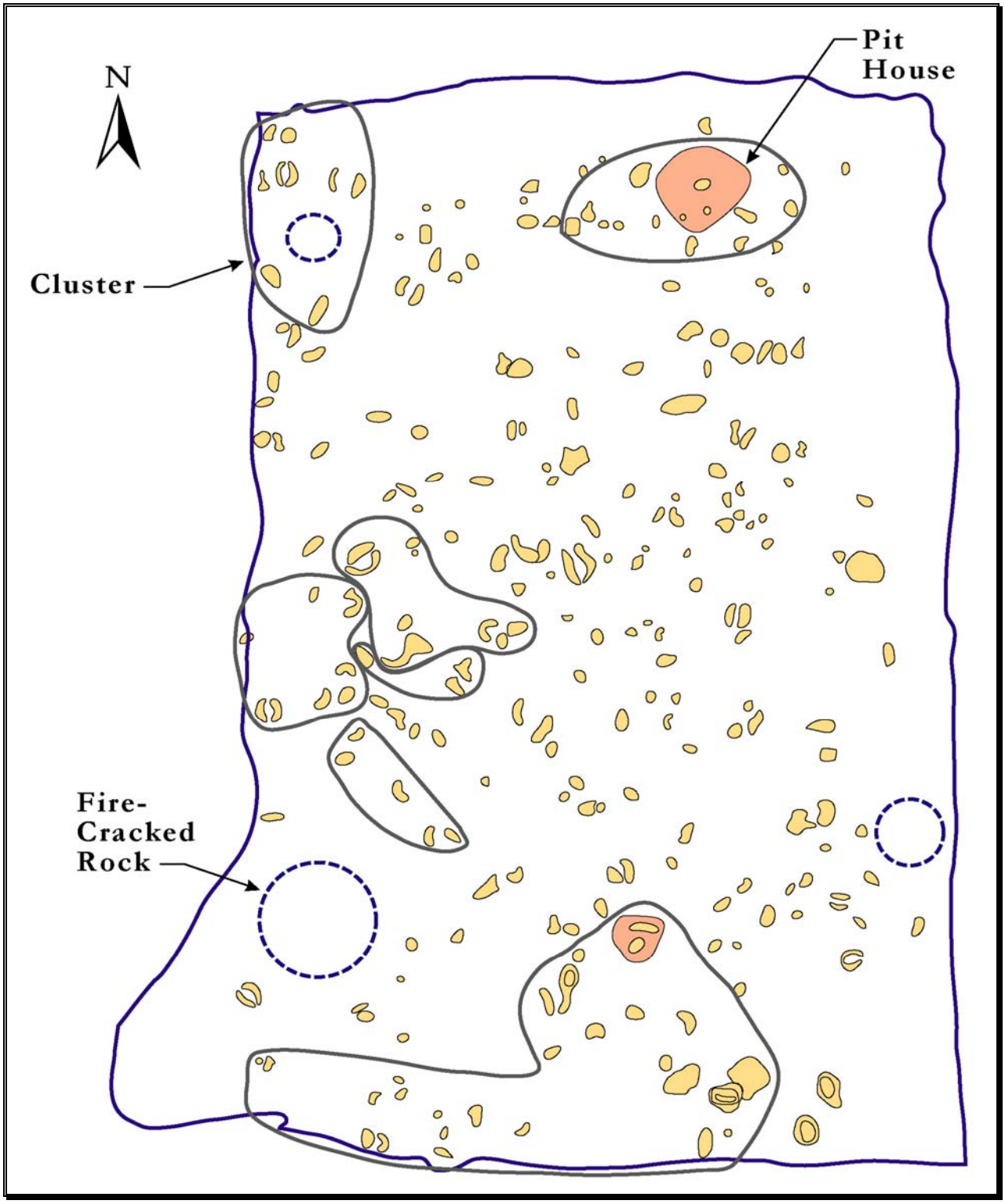

Figure 2.4 Distribution of Features at the Snapp Site (Custer 1994: Figure 38**)**

More recently, basin features have been interpreted as the result of burial practices, sweatlodges, coming of age, menses, and birthing locations (Charlie Clark, personal communication 1998; Clark 2000c). This interpretation is based on ethnohistoric and oral history accounts of the Nanticoke Skeleton Dance, as well as observed Powhatan practices. While secondary burials are noted in archaeological contexts in Delaware, the original facility for temporary burial deposition has not been identified. The original and temporary burial facilities may consist of above-ground structures, abandoned pits, or ethnohistorically recorded charnel houses (Potter 1993; Thomas 1987). Some basin features may represent temporary burial facilities. Archaeological research on Woodland groups inhabiting Delaware have in fact shown some degree of variability in the treatment of human remains (e.g., Thomas 1987). As examples of this variability, a number of individuals were placed in the St. Jones Adena site and accompanied by elaborate accoutrements (Thomas 1987); flexed skeletal remains with few grave offerings were placed in burial pits at the Island Field cemetery (Custer et al. 1990; Thomas 1987); and a single flexed burial in a pit was identified at Carey Farm (Custer et al. 1995b).

Features with varying arrangements and densities of "fire-cracked rock" (FCR) are an important source of functional data (e.g., Barfield and Hodder 1987; Hester 1991; McDowell-Loudan 1983). Fire-cracked rock features are common in the Eastern United States, and are often interpreted as "hearths" or remnants of "boiling" activities (e.g., Kinsey 1972; Ritchie and Funk 1973). Research on features with fire-cracked rock indicate much variability in the size and density of both the rock and the features (e.g., Cavallo 1984; Hatch and Stevenson 1980; Knepper and Petraglia 1994; Pagoulatos 1992; M. Stewart 1977). As a result, traditional descriptive and interpretive categories overshadow much variability in feature formation and use history. Rigorous archaeological analysis is warranted given that thermally altered stone (TAS) is plentiful and the morphologies and distributions of features with TAS provide key functional information (Petraglia and Knepper 2001). The formation of TAS features needs to be examined in detail, using tabulations of the number, size, raw material type, and degree of fracture of TAS (Petraglia et al. 1998a). Variations in size, shape and overall content of the larger feature may then be defined.

Another category of features, albeit rare in Native American sites, are caches. Stone tool caches are usually interpreted to contain collections of items that have technological or economic utility, but which due to transport costs, are stored and placed in anticipation of future use. Caches are more common in Woodland sites than in Archaic sites on the Delmarva. Biface caches have been found at several sites including the Bailey Site (Custer et al. 1986), the Kiunk Ditch Site (Omwake 1955), Barkers Landing (Custer 1984c), and Carey Farm (Custer et al. 1995b).

Feature Formation at Hickory Bluff

A large number and variety of features were encountered at Hickory Bluff (n=331). Given the difficulty in obtaining information on feature size and contents from reports of previous site investigations in Delaware, project goals for the Hickory Bluff investigation included reporting all available information for individual features of all types (artifact concentrations, basins, surface anomalies, biotic patterns, geomorphic features, and natural discontinuities), and construction of a general typology that would take account of variations in materials and morphology and consider the influence of major cultural and natural processes.

Basin features were of particular interest, as previous work at Hickory Bluff identified all basin features as pithouses (Liebekneckt et al. 1997). Given this background, the issue of basin formation and interpretation was tackled as comprehensively as possible and consisted of a study of basin morphology and content, geoarchaeological analysis, and actualistic studies (i.e., subsurface tree morphology study, experimental feature degradation study). Basin attribute studies included measurement and recordation of size, material contents (artifacts, ecofacts), radiocarbon ages and three dimensional shape followed by analysis of the range of variation represented within each attribute. Geoarchaeological investigation incorporated pedological, sedimentological, and geochemical analyses of samples collected from basin features and natural stratigraphic contexts.

Modern tree excavation and basin degradation studies were initiated in the field to provide better understanding of formation processes and to obtain information for modeling on-site conditions. The modern tree study consisted of the excavation of observable tree rots and tree throws. The study was conducted since archaeologists have related basin features to tree activity and yet no formal studies of such activity have been undertaken on the Delmarva. The basin degradation study was initiated to improve our understanding about the preservation of basin features. A total of eight basin features (four types) were constructed to replicate archaeological types. The basin degradation study examined the relationship between feature morphology, degradation, natural interactions (i.e., fauna, flora, and climatic), and tempo and mode of infilling.

Common throughout Hickory Bluff were clusters of TAS, consisting of fractured (i.e., "fire-cracked") and unfractured (i.e., discolored and crazed) rock. The analysis of TAS features aimed to examine variable behaviors. Fractured and unfractured stones from a sample of TAS features were measured in detail. Measurements and observations were taken including rock size, weight, raw material, degree of reddening, potlidding, crazing, and percent of completeness. The data was considered useful for discriminating differences in primary functions (e.g., direct heat over a number of hours and indirect heating/boiling) and secondary functions (e.g., re-use and mixed dumping).

Activity and Spatial Distributions

While analysts have considered co-occurring artifact sets as a proxy to behavioral activities, the interpretation of artifacts found in archaeological context is not a straightforward exercise, as many processes lead to the creation of spatial patterns. Researchers have pointed out that artifacts recovered in archaeological context may be the product of different use life histories (Schiffer 1976, 1987), but all are the patterned "fall out" from the operation of complex behavioral operations (Binford 1981, 1982). Archaeological sites may be examined as spatial occurrences across landscapes (e.g., Rossignol and Wandsnider 1992). Ethnoarchaeological observations of aboriginal peoples have indicated the need to examine broad areas to understand contemporaneous settlement organization and site structure (Binford 1982; O'Connell 1987). Spatial studies show that archaeological sites are the product of short term, episodic events that are sometimes discretely preserved. Re-use behaviors are also preserved within features or on surfaces (e.g., Cahen et al. 1979; Camilli 1988; Wandsnider 1996). In considering the interpretation of spatial patterns, investigators have also pointed to the fact that natural processes have an effect on the spatial arrangement of materials (e.g., Butzer 1982; Goldberg et al. 1993).

A variety of methods have been developed for examining spatial patterns (e.g., Kroll and Price 1991; Rossignol and Wandsnider 1992). Computer programs such as SURFER® and Geographic Information Systems (GIS) (e.g., ArcView) are powerful methods to examine the relations and distribution among features and various artifact classes. Computer contours help to identify "latent" features, those that are not readily apparent in the field, but nevertheless represent clustering of material remains (Leroi-Gourhan 1972; Petraglia and Knepper 2001).

Mid-Atlantic archaeological sites have traditionally been considered on the basis of gross patterns in single component and multicomponent assemblages (Dent 1995). Categories of sites in Delaware have been developed based on varying site sizes and content, and include macroband base camps, microband base camps, and procurement sites (Custer 1989, 1994). Recently, however, spatially broad excavation at the Snapp site led to the realization that the microband/macroband typology was problematic when site size and artifact density were viewed as products of repeated site use (Custer and Silber 1995). Distributional studies have been conducted to define activity areas (e.g., Custer and Watson 1985; Stewart 1986) and spatial patterns have been related to settlement intensity, re-use, site burial, and postdepositional processes (Blume 1995; Petraglia et al. 1998a).

Activity and Spatial Distributions at Hickory Bluff

Broad lateral block unit excavations at Hickory Bluff provided an unparalleled opportunity to examine site layout and structure both in the field and through examination of archaeological distributions of features and artifacts through computerized spatial analysis using GIS and SURFER® software. Mapping of artifact clusters, artifact refits (e.g., fire-cracked rock and ceramics), structural features, and latent features was employed. Spatial plotting was used to assess the behavioral resolution of activity areas and the relative influence of cultural and natural factors in forming spatial patterns.

Hickory Bluff provided an opportunity to test short and long term accumulations and the formation of archaeological surfaces. In some places, it was possible that patterns represented discrete features, allowing for the examination of site occupation episodes in both feature formation and community patterning (i.e., relations between features and artifacts over space). The identification and analysis of activity areas within the site was potentially important to understanding task specific behaviors. In contrast, it was probable that significant components of Hickory Bluff represented repeated accumulations in the same areas. The topic of repeated behaviors could be investigated in artifact formation (e.g., ceramic recycling and biface rejuvenation), artifact dispersion (e.g., ceramic cross mend distance), and feature reuse (multiple use features). Repetition in site use potentially created patterns of interest in understanding long term behavioral processes.

Spatial analysis from the excavation of broad areas allowed for a test of the site typology concept used in the Mid-Atlantic and Delaware literature. Specifically, the Hickory Bluff data set provided for analysis of how spatial patterns are formed, and how the site conformed with the "macroband base camp" or "microband base camp" types. Hickory Bluff was examined to determine if the site assemblage represented the coalescence of large groups of people at particular occupation stages or if it represented the horizontal accumulation of repeated activities through time, or both.

Societal Patterns

Socio-Cultural Process

The 6,000 year long period known as the Late Archaic to Late Woodland of Eastern North America is marked by substantial changes in social, political, and economic patterns (e.g., Brose and Greber 1979). Most socio-cultural models of change occur in the context of the evolutionary relationships between environmental alterations, population growth, and increased social ranking. The organization of Late Archaic to Late Woodland societies of the Mid-Atlantic has been examined from the perspective of evolutionary change (e.g., Custer 1986, 1989; Dent 1995; Gardner 1982; Reinhart and Hodges 1991, 1992). While certain periods witness broad similarities in material culture and societal developments, archaeologists recognize that regional and local differences in subsistence, social organization, ceremonialism, interaction networks, and local experiments in managing people, goods, and ideas occurred (e.g., Stewart 1992).

Like cultures in many other regions, Delmarva cultures of the Late Archaic to Late Woodland underwent great changes in societal institutions; these changes are usually explained in an ecological framework (Custer 1984a, 1989; Gardner 1982). The Late Archaic on the Delmarva Peninsula is marked by changes from earlier, more mobile societies, to increased sedentism and intensification of regional resource use (Custer 1988, 1994; Gardner 1982). Shifts include changes in material culture (an increase array and diversity of tool types), and increased population densities and sedentism along major rivers and estuaries. Subsistence is focused towards certain resources and incorporation of storage of foodstuffs. Local groups specialized in the production and distribution of resources, while territorial access to critical resources reinforced socio-political mechanisms to allow transfer materials beyond the source area. Trade and exchange of various raw materials and goods developed more formally, attesting to inter-group interactions and more elaborate social organizations.

The Early Woodland is marked by further sedentism and more developed social and political organizations. It is during the Early Woodland that the Delmarva Adena Complex flourishes (ca. 500 B.C. to A.D. 0), a 500-year period associated with a presumed “ranked” social organization (Ford 1976; Jones 1965; Thomas 1970, 1976). Examination of the Delmarva Adena Complex is of interest as it is geographically situated on the outer boundary of the Adena core areas of Ohio, northern Kentucky, and western West Virginia (Dragoo 1963; Tuck 1978; Webb and Baby 1957; Webb and Snow 1945). The Adena presence in outlying areas was originally considered an eastward migration of people (Ritchie and Dragoo 1960); however, this idea has been criticized (Grayson 1970; Griffin 1961) in favor of the view that the Delmarva Adena represents a local manifestation that grew out of an intensification of Late Archaic mortuary ceremonialism and trade and exchange networks (Thomas 1976).

Regardless of its origins, Delmarva Adena interments in the St. Jones Adena site (Figure 2.5) and the Frederica Adena site show that certain individuals may have attained special status, as exemplified by burial accoutrements such as exquisite bifaces, gorgets, pendants, paint cups, copper artifacts, and tubular pipes. The burials and caches of exotic bifaces have been related to extensive trade and exchange systems, and contact with Adena sites located as far distant as the Ohio Valley (Figure 2.6).

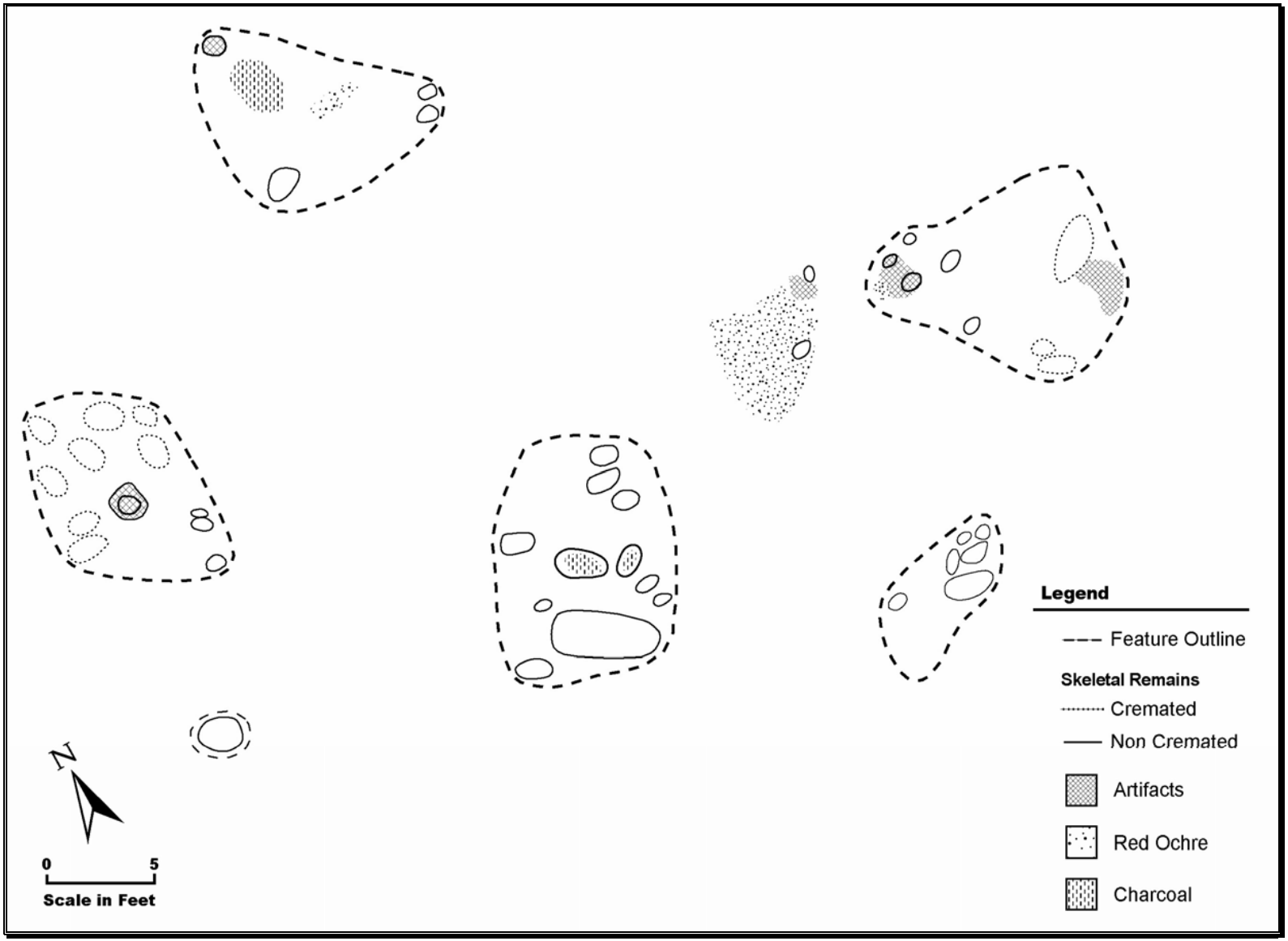

Figure 2.5 St. Jones Adena site Showing Burial Loci (Thomas 1976: Figure 2**)**

The Delmarva Adena is therefore a prominent example of long distance artifact distribution in the prehistory of the Mid-Atlantic region, with evidence to suggest that exchanges were made between groups in the Mid-Atlantic, the Midwest, and the Northeast (Stewart 1989). Models have incorporated a hierarchy of site complexity and mortuary centers, variation in ascribed status based on differential grave treatments and goods, and rudimentary "Big Man" social organization (Custer 1987b; Dent 1995; Gardner 1982; Stewart 1989). Idiosyncratic geographic relationships and rarity of material goods argues against a formal specialization in production centers, although trade and exchange relations may be tied to maintaining social alliances and ritual ties (Custer 1989; Stewart 1989, 1992). The relationship of the Delmarva Adena with long-lived cultures of the Virginia Coastal Plain and the West Virginia Stone Burial Mound Complex is not well understood (Custer 1989; Gardner 1982; MacCord 1985a; Stewart 1992).

Figure 2.6 Biface Cache Blades, St. Jones Adena Site

A Delmarva territorial model for the Late Archaic and Early Woodland (Woodland I) has been proposed (Custer 1994). Material culture variations on the Delmarva during this period are thought to represent differences in the social systems of the Clyde Farm Complex and the Barker's Landing Complex (Custer and Silber 1995; Watson and Custer 1990) (Figure 2.7). The Barker's Landing Complex of central and lower Delmarva was considered to be part of an organized trade and exchange network that acquired materials from New Jersey, central Delaware and eastern Maryland (Custer 1989). However, in a recent reconsideration of this model, acquisition of raw materials through mobility was considered a more compelling argument over trade and exchange, with rhyolite being obtained from western Maryland and argillite from the Middle Delaware Valley as part of seasonal rounds, and caches of material were placed in anticipation of future needs (Custer 1994). Regardless of whether obtained through trade or exchange or mobility, Barker's Landing sites of central and lower Delmarva are considered distinct from Clyde Farm sites of northern Delaware (Custer 1994). The Lums Pond jasper characterization study lent support for the Clyde Farm model, showing material was acquired from northern Delaware, eastern Maryland, and Pennsylvania (Petraglia et al. 1998a: 185-187).

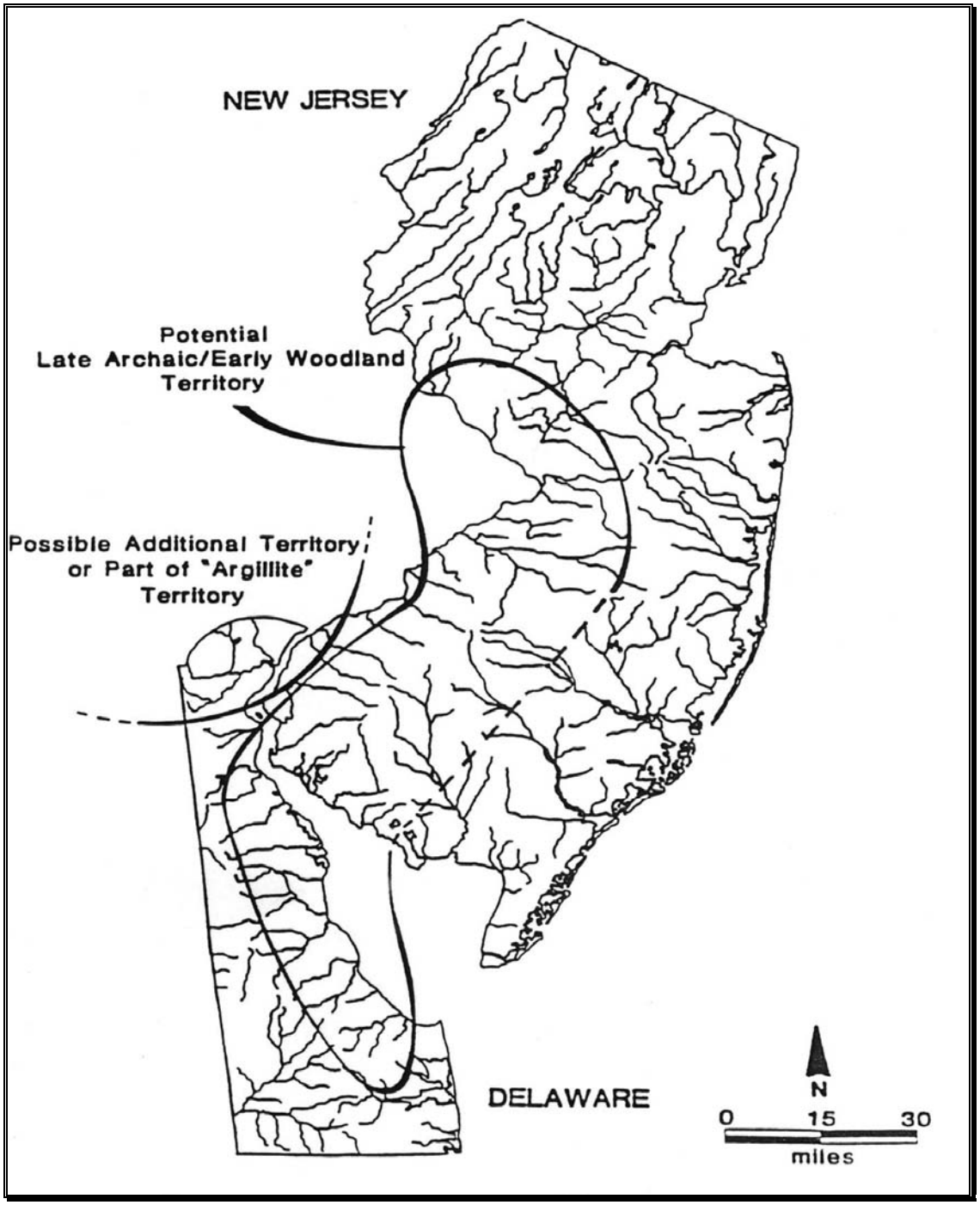

Figure 2.7 Late Archaic/Early Woodland Territorial Model
(Custer 1994: 141, Figure 68**)**

Elaborate social organizations appear to be retained into the Middle Woodland, as exemplified in the Webb Complex Island Field mortuary site (Custer et al. 1990; Thomas and Warren 1970). Variations in Middle Woodland material culture have been noted between particular point and ceramic types, and are considered to be an indication of an increase in the delineation of group territories and of divisions in Delmarva regional interaction spheres

delimited by the Delaware and the Chesapeake drainages (Custer et al. 1995b). It has also been contended that Early Woodland Adena Complex material traits persisted into the Middle Woodland Carey Complex, as observed at the Island Field and Carey Farm sites (Custer et al. 1990, 1995b). The increases in Early and Middle Woodland social and ceremonial complexity, the emergence of incipient ranked society, and "Big Man" social organization have been viewed as a viable alternative to fissioning of communities, which was not possible as a result of increasing sedentism created by environmental stabilization and territorial circumscription (Custer 1984a, 1988). No increases in the systemization of formal and highly structured trade relations between societies of the Midwest and Delmarva are evident during this time period (Stewart 1989). As a result of recent excavations, social complexity and ranking of Adena and Webb Complex sites have been called into question, arguing these societies represent more egalitarian hunting and gathering lifestyles, based on the evidence that grave offerings were rare, accoutrements were mainly personal goods, and skeletal remains did not show variations in health and diet (Custer 1994).

With the onset of the Late Woodland period, the trade and exchange systems and the more elaborate mortuary practices disappear (Stewart 1989). A variety of settlement systems with semi-permanent sites are inferred, with increasing focus of groups near the coastal zones. Mixed economies of horticulture, wild plant processing, and marine exploitation on the Delmarva appears to be the dominant subsistence strategy (Custer 1994; Custer and Griffith 1986).

Archaeologists have traditionally divided prehistory and history with Euro-American contact (Custer 1989). Several studies have shown that Native Americans incorporated traditional and new technologies and lifestyles into the eighteenth century (Custer and Watson 1985; Heite and Blume 1999; Santone 1999; Stewart 1999), hence acculturation and traditional use of properties may be addressed in the context of the dominant Euro-American society.

Societal Relations

Society may be examined from the perspective of particular historical events, analyzing local factors, the individual, and agents of change (Hodder 1986, 1999; Hodder et al. 1995). In this view, ideology, belief, and symbolism are media in human change agencies (Whitley 1998). Variations in social differentiation, high levels of ritual and trade of goods are a product of relations within the power structure (Hodder 1980; Price 1982). Individuals within hunting and gathering societies can manipulate systems to obtain status and to forge social alliances, expressions reaching their zenith in hierarchical organizations (Hayden 1996, 1998). Individuals have the power to trade with other social groups, manage special rituals and distribute goods that may be symbolically charged, thereby cementing social, political, and spiritual alliances.

Power relations and particularistic study of societies has not been yet commonly applied to the Native American archaeology of the Mid-Atlantic. The closest approximation of this approach may be seen in examination of Tidewater societies of Virginia, where ethnohistoric and archaeological information has been used to understand power relations and the influence of individuals in society (Hantman 1990). In a study of Late Woodland and late prehistoric changes in the James River basin, the transition to more permanent sedentism is cited as a cause for the creation of social transformations and inequality, circumstances of which are rooted in historical

conditions, political strategies, and economic relations (Gallivan 1999). These archaeological and ethnohistoric studies of Chesapeake region economic, social and political systems are beginning to show more variability between groups, and fluidity and responsiveness to historical conditions than previously discussed.

Hickory Bluff Systems

The excavations at Hickory Bluff provide an opportunity to provide detailed information about the articulation of a key site within Late Archaic to Late Woodland societal change. The Hickory Bluff excavation data may be used to address the involvement of the site in a diachronic and synchronic settlement pattern system; the relations between material culture and social integration and inter-group boundaries; and the connection of the site within a regional political and social power structure.

The relation of Hickory Bluff to other key sites along the St. Jones River and its southern tributary, the Murderkill River is crucial to understanding regional settlement systems. These drainages have been subject to intensive archaeological investigations, providing important information on Archaic and Woodland cultures of the region. Specific project goals included the placement of Hickory Bluff in the context of temporal changes in regional site settings and settlement patterns, and the comparison of temporal and spatial changes in settings. This goal was to be achieved in part by obtaining information on site locations from the Delaware State Historic Preservation Office (SHPO) and synthesizing published information on radiocarbon dates and ceramic assemblage data.

Concerning the evaluation of the relative degree of mobility and sedentism of Hickory Bluff's occupants, several lines of evidence could be explored, including a study of spatial patterns and procurement patterns of raw materials. Technological and mineralogical studies were envisioned to examine patterns of procurement either directly through visitation to source areas, or indirectly, through trade and exchange networks. A study on the manufacturing technology and the mineralogy for projectile points, bifaces and unifaces was initiated to determine the degree to which local gravels were exploited to manufacture tools. The Hickory Bluff ceramic assemblages were examined to provide corollary information on social group mobility and exchange. Clays for ceramic manufacture were examined to determine whether the vessels themselves were manufactured from local or distant sources, and if local, whether local or distant source tempering agents were used. In this regard, the abundance of steatite tempered wares at Hickory Bluff was intriguing, as steatite was not a local material. In addition, the abundance of clay tempered wares at Hickory Bluff provided an opportunity to examine whether they were related to types and sources in the southeast (southeastern Virginia and North Carolina), as opposed to the fewer finds of this ware to the west and north (Maryland, Washington D.C., and New Jersey).

The material culture obtained from Hickory Bluff also was examined in light of social integration and inter-group boundaries. Ceramic attribute analyses from a technological and stylistic perspective have provided a forum for studying individual choices and integration, maintenance of social group identity, and societal boundaries (e.g., Carr and Neitzel 1995; Chilton 1998; Stark 1998). To provide information on technical choices and social groups, the Hickory Bluff ceramic assemblage was organized according to typological style, technological

attributes (e.g., temper, thickness, and surface application), and mineralogy. The characteristics and attributes of lithic artifacts, particularly projectile points, was considered to provide useful supplemental information, as many types were recovered. Since some of the points appeared to be made from a variety of materials and clast forms, an analysis was performed to examine the degree to which general styles and individual expression were reflected in materials or where local pebbles confined expression.

Hickory Bluff provided an opportunity to view a site in the context of external and internal societal influences, particularly the role of the site within the development of the St. Jones River Delmarva Adena landscape. Given overwhelming attention on Adena mortuary behavior, Hickory Bluff provides some basic archaeological data on other major cultural aspects. A unique, developmental history is provided by the Delmarva Adena and Hickory Bluff as it occupies an outer, easternmost periphery position from the "core" of the midwestern center. By examining the material culture and history of Hickory Bluff, a forum was presented to study the relative political and social influences exerted by other groups participating in the Adena system. The internal history of St. Jones River culture change could also be examined by an examination of unique material culture patterns in temporal and spatial context. With such a perspective, Hickory Bluff presented an opportunity to examine the relative influence of powerful individuals to shape Delmarva society and the individual as an agent of change. A question that could be raised as to whether certain societal patterns of the Late Archaic through Middle Woodland could be attributed to external influences, dominant society, or individual aggrandizement.

COSMOLOGY AND RITUAL

Most cultures have a belief of the cosmos that is conveyed through human cognition and translated into formal practice through rituals and religion (e.g., Flannery and Marcus 1993; Rappaport 1999; Whitley 1998). The way in which cultures conceive of the cosmos and the natural world affects the way in which behavior and material objects are treated in a system. Ethnohistoric and contemporary Native American societies practice diverse forms of ritual behavior, but are united by common perceptions of divine natural and supernatural forces (Williamson and Farrer 1992). Religions involve a philosophy to life and a code of ethics that transcends many actions, including social and economic practices.

Archaeologists working in the Eastern Woodlands have usually considered ceremony, symbolism, and spiritual belief systems as part of mortuary practices and elaborate trade and exchange systems (e.g., Bartel 1982; Brown 1997; Buikstra and Charles 1999; Loring 1985). Mortuary practices have been viewed as either ancestor linked or as more of a social ritual use to define cultural identity and reinforce alliances. Ancestor linked ritual provides continued access to the departed in the afterworld and allows ancestors to serve as ongoing participants in the social, political and economic relationships of their living descendants (Buikstra and Charles 1999). Social ritual associated with broad mortuary practices in the lower Illinois River valley included the procurement and collection of quantities of special items through alliances and trade networks, and the ritual removal of those items from the natural world through ritual breakage, caching, or burial.

Apart from mortuary and ritual centers, archaeologists have begun to investigate "traditional cultural properties," defined as places that have association with practices and beliefs

rooted in the history of a community and that are important to maintaining the continuity of a community's beliefs and practices (Parker and King 1990). While archaeologists have long sought to protect properties important to communities, renewed effort has gone into the recognition of the importance of oral histories of living peoples in conveying the beliefs and practices of communities and the places attached to such lifeways. The result of interaction and partnerships with Native Americans has been a widening consideration and understanding of the meaning of places and landscapes (King 1993), and investigating sacred landscapes and places (e.g., Carmichael et al. 1994; Kelley and Francis 1994; Snead and Preucel 1999).

From an artifact based perspective, ideology and symbolism may be conveyed in technology and manufactured objects (Schmidt and Mapunda 1997). Certain attributes, such as color, may be tied to ritual, birth and death cycles, and sacred deities, or require possession and use by individuals of noble status (Hosler 1995; Sahlins 1976). Color, from ethnographic information, indicated certain associations, such as black with males, the direction east, and positive supernatural power; red with females, the west, and uncontrolled supernatural power; projectile point color was part of shamanistic rituals and points are found in ceremonial contexts as burial offerings (Whitley 1998). Color was used to identify various bands, as well as gender relations; bow hunting was a male activity and black was the preferred color of points. While these are known ethnographic observations, preliminary evidence indicates that color of some Hickory Bluff artifacts is tied to raw material type and distance to quarries (white chert and black obsidian), thus idiosyncratic and ideological realms are only one part of other basic foundations.

In the Mid-Atlantic, ethnohistoric and ethnographic accounts have indicated the importance of ceremonies, sacred places, and ritual objects (e.g., Harrington 1921; Strachey 1953). Accounts note the importance of rituals, states of mind, places, directionality, divine beings, spirit travel, and material objects (Rountree 1989; Weslager 1972). Bead color choice has been related to aspects of cosmology and worldview, underscoring the role of certain individuals in the social group (Hamell 1983; Pietak 1999). For burial customs of the Adena phase, ritual paraphernalia and preferred orientation to the west was observed (Thomas 1987). With respect to artifacts as social and ceremonial symbols, deeper meanings have been hypothesized for ceramics, including imitation of perishable baskets and use of tempering agents such as soapstone and shell, which may have ritualistic purposes (Stewart 1998b).

Hickory Bluff Cosmos and Ritual

A project goal was to examine non-secular aspects of Hickory Bluff, identifying the potential ritualistic and spiritual meaning of the site in the St. Jones River landscape. An assumption was that the cultural landscape of the St. Jones River most likely contained spiritual aspects of site location and ritual activity. The setting of Hickory Bluff was examined to test influences by cosmology and belief and aspects of spatial symbolism were explored (e.g., examining the position of the site on the river and its viewshed relative to physical features).

Ethnohistoric research was considered particularly useful in investigating aspects of cosmology and ritual in Mid-Atlantic societies and at Hickory Bluff. Aspects of creation, otherworldly beings, metaphors, and symbols were examined in order to provide information that could be modeled and tested against the archaeological record. Cosmos and ritual could be examined through the investigation of features and material culture. Structural features, such as

TAS clusters, could be viewed from the perspective of potential ritual and ceremonial functions. The possibility of examining Native American worldviews on the cycle of life forces of birth and rebirth was also intriguing. In this sense, recycling of material for artifact manufacture and reuse of site could be potentially viewed as important aspects of human thought and ritual behavior. Symbolism could also be explored on objects, such as the color of various rocks and use in features or for producing certain classes of objects. The design and tempering agents in ceramics, as well as the design and artwork on special artifacts (e.g., gorgets), could be informative about human expression and ritual.

CONCLUSION

This chapter introduced and summarized a number of theoretical approaches that may be applied to Native American archaeology of the Mid-Atlantic region. Major research paradigms in archaeology were reviewed with a goal to explore areas of common ground and to indicate useful areas for future investigation. Most archaeologists are beginning to realize that there may be many ways of doing archaeology successfully, such as combining and applying evolutionary and humanistic approaches. However, few archaeological sites and their material culture have been specifically examined, defining areas where elements of these research approaches may applied. Furthering theoretical discussion, Chaos and Complexity theories were introduced as potentially worthy areas for exploration in archaeology. Emphasis was placed on opening up archaeological investigations over traditional, purely academic and professional discussion, through engagement with the general public and the incorporation of Native American views. The theoretical review and broadened research context was followed by sections which operationalized these concepts. Hickory Bluff provided a forum for examining how these various research topics may be applied to an actual archaeological site in a CRM context. The Hickory Bluff research strategy attempted to blend various areas of investigation, including overarching processual questions with particularistic contexts that appeal to local historical circumstances. Given the general and specific framework provided here, the goal of the following chapters will be to describe the archaeological evidence from Hickory Bluff and eventually examine how it fits with certain research issues.