Seeing What Smoking Pipes Signal(ed): An Examination of Late Woodland and Early Contact Period (A.D. 900-1665) Native Social Dynamics in the Middle Atlantic

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For George, Virginia, Helen, and Paul Bollwerk

Education is not preparation for life; education is life itself.
John Dewey

This is dedicated to four people who instilled in me the value of constant curiosity and an eager mind.

Abstract

This dissertation explores the integral role Native tobacco smoking pipes played in the processes of interaction, individual and group expression, and innovation that were part of Native social networks in the Middle Atlantic region of the United States during the Late Woodland and early Contact periods (A.D. 900 to 1665). While previous work in the region has focused on mapping similarities in ceramic wares and projectile points that were thought to represent the boundaries of cultural areas, this dissertation examines how stylistic variations of material culture are linked to other axes of social differentiation and interaction that also constituted Native social landscapes. Data from a sample of 2,543 pipes from 70 archaeological assemblages distributed throughout the Middle Atlantic was used to evaluate what the stylistic variations of pipes mapped across space and time reveal about the dynamic social and ritual processes that were an integral part of Native societies.

The project's analysis begins by synthesizing information from sixteenth and seventeenth century historical accounts to explain how pipe smoking was an important spiritual and diplomatic practice primarily associated with elder male leaders among prehistoric and Contact period Native groups. Next, a stylistic analysis of pipes assesses variability among pipe forms and attributes. Significantly, spatial analyses conducted using ArcGIS reveal that the geographic distributions of many of the forms and attributes did not 'map on' to traditionally defined cultural boundaries. In many cases, geographically dispersed stylistic patterns support textual evidence that pipes were an integral part of interaction between groups spread throughout the region. In other instances however, the clustered patterning of certain forms and stylistic units suggests such elements may have been used to communicate information on an intra-community level. Changes in distributions over time were also apparent. Additionally, an LA-ICP-MS test of the chemical composition of a subset of clay pipe fragments indicated that it was the circulation of ideas and not pipes that had caused some stylistic elements to be widely distributed. By providing a more comprehensive picture of Native social geography this dissertation demonstrates the dynamic nature of past Native communities.

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Chapter 1 : Introduction

In my dissertation I explore the integral role Native tobacco smoking pipes played in the processes of interaction, individual and group expression, and innovation that were part of Native social networks in the Middle Atlantic region during the Late Woodland and early Contact periods. Previous work in the Middle Atlantic has focused on mapping similarities in ceramic wares that were thought to represent the presence of communal identities or the boundaries of cultural areas. However, more recently archaeologists have increasingly argued that Native groups were not simply using material culture to broadcast a collective identity. Rather, these researchers contend that although culturally distinct traditions did exist, it is essential to examine how stylistic variations of material culture link to other axes of social differentiation and interaction that also constituted dynamic Native social landscapes.

A brief example serves as an illustration of some of the challenges of studying Native social dynamics in the Middle Atlantic. In the upper left hand corner of John Smith's famous *Map of Virginia,* published in 1613, is an inset that depicts Chief Powhatan, the paramount chief of over 30 Native communities spread along the coastal area of what is now Virginia. The inset is located above a caption that reads, "Powhatan held this state and fashion when Capt. Smith was delivered to him prisoner 1607". It depicts the *mamanatowick*, or chief, seated on an elevated platform surrounded by attendants. The only other "trappings of power" associated with Powhatan are a feather headdress, a number of strands of pearls around his neck, and a tobacco pipe in his right hand (see Figure 1.1).

This inset was added to the original copper plate for the map by the English engraver William Hole, and was based on the description of Powhatan given by Smith in his *True Relation* (McCary 1957:7). The depiction of Powhatan holding a pipe is curious because Smith never mentions a pipe during his first meeting with Powhatan or in any of his subsequent encounters with the Native leader. Smith's description of Powhatan reads as follows: "their Emperour [was] proudly lying upon a Bedstead a foote high, upon tenne or twelves Mattes, richly hung with Manie Chaynes of great Pearles about his necke, and covered with a great Covering of Rahaughcums [raccoon skins]" (Smith 1986:Vol II). It seems as though Hole may have taken some artistic license when giving Powhatan the feather headdress and the pipe, both of which are not mentioned in Smith's description. However, McCary (1957:7) notes that Smith could have given Hole additional details during his conversations with him about the engraving.

The prominence of the pipe in the illustration contrasted with its absence in Smith's account introduces an interesting question: what is the significance of the pipe? Did a description of Powhatan's pipe simply never make it into the written record? Did Hole add it as a symbol or icon of Powhatan's power based on conversations with Smith or others about the roles of these objects in Native culture? Given that there are so few personal goods of status illustrated in the picture, the deliberate choice of a pipe seems to indicate this object was either endowed with special meaning for Powhatan or meant to convey something important about Powhatan.

While the specifics of how the pipe appeared on the John Smith map may be lost to history, it points to a larger question that has not received attention: how did pipes relate to social interactions and processes among the Powhatan and neighboring Native groups in the Middle Atlantic? Smith's failure to describe the pipe is representative of a larger dearth in the historical record of Native lifeways in the Middle Atlantic, a record that is noticeably patchy on the subject of pipes and their roles in Native social dynamics. Yet the few historic records and depictions of Middle Atlantic pipes that do exist indicate that pipes were significant objects and that pipe smoking and exchange played an integral role in the complicated and rich social dynamics and networks that both connected and divided Middle Atlantic Native groups. The limited amount of historical information is particularly noticeable when compared to the rich accounts of Native pipe smoking ceremonies that are available for other parts of North America chronicled by French settlers and explorers (Blakeslee 1981; Brown 1989; Springer 1981). This dissertation strives to address this problem by gaining a better understanding of the role of tobacco pipes and their stylistic attributes in the social dynamics of Late Woodland and Contact period Middle Atlantic Native groups.

Figure 1.1: Inset of Powhatan from John Smith's Map of Virginia (Image courtesy of Virtual Jamestown, Virginia Center for Digital History, University of Virginia, http://www.virtualjamestown.org/js_maplarge.html)

Gaining a better understanding of how pipes are related to Native social processes is particularly significant in the Middle Atlantic (Figure 1.2). In this region much of the archaeological research of Late Woodland social dynamics has focused on using distributions of artifacts, mainly ceramics, to map discrete, spatially restricted entities called cultural complexes. Labels such as the Montgomery Complex and the Keyser Complex have persisted on maps and in archaeological literature as markers of spatially discrete territories. These territories, although originally analytical units meant to represent the distributions of similar artifacts, have through time become equated with actual cultural groups. Moreover, in many cases these “cultures” have been tied to historic period ethnic groups. This continuity gives the impression that many Native groups maintained static social structures and practices for hundreds of years.

Although archaeological models have depicted a somewhat static social landscape, the picture painted by historical documents is one of a complicated and rich social topography. At the time of the English settlement at Jamestown in 1607, the Middle Atlantic region was home to hundreds of Native societies who spoke a variety of languages and dialects. Algonquian-speaking communities that were part of the Powhatan, Conoy and Piscataway chiefdoms were spread out over the Coastal Plain in the areas now known as Virginia and North Carolina. Across the Fall Line, the Siouan-speaking Monacans and Mannahoacs inhabited the Piedmont and Ridge and Valley of central Virginia. Farther south, the Sara, Tutelo, and Saponi lived in communities dispersed through the Ridge and Valley and Piedmont of southern Virginia and northern north North Carolina. In far southwestern Virginia Native communities were involved in long distance trade networks with groups located farther west and south. Farther north, Iroquoian-speaking communities, known by colonists as the Susquehannocks, lived in communities spread along the banks of the Susquehanna River in Pennsylvania (Jennings 1978). The Iroquoian-speaking Nottoway and Tuscarora lived further south, inhabiting the inner Coastal Plain of Virginia and North Carolina.

In addition to speaking different languages, many of these communities had social hierarchies comprised of chiefs, commoners, and priests. Rituals brought members of different communities together to inter their dead in accretional burial mounds or

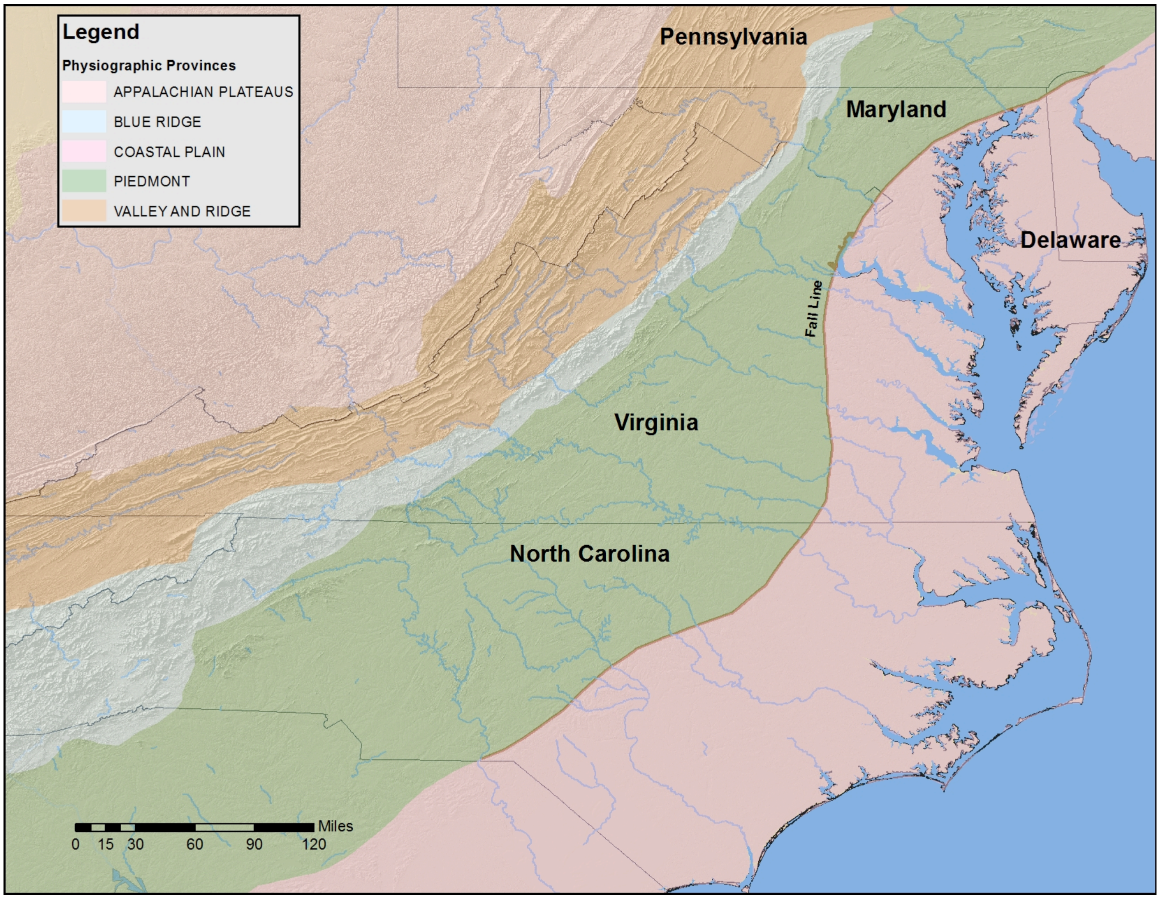


Figure 1.2: The Middle Atlantic region

ossuaries that held many generations of their ancestors. Hundreds of trading routes followed river systems and crisscrossed different environmental and cultural boundaries bringing both rare and common objects to communities located far away from their sources. Native individuals held multiple social roles and interacted with a variety of other people both from their own communities as well as outsiders who traveled for exchange or exploration. The simple recording of traditional culture areas fails to get at these critical social dynamics, and even obscures them at times.

The disjuncture between the complicated picture of Native societies described in historic records and the somewhat static view of Native social dynamics depicted in current archaeological models of Late Woodland social organization is unquestionably problematic (Eastman 1999; Gallivan 2003; Means 2003). Although it is necessary to create models of artifact variability to establish a framework for tracing chronological change or differences in the production and use of different materials in different areas, Late Woodland and Contact period Native groups were not simply using material culture to broadcast a collective identity. Of course, distinct traditions and different ways of doing things did exist. However, it is also essential to examine how stylistic variation links to other axes of social differentiation and interaction that also constituted Native social landscapes. Recent archaeological studies have connected stylistic variation to more dynamic social processes, including the ebb and flow of different trading networks through time (Eastman 1999; Gallivan 2003; Stewart 1989), the interactions of different linguistic or ethnic groups in certain parts of the region (Egloff 1992), or the marking of memberships in certain age, gender, or status groups (Eastman 2001; Lapham 2005; Driscoll, Davis and Ward 2001).

Along the lines of the studies just mentioned, this dissertation explores how tobacco pipes, which constitute a unique form of material culture that is tied to Native social and ritual processes, can provide insights into social dynamics that are not necessarily captured through previous models used by archaeologists in the region. While they are not as ubiquitous as ceramics or lithics, which are the artifact classes that have typically been used to consider social processes, whole and fragmented tobacco pipes are consistently found on Native Late Woodland and Contact period sites throughout the Middle Atlantic region. I argue that the unique social and ritual roles pipes played in Native societies afford the opportunity to investigate different social dynamics than ceramics or projectile points alone can offer.

Besides focusing on a different artifact class, in this dissertation I harness recent technological innovations in archaeology in my endeavor to bring new insights into Native social dynamics. Geographic Information Systems software provides archaeologists with the ability to look at artifact patterning with a finer level of detail over larger expanses of space. It provides the opportunity to investigate the spatial distributions of much larger datasets at both the inter- and intra-site levels. I use Geographic Information Systems to investigate the patterning of pipe attributes in my dataset, which includes collections from 70 Late Woodland and Early Colonial Period archaeological sites in the Middle Atlantic region.

In addition to new software platforms, the recent application of archaeometric techniques allows researchers to locate the geographic source of raw materials used to produce objects. Knowing the source of raw materials enables researchers to investigate the movement or circulation of objects or ideas about their production. In this dissertation I use Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) to investigate the chemical composition of a sample of pipes in the dataset. While petrographic analyses and Instrumental Neutron Activation analyses (INAA) provide similar results LA-ICP-MS is a relatively new, minimally destructive method, which is beneficial for testing an artifact class that typically has a small sample size. In my dissertation I demonstrate that LA-ICP-MS is a technique that, like petrography or INAA, can provide additional insights into the social processes that create stylistic variation.

Finally, in this study I draw from recent developments in archaeological stylistic theory to interpret the patterns revealed by analytical research. Rather than assuming similarities or differences in stylistic elements were meant to signal cultural or ethnic similarities or differences, I consider what other social groups and processes may have caused the distributions of stylistic attributes revealed by these analyses. This dissertation explores how stylistic variation in Native tobacco smoking pipes can provide insights into the processes of individual and group expression, interaction, and innovation that were part of Native social networks in the Middle Atlantic region of the United States during the Late Woodland and Early Colonial periods. I consider how the geographic distributions of stylistic elements are related to the multiplicity of social roles and networks that were part of Native lifeways and how these social processes changed over time. First, I will briefly review the literature on stylistic variation that creates the interpretative framework for this dissertation.

Archaeological Theories of Stylistic Variation

Archaeological analyses of style have followed many different paths since the inception of the Culture Historical paradigm in the 1950s. Stylistic research that systematically recorded, compared, and contrasted similarities and differences between artifact traits began in the early part of the twentieth century with the period of cultural historical research in archaeology. Analysts investigated stylistic variation with the goal of delineating distinct social units in the archaeological record. These studies primarily were concerned with isolating spatially distinct patterns that could reflect homologous groups (Conkey 1990). Researchers used the information from stylistic analyses to draw large-scale boundaries over areas of the United States based on general similarities in various classes of material culture (Driver 1961; Griffin 1952; Holmes 1903; Kroeber 1939; McKern 1939). Areas that exhibited general homogeneity in artifact assemblages were assumed to contain groups that practiced similar cultural traditions. These territories came to be known as culture areas and the Native communities within them were labeled archaeological cultures. Changes in archaeological cultures were attributed to either migration or diffusion, and only rarely if ever to internal innovation. An equally important objective was to identify patterning in artifacts that could be used to establish chronological control in assemblages.

With the advent of New Archaeology in the 1960s, archaeologists shifted from viewing stylistic variation solely as a marker of temporal change or different cultural groups to consider how past peoples used style *within* their cultural systems. New Archaeologists interpreted stylistic variation as reflecting behaviors, activities, relationships, or cultural processes of past peoples (Conkey 1990:9). Researchers created inferences that linked the activities and behaviors captured by stylistic patterning and considered how such activities functioned within cultural systems. Nevertheless, although style was used or interpreted to decipher the activities, interactions, and relationships of past peoples, it was still not seen as playing an active role in cultural systems. Binford (1965:208) in particular created a dichotomy between style and function by categorizing style as something added to artifacts that served no functional purpose (Conkey 1990; Stark (ed.) 1998, 1999). Following Binford, many archaeologists typically viewed style as non-functional or residual and a passive reflection of social organization.

The move to Post-Processualism in the early 1980s caused stylistic analyses to shift yet again as researchers focused on how stylistic variation related to more specific social processes (Conkey 1990; Hegmon 1992; Plog 1983). Studies employed a definition of style that acknowledged its more active and functional role in cultural systems than that used within the interpretative framework of the New Archaeology or Cultural History paradigms. Stylistic variation in artifacts was broken down to identify a range of social processes such as interaction (Plog 1980; Braun and Plog 1982), learning networks (Hill 1970; Longacre 1964, 1970), and social comparison and differentiation (Hodder 1982; Wiessner 1983, 1985; Wobst 1977). Perhaps most importantly, researchers linked stylistic variation to active efforts by individuals or groups to signal or communicate aspects of their identity (Hodder 1982; Wiessner 1983, 1985; Wobst 1977).

Despite the more active social role attributed to stylistic variation many of these studies continued to employ a somewhat narrow view of style by viewing it as something added onto artifacts and separate from technology or function (Conkey 1990:9-10; Dietrich and Herbich 1998:237-238; Hegmon 1998:265). Studies focused on the variation of particular types of attributes, mostly decorative features added onto artifacts. Many of the researchers who concentrated on the more active roles of style were not concerned with the variation of technical characteristics such as forms, raw materials, or surface treatments of objects.

Partially as a response to this somewhat narrow focus other researchers took a particular interest in attributes such as raw material or the techniques used to make vessel forms (Lechtman 1977; Sackett 1977, 1982, 1985, 1990; Stark 1998, 1999). These traits were called "technological traits" and the variability/arbitrariness in these traits was labeled *technological style* (Lechtman 1977). Sackett (1982) coined the term "isochrestic variation" to describe stylistic variation that results from technological style. Such variation was considered to be the choice of one option from many equivalent alternatives. Researchers interested in technological style argued that like decorative attributes, variation in technical attributes was guided by human choices and could provide insight into the functioning of social groups. Sackett (1990:33) and others (Stark 1999, Wiessner 1983) argued that such choices were largely dictated by rote learning and the technological traditions within which individuals function. Others have interpreted the social structures that determine the production of such attributes within Bourdieu's (1990) concept of *habitus* (Dietrich and Herbich 1998; Stark 1999:28).

While stylistic research in the 1980s and 1990s sought to dismiss the dichotomy drawn between style and function in previous research, these studies introduced a new divide: that between "active" and "passive" style. Archaeological studies of style tended to characterize variation as linked to either active or passive social processes and directly contrasted or juxtaposed these two categories. Although researchers used a number of different designations to describe these classifications (instrumental, isochrestic, and technical vs. adjunct, iconographic, emblematic, and assertive), active style was typically characterized as the use of attributes to consciously communicate information while passive style was related to attributes produced through unconscious actions that were the result of rote learning (Dietler and Herbich 1998:245).

The types of attributes associated with these processes were also divided. Decorative attributes such as design forms and design symmetry were argued to have been used to consciously relay social information about identity or for the marking or maintenance group boundaries (Conkey 1980; Hegmon 1992; Plog 1983; Stark 1999; Wiessner 1983, 1985; Wobst 1977). Since these types of attributes were generally more visible and could be readily copied, they were usually thought to have been linked to conscious processes. In contrast, attributes that were built into the form of an object or were not as noticeable such as the choice of raw material, vessel form, surface or finishing treatments, or smaller secondary aspects of decoration were usually associated with passive or unconscious processes, generally believed to have been linked with artisans' choices or production networks (Sackett 1982, 1985, 1990; Stark 1999; Washburn 1977).

These studies also inspired new debates about the social groups or boundaries that were being marked by stylistic variation. Although Sackett (1982, 1990) argued strongly that the social boundaries delineated by isochrestic variation were linked to ethnic groups, other researchers contended that the relationship between stylistic variation and social groups is highly contextualized (Barth 1969; Carr and Neitzel (ed.) 1995; Conkey 1990; Dietrich and Herbich 1998; Hodder 1982; Sassaman and Rudolphi 2001; Shennan 1989; Stark 1998; Wiessner 1985, 1990). These researchers have shown that the behaviors governing object production and use are socially informed actions that reflect a shared understanding of how things are done and that the social groups that control these understandings can vary greatly depending on the object being produced or area being studied.

The recognition that multiple types of stylistic variability exist, are the product of different social processes, and can be linked to a variety of social relationships has provided a more nuanced understanding of the link between stylistic variation and social dynamics. Nevertheless, the dichotomy created between active and passive style has often caused researchers to limit their focus when analyzing stylistic patterning (Conkey 1990:6; Dietler and Herbich 1998; Neitzel 1995; Plog 1990:62; Sackett 1990; Wiessner 1990). Although the various theories and conceptual frameworks used to characterize style are not mutually exclusive few studies of stylistic research conducted in the last decades of the twentieth century attempted to bridge the gap between active and passive style or to consider aspects of both when analyzing artifacts. Rather most studies proceeded from research questions that drew from one particular theoretical perspective.

A focus on either active or passive style obscures the fact that style is multivalent and can be linked to a variety of different social processes depending on the context of production and use (Carr and Neitzel 1995; Carr 1995; Dietler and Herbich 1998). Carr (1995) in particular emphasized the need for a "middle range theory" of stylistic variation, which emphasized both active and passive categories. The movement beyond the dichotomy of active and passive style was initiated because researchers realized that this divide is arbitrary. For example, even if the production of attributes that fall under isochrestic variation is unconscious or the result of rote learning such methods are still actively taught, reinforced, and modified. Thus isochrestic variation can be considered active as it still constitutes choices being made (Conkey 1990:13). Additionally decisions that govern aspects of what is considered technical style, such as the choice of raw material, are not necessarily unconscious but could be linked to conscious ideational social processes such as cosmology (Lechtman 1977). Stylistic elements that western researchers may dismiss as being determined by unconscious processes or environmental limitations may in fact have been actively chosen to incorporate cosmological principles into production. Finally, the size, shape, and location of decorative attributes can also be a result of influences by learning or production groups rather than active efforts to signal social information (Dietler and Herbich 1998).

Consequently many recent stylistic studies have encouraged the use of an interpretative model that acknowledges the multiplicity of style and its dynamic link to production techniques *and* efforts of social signaling (Carr and Neitzel (ed.) 1995; Sassaman and Rudolphi 2001; Stark (ed.) 1998). A more holistic consideration of stylistic variation is necessary because it acknowledges that the attributes on any single object or class of objects can result from a variety of social processes. For example, certain artistic practices used to create one set of attributes can be passed down through the generations within one community while other practices used to create different attributes on the same class of objects can be inspired by interactions with members of other nearby communities (Sassaman and Rudolphi 2001). Moreover, stylistic attributes that are used to actively convey information can have multiple meanings depending on the context of use or the audience (Carr 1995; Wiessner 1983; Wobst 1977). An individual or social group can simultaneously embody multiple social roles and become intertwined with members of other social groups through social interaction. Consequently, individuals and groups can choose to communicate or show different aspects of their identity through stylistic variation when it is beneficial for them to do so (Wiessner 1983, 1990:107). Thus the social meanings of style are dynamic, contested, and can be actively manipulated (Conkey 1990:15; Earle 1990; Neitzel 1995).

While these realizations have encouraged researchers to employ a more holistic view of style in their analyses, identifying which characteristics are linked to certain social processes still presents a challenge. A number of researchers have questioned the ways archaeologists create classifications or divisions to study style in the archaeological record (Chilton 1999; Conkey 1990; Plog 1980, 1983; Rouse 1971[1960]). Challenges cited include the replicability of the analysis (Plog 1980:42), and whether the resulting groups are completely formulated by the archaeologist's classification system or whether such divisions would be recognized or validated by the past peoples they study (Binford 1986). Moreover, although archaeologists often view economic, political, ritual, and social relations as discrete components of human societies, these aspects are often arbitrarily defined to aid our analyses (Plog 1995:193). Even though researchers often tend to demarcate or delineate particular aspects of societies as the focal point of research, it also must be acknowledged that various social groups in a society are rarely separate, distinct entities but are constantly in production and interacting with each other (Conkey 1990; Plog 1995).

As a result of these considerations, the most popular archaeological method of artifact classification, the type, has come under question both in discipline more generally (Chilton 1999; Dunnell 1971, 1972, 1973:73, 1978, 1986; Plog 1983; Rouse 1971[1960]; Wylie 2002) and within the context of work conducted in Middle Atlantic archaeology specifically (Egloff 1992; Hart 1992; Klein 2003; Means 2003). Types are distinct categories of artifacts that are created based on the co-variation of a group of chosen attributes. In the Middle Atlantic archaeologists have primarily used taxonomic classifications to categorize artifacts, particularly ceramics (Binford 1964; Coe 1965; Egloff and Potter 1982; Evans 1955; Griffith 1982; Holmes 1903; Phelps 1983). Taxonomic systems create types by choosing a few attributes that are given priority over others and creating groups based on the presence or absence of those particular attributes. In the case of ceramics in the Middle Atlantic, the primary determining attributes have been the material used for temper and its density within the paste, paste color, paste hardness, and surface treatments. Other attributes, such as decorative motifs, rim shape, and vessel shape are noted but do not necessarily factor into a typological assignment. A sherd is assigned to a particular type based on its temper or paste composition even if it demonstrates evidence of additional attributes that are similar to sherds in other type categories. Thus the order in which the attributes are considered plays a large role in determining how artifacts are grouped together.

A good deal of research conducted in the Middle Atlantic has been devoted to creating typologies of ceramics and projectile points that can be used to establish chronological control over collections. However, the traditional order in which attributes have been given priority in classifications has obscured similarities in what are considered lower order attributes that could provide information about social connections or networks other than cultural boundaries or collective identities. For example, the focus on temper and surface treatments as primary attributes of ceramic classification has caused archaeologists to ignore some similarities in decorations or paste types that suggest interactions over linguistic and cultural boundaries (Egloff 1992; Gallivan et al. 2008:8). Moreover, archaeologists continue to make typological divisions commensurate with spatially distinct cultural entities, which are still labeled as cultural complexes or phases.

When it comes to analyzing the social significance of stylistic variation, only acknowledging certain aspects of variability becomes especially problematic because the attributes not considered in the classification could related to different social processes that are obscured when the object is assigned to a particular group. Consequently, most recent studies of style recognize it is not a single, indivisible entity but multidimensional, meaning that objects and classes of objects contain a variety of stylistic attributes that are related to different social factors (Plog 1983:129). Rather than creating typologies, researchers (Carr 1995; Chilton 1999; Hegmon 1992, 1995; Plog 1983; Voss and Young 1995) have advocated the incorporation of a wide range of attributes to fully explore the relationship between material patterning and social phenomena. This includes both technological and decorative elements or characteristics that might relate to either conscious or unconscious practices. Recent studies indicate the best way to deal with the multivalent nature of style is to be very explicit about the analytical units and methods used for analysis and to gather as much historical and cultural information about the production and use of the objects of inquiry (Carr and Neitzel (ed.) 1995; Conkey 1990: Hodder 1982; Sassaman and Rudolphi 2001; Plog 1990; Stark (ed.) 1998; Wiessner 1990).

Stylistic Variation and Tobacco Smoking Pipes

This study diverges from the typological systems typically used in the Middle Atlantic and employs an attribute based classification system that includes both technical and decorative attributes as part of the stylistic analysis. The focus on attributes rather than types allowed me to consider both fragments and whole pipes in my analysis. This study also draws from ethnohistoric and material evidence to create a holistic framework that considers social processes other than communal expression when interpreting the stylistic variation of smoking pipes. Tobacco smoking pipes provide an interesting opportunity to explore Native social dynamics because historic records indicate they were linked to a number of different social groups and processes in Native societies. As I will discuss in Chapter 4, high status males, such as chiefs or priests, used pipes as part of ritual ceremonies to welcome visitors. Thus pipes played important ritual roles in Native societies. Pipe use in these social contexts suggests that Native individuals and groups could have used variation in design forms or structures to signal or mark aspects of their identity. However other attributes such as the choice of raw material or the general shape of the bowl or stem, could be linked to community learning traditions and have a different social meaning. Moreover, their use by high status males suggests the distributions of certain designs could be related to the movements and interactions of important individuals throughout the region. In light of the fact that pipes were linked to multiple social aspects of Native society, I made an effort to include attributes that I anticipated might be related to learning networks as well as decorative attributes that could be linked to the signaling of social information to gain a more holistic understanding of how pipes were part of social dynamics. I will discuss the attributes that serve as the basis for this analysis in more detail in Chapter 4.

The Broader Significance of Understanding Prehistoric Social Dynamics

Addressing the dynamic nature of prehistoric Native communities has become increasingly important as contemporary Native Nations and Tribes have begun to utilize historical and archaeological research to support their bids for repatriation and cultural patrimony under the Native American Graves Protection and Repatriation Act. Archaeologists in the Middle Atlantic and in the Americas more broadly have acknowledged the need to counter previous portrayals of Native communities as static, homogeneous entities that were drastically and irrevocably impacted by European arrival. Without denying the impacts of colonization, this recognition has encouraged research that demonstrates how Native societies used certain materials to maintain distinctive practices and traditions while simultaneously modifying and innovating some aspects of their material culture in response to changes in their social environments. The results of such studies also confront perceptions held by members of the public and federal government that allege contemporary Native communities are no longer authentically "Native" because they fail to engage in the exact same practices as their ancestors. My dissertation contributes to these endeavors by demonstrating how the material distributions of pipes provide insight into Native efforts to create a complex social landscape that simultaneously maintained communal boundaries while facilitating social interactions that traversed such boundaries. Additionally, considering pipes over a long temporal range (A.D. 900-1665) allows me to examine how material variations are linked to social changes taking place in Native societies over time.

This chapter began with a consideration of the pipe depicted in the illustration of Chief Powhatan. While we may never know the significance of that pipe to that one important individual in 1607, the image and its history and reproduction nevertheless provoke interest in gaining a more nuanced and broader understanding of the multivalent and complex meanings of pipes in Native American culture in the Middle Atlantic region. In this dissertation, I use multiple but complementary methods to attempt to reach such understandings.

Organization of the Dissertation

The remainder of this dissertation reviews the history of ethnohistoric and archaeological research of social dynamics and pipes in the region, explains the dataset and methodological framework for my analysis, and considers how the distributions of different pipe forms and attributes relate to Late Woodland and Contact period social dynamics.

Chapters Two and Three provide a brief cultural history of the Middle Atlantic region. Chapter Two synthesizes previous archaeological and ethnographic research in the Middle Atlantic region that has focused on the relationship between stylistic variation and cultural complex boundaries. Chapter Three explores how geographic territories, also known as physiographic provinces, have come to be equated with cultural areas in the Middle Atlantic region. In both chapters I contrast the Cultural Historical model with more recent research that demonstrates how variations in material characteristics can be used to frame a variety of social dynamics and relationships. My analysis in later chapters draws on these models as comparative frameworks for the distributions of pipes.

Chapter Four provides a synthesis of information from sixteenth and seventeenth century historical accounts to explain how pipe smoking was an important spiritual and diplomatic practice among Native groups in the Middle Atlantic. These accounts demonstrate that pipes, when filled with sacred tobacco, endowed smokers, who were generally community leaders, with the ability to perform a number of tasks ranging from petitioning ancestors to declaring peace or war. When smoked in peace, pipes helped smokers to form social bonds that some have likened to kinship. I argue that because pipes symbolized community, kinship, and power, their stylistic variability provides a unique opportunity to investigate the social and ritual practices of Native societies. I conclude the chapter by outlining the four hypotheses that guide my analyses of pipes.

In Chapter Five I provide background information on the 70 Late Woodland and Contact period archaeological sites whose collections form the foundation of this study. Additionally, I explain my methodology for establishing the chronological organization of the sites and for my data collection. Next, I describe the pipe characteristics (attributes) chosen for analysis. Finally, I detail how Geographic Information Systems (ArcGIS) software was used to map and analyze the geographic distributions of pipe attributes throughout the entire region.

Chapter Six marks the first of four chapters that detail my stylistic and spatial analysis of the 2543 pipe fragments that comprise my dataset. I begin by examining the spatial distributions of different pipe forms throughout the region. I argue that the form of pipes (for example, elbow vs. tubular) is a kind of stylistic expression, but is considered here separately from incising and other decorative modification added to pipe forms. My analysis reveals that Natives used seven different pipe forms during the Late Woodland and Contact periods. I argue this contemporary variability is likely linked to differentiations in the social roles of different forms.

In Chapters Seven and Eight I shift my focus to analyze the spatial and temporal distributions of different characteristics that are found on pipe forms. In these chapters I identify and discuss two general categories of pipe stylistic attribute distributions. Chapter 7 considers stylistic attributes that are built into the pipe form such as cut or rounded bowl rims and mouthpieces or squared stems and rounded bowls. Chapter 8 focuses design elements, units, and structures that were carved into or stamped onto the surfaces of pipes. The distributions of different design forms and design structures and their possible social meanings are considered.

Chapter Nine details the results of a compositional chemical analysis of a subset of pipes in the dataset and addresses how production and exchange networks may have influenced the previously described stylistic distributions. Using a method called Laser Ablation Inductively Coupled Plasma Mass Spectrometry, I examine a sample of stylistically similar pipes from four different sites spread across what are considered to be different linguistic, cultural, and environmental territories. This analysis provides additional insights into what social processes may be causing the stylistic patterning identified in previous chapters.

By way of conclusion, I situate the results of my analysis within broader discussions about archaeological depictions of Native groups. I note that my investigation has revealed material evidence of past Native communities using pipes to maintain and perpetuate certain aspects of communal identity while simultaneously facilitating the exchange of ideas and materials with outside groups. I contend that this dissertation serves as a case study that provides a more comprehensive picture of Native social geography and demonstrates the dynamic nature of past Native communities.

Chapter 2 : Mapping the Landscape of the Middle Atlantic Region, A.D. 900-1665

Introduction

In the next two chapters I provide a brief synopsis of how previous researchers have delineated Native social dynamics and networks in the Middle Atlantic in the Late Woodland and Contact periods. I will show that throughout the past century, archaeologists have employed a variety of methods to gain insights into the material correlates of various social groups. There is no question that our understanding of the patterning of material culture over time and space has expanded through efforts that have explored different lines of evidence such as historic and ethnographic records, variations in environment, features, and artifacts. Nevertheless I will demonstrate that there has been a tendency to focus on large-scale cultural and social relationships. I will also show that despite the focus on large-scale patterns there is also great deal of evidence that relates to intrasocietal social dynamics and networks that traverse large scale boundaries. In this and following chapters I will compare and contrast pipe distributions with traditional large-scale cultural boundaries long accepted by Middle Atlantic archaeologists. As such, this chapter will provide necessary context for the spatial analyses and interpretations of pipes in the chapters that follow.

The Middle Atlantic Culture Area

In the first half of the twentieth century, the goals of archaeologists working in North America were primarily framed by the Cultural Historical paradigm (Trigger 2006; Willey and Sabloff 1993). Many archaeologists during this period drew from a conception of culture that stresses continuity over wide geographic areas (Kroeber 1939; Binford and Sabloff 1982:139-140, in Freed and Freed 1983; Wissler 1922). Culture areas were created based on an integration of linguistic and ethnographic evidence of historic period tribes with archaeological evidence that was slowly being unearthed. Researchers often sought to delineate the territories of Native groups by blocking out larger regions based on generalized similarities and then subdividing them based on more localized variations of environment and material culture.

However, researchers quickly acknowledged difficulties with this method even as they employed it. Holmes (1914:414) noted that culture areas were "bound to overlap and blend along borders and more especially along lines of ready communication." Kroeber (1939:6) suggested that it would be desirable "to use some system of shading or tint variation of color when drawing cultural boundaries, rather than lines," given that groups at the edges of these lines often share a number of characteristics owing to their interactions with each other. Driver (1961:18) also observed that the "boundaries of such areas on maps unavoidably give a false impression by overemphasizing the sharpness of the break." As I will demonstrate below, the boundaries of the area now known as the Middle Atlantic culture area are a product of the "Culture Area" approach, and embody the problems that are inherent within it. I have taken these complications into account when creating the maps of my survey area, which I will also explain below.

The "Boundaries" of the Middle Atlantic Culture Area

The creation of the boundaries of the Middle Atlantic is best understood in relation to the larger cultural territory of which it is a part, the Eastern Woodlands. The Eastern Woodlands is a term used to delineate all territory and Native groups living east of the Rocky Mountains. A number of archaeologists and anthropologists have suggested that the Native peoples of this area shared general cultural traits. Holmes (1903), Wissler (1922), Kroeber (1939), and Driver (1961) were some of the first to define and discuss the cultural areas of the United States, and all designated the eastern region as a distinct cultural area. Many of the first overviews of the Eastern Woodlands designated it as a cultural area based on its "low-level" of characterization when compared with the southwestern and western regions of the United States. The area was generally seen as uniform both in terms of culture and environment (Holmes 1903:146-147; Kroeber 1939:60) and its Native groups as lacking the complex cultural markers of its western neighbors.

In subsequent periods, archaeologists and anthropologists (Driver 1961; Griffin 1952; Wissler 1922) provided a more substantive basis for this boundary based on material evidence of broadly shared practices and the stylistic similarity of objects. Practices such as deer hunting, chiefdom level political systems, the independent domestication of squash, sunflower, lamb's quarter and marsh elder around the beginning of the Christian era, the adoption and prevalence of maize agriculture after A.D. 800 and mound construction have also been used to delineate the East as a cultural territory (Cordell and Smith 1996; Smith 1989). Consequently, the label Eastern Woodlands continues to operate in archaeological nomenclature today.

Despite the perceived uniformity and simplicity of the Native groups who occupied the vast territory of the East, Holmes (1903), Wissler (1922, 1950), Kroeber (1939), and Driver (1961) all segmented the Eastern Woodlands into multiple cultural subdivisions. Although the placement of boundaries varied, researchers consistently noted a distinct transition between the cultures of the north and south areas of the eastern region. The location of this shift and the Native cultures involved within it, however, were contested. Some scholars placed the Native groups inhabiting the area now known as the Middle Atlantic within the northern region designated the "Atlantic Slope" (Holmes 1903, 1914; Kroeber 1939:92). The boundary line between these areas was usually based on the perceived lack of influence from the Southeastern region rather than a clash of distinctive traits between the north and south. The paucity of attributes and traits associated with the Southeast, such as complicated and stamped pottery, and large accretional burial mounds led researchers to conclude that Natives in the area of the Middle Atlantic were noticeably different from those farther south.

While a number of archaeologists and anthropologists noted the uniformity of the Northern East, the placement of the southern boundary remained a matter of debate. Holmes (1903:147) identified the Middle Atlantic culture provenience based on ceramic types and placed the southern boundary at southwestern Virginia. He portrayed North Carolina as a liminal territory comprised of a wide zone of sites exhibiting a remarkable intermingling of northern and southern elements (1903:147-148). However, in 1914, drawing from a wider variety of evidence, he moved the boundary further south to include the Carolinas. Kroeber (1939) also delineated cultural subdivisions within the Northern Atlantic slope. The Middle Atlantic Slope included parts of Maryland and Virginia. It should be noted, however, that he classified the Virginia and North Carolina Siouan speaking Piedmont groups and Algonquian speaking Coastal groups in a different cultural group called the Southern Atlantic slope based on similarities in material culture.

Nevertheless he suggested that they demonstrated “northern influences” and should not be included in the southeastern cultural area.

In contrast to Holmes and Kroeber, Wissler (1950:239) classified the Eastern Siouans as one of the chief groups of what he designated as the Southeastern cultural area based on their use of intensive agriculture, hunting of deer, well-fortified towns, and ceremonial houses, among other things. In addition, Speck (1924) and Swanton (1928) argued that the Algonquian Powhatan chiefdom of the Virginia Coastal Plain should be grouped with the Southeast cultural area based on linguistic and ethnographic information. Wissler (1950) also placed the Powhatan in his “Southeastern area” although he did label them as “marginal.” For some time the Powhatan were known as the “Southeastern Algonquians” (Mook 1943:28) among anthropologists.

The vague partition between the North Atlantic and Southeast continued to be an issue during the second half of the twentieth century. Schmitt (1952) in his pivotal study of Middle Atlantic cultural complexes designated the Middle Atlantic as comprised of Pennsylvania, Delaware, New Jersey, Virginia, and Maryland. However, in the same volume, Coe includes North Carolina as part of the Middle Atlantic or Central Atlantic states (Coe 1952:302). Kinsey (1971) acknowledged that the Middle Atlantic continued to suffer from an “identity crisis” as a prehistoric culture area well into the second half of the twentieth century. Moreover, well into the 1990s archaeologists continued to portray this area as a southern periphery of the northeast (Funk 1983) or a northern periphery of the southeast (Bense 1994; Muller 1983).

Custer (1994) and Hantman and Gold (2002) have suggested that the Middle Atlantic did not become solidified as a cultural region in archaeological literature until the early 1970s when William Gardner convened the Middle Atlantic Archaeological Conference which began meeting and publishing the *Middle Atlantic Journal of Archaeology*. This conference and journal focus on the five states outlined by Schmitt, with the inclusion of parts of New York and the Virginia/North Carolina border. Later works that argued for the existence of a Middle Atlantic culture area upheld these boundary lines (Custer 1986, 1994). Thus New York and Virginia serve as the defacto north and south boundaries of this region while the Atlantic coastline and western edge of the Appalachian Highlands are designated as the east and west boundaries.

Nevertheless, there continues to be overlap between the Southeast and Middle Atlantic. For example, the *Journal of Middle Atlantic Archaeology* has included articles that focus on North Carolina (Abbott 2003; Egghart 2008), which demonstrates that this division is not absolute. Moreover, recent volumes entitled the *Histories of Southeastern Archaeology* (2002) and *The Woodland Southeast* (2002) include respective chapters on the archaeology of Virginia and the archaeology of the Middle Atlantic. In *The Woodland Southeast* Hantman and Gold (2002) have cogently argued that the boundary between these two areas is somewhat arbitrary.

Additionally, there is a great deal of material, historical, and ethnographic evidence that suggests various groups in what is now North Carolina also had ties to and relationships with groups in what is now Virginia and Maryland. For example, North Carolina Siouan-speaking groups, such as the Saponi and Occaneechi are often tied to other Siouan speaking groups in Virginia, such as the Monacans and the Tutelo, even though they are all seen as distinct cultural entities (Coe 1965; Eastman 1999; Griffin 1945; Merrell 1989; Mooney 1894; Ward and Davis 1993, 1999). Additionally, multiple researchers have noted the similarities of attributes and characteristics of the material culture of the Coastal Algonquian groups (Coe 1965; Holmes 1903; Hutchinson 2002; Irwin 2004; Kroeber 1939:94; MacCord 1996; Speck 1924; Swanton 1928) and the shared history and culture of the Iroquoian groups who inhabited the inner Coastal Plain of Virginia and North Carolina (Boyce 1978; Phelps 1983; Smith 1984; Turner 1992). Furthermore, ceramics exhibiting similarities to types found in Tennessee and West Virginia have been recovered from sites in southwestern Virginia (Egloff 1992; Egloff and Woodward 1992). Citico-style gorgets found in some of the burials at sites in northern North Carolina and more widely in a number of Late Woodland contexts in southwestern Virginia also indicate connections with Mississippian or Cherokee groups in Tennessee or North Carolina (Brain and Phillips 1995; Meyers 2011; Sullivan (ed.) 1995; Ward and Davis 1999). Additionally, Jeffries (2001) and Meyers (2011) have noted that the presence of a large platform mound in Lee County, located in the far tip of southwestern Virginia, indicates that this area could have been occupied by a Mississippian chiefdom on the frontier of what is traditionally considered Mississippian territory.

This problem illustrates the challenge of drawing cultural boundaries previously noted by the Culture area pioneers, Holmes, Kroeber, and Driver. The delineation of Middle Atlantic boundary lines varied greatly depending on the materials or traits being used as the basis for the comparison. Boundaries also shifted over time. To some degree, the demarcations of Middle Atlantic and Southeastern cultural areas are impacted by contemporary political boundaries. Late Woodland and Contact period American Indian groups obviously did not observe the boundaries that exist today. American Indian groups traveled over terrestrial routes and waterways throughout Virginia and North Carolina to procure materials for subsistence and engage in exchange and ritual ceremonies with other groups. In the twentieth century, however, it is politically complex and unfeasible to include a segment of a state in a region. Consequently, Virginia and North Carolina had to be placed as a whole in one region or another, despite the fact that this state boundary obviously has nothing to do with the cultural boundaries of American Indians living in the Late Woodland and Contact periods.

Given the somewhat arbitrary nature of the boundary placed between Virginia and North Carolina, I have chosen to include North Carolina in my survey universe even though it is technically considered to be in the Southeastern cultural territory. When choosing the boundaries of my survey, I anticipated that the interaction and exchange between the groups living in these areas likely impacted pipe production and exchange. As I will demonstrate in the following sections, there is a great deal of material evidence of interactions between groups living in North Carolina and southern Virginia. For this reason, I included North Carolina in my study because I believe these interactions likely had an impact on pipe production, use and exchange.

Additionally, it should be noted that parts of New York, New Jersey, and West Virginia are often considered part of the Middle Atlantic (Custer 1986, 1994; Schmitt 1952). Nevertheless, I chose to exclude New York and New Jersey from my survey area. Instead, I have focused on the area bounded by Pennsylvania and North Carolina on the north and south, and running from the Atlantic coast to the western boundaries of Virginia, Maryland, Pennsylvania, and North Carolina. The reasons for this are twofold. The first is that the pipes of Iroquoian groups in New York and New Jersey have been thoroughly discussed and many of their distributions already mapped (Drooker 2004; Hayes and Paper 1992; Kuhn 1986; Wonderley 2005). Second, I believe gaining a better understanding of pipe production and exchange in the area I have designated will provide a basis for comparison with other areas in the future, as the pipes in this area have not been systematically analyzed. Figure 2.1 depicts the boundaries of my study area.

Having explained the history behind the delineation of the Middle Atlantic cultural area and my reasoning for focusing on a certain area of the Middle Atlantic, I will shift to discussing the theoretical traditions and methodologies that have been used to identify and label the different Native communities who occupied this region. The rest of this chapter is devoted to discussing cultural complexes while Chapter 3 considers the how physiographic provinces have served as another form of cultural unit. I will first discuss how archeologists have used the cultural complex model to interpret artifact distributions and some of the problems that have become apparent about these interpretations. Finally, I will briefly synthesize recent research that has considered how material variation is tied to intra-community dynamics within cultural complex boundaries.

The Culture Areas of the Middle Atlantic

While the Culture Area paradigm continued to guide archaeological research and interpretation well into the middle of the twentieth century, archaeologists became increasingly interested in moving beyond describing generalized culture areas to gain a better understanding of the behaviors of prehistoric and historic groups who inhabited these regions and how they changed over time (Guthe 1952:11; Willey and Sabloff 1993:133). Moreover, there was a growing

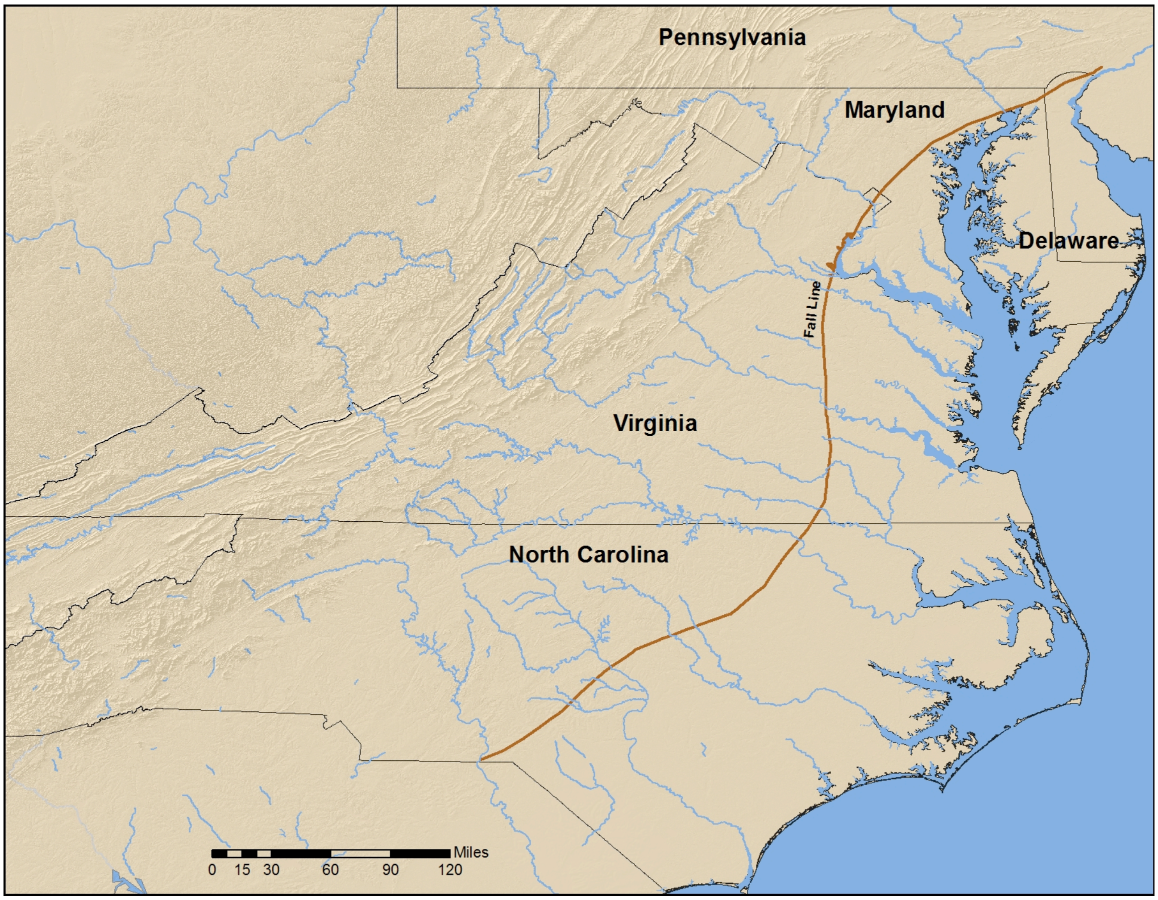


Figure 2.1: Overview of the study area

sense that the term "culture" was becoming too vague to be useful and thus loosing its significance archaeologically (Guthe 1952:9). Consequently, shifts in methodology sought to bring more organization to this system. One proposed solution to this problem was the Midwestern Taxonomic system (McKern 1939), which was widely adopted by archaeologists working in the Midwest and Middle Atlantic. I will briefly explain this system and discuss the historical and ongoing significance of its use in the Middle Atlantic.

The Midwestern Taxonomic System

In the mid-twentieth century, complications with current methodologies encouraged shifts in method and theory towards a more systematic look at cultural process, as opposed to the previous focus on describing artifact distributions **(**Guthe 1952; Willey and Sabloff 1993:135**).** A look back at the cultural divisions outlined in the previous section confirms that the geographic extent of "culture areas" could vary from thousands of miles, such as the Eastern Woodlands, to much smaller areas, such as the territory of the Southeastern Algonquians. As the amount and diversity of material cultural recovered from excavations increased, it became clear that a more systematic way of identifying artifact variation and its relationship to social organization was needed.

McKern (1939) offered a new system called the Midwestern Taxonomic System as a possible solution to this problem. This system created a method for classifying material culture on the basis of morphological attributes (Schwartz 1996:3) and used new archaeological designations to label different classes. The primary purpose of McKern's system was to create paradigmatic classes of sites formed by intersections of similar types of artifacts. It should be noted that chronology was a secondary concern (Schwartz 1996:3).

McKern's system broke down material culture similarities into different classes: foci, components, aspects, phases, patterns, and bases. The designation of sites into these different classes was based on the degree to which sites shared "linked traits" such as ceramic and lithic types, house shapes, etc. If a number of sites exhibited a diagnostic trait, in the form of a ceramic type or house pattern style different from sites in the surrounding area, they would be considered part of a focus, which is the class of culture exhibiting peculiarities at the finest level. “Components” were the manifestations of any given focus at a particular site. In many instances a site with multiple occupations could have multiple components. The Aspect class captured a group of foci that share broadly general similarities. A Phase was a group of aspects that show general characteristics. Likewise, a Pattern was comprised of several phases sharing a small complex of broadly general traits. Finally, if a number of sites shared a very generalized linked trait, such as a form of subsistence practice, or a similar settlement pattern type, they could be considered part of a Base (McKern 1939:307).

The immediate benefit of this system was that it theoretically gave archaeologists a standardized way to conceptualize and classify similarities of material cultural types and created spatial delineations that could capture these variations. Instead of just describing traits such as burial practices, house shapes, vessel types and decoration over an area that covered thousands of miles, archaeologists were able to use artifact styles to compare how individual sites related to each other and to other sites in the surrounding region. For example, Griffin (1945) used this method to draw a line between the Virginia and North Carolina Siouan groups based on archaeological and ethnographic evidence. Putting forth an argument that would be elaborated by Coe (1952) a few years later, Griffin suggested that the North Carolina Siouan groups were a “relatively homogenous archaeological culture, which could possibly be placed in a division about the same magnitude as the aspect” (Griffin 1945:327).

Nevertheless, the Midwestern Taxonomic system faced criticism because it did not contain mechanisms that would help determine the chronology of artifacts. As a result, many “phases” or “foci” consisted of groups of sites that had similar “traits” but whose relation in time was not well-defined. McKern was quite forthright about this when he set out the model for the system, stating that the “archaeologist requires a classification based upon the cultural factor alone; temporal and distributional treatment will follow as accumulating data shall warrant" (McKern 1939:303).

While archaeologists in the Middle Atlantic employed McKern’s system, by the mid-twentieth century chronology had become a matter of some importance. This period saw the development of Ford and Willey’s (1941) Southeastern Developmental System classification scheme for the Southeast United States and Griffin’s temporally ordered cultural periods for the United States (Schwartz 1996:3-4; Willey and Sabloff 1993:122). Yet the continuing influence of the MTS in the Middle Atlantic was cemented when Schmitt (1952) combined the Midwestern Taxonomic framework with Griffin’s recently formulated chronological terminology for the eastern United States (Griffin 1952). Schmitt presented his data divided among four of Griffin’s time periods, the now familiar Archaic, Early, Middle, and Late Woodland periods. Schmitt classified sites into periods based on the presence or absence of pottery and pottery attributes that were known to belong to certain periods. He then used traits such as house shapes and refuse pit configurations and types of ceramics, pipes, and projectile points to classify sites into particular components. For example, he grouped two sites into the Potomac Creek focus based on similarities in ceramic types (Potomac Creek ware, crushed quartz gravel temper), pipe types (obtuse elbow pipes with “delicate” dentate stamping), and house structures (Schmitt 1952:63). While some of these boundaries or labels have been modified, as we will see in the next section, others persist and continue to operate in contemporary research.

Coe (1952, 1965) also made use of the MTS to argue for the differentiation of the various Native groups who inhabited North Carolina prior to European arrival. Prior to Coe's work, North Carolina had been viewed as a hinterland between the fabric impressed pottery cultures of the north and the stamped pottery traditions of the south. Griffin (1945) provided some evidence to the contrary, but Coe was the first to clearly demonstrate that there were numerous cultural groups such as the Dan River Focus. This division included sites that contained sand-tempered, net-impressed ceramics, elbow pipes, and a number of different kinds of bone tools. Coe demonstrated that groups in this area were cultural manifestations that needed to be considered in their own right, and not just as various extensions of the north and south. While Coe acknowledged the importance of chronology, he was unable to assign these groups to Griffin's cultural periods due to lack of information. Instead he divided the foci into three phases, the Formative Phase, the Developmental Phase, and the Climatic Phase.

The rise of Processual Archaeology in the later half of the twentieth century instigated a movement to push pass descriptions of shared traits (no matter how systematic they were) to investigate cultures as integrated functional systems. With this movement the Midwestern Taxonomic system fell out of favor in North American archaeology and cultural complexes became the preferred system of cultural delineation. In spite of the critiques of the Midwestern Taxonomic System, subsequent Middle Atlantic researchers continued to use this basic classificatory framework when comparing patterns of material culture well into the last decade of the twentieth century. For example, Slattery and Woodward's synthesis of the relationships between Native groups in the Potomac Valley of Maryland and Virginia was entitled *The Montgomery Focus* (Slattery and Woodward 1992) and employed comparative trade lists to identify different relationships amongst the sites in this area. Additionally, even when labels were altered, as for example, when the Potomac Creek Focus became the Potomac Creek Complex, very little actually changed in terms of the methods used to create these labels. In the next section, I briefly will explain the schema of the cultural complex system.

Cultural Complexes

The move to the New or Processual Archaeology of the 1960s shifted the focus of archaeological inquiry from description of shared traits to gaining an understanding of cultures as dynamic systems that could change over time (Willey and Sabloff 1993:183). Part of this movement included efforts to expand beyond descriptive explanations of archaeological cultures and look at them as dynamic and integrated systems. These systems came to be known as cultural complexes. Clarke (1978) outlined the purpose and utility of cultural complexes in great detail. He stressed that cultural systems were comprised of 'intercommunicating network[s] of attributes or entities forming a complex whole" (1978:43) and that these networks change over time. When defining archaeological cultures, Clarke stressed that archaeologists must be acutely aware of how the dynamic nature of these systems could influence the material assemblages that serve as the basis of comparative research. In his words, an archaeological assemblage "was an associated set of contemporary artifact-types" (1978:245). Following from this, an archaeological culture "is expressed by a group of assemblages containing some of these artifact-types" (1978:246). For Clarke, a key component of these cultures was that the assemblages associated with them dated to the *same time period* and that they shared *multiple* types of material culture.

In terms of creating and conceptualizing social boundaries for prehistoric groups, the cultural complex approach did build on the Midwestern Taxonomic system by explicitly acknowledging both variations over time and the diversity present within broader boundaries that could be caused by variations of different social subgroups. For example, Clarke lists five varieties of subcultures: Ethnic subcultures, Regional subcultures, Occupational subcultures, Social subcultures, and Sex subcultures (Clarke 1978:102). Clarke also encouraged researchers to think about how variation in one part of a system could reverberate in other components because the archaeological culture "maps a real entity that really existed, marking real interconnection" (1978:369).

Although the cultural complex system acknowledged different types of variation, in the Middle Atlantic and elsewhere, as previously noted traditional archaeological cultures continued to serve as the basic unit of description and classification (Jones 1997:29). Renfrew (1972:17 in Jones [1997:29]) expressed the sentiment of the time when he said "the first goal of the preliminary archaeological study must be to identify the archaeological culture in space and time. Only when a culture has been identified, defined, and described is there any hope of taking it apart." There is no question that a primary starting point is necessary to establish a basis for comparison. However, in the Middle Atlantic, this standard had interesting repercussions for archaeological method and theory.

The designation of culture as the basic unit of inquiry, and the association of "archaeological cultures" with "real" units ultimately encouraged Middle Atlantic archaeologists to focus on classes of material culture that could consistently be tied to a "culture." For example, when Holmes (1903), Schmitt (1952), and Coe (1952), and others defined Foci and Phases, they used a variety of criteria such as ceramics, pipe forms, burial patterns, and feature patterns to differentiate between certain cultural groups. One of the often-repeated traits of the Native groups in the vicinity of the Potomac was their production of obtuse angled clay pipes that were often decorated with dentate symbols or lines. Both Holmes (1903, 1914) and Schmitt (1952) used this characteristic to identify the Potomac Creek cultural area or focus. However, once it was discovered that this type of pipe had a broader distribution that extended farther south and into Delaware, beyond the boundaries of the Potomac Creek "culture," the pipes came to be ignored because they were no longer diagnostic cultural markers.

Ultimately, as distributions of artifact classes were found to extend outside of "cultural" boundaries, archaeologists extensively pared down the classes of material culture that could be "reliably" used as diagnostic traits. In essence, ceramic forms came to be seen as the only dependable material cultural class for these types of analyses (Dent 2003; Jirikowic 1995; Kavanagh 1982; Potter 1993**)**. Thus, rather than embracing variation, archaeologists began to eschew variability in favor of consistency or continuity in artifact patterning. What is particularly interesting about the use of one class of material culture as the primary diagnostic type of an archaeological culture is that it directly contradicts Clarke's criteria as he contended that these types of categories should never be based on only one form or type of material culture (Clarke 1978:248). Instead, similarities and interconnections between *assemblages of specific types* were the critical component of the archaeological culture.

Despite these critiques and problems, researchers continue to classify complexes primarily predicated on the distributions of ceramic types. The rough boundaries of the complexes are illustrated in Figure 2.2. It should be noted that the borders between the complexes are purposefully illustrated using "fuzzy" boundaries that fade into each other and overlap rather than solid lines that demarcate separate territories. This serves as a visual reminder of the fact that these boundaries were not impermeable.

The time periods and traits of the different complexes are summarized in Table 2.1. Although most of these complexes are now solely based on the distributions of ceramic types, I have included the rest of what were originally considered to be diagnostic traits to provide a sense of how the classification system worked. Many of these labels are still used in literature published within the last decade.

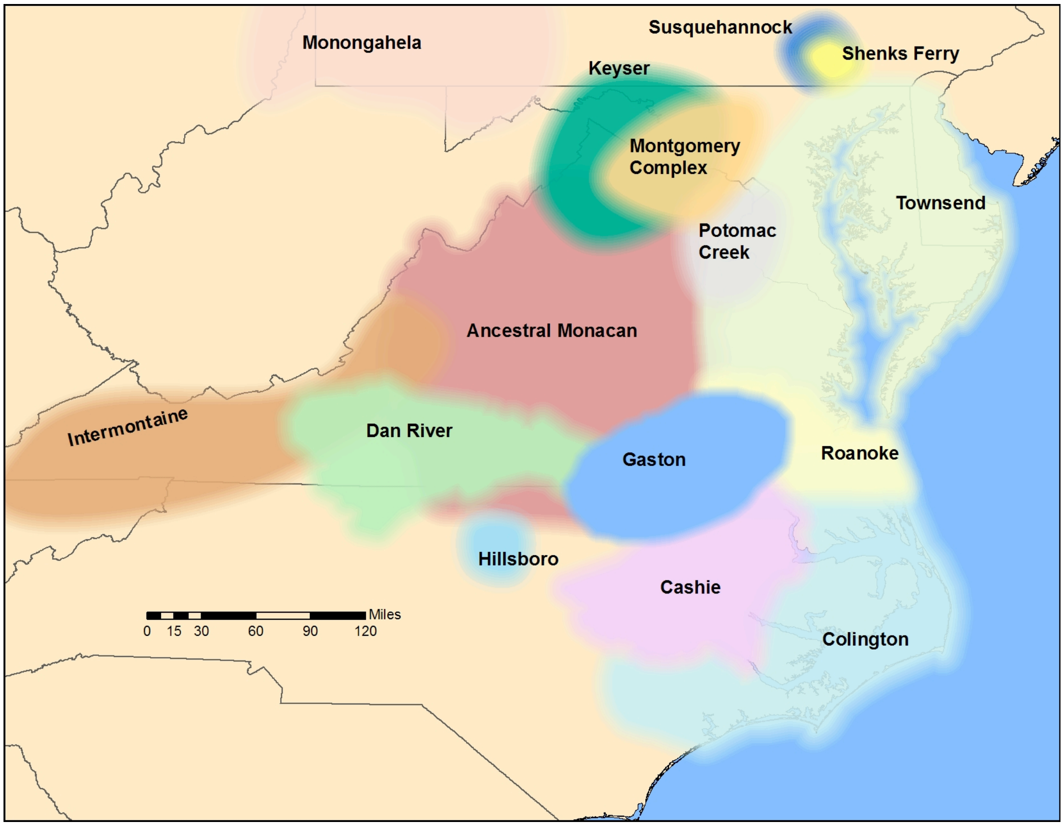


Figure 2.2: Cultural Complexes of the Middle Atlantic Region

Table 2.1: Cultural complex traits

Cultural Complex	Dates	Major Sites*	Ceramics	Burial Practices	Village Configuration	Source
Monongahela	AD 1000-1600	Friendsville (18GA22) Sang Run (18GA23)	Monongahela Ware, limestone tempered and shell tempered, cord-marked		Circular	Mayer-Oakes 1955 Means 2007
Susquehannock	AD 1500-1665	Schultz (36LA2) Washington Boro (36LA8) Strickler (36LA3)	Schultz ceramics shell tempered triangular diamond patterns catellations on rim. Washington Boro phase-ceramics similar to Schultz phase but have effigies&castellations	Individual extended and bundle burials	Unknown	Kent 1984 Jeffpat Diagnostic Ceramics website
Shenks Ferry	AD 1100-1500	Shenks Ferry (36LA7)	Shenks Ferry cordmarked, incised Tempered with soft granite, crushed quartz, chert, and limestone, cord-marked exteriors	Individual Burials		Griffith 1982 Jeffpat Diagnostic Ceramics website
Townsend	AD 1000-1600	Townsend (7S-G-2)	Townsend, shell-tempered fabric impressed with varying kinds of incised	Ossuaries?	Microband basecamp or villages	Custer 1989 Thomas 1973, 1977 Potter 1993

Keyser Complex	AD 1300-1500	Keyser (44PA1) Biggs Ford (18FR14) Hughes (18MO1) Catoctin Creek (44LD14) Martin's Meadow (18WA23) Cabin Run (44WR3) Mason's Island (18MO13) Bowman (44SH1) Miley (44SH2) Quicksburg (44SH3) Moore Village Site (18AG3) Cresaptown Herman Barton (18AG3) Folley Run (18Ga53) Sang Run (18Ga22) Friendsville (18GA23)	Keyser Ceramics tempered with finely crushed mussel shell two distinctive opposing lugs applied to rim area	Primarily Extended Individual Burials	Circular or oval, 100-120m in dia. Permanent, nucleated villages Center of village left open for a plaza (unconfirmed) Villages located on or near floodplains	Mason et al. 1944 Jirikowic 1995 Barber 2008 Gardner 1986
Montgomery	AD 1100-1450	Shepard (18MO3) Kerns (44CK3) Fisher (44LD4) Winslow (18MO9) Hughes (18MO1) Biggs Ford (18FR14)	Shepard Ceramics Quartz&granite tempered cord-marked added collar strips	Flexed burials Individual burials no grave goods	Villiages left open for a plaza	Slattery and Woodward 1992 Kavanaugh 2001 Curry and Kavanaugh 2004
Rappahannock	AD 900-1600	Boathouse Pond (44NB111)	Townsend Ware	Ossuaries	Dispersed Villages	McNett 1975:235

		Last Resort (44NB16) Forest Kitchen Site (44NB44) Small shell midden (44NB147)	Rappahannock Fabric Impressed shell tempered Potomac Creek and Moyane are minority wares	few gravel goods		Potter 1993
Huffman	AD 1000-1300	Huffman (44BA5) Perkins Point (44BA3) Noah's Ark (44BA15)	Page ware - tempered with crushed limestone, cordmarked, or smoothed cordmarked added collar strips	Individual burials	Clustered Villages	Geier 1982 Jeffpat Diagnostic Ceramics website
Dan River	AD 1000-1450	Box Plant (44HR2) Belmont (44HR3) Philpott (44HR4) Koehler (44HR6) Dallas Hylton (44HR20) Stockton (44HR35) Powerplant site (44RK5)	Dan River ceramics Quartz tempered net impressed, cordmarking, smoothing, corncob impressing, brushing	Individual burials with grave goods	Linear commuity of houses & features are strung out parallel to the river, later settlements: circular, stockaded villages, 15-20 circular structures	Coe 1952 Ward and Davis 1993 Davis et al. 1997a,b, c, d, 1998a, b Eastman 1999 MacCord 1996, 2005
Ancestral Monacan	AD 900-1715	Spessard (44FV134) Wood (44NE143) Wingina (44NE4) Monasukapanough(44AB18) Wright(44GO30) Lickinghole Creek	Albemarle ceramics quartz temper lithic temper	Accretional burial mounds	Clustered villages in floodplain	Hantman 1990, 1993, 1998 Gallivan 1999, 2003 Dunham 1994 Gold 2004

		(44AB416)				
Saratown	AD 1450-1600	Early Upper Saratown (31SK1) Upper Saratown (31SK1a) Kluttz (31SK6)	Upper Saratown ceramics fine sand tempered paste smooth or burnished or net impressed surfaces rim notching, finger pinching, and sitck punctation	Shaft and chamber burials with grave goods	Based on Early Upper Saratown	Eastman 1999 Ward and Davis 1993 Ward and Davis 1999
Hillsboro	AD 1400-1600	Wall (31OR11) Jennette (31OR231a) Fredericks Site (31OR231)	Hillsboro ceramics			Coe 1952 Ward and Davis 1993 Ward and Davis 1999
Potomac Creek	AD 1300-1600	Potomac Creek (44St2) Accokeek Creek (18Pr8)	Potomac Creek Tempered with a combination of angular quartz and vertical, horizontal, criss-crossed, and geometric marks applied by impressing single or multiple cords	Ossuary burials	Large palisaded villages	Schmitt 1965 Stewart 1992 Potter 1993 Blanton et al. 1999 Stephenson et al. 1963
Intermontaine	AD 1200-1600	Shannon (44MY8) Trigg (44MY3) Crab Orchard (44TZ1)	New River: Tempered with Limestone/gastrod shell Gastropod shell ware, cord marked/plain	Individual flexed		Egloff 1992 Lapham 2005 MacCord 1996

			Dallas ware Mussel shell ware			
Roanoke/ Nottoway	AD 1350-1600	Great Neck (44VB7)	Roanoke, shell-tempered, simple stamped	Individual burials	Palisaded villages	Hodges 1998
Cashie	AD 800-1725	Hand Site (44SN22) Jordan's Landing (31BR7)	Chickahominy Series Sussex Plain Sturgeon Head Series Hercules Series Branchville Series	Ossuary burial Individual extended and bundled burials with & without goods, Cremations	Palisaded villages	Phelps 1983 Smith 1984 Binford 1964 Phelps and Heath 1998
Colington	AD 800-1600	Broad Reach	Colington ware, shell-tempered, fabric impressed, simple-stamped, plain, and incised	Ossuaries Individual	Palisaded villages	Phelps 1983
Gaston	AD 1200-1700	Gaston (31HX7)	Gaston ware, shell-tempered	Individual with grave goods	Palisaded villages	Coe 1965 Ward and Davis 1999
Sandhills	AD 900-1300	McLean Mound (31CD7) McFayden Mound (31BW67)	Hanover ware tempered with clay or grog	Accretional sand mounds	Unknown	South 1966 MacCord 1966 Irwin et al. 1999 Herbert 2002, 2010

*Not all of these assemblages are included in this study

Problems with Cultural Complexes

Despite the widespread use of cultural complex method, a number of studies in the Middle Atlantic have indicated that ceramic distributions do not reliably "map" onto cultural boundaries. For example, material evidence has demonstrated that it is difficult to classify the inhabitants of sites in southwestern Virginia into one "cultural group" based on ceramic patterns. Although MacCord grouped sites in this area together into the Intermontane culture (1996), based primarily on the distribution of limestone-tempered Radford ware, Egloff (1992:202) demonstrated that the ceramics of this area include three major ceramic traditions, Eastern Woodland, Southern Appalachian Complicated Stamped, and Mississippian Shell Tempered. In addition to the presence of three different ceramic traditions, the mixtures of Eastern Woodland Tradition wares, Albemarle, Radford, New River, and Wythe at numerous sites in this area suggest that the simple one to one correlation between ceramic types and culture is dubious (Egloff 1992:203; Gardner 1986:80-83). Some examples of pottery from southwestern Virginia even exhibit attributes from multiple traditions on the same vessel (Gardner 1986:83). Consequently, Egloff (1992:204) has suggested that it would be more productive to consider other social relationships and ties that might produce such a material pattern rather than obscuring the variation by giving preference to the wide distribution of a particular ceramic type. In a similar vein Steve Davis (2005:xvi) has recently noted that the ceramics at the Gaston site (31HX7) in North Carolina are similar to those associated with both Iroquoian and Siouan traditions, pointing toward close interaction between these groups in the Roanoke River Piedmont.

Other researchers have offered more pronounced critiques of the cultural complex paradigm. Drawing from Hodder (1982) and Shennan (1989:11-24) these archaeologists have questioned the utility of drawing direct relationships between material patterning and particular types of social categories, such as cultures. They have begun suggesting that archaeologists have done enough to establish and describe the basic units and should move towards "picking things apart" (Dent 2003; Egloff 1992; Means 2003). Additionally there is a growing consensus that archaeologists working in the region should give more consideration to the kind of units they are defining and more attention to the variation within those units. For example, Means (2003) has suggested that the boundaries of cultural complexes are useful analytical tools for looking at variation, but that it is dangerous to perceive them as actual social units. Dent (2003) demonstrated that variability in house patterning at the Winslow site had been obscured because of a particular focus on one pattern that linked it to other Montgomery Complex sites. Dent explored how changes over time in house patterns at the site could provide information about changing social structures and family relations taking place at the site throughout the Late Woodland period. These two studies demonstrate that there is still much variation to be explored in the Middle Atlantic that lies within the boundaries of cultural complexes.

While boundary maintenance and long term continuity has been paramount and is important, a goal of this dissertation is to evaluate how pipes relate to the presence of internal groups and boundary variation. In the next section I will provide a brief synthesis of previous research that has investigated the internal variation present within cultural complex boundaries to introduce some alternative social contexts and networks that could also have impacted pipe production and use.

Previous Archaeological Investigations of Intra-Societal Groups

Researchers mark the Late Woodland transition as the point at which Native groups in the region began to adopt more sedentary lifestyles that were more adapted to local settings (Binford 1964; Dent 1995; Egloff and Woodward 1992; Gallivan 2003; Gardner 1986; Phelps 1983; Potter 1993; Turner 1986; Slattery and Woodward 1992; Ward and Davis 1999). As previously mentioned, however, this transition did not happen suddenly or at the same rate throughout the region. In the early centuries of the Late Woodland (A.D. 900-1200), many Native societies in the Middle Atlantic continued to live a fairly mobile lifestyle. In much of the region, smaller hamlet-sized settlements, comprised of a few households or family groups, remained a common form of occupation although some larger villages were established (Egloff and Woodward 1992; Gallivan 2003; Gardner 1987; Potter 1993; Ward and Davis 1999).

Until the thirteenth century it is generally thought that the divisions of tasks and status in Native communities in the region were determined by gender and age with no institutionalized political hierarchy. Rather, in many societies daily interactions were likely managed through heterarchical relations instead of hierarchical ones (Eastman 1999; Potter 1993; Rountree 1992). However, archaeologists have only recently started exploring how the material record can provide information about social divisions besides political hierarchy.

One of the most common methods of investigating gender in the archaeological record is to look for the presence of “gendered objects” in burials. This movement draws from more classical studies that identified objects strongly associated with a certain gender. For example, projectile points and weapons have typically been identified as "male objects" based on their internments with males while shell ornaments, domestic tools and ceramics are often associated with women. Although the identification of "gendered" objects provides valuable insights into the activities and practices of gender groups, and instigated a movement towards gaining a better understanding of women's roles in Native societies, some researchers have suggested that we need to complicate what is seen as too simple of a dichotomy between "male" and "female" objects (Arnold and Wicker 2001).

Consequently, more recent studies have considered how gender roles were actively constructed, negotiated and reinforced by mortuary rituals (Driscoll et al. 2001; Eastman 1999, 2001; Lapham 2005; Ward and Davis 1993). For example, Eastman (1999) in her analysis of burial goods recovered from sites associated with the Sara and other protohistoric Siouan speaking groups in the Dan River area of Virginia and North Carolina took a step beyond identifying which objects were associated with each gender. She also examined variations within each gender according to age group differentiations and noted that the types of artifacts interred with women of child-bearing ages differed from those buried with elder women. She suggested that this shift in mortuary objects could be related to changes in the expectations and roles played by women at different stages of their lives. Additionally, burial evidence has been used to argue that the introduction of the fur trade provided new opportunities for certain gender and age groups to define a new role for themselves in Native society. Lapham (2005) observed that the inclusion of European trade items, including clay pipes, with young adult male burials at the Trigg Site in Montgomery County, Virginia, represents a societal shift as pipes were only included in elder male burials prior to the Protohistoric and Contact periods. These studies demonstrate that Native groups were undergoing internal shifts and changes throughout the Late Woodland and Early Contact Periods. The conclusions of these researchers show that moving beyond simple dichotomies and a homogeneous conception of culture can provide a great deal of insight into how social roles were fluid and dynamic in Native societies.

In tandem with the flourishing of agriculture in the Middle Atlantic in the thirteenth and fourteenth centuries came the development of hierarchical political systems, primarily in the form of chiefdoms. While some have argued that these political systems arose as an organized response to European settlement (Turner 1976) it is clear that in many areas political hierarchical systems were in place well before the arrival of the Europeans (Gallivan 2003; Hantman 1990; Potter 1993; Rountree and Davidson 1997; Rountree 1992; Ward and Davis 1999). As archaeologists became more interested in the rise of social hierarchy a number of researchers began to investigate material markers of social position. One of the most prevalent methods for determining social position has been examining burial contexts for the presence or absence of burial goods. Certain types of burial goods, such as nonlocal objects, have often been interpreted as markers of the deceased's status or rank in society. For example, multiple studies have discovered and reinforced the idea that copper was a restricted material among Algonquian groups on the Atlantic coast of Virginia, particularly those of the Powhatan chiefdom (Hantman 1990; Mallios 2006; Potter 2006; Rountree (ed). 1993). Consequently, burials found to have copper objects were considered to be persons of some importance in Algonquian society (Potter 2006[1989]). Shell beads produced from *Marginella* shell found on the Atlantic coast are also considered to be prestige items because they circulated throughout a long distance trade network that extended from the coast well into the interior Ridge and Valley province (Barber 2003b; Rountree (ed.) 1993). Interestingly in the Piedmont and Coastal Plain they are often associated with females and subadults rather than males (Eastman 1999; Phelps 1983; Ward and Davis 1993).

Besides the inclusion of certain objects, archaeologists have also tended to categorize burials with a large number of grave inclusions as high status individuals (Carr 1995). For example, among the Susquehannocks, Cadzow (1936) hypothesized that individuals who had multiple burial goods were likely individuals of high status. Following this logic, graves without a number of grave goods have been considered to be those of the "common classes." However, some forms of communal burial interments, such as ossuaries, complicate this argument. Ossuaries were communal burial pits filled with human remains that had been initially interred elsewhere and were transported to a different site for final interment. Although many archaeologists have noted the general lack of artifacts associated with these contexts (Curry 1999; Loftfield 1987, Phelps 1980, 1983; Ward and Davis 1999), shell beads, bone tools, and other items, such as a panther mask, and the phalanges of *Felis* have been found (Curry 1999; Gallivan et al. 2009; Hutchinson 2002; Jirikowic 1990; Loftfield 1990; Phelps 1984; Ward and Davis 1999). Some have argued that the lack of grave goods indicates these are burials of commoners (Jirikowic 1990; Phelps 1984) but others have argued that there is not enough evidence to make this determination (Mathias 1993; Ward and Davis 1999). Curry (1999) and Phelps (1984:8) have interpreted these objects not as markers of status differentiation but as "sentimental inclusions with individuals" which provides another venue for thinking about the relationship between the living and the dead that is signaled in these contexts.

The burial sequences of many of the accretional mounds located in the northwestern Virginia complex also indicate that Siouan groups may not have signaled status specifically with burial inclusions. The earliest burial sequences in these mounds begin with submound internments of individuals that do contain artifacts, which may be related to certain social roles (Dunham 1994). However, by the fifteenth century, interred individuals are intermingled in compact bone beds. Dunham (1994:892-902) and Gold (1998:311) have argued that this shift was likely linked to larger social efforts to mediate social differences that were being introduced into the society as social inequality was becoming more evident. Although important individuals were likely buried in these mounds they were not marked with conspicuous objects. Rather their remains were intermingled with other members of their community, which eliminated any sign of the social differentiation they may have had in life.

Summary and Conclusions

In this chapter I outlined the developmental history of cultural complexes in the Middle Atlantic. I have demonstrated that although these boundaries are relevant, the methods used to draw them and the way they are depicted continue to be a source of debate. Although archaeologists initially employed these methods to create a more systematic way of dealing with variation, these techniques tend to focus on patterns that are believed to relate to large-scale cultural or ethnic boundaries and focus on between group variations rather than within group differences. The material investigations of gender, age, and status synthesized above demonstrate that the social landscape of the Middle Atlantic was more dynamic and complicated than the picture portrayed by mapping cultural complexes. There is a great deal of evidence that indicates the presence of social diversity and variation that is not captured by a focus on large scale boundaries and long term cultural continuity.

Although the use of cultural phases or complexes remains one of the most prevalent ways of tracing boundaries in the Middle Atlantic, these delineations are not the only method archaeologists have used to identify social groups in the Middle Atlantic. In addition to cultural complexes, researchers have suggested that physiographic variation in the region at times served as a physical and social boundary marker that impacted the distributions of artifacts and settlements left behind by Native groups. I will now shift from cultural complexes to consider how archaeologists have used physiographic provinces as their analytical units consider social groups.

Chapter 3 : Physiographic Provinces as Cultural Units

Introduction

In the last chapter I focused on how the interpretative frameworks of cultural areas and cultural complexes have influenced archaeological interpretation and the depiction of Native groups in the Middle Atlantic. In this chapter I will focus on another interpretative framework archaeologists have used to examine social dynamics, environmental variation. I argue that in a manner similar to cultural complexes, it has also become a convention in the Middle Atlantic to view different regional environmental territories, known as physiographic provinces, as cultural units. I will show how this conventional system is problematic by underscoring research that focuses on the variability present within similar geographic territories. Furthermore, I will emphasize research that shows geographic boundaries were permeable. I will demonstrate that considering variability between different geographic territories is necessary but it is also important to acknowledge that these boundaries were not impenetrable nor did they ultimately define the practices of Native societies living within their borders.

Physiographic Provinces

Another consequence of the shift to "New Archeology" in the 1950s and 1960s was that archaeologists working in North America became increasingly interested in discerning the dynamic connections between nature and culture. In the 1960s, archaeologists embraced human ecology studies as they centered their attention on the functional systems of prehistoric groups (Willey and Sabloff 1993:152). This expanded the focus from artifact patterns to include settlement patterns and subsistence studies.

Archaeologists charting this variation in the Middle Atlantic primarily used geographic regions called physiographic provinces as the basis for their comparisons. A physiographic province is a landform region, an area delineated according to similar terrain that has been shaped by a common geologic history. The five physiographic provinces that run north and south through the Middle Atlantic region are, from east to west, the Coastal Plain, the Piedmont, the Blue Ridge Mountains, the Ridge and Valley, and the Appalachian Plateau. These five provinces that pertain to the study area of this project are illustrated in Figure 3.1. I will briefly summarize some of the defining attributes of each of these provinces.

The Coastal Plain

The Coastal Plain runs along a north/south line beginning in Alabama and extending to New York. It begins at the coastline of the Atlantic Ocean and runs west until it reaches an area where the softer sediments meet the more robust granite of the Piedmont. This line is marked by a sharp and rugged runoff of the major rivers flowing from the mountains, through the Piedmont, and into the Chesapeake Bay and it is known as the Fall Line (Hantman and Klein 1992:140). The Chesapeake Bay divides the segment of the Coastal Plain that runs through Virginia, Maryland and Delaware into two sub-regions, the Eastern shore and Western shore. The Eastern shore is bounded by water on both sides and is peninsular in shape. The Western shore runs from the western edge of the Chesapeake Bay to the Fall Line. The former is also generally subdivided into the inner and outer Coastal Plain based on variations in topographic relief (Dent 1995:70). The eastern edge of the Coastal Plain that runs through the Carolinas is lined with barrier islands called the Outer Banks that form a barrier between the Atlantic Ocean and inland waterways and support sand dune and maritime forest habitats.

The topography of this province varies because the foundation of this province, a basement of mica-gneiss, has eroded and slopes steeply from the Fall Line. Consequently, the unconsolidated sediments of sand, clay, and gravel that eroded from the Appalachian highlands and lie on top of this foundation slope gently seaward from the Fall Line to the coast (Vokes and Edwards 1974:47-56 in Dent 1995:72). The soils of this province are sandy, light textured, easily worked and well-drained. These light soils warm up quickly in the spring and are less sensitive to early frosts, permitting longer growing seasons (Binford 1964:112).

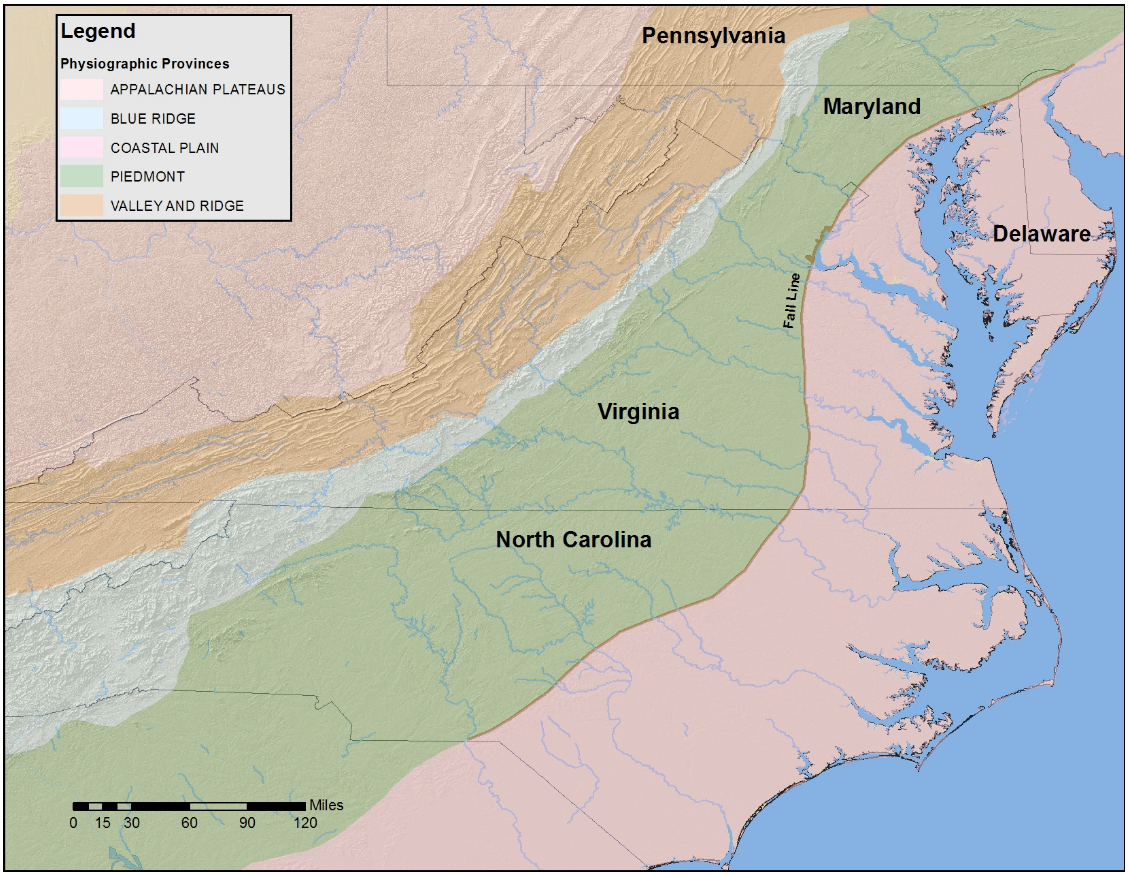


Figure 3.1: Physiographic provinces of study area

The Coastal Plain is characterized by a temperate, deciduous environment and is one of the world's most diverse estuarine settings (Dent 1995; Klein 1994; Turner 1992). Along the Western shore, the Susquehanna, Northeast, Brush, Gunpowder, Patapsco, Magothy, Severn, South, Patauxent, Potomac, Rappahannock, Payankatank, York (and its tributaries the Mattaponi and Pamunkey), and James (and its tributaries the Elizabeth, Nansemond, Chickahominy, and Appotomattox) rivers all empty into the estuary of the Chesapeake Bay. The major tributaries on the Eastern shore include the Sassafras, Chester, Choptank, Nanticoke, Wicomico, and Pocomoke rivers. Further south the Blackwater, Nottoway, and Meherrin rivers flow into the Carolina sounds.

The Piedmont

The Piedmont province extends from southern New York to Alabama. In the Middle Atlantic it runs west from the Fall Line and shares its western border with the Blue Ridge Mountains. At its northernmost point it is fairly narrow but widens as it moves south. Landforms are characterized by rolling hills and valleys. The province's vegetation is variable, but is generally considered to be dominated by oaks, hickory, and pine forests (Braun 1950:259). The region also boasts fertile, well-drained alluvial soils that are well suited for maize agriculture (Gallivan 2003; Hantman and Klein 1992; Holland 1978; Klein 1994; Ward and Davis 1999). A number of major rivers run west to east through this province, including the Susquehanna, Shenandoah, Potomac, and James. Additionally the sources of the Roanoke and Chowan rivers are located in the Piedmont of Virginia and run through the North Carolina Coastal Plain to meet the Atlantic Ocean. The Tar and Neuse arise in eastern portion of the North Carolina Piedmont as does the Cape Fear River, although its source is farther south. The portion of the Susquehanna occupied by the Susquehannocks and Conestoga also follows on a southeast trajectory through the Piedmont into the Coastal Plain before it empties into the Chesapeake Bay.

In contrast to the Coastal Plain, there are a number of geologic formations in the Piedmont that are comprised of quartz, gneiss, and schist, with some quartzite, granite and granite gneiss. Steatite and copper also occur locally in the Piedmont (Dietrich 1970:20). Materials such as jasper or chert do not occur locally although nodules or "float chert" in the form of cobbles was transported from the Ridge and Valley province by rivers in the form of river gravels (Hantman 1987).

The Blue Ridge

The Blue Ridge is a mountain chain that runs north/south in between the Piedmont and Ridge and Valley provinces. It begins at the Hudson River in New York and narrows to a point nearing Reading, Pennsylvania. It is then interrupted by a gap some fifty miles in width and then reappears at South Mountain near Carlisle, Pennsylvania. Here the ridge is a narrow chain of mountain peaks and only about 1,000 feet in height. Southward the altitude increases until about thirty miles south of the Potomac River. This area is known as the Roanoke Gap. South of the gap, the Blue Ridge widens into a high plateau. In North Carolina the Blue Ridge province continues to widen and essentially becomes a mass of minor ranges. It includes all of far western North Carolina, along with portions of eastern Tennessee, southwestern Virginia, northeastern Georgia, and northwestern South Carolina. The portion that runs from southwestern Virginia to northeastern Georgia, which is the broadest and most rugged extent of the mountain terrain, is termed the Southern Blue Ridge (Thornbury 1965). This area is largely drained by the tributaries of the Tennessee River. In contrast to the other physiographic provinces, however, these streams lack wide alluvial plains, such as those associated with rivers and tributaries of the Piedmont province. Consequently, unlike the other provinces discussed, the topography of the Blue Ridge does not support dense agriculture. Few archaeological studies and surveys have yet to identify any Late Woodland or Contact period sites in this area. In North Carolina, however, the Cherokee and their ancestors carved out a living in this region (Dickens 1976).

The Blue Ridge is characterized by a diverse set of microenvironments, including mountain slopes, terraces, and valley floors, all of which can vary in the amount of rainfall they receive and their mean annual average temperatures (Dickens 1976:6;

Peattie 1943; Shelford 1963). Soil types also vary, with alluvial and erosional soils found on low lying terraces and valley floors and more mature soils found at higher elevations. The region also exhibits a diversity of forest types, with oak-chestnut and oak-pine forests occupying intermediate slopes, rolling hill country, and intermontaine basins and northern hardwoods and spruce-firs occupying higher elevations.

The Ridge and Valley

The Ridge and Valley or Valley and Ridge province, lies west of the Blue Ridge Mountains. It extends from southeastern New York through northwestern New Jersey, westward into Pennsylvania and southward into Maryland and Virginia. Its arc extends westward so that it is not contained within the borders of North Carolina. Peaks and valleys characterize the Ridge and Valley province. These ridges and valleys run from northeast to southwest with river drainages running in several directions. The sources of the Shenandoah, James, and Roanoke rivers are located in the section of this province contained in Virginia. Other rivers that make up the headwaters of the Tennessee, such as the Powell, Clinch, and Holston, flow through southwestern Virginia.

Sedimentary rocks serve as the parent material for this province (Frye 1986). The ridges and valleys that flow through this province were created when the Continental collision in the late Paleozoic produced a fold and thrust belt which thrust the rocks that comprised the Blue Ridge Province to the northwest and on top of the sedimentary Paleozoic rocks. Silurian sandstones underlie the ridges. These sandstones erode less easily than the shales and carbonates that underlie the valleys (Frye 1986). The Great Valley, which extends from northern to southwestern part of Virginia, is also considered an important part of this province. The Great Valley consists of upland valleys and ridges that vary from 1000 to 2000 feet in elevation. The soils of this region are fertile in the bottomlands. This province is also a rich source of cryptocrystalline lithic materials, including jasper, chalcedony, and chert.

Geophysical Boundaries as Cultural Units

Archaeological comparisons of the region have generally focused on the Native groups living in the Coastal Plain, Piedmont, and Ridge and Valley and have taken many different forms. However, in a manner similar to cultural complexes, archaeologists have tended to view physiographic provinces as bounded cultural units, especially during the Late Woodland period (Gallivan 1999:6). This was due in part to evidence from ethnographic and historical research that indicated different linguistic groups likely occupied the different physiographic territories. Three different language families are thought to have occupied the territory now known as the Middle Atlantic region during the Late Woodland and Contact periods. In general, the territories of these three groups have often been loosely aligned with physiographic boundaries during the Late Woodland and Contact periods although the farther one continues back into the Late Woodland the certainty of these demarcations becomes more ambiguous. Groups speaking different Algonquian dialects are thought to have inhabited the Coastal Plain stretching from New York to North Carolina (Goddard 1978; Holmes 1903). Siouan-speaking peoples lived in the Piedmont region of Virginia and North Carolina (Mooney 1894; Sturtevant 1958; c.f. Miller 1957 for an alternative view) and the Coastal Plain of southeastern North Carolina (Irwin 2004; Irwin et al. 1999; MacCord 1966). The Iroquois occupied areas of the Piedmont in Pennsylvania (Boyce 1978; Cadzow 1936; Fenton 1978; Holmes 1903; Lounsbury 1978; Tuck 1978) with a few isolated groups inhabiting the inner Coastal Plain of southern Virginia and northern North Carolina (Binford 1964; Boyce 1978, Lawson 1967). Figure 3.2 illustrates the general locations of these language families based on information from these studies, compared with physiographic boundaries.

In general, archaeologists have drawn from ethnohistoric and linguistic studies to support their interpretations that variation in material culture from different physiographic provinces is indicative of these boundaries serving as cultural units. For example, researchers attributed variations in ceramics recovered from both sides of the Fall Line in Virginia and North Carolina to differences in the linguistic groups occupying these areas (Egloff 1985; Turner 1978). As early as 1903 Holmes noted that ceramics from sites in the vicinity of James, Dan, New, and Yadkin rivers in the Piedmont of Virginia and North Carolina exhibited characteristics that differentiated them from those found in coastal areas. These attributes included "rudely shaped handles, short, slightly constricted necks, and frequent occurrence of a thickened collar, sometimes slightly overhanging marked with cords and cord indentings" (1903:149). Evans (1955) noted that the ceramics from the Piedmont of Virginia shared a number of characteristics including quartz temper and similar surface treatments. He grouped these ceramics into one category called Albemarle ware. Due to its association with Piedmont sites, Albemarle ware is typically associated with Siouan speaking groups living in the Piedmont. In the early half of the Late Woodland groups in the Ridge and Valley produced similar quartz-tempered ceramics (Gardner 1986) although by the later half of the Late Woodland the predominance of shell and limestone tempered ceramics contrasts with ceramics found in the Piedmont.

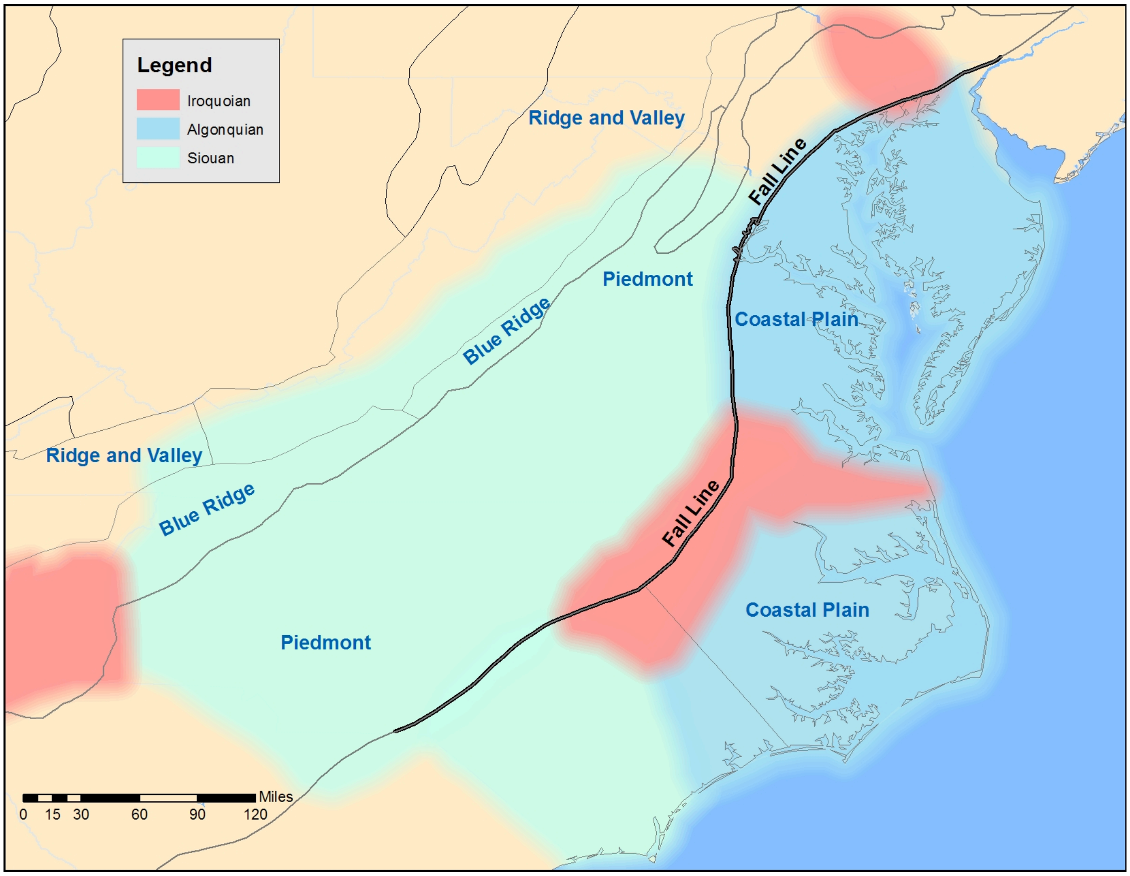


Figure 3.2: Language families compared with Physiographic boundaries

In contrast shell-tempered Townsend wares, with geometric decorations predominated sites on the Coastal side of the Fall Line. Townsend ware, and ceramics series within this ware type, such as Rappahannock (formerly known as Chickahominy ware) are thought to be an indicator of Algonquian groups (Custer 1986; Evans 1955; Holland 1966; Holmes 1903; Potter 1993; Turner 1992, 1993). Townsend has a wide distribution beginning in northeastern Virginia and extending to the Delmarva Peninsula of Delaware, which are areas associated with Algonquian speaking groups during the historic period. The abundance of Townsend on the eastern side and Albemarle wares on the western side has been used to argue that the Fall Line was a cultural and natural barrier (though a permeable one) between the Algonquian speaking groups who lived in the Coastal Plain and the Siouan speakers of the interior Piedmont for a millennia or more (Egloff and Potter 1982; Evans 1955; Holland 1966; Mouer 1983).

Besides Townsend ware, shell-tempered Colington wares (Herbert 2002; Phelps 1983, 1984) found on sites along the Albemarle drainage of the outer Coastal Plain of North Carolina are associated with Late Woodland and Contact period Algonquian-speaking peoples. Colington wares exhibit a variety of surface treatments, including fabric impression, simple stamping, and plain surfaces but little decoration. In contrast, variations of temper and surface treatments (most notably simple stamping) found on ceramics from the inner Coastal Plain are considered to be material evidence that these areas are associated with Iroquoian, rather than Algonquian speakers. Many of the ceramics located in the inner Coastal Plain of Virginia and North Carolina are classified as quartz-tempered Cashie ware (Binford 1964; Phelps 1983; Phelps and Heath 1998; Smith 1984). However, Gaston and Roanoke wares, which are found on sites located in the outer Coastal Plain also exhibit simple stamping. Lithic-tempered Gaston ware has also been associated with Iroquoian speakers, probably the Nottoway or Meherrin (Coe 1965; Ward and Davis 1999).

The presence of communal ossuary burials located up and down the coast has also been used to argue that the Coastal Plain was the territory of Algonquian-speaking and Iroquoian-speaking Native groups in the Woodland period (Curry 1999; Jirikowic 1990; Potter 1993; Rountree 1992). Archaeologists have used ethnohistoric records (Feest 1978a, 1978b, 1978c; Mook 1944; Smith 1986; Tooker 1964) to tie the ossuaries in the region to different Algonquian and Iroquoian speaking groups occupying areas up and down the coast such as the Powhatan, Huron, Piscataway, and Lenape (Boyd and Boyd 1992; Curry 1999, 2009; Hutchinson 2002; Hutchinson and Aargon 2002; Jirikowic 1990; Loftfield 1990; Mathias 1993; Phelps 1983, 1984; Ubelaker 1974; Ward and Davis 1999). Like Algonquian speaking groups, Iroquoian groups such as the Nottoway and likely the Tuscarora and Meherrin located in southeastern Virginia and northern North Carolina, buried their dead in ossuaries and treated people of importance differently at death by interring their remains in a quiocosin or mortuary house (Boyce 1978:285; Lawson 1967:188-189, 219; McIlwaine 1925-1945, 3:98). One major physical difference between these burial types is that Algonquian ossuaries generally interred hundreds of people (Curry 1999; Jirikowic 1990; Ubelaker 1974) while Iroquoian ossuaries tended to inter only a few individuals, possibly family groups (Hutchinson 2002; Mathias 1993; Phelps 1983, 1994).

In contrast to ossuaries Siouan-speaking groups in the Piedmont and Ridge and Valley entombed their dead in accretional mound burials (Bushnell 1920; Fowke 1894). Dunham (1994, Dunham et al. 2003) and Gold (2004) have contended that the mounds in the Virginia Ridge and Valley and Piedmont can be tied more specifically to the Monacan groups who inhabited the area (but see c.f. Boyd 2004 for an alternative view). The burial practice of accretional mounds was also used in the southeastern Coastal Plain of North Carolina, which is also believed to have been occupied by Siouan-speaking peoples (Irwin et al. 1999; MacCord 1986, 1996).

Variations in house shapes between different physiographic provinces have also been interpreted as material evidence of linguistic differences between the groups occupying the provinces. The predominance of longhouses on Coastal Plain sites have been tied to Algonquian-speaking peoples (Holmes 1903; Hodges 1998; Turner 1992). On the other hand, excavations of Piedmont sites in Virginia (Davis et al. 1997a, 1997b, 1997c, 1997d, 1998a, 1998b; Gallivan 2003; Gallivan 1997, n.d.; Hantman and Klein 1992; MacCord 1974) and North Carolina (Davis et al. 1997a, 1997b, 1997c, 1997d, 1998a, 1998b; Ward and Davis 1993, 1999) determined that the peoples living in these areas primarily built circular houses.

Apart from ceramics and burial forms, differences in the size and internal orientation of settlements have also been noted between the different physiographic territories. While Middle Woodland groups are considered to have been fairly mobile (Blanton 1992; Custer 1984; Potter 1993; Ward and Davis 1999), with the commencement of agriculture during the Late Woodland, many Native groups stopped traveling between macrobase camps and smaller seasonal camps and settled permanently in larger villages along major rivers or in river drainages. In some cases archaeologists have suggested that certain aspects of settlements were dependent on particular elements of the surrounding environment. In particular, archaeologists have tended to attribute the size, location, and configuration of settlements as at least partially determined by the environmental territory groups were living in. For example, Binford (1964), Smith (1984), and Potter (1993) demonstrated that in certain areas along the Coastal Plain, groups settled in dispersed rather than condensed villages where buildings were located in close vicinity to each other. This contrasts with settlement patterns in the Piedmont, where groups generally settled in nucleated villages located in the floodplains of major rivers (Davis et al. 1997a, 1997b, 1997c, 1997d, 1998a, 1998b; Hantman 1985; Holland 1978; Ward and Davis 1993). Binford (1964) suggested that this difference was likely because the fertile soil of the Coastal Plain is not limited to the terraces of floodplains as it is in the Piedmont. Rather, groups could spread out to maximize the fertile soils in a particular area.

Finally, in addition to comparing variations in material culture with physiographic boundaries, archaeologists have also tied variations in levels of social complexity of the different groups occupying these areas to differences in environmental territories. In particular, Gardner (1986) and Custer (1994) emphasized the link between variation in the physical environment of the region and cultural variability. They argued that environmental differences between the physiographic provinces were the primary factors that influenced social and settlement configuration of the Native groups inhabiting these areas because of the different types of resources available. In a similar vein, Mouer (1981) postulated that differences between the environments of the Piedmont and Coastal Plain in Virginia led to differences in socio-political development of the Monacans and Powhatan. He suggested that the greater capacity for maize production and storage allowed the Powhatan to organize into a more complex chiefdom than the Monacans, who were perceived to be hunter-gatherers. Consequently, archaeologists have used a combination of ethnohistoric, linguistic, and material evidence to cement the view of these geographic units as cultural entities.

Breaking Down the Barriers

Despite the tendency to affiliate physiographic provinces with cultural units, additional evidence demonstrates that there is a great deal of variation within and overlap between the material culture of these different geographic territories. Perhaps the best example of this is the uncertainty that surrounds the linguistic and cultural affiliation of the Native groups occupying the Ridge and Valley. While the associations of Siouan groups with the Piedmont and Iroquoians and Algonquians with the inner and outer Coastal Plain are fairly well-accepted, the language affiliations of the people occupying the Ridge and Valley province are less well-known. Ethnohistoric records of the people occupying this territory are scarce because so few explorers or settlers arrived in the area prior to the mid-to-late seventeenth century, long after many Native communities had abandoned their villages. The available material evidence, however, suggestions a number of different groups occupied the area. Archaeologists (Egloff 1987, 1992; Jeffries 2001; Meyers 2011; Walker and Miller 1992) have noted that material evidence suggests a variety of Native American societies likely occupied the southwestern Ridge and Valley of Virginia. For example, multiple ceramic wares with varying attributes, including Radford, New River, Dan River, and Wythe are found on Ridge and Valley sites (Egloff 1987, 1992). Evidence in the form of platform mounds (Meyers 2011) with interments of marine shell masks and gorgets that exhibit motifs matching those from Mississippian contexts further south and east (Brain and Phillips 2005; Egloff 1987) along with the presence of complicated and stamped ceramics (Egloff 1992) has been used to argue for connections between Middle Atlantic Ridge and Valley groups and Mississippian peoples.

It is also likely that Siouan-speakers culturally affiliated with the Monacans occupied parts areas of the Ridge and Valley (Gardner 1986; Hantman 1998; Lapham 2005; Walker and Miller 1992). Egloff (1992) has suggested that ceramic patterns in southern Virginia indicate that the groups living in the Ridge and Valley and Piedmont shared a common social bond, perhaps that of a shared language. Moving north, areas of Ridge and Valley in west-central Virginia that show evidence of accretional mound burial are attributed to Siouan groups who were linked to those in the Piedmont (Dunham 1994; Dunham et al. 2003; Gold 1999; Hantman 1990, 1998). Lastly, archaeological information suggests that the far northern territory of the Ridge and Valley was a confluence of different cultural influences from the Fort Ancient and Monongahela cultures to the north (Egloff 1987; Gardner 1986; Pollack et al. 2002). Thus it is likely that the Ridge and Valley had a number of different language families and dialects present within its boundaries.

Additionally, although archaeologists have accepted that certain aspects of the environment impact settlement creation and agricultural development they do acknowledge that environmental variation does not always directly translate to differences in social complexity. For example, Hantman (1990) countered Mouer's (1981) interpretation of the socio-political differences between the Monacan and Powhatan as environmentally determined by showing that the English depiction of the Monacans as hunter-gatherers is unfounded. Hantman's work and that of others (Barber 2003; Dunham 1994; Gallivan 2003; Lapham 2005) has shown that the Monacans did have a complex socio-political system that transcended the physiographic boundaries of Piedmont and Blue Ridge.

Moreover, similarities in settlement patterns and material culture are shared across physiographic provinces. For example, the coalescence into villages along major rivers or tributaries is found throughout all of the physiographic provinces in Maryland and Virginia (Hantman and Klein 1992; Holland 1978; Gallivan 2003; Kavanaugh 1983;

Klein 1986; Mouer 1983; Potter 1993; Turner 1992; Walker and Miller 1992). A number of researchers have suggested that groups relocated to these areas so they could take advantage of the alluvial deposits and fertile soils as agriculture took on a more prominent role in their subsistence systems. Nevertheless, this pattern did not repeat everywhere. Late Woodland villages in the southwestern area of the Virginia Ridge and Valley were not only located on floodplains but also on gently sloping valley floors, ridges, hills, and plateaus (Egloff 1992; Holland 1970:114). Archaeologists have suggested that this is linked to two environmental conditions. The first is that colluvial upland soils formed by nearby limestone, sandstone, and shale deposits often have more potential to be agriculturally productive than the alluvial deposits found on the floodplain. The second is that areas at the heads of major river drainages or in-between ridges could have been strategic positions to control certain trade networks (Bott 1981:38-45; Egloff 1992:211-212).

Additionally, Custer (1986) has argued, based on archaeological evidence, that Late Woodland Native groups occupying the Coastal Plain in northern Delaware often maintained their settlements in the same areas as more mobile Middle Woodland groups, which were not always associated with the most fertile soils in the area. Custer (1986) has suggested that this was due to the fact that maize agriculture was apparently only of limited importance in the northern areas of Delaware. In contrast, Thomas (1973, 1977) found evidence that Native groups occupying the southern Coastal Plain of Delaware during the Late Woodland conglomerated into larger macrobase village sites that were often located on the floodplains of major drainages. More permanent houses and larger storage pits were built, but societies maintained seasonal patterns of movement between coastal and interior settlements.

Analogous to the Ridge and Valley, more recent research has focused on the diversity of ceramics and settlement patterns present in the Coastal Plain. In addition to Townsend, the presence of other ceramic types that have also been recovered along the coast, including the sand/crushed quartz tempered Potomac Creek ware in northern area of the inner Coastal Plain (Egloff and Potter 1982:112; Schmitt 1952) and shell-tempered Roanoke ceramics found in the outer Coastal Plain of southeastern Virginia (Hodges 1998) shows there was intra-province variability. Moreover, Davis (2005) has noted that Gaston ceramics exhibit similarities that can be tied to both Iroquoian and Siouan traditions, suggesting that communication between these groups was traversing the Piedmont/Coastal Plain divide. More generally, Gallivan et al. (2008) have noted that simple-stamping of ceramics seems to cross linguistic, cultural, and geographic boundaries to a considerable degree after AD 1400 and that its presence should be considered a marker of interaction rather than Iroquoian identity or influence.

These examples demonstrate that Native lifeways within physiographic boundaries were diverse. Natives adjusted the ways they interacted with the environment depending on the circumstances they were facing. While physiographic boundaries provide one way of considering the variations found in settlement patterning and material culture, it is also clear that there is a great deal of diversity within these larger boundaries. There were not customs or conventions that were ideal for each physiographic province. Native groups occupying these areas operated in ways that allowed them to take advantage of local resources.

In addition to variation within physiographic provinces, it is clear that groups were traversing these boundaries to procure necessary or desirable resources that were not locally available. Although the Middle Atlantic region is divided into multiple environmental and cultural territories, a number of rivers simultaneously cross-cut and connect these territories (Figure 3.3), creating opportunities for individuals and materials to cross-cut environmental boundaries as well. In addition to settlement and agricultural patterns, exchange networks have became a focal point of research in the last decades of the twentieth century (Barber 2003; Custer 1986, 1989, 1994; Dent 1995; Eastman 1999; Gallivan 2003; Lapham 2005; Potter 1993; Reinhart and Hodges 1992; Stewart 1989, 1994, 2004; Turner 1978; Ward and Davis 1993, 1999). Consequently archaeological investigations have also focused on the role geophysical boundaries played in the material production and social relationships of different groups. I will briefly synthesis the results of these studies as they expand the interpretative framework I will use to examine pipe variability.

Traversing Boundaries: Trade and Exchange

Stewart (1989, 1994, 2004) has provided the most comprehensive evaluation of long-term exchange patterns among prehistoric peoples in the Middle Atlantic region. His research indicated that long distance or down-the-line exchange was prevalent in early periods, such as the Middle Woodland, based on the movement of nonlocal goods throughout the region. Ceramic distributions also indicated that cultural boundaries were more permeable during this period given that certain ceramics, such as the shell-tempered Mockley ware, exhibited a wide distribution (Egloff and Potter 1982). In the Late

Woodland, especially during the fifteenth and sixteenth centuries, Stewart demonstrated that artifact patterns became more focused and the long distance trade networks broke

Figure 3.3: Regional river systems

down, perhaps because of the growth of chiefdoms during this period. For example, the use of shell-tempered Mockley ware ceased and Algonquian groups in the Coastal Plain began producing more differentiated ceramics, such as Rappahannock impressed and Potomac Creek in the northern areas and Gaston and Roanoke ceramics in the southern areas of the Coastal Plain (Egloff and Potter 1982; Turner 1993:90). Additionally, material evidence shows that groups grew more protective of their territories during the latter part of the Late Woodland period. Starting in the fourteenth century palisades became much more prevalent on sites throughout the region (Benthall 1969; Kent 1984; Slattery and Woodward 1992; Smith 1984; Turner 1992; Ward and Davis 1993). Many researchers have interpreted the increase of palisades as an indicator of increases in warfare during this time. During these times, zones around the natural boundaries of the various physiographic provinces in the region may have played an important social role in the region. For example, Turner (1978) has suggested that at times the Fall Line acted as a social buffer or "demilitarized zone" between the Monacans and Powhatan, especially in the latter parts of the Late Woodland when warfare increased in the region. Potter (1993) has suggested that other areas served a similar purpose between the groups of the Eastern shore and the raiding Susquehannocks.

Nevertheless, despite the increase of warfare and the rise of chiefdoms, there are some indications that certain long distance trade networks continued to function. The presence of steatite pipes at the Coastal Plain Hand site (44SN22) in Virginia indicates ties between Piedmont and Coastal groups as steatite was not available on the Coastal Plain. Hantman (1990, 1993) has suggested that the copper trade continued between the Monacans of the Piedmont and the Powhatan of the Coastal Plain into the Contact period. Moreover, the presence of similar ceramics and pipes on the Hughes, Keyser, Potomac Creek, and Accokeek Creek sites suggest that their inhabitants, who were scattered throughout the Shenandoah and Potomac River valleys, were interacting (Stephenson et al. 1963; Stewart 1992). This could be due to the fact that the Shenandoah and Potomac rivers provided easy routes of transportation between these sites. Additionally evidence of exchange between Native groups in the Middle Atlantic and Mississippian or Fort Ancient groups living in the areas surrounding the region indicate that long distance trade networks of prestige goods continued to function (Brain and Phillips 1995; Egloff and Woodward 1992; Meyers 2011; Potter 1993).

The broad distribution of beads produced from Atlantic coastal shells, which stretches from the eastern coast into the interior mountain areas of Virginia, also suggests that east and west exchange networks remained active and traversed multiple environmental territories. Barber (2003, 2008) has suggested that bone and shell objects, such as pendants and beads, were affiliated with high status individuals throughout parts of the Coastal Plain, Piedmont, and Ridge and Valley of Virginia and that this social connection facilitated shell bead production and exchange throughout the Late Woodland. Finally, other analyses, which have focused on attribute distributions rather than the spatial boundaries of types, have determined that ceramic attributes were still crossing over social and physical boundaries, even if entire types were not (Gallivan 2003).

Besides beads, the analysis of patterns of lithic procurement and utilization has been another popular method used to trace social networks. Beyond the identification of point styles and chronologies (Coe 1965; Holland 1955; Hranicky 2002; Potter 1993) archaeologists have considered how variations in raw material relate to the environmental and social contexts of Native groups. For many groups it would seem that environmental boundaries did impact raw material procurement and use. For example, Piedmont groups, such as the Monacans, Saponi, and Tutelo used quartz as their primary material for lithic production (Gallivan 2003). Similarly, Ridge and Valley groups in Virginia used local jasper, chert, and rhyolite outcrops (Garner 1986; Walker and Miller 1992). Moreover, lithics tend to be more limited on Coastal Plain sites as these materials are extremely rare along the coast because of a lack of natural outcrops (Gallivan 2003; Phelps 1983; Ward and Davis 1999).

The distributions of lithics provide further evidence that although Native groups were somewhat limited by their local environmental settings, they also used natural avenues of transport provided by river systems to transcend geographic barriers to procure materials that were necessary for subsistence and other social practices, such as rituals or denoting rank or status. It is not uncommon to find projectile points of rhyolite and jasper in the Piedmont where there are very few natural outcrops of these materials. This was likely due to at least in part to some down the line procurement of raw cobbles from rivers (Hantman 1987) but also because groups in Coastal Plain engaged in exchange networks with Piedmont groups or traveled to the Fall Line for lithic materials (Coe 1965, Gallivan 2003; Holland 1955; Ritchie 1961, Turner 1992).

Finally, a number of archaeological and ethnohistoric studies have also focused on trading relationships between Native groups and European settlers after 1607. One of the principle findings of these investigations is the determination that Native groups in different areas of the Middle Atlantic had different strategies for interacting and trading with Europeans. For example, the Susquehannocks gained access to European goods by the early 1550s and moved quickly to situate themselves on the lower portion of the Susquehanna so they could take control of that trade corridor (Cadzow 1936; Kent 1984; Whithoft and Kinsey 1959). Historical, archaeological, and ethnohistorical evidence demonstrates that the Powhatan of the Virginia Coastal Plain immediately began engaging in exchange with the colonists at Jamestown upon their arrival in 1607 (Smith 1986; Mallios 2006; Potter 2006[1989]; Rountree 1993). In contrast Native groups in the

Piedmont interior of Virginia and North Carolina did not engage in trade with European settlers until the late seventeenth century. Hantman (1993) has suggested that this was a deliberate strategy on the part of the Monacans. Nevertheless, historical period archaeological sites in the southern Virginia and northern North Carolina interior do confirm that a number of Siouan speaking groups because involved in the fur trade in the latter part of the seventeenth and early quarter of the eighteenth century (Eastman 1999; Lapham 2005; Ward and Davis 1993, 1999). Some groups, such as the Occaneechis, even became powerful middlemen (Ward and Davis 1993).

Most recently, archaeologists have been using archaeometric techniques, such Laser Ablation Inductively Coupled Plasma Mass Spectrometry and Instrumental Neutron Activation Analysis to source the raw materials used to make ceramics (Ashley 2003; Herbert and McReynolds 2004; Klein 1990; Pevarnik et al. 2008; Speakman and Glascock 2006; Steadman 2008). Understanding the chemical composition of these artifacts allows archaeologists to actually trace exchange relationships and the movements of different groups. Interestingly, the underlying differences of the clays and geological formations of the physiographic provinces are what allow archaeologists to source or at least differentiate the elemental compositions of the different materials used to produce these objects. Thus, although the variations in environments and landforms of the physiographic provinces do not always exhibit a one to one relationship with variability among social groups, they do provide a means of understanding some of the variation we see in the archaeological record and provide a means of assessing the patterns that are seen in stylistic elements. I will discuss archaeometric investigations of pipe production and trade in more detail in Chapter 9 when I explain the results of my own chemical analysis.

One important part of exchange that has not been considered by archaeologists focusing on Late Woodland and Contact period groups in the Middle Atlantic is the fact that exchange between Native groups did not function in the same way as capitalist exchange. Instead of a series of isolated transactions, exchange often created long term social ties between different groups. Anthropologists have long studied the variety of ways reciprocal exchange is used to create and cement relationships between different groups (Appadurai 1986; Gregory 1982; Helms 1993; Mauss 1954; Weiner 1985). Yet in the Middle Atlantic, only a few archaeologists have considered how Native's view of the inalienable character of goods impacted exchange between different groups prior to the Contact period and exchange relations between Natives and the English (Blanton and King (ed.) 2004; Mallios 2006; Murray 2005; Potter 2006). The insights of anthropological theory can also be applied to interactions prior to the Contact period. The inalienable character of pipe exchange could explain patterned similarities of attributes found at sites located in different cultural complexes or language groups. I will discuss more about the significance of pipes in Native societies in the next chapter.

Conclusion

In this chapter I demonstrated how physiographic boundaries, like cultural complexes have also been viewed as bounded cultural units by archaeologists. I then highlighted research that has shown there is both 1) variability of material culture within physiographic boundaries and 2) evidence that these boundaries were permeable at different times in the Late Woodland and Contact period. Ethnohistoric and archaeological evidence demonstrates that geographic territories, like the cultural area boundaries discussed in the previous chapter, do not represent homogenous groups. Whether because of migrations, interactions with neighbors, or in situ developments, there is a great deal of diversity encompassed within these territories. Additionally, I emphasized that viewing the social connections created by such trade through a capitalist lens likely obscures the kinds of social connections that were an integral part of interactions between different Native groups. In the next chapter I will provide more background on the artifact class that is the focus of this study, tobacco pipes.

Chapter 4 : The Social Significance of Pipes

Introduction

In this chapter, I provide a cultural and historical overview of the role of pipes in Middle Atlantic Native societies during the Late Woodland and Contact periods. The goal of this review is to create an interpretative framework for the stylistic analysis that follows. First, I provide a brief explanation of how pipes were part of what has been termed the "Smoking Complex." Understanding that pipes were part of a multi-component complex provides insight into the ways Native societies viewed and used pipes and why these objects were endowed with social significance that differentiated them from other materials. Next I discuss what ethnohistoric records and archaeological research indicate about the contexts and variation in the status, age, and gender of pipe users and producers. I should note that I have attempted to identify historic records and ethnographic information that directly pertain to the Native groups of the Middle Atlantic but at times I will integrate information from other Native groups in the Eastern Woodlands to fill in holes where historic accounts and ethnographic information from the Middle Atlantic region are not available. Last, I detail the four hypotheses that provide the framework for my analysis.

The Smoking Complex: Tobacco

Native American groups often utilized pipes as part of a "Smoking Complex" which consists of four material elements: tobacco, kinnikinnick, pipe stems, and pipe bowls, each of which has different sets of uses and associations (Linton 1924; McGuire 1899; Springer 1981; West 1934). However, it should be noted that this model is primarily based on accounts of Native smoking ceremonies from the Midwest and Great Plains. Historic and archaeological evidence suggests that Native groups in the Middle Atlantic may not have used all four of the different elements. Yet it is still important to talk about pipes as part of a complex because their use can only be fully understood in conjunction with related elements. Moreover, I will demonstrate that even the elements that are not directly applicable to Middle Atlantic pipe use point to general aspects of pipes that are important. Thus the Smoking Complex model will be used as an explanatory device but will also be modified regionally and intra-regionally as needed.

The first element of the Smoking Complex, tobacco, was used and revered by Native North Americans as a "mind-altering substance that serves as a medium between the ordinary world of humans and the superordinary world of the spirits" (von Gernet 2000:63; Winter 2000:3). Most American tobacco species are classified under the genus *Nicotiana*. The modern distribution of the genus includes South America, North America, Australia and a few South Pacific islands (Goodspeed 1954; Haberman 1984:274). Thirty species of *Nicotiana* are found only in South America, six are found in both South and North America, and nine species occur only in North America (Goodspeed 1954; Haberman 1984:274). Based on the higher number of species present in South America, researchers have argued that the origin of the genus *Nicotiana* was on that continent. Subsequently, it either spread through cultivation or trade to reach Central America and Mexico continuing all the way to North America (Goodspeed 1954:8; Haberman 1984:274; Winter 2000:4).

Although nine different species of *Nicotiana* occur in North America, *Nicotiana rustica* L. is the species cultivated by Native groups in the Eastern Woodlands

(Goodspeed 1954:353,9; Haberman 1984:6-7; Winter 2000). The timing of *N. rustica* L's arrival in North America is somewhat unclear. Although pipes have been recovered from archaeological contexts dating to the second millennium B.C. in North America (Rafferty 2001) these objects are only viewed as indirect evidence of tobacco smoking as other botanical materials could have been used. Gas chromatography/mass spectrograph analysis of pipe residue from the Boucher site in Vermont produced evidence of nicotine decay that puts the earliest date of tobacco use at approximately 300 B.C. (Rafferty 2006). It should be noted, however, that this is only the earliest use of tobacco in the genus *Nicotiana*. The earliest evidence of *N. rustica* L. comes from archaeobotanical samples from the Smiling Dan site in Illinois, which dates to approximately A.D. 160 (Asch and Asch 1985:384; Haberman 1984:271) in the Middle Woodland period.

In addition to the use of *N. rustica* L., another species, *Nicotiana tabacum,* was also grown and smoked in the Middle Atlantic. *N. tabacum* L. is the commercial variety that is widely known and used today in cigarettes and other tobacco products. It is thought to have been used in the prehistoric period in Central and South America but there is no evidence of its use by Woodland period North American Native groups prior to the seventeenth century (Goodspeed 1954:375; Haberman 1984:269). *N. tabacum* L. was introduced to the Middle Atlantic area when John Rolfe brought this species to the Jamestown colony from the Caribbean (Brooks 1952; Haberman 1984:269). Although the colonists had originally tried growing *N. rustica* L. it proved to be too harsh for most European tastes. In contrast, *N. tabacum* L. found a ready market in England and soon became a cash crop that supported the development of the English colonies (Brooks 1952).

It is important to discuss tobacco in relation to pipes because of the social and ritual importance Natives ascribed to this substance. As a means of transforming tobacco into smoke, which activated tobacco's psychotropic properties and simultaneously sent it as a gift to the spirit world, one of the primary roles of pipes documented by researchers was as a facilitator of spiritual communication (Springer 1981:219; von Gernet 1992, 1995, 2000). Yet pipe smoking was not the only vehicle for transporting tobacco to the spirit world; groups in the Middle Atlantic offered tobacco in a variety of ways. John Smith (1986:124) observed that the Powhatan of coastal Virginia offered tobacco along with blood and deer sweat on altar stones called *Pawcorances* that were found in houses, woods, and in the wilderness after they returned from hunting, or on other occasions. He also noted that during storms, "when the waters are rough in the rivers and sea coasts their Conjurers runne to the water sides, or passing in their boats, after many hellish outcries and invocations, they cast Tobacco, Copper, *Pocones,* and such trash into the water, to pacifie that God whome they thinke to be very angry in those stormes" (Smith 1986:124). William Stratchey described the sacrifice of tobacco among the Powhatan in a similar manner (1953:97). Thomas Hariot also noted that the Natives of Roanoke in North Carolina sacrificed tobacco in a variety of ways:

> "This Uppwoc [tobacco] is of so precious estimation among them that they thinke their gods are marvelously delighted therwith: Wereupon sometime they make hallowed fires & cast some of the powder therein for a sacrifice … being in a storme upon the waters to pacifie their gods they cast into the air and into the water …" (Hariot 1893[1588]:25).

Likely due to its significant role in Native rituals, tobacco horticulture seems to have been subject to different cultivation practices than other Native domesticates. Hariot's (1893[1588]:25) account of his interactions with Roanoke Natives of North Carolina noted that "Upp'woc" or Tobacco was an "herbe sowed a part by it selfe". DeBry's (1590) well-known engraving of the Algonquian town of Secoton in North Carolina depicts tobacco planted in a field separate from other fields containing corn, beans, and other herbs. In a similar vein, the accounts of Jamestown colonists William Stratchey, George Percy, and John Smith indicate that the Powhatan may have grown tobacco separately from more staple foods like corn and beans. The Virginia Powhatan used two different types of fields for plant cultivation. Stratchey (1953:79) noted that tobacco was planted with other plants such as "pumpons" and fruit in small square plots of ground 30-61 meters on one side that were interspersed amongst village households (Potter 1993:34). Percy provided a similar description of a garden of tobacco located some distance away from the Powhatan village of Paspahegh: "one of the Savages brought us on the way to the Wood side, where there was a Garden of Tobacco, and other fruits and herbes" (1969a[1608]:140). In addition to these gardens, larger fields ranging from 8 to 81 hectares per community were planted with corn and some beans (Potter 1993:34; Smith 1986:162). These descriptions indicate that Virginia Algonquians may have grown tobacco with other plants such as fruits and herbs but kept it in separate, smaller gardens located some distance away from villages.

One additional reference complicates this picture of cultivation practices. It suggests tobacco may have been included in fields with other plants in certain circumstances. Gabriel Archer (1969a[1607]:93) noted that a field belonging to the *werowance* of the Weyanock was "some .100 acres, where are set beanes, wheate, peaze, Tobacco, Gourdes, pompions, and other thinges." This description is particularly interesting because it suggests that tobacco may have been planted differently depending on who owned the land or field where it was being cultivated.

Some Native communities restricted the cultivation of tobacco to men. Ethnographic and historic sources suggest that in some areas of the Eastern Woodlands, such as what is today southern New England and Missouri, men were solely responsible for cultivating tobacco (Haberman 1984:270; Springer 1981:218; Williams 1936:99, 14). This contrasts with accounts that suggest the cultivation of other plants was primarily the responsibility of women although men did assist in the clearing of the fields beforehand (Feest 1978; Hariot 1983; Stratchey 1953; Weslanger 1983:40). However, a passing comment made by John Smith suggests that men were involved in the cultivation of tobacco and corn: "an industrious man not other waies imploied, may well tend foure akers of Corne, and 1000. plants of Tobacco" (Smith 1986:162 in Potter 1993:39). This is the only reference I have identified that directly mentions a gendered group involved in tobacco growth in the Middle Atlantic. Rountree (1992:44) has noted that no English source indicates whether tobacco cultivation was a male or female prerogative. Therefore, it is difficult to verify whether Smith's depiction is accurate or which groups in the Middle Atlantic may have restricted tobacco cultivation to a male practice.

Smoking Complex: Kinnickinnick or Other Plants?

Despite the fact that tobacco was clearly a substance of great import amongst Native groups its use as the singular plant element for pipe smoking has been a matter of debate. A number of authors have suggested that other types of plants could also have been smoked or mixed with tobacco (Linton 1924:7-8; McGuire 1899:366; Yarnell 1964). The second element of the smoking complex, kinnikinnick, is an Algonquian word which refers to the various wild plants mixed with the tobacco before it was smoked (Brown 1989:313; Driver 1961:90; McGuire 1899:366; Springer 1981:220). Various materials such as barks or leaves of different kinds served to make the tobacco milder and last for longer periods of time. These materials are also thought to have a ritual value unto their own and the use of certain materials was prescribed for particular rituals.

A number of researchers have attempted to identify direct evidence of tobacco use among Eastern Woodlands groups. However, paleobotanical evidence of tobacco use has been difficult to find in the archaeological record. In general, archaeological tobacco seeds are found in relatively small numbers per sample (Wagner 2000). This is likely due to a few factors. The first is the extremely small size of tobacco seeds (Haberman 1984; McKnight 2009; Rafferty 2001, 2006). Additionally, Rafferty (2001:287) has noted that tobacco could have been used and stored on an individual basis, rather than stockpiled for community use like other plants such as corn. Such storage practices would leave few areas where a sizeable amount of the plant is found in a single context. All of these researchers have advocated the use of more intensive screening methods such as wet screening and floatation to increase the likelihood of finding tobacco seeds. However, the measurements of the seeds that have been identified tend to correspond well with modern *Nicotiana rustica* L. (Wagner 2000).

Due to the difficulties of gathering botanical materials more recent attempts to identify direct evidence of tobacco use in prehistory have focused on chemical analysis of nicotine alkaloids (Gager 1991; Rafferty 2001). Rafferty (2001, 2002, 2006) has developed a technique that identifies nicotine alkaloids in pipe dottles[1] and residues using gas chromatography/mass spectroscopy. Nicotine alkaloids are characteristic compounds in the chemistry of the *Nicotiana* genus and therefore can be interpreted as direct evidence of tobacco use. Rafferty identified the presence of *Nicotiana* in Early Woodland pipes from Adena mounds in Ohio and New York although it could not be identified to species. These studies pushed evidence of tobacco use among Native groups back hundreds of years. Unfortunately, however, Rafferty also noted that it would be difficult to use this technique to identify other plant materials because it would entail an extensive research program to identify the distinctive chemical signature for each plant (Rafferty 2001:302). Nevertheless, an additional study, which is currently ongoing, is attempting to identify the presence of tobacco and possibly other plants through pollen analysis of residues and daubs found in pipe bowls from the Middle Atlantic and southern sites (Carmondy, personal communication 2010).

Although material evidence is sparse, historic accounts from early English settlers all point to tobacco as the primary plant material smoked by Native groups in the Middle Atlantic. For example, accounts by Jamestown settlers specifically mention the use of tobacco and tobacco pipes amongst the Powhatans of Coastal Virginia and other Algonquian speaking groups in Coastal North Carolina (Hamor 1971[1615]; Hariot 1893; Percy 1969a[1608]; Smith 1986). Missionary memoirs also specifically mention the Pautxents of Maryland (White 1634:35) and the Lenape of Pennsylvania (Heckewelder

[1] Dottle is a term used to describe the carbonaceous incrustations found on the interiors of pipe bowls (Haberman 1984:272).

1881) using tobacco as the primary plant material in smoking rituals. Nevertheless, it is possible that these Europeans were simply unaware of the fact that other plants were being mixed in.

Smoking Complex: Pipe Forms and Pipe Parts

The third and fourth elements of the Smoking Complex consist of different parts of the pipe, the bowl and the stem. It should be noted that only a particular form of pipe, variously called a reed-stemmed, or separate-stemmed pipe, had a bowl and a stem that were considered separate elements. The most well-known example of the separate-stemmed pipe, the Calumet, originated in the Great Plains in the Late Woodland period and spread to the Eastern Woodlands and later to the Southeast during the historic period (Blakeslee 1981; Springer 1981). The distinctive bowl, made from red catlinite stone was joined with an ornate reed stem when it was smoked. A number of ethnographic and historic accounts indicate the bowl and stem were separate pieces that each had their own role to play in the pipe smoking ceremony (Springer 1981:221). Such accounts indicate that Native communities made (and continue to make) a distinction between pipe bowls and stems by only allowing them to be joined for ceremonial purposes and requiring they be kept separated at all other times (Conklin 1994:126; Hall 1997; Paper 1988:12, 1992:164).

Although the Calumet was widely used by Native groups in the western Great Lakes area during the protohistoric period (Blakeslee 1981) and was incorporated into the practices of Southeastern groups in the historic period (Brown 1989) there is no documentary or material evidence that Middle Atlantic groups ever used this particular type of pipe in their ceremonies. As I will explain in Chapter 5, few separate stemmed pipes have been identified from Native sites in this area. Rather elbow pipes, or pipes where the stem is permanently attached to the bowl, were the predominant pipe form used by Middle Atlantic Native groups. Consequently it is very possible that Middle Atlantic Native groups did not consider the bowl and stem as separate entities in their ceremonies. Yet, regardless of whether bowls and stems were considered to be separate entities or a single piece, I suggest the distinction drawn between them by some Native societies calls attention to the fact that physical or technological characteristics of a pipe, such as its size or the raw material used to make it, provide important clues that indicate these objects were endowed with social and ritual significance.

Although the distinctive red Catlinite stone used to make Calumet pipe bowls is the material most associated with Native "peace pipes" in the popular imagination, Native groups in the Middle Atlantic used different raw materials in their pipe production. The majority of pipes analyzed in this study were made from different clays although different types of stone were also represented. Other materials, such as bone or wood, may have been used as well but to date there is no material evidence that can be used to confirm or negate this possibility. The majority of stone pipes analyzed in this study were carved from steatite or chlorite schist. Steatite is believed to have been a material with a particular social significance for Siouan-speaking groups living in the Piedmont and Ridge and Valley areas of Virginia because it was used to make vessels to cook and serve meat, fishes, and teas that were designed to be consumed during rituals or for serving ritual drinks and foods (Hantman and Gold 2002:277-279; Klein 1997:147). Like steatite bowls, steatite pipes, when used to smoke tobacco, a substance that was also consumed during rituals, were likely endowed with social import.

With regards to clay pipes, ethnohistoric research and historic records indicate that the color of the clay and the size of the pipe could have been material markers of a pipe's importance. Rountree (1992:63, 169) noted that the lighter color of clay pipes in comparison to other Powhatan ceramics could have been used to distinguish pipes as objects that had a particular social significance. Additionally size may also point to their important role as at least two historic accounts from Virginia settlers note that pipes used by Natives were larger than "ordinary" English ones. Percy (1969a[1606]:136) noted that the Powhatan took a tobacco in a "pipe made artificially of earth as ours are, but far bigger." Beverly (1947[1705]:143) noted that Natives in Virginia greeted visitors with a "pipe much larger and bigger than the common tobacco pipe."

In addition to variations in size or color, materials could be added to pipes to signal their social significance. Ethnographic accounts from French settlers and explorers noted that separate stems of Calumet pipes often included decorations such as feathers, bird skins, and carvings and paintings. The materials used to decorate these pipes were also endowed with social significance, adding another level of meaning to ritual ceremonies that included pipe use (Brown 1989:313; Hall 1997:2; Paper 1988:12; Springer 1981:220). While there are no descriptions of Middle Atlantic pipes being decorated in this manner, one historic account suggests that clay pipes smoked by the Powhatan were in some instances decorated with prestige materials. For example, Percy not only noted that Native tobacco pipes were larger than English pipes, but also that one particular pipe had a "bowle fashioned together with a piece of copper"

(1969a[1608]:136). Copper is widely acknowledged to have been an important status symbol among the Powhatan (Gleach 1997; Hantman 1990; Mallios 2006; Potter 2006[1989]; Rountree 1992). It is safe to say that a pipe inlaid with copper would have served as a prestige item within the Powhatan community.

The Smoking Complex (pipes, tobacco, and perhaps other plant materials), played a unique role in ritual contexts in Native communities. The association of pipes with tobacco, a substance of great ritual importance to Native peoples, demonstrates the importance of this object to Native communities. It is further clear that certain physical characteristics of pipes, such as the raw materials used to make them, their size, and any decorative aspects added onto them, suggest that these objects served important roles in Native communities. However, understanding the ritual importance of pipes does not necessarily provide enough information to draw concrete conclusions regarding how material variation may relate to social dynamics. It is also necessary to consider which social groups were actually using and producing pipes and how they were using them. In the next section I discuss ethnographic and archaeological investigations that shed light on which social groups were likely using and producing pipes during the Late Woodland and Contact periods.

Pipe Users and Producers

Users

As previously noted one of the primary roles of pipes, in conjunction with tobacco, was as a facilitator of spiritual communication. Winter (2000:29) has speculated that in the Eastern Woodlands and parts of the U.S. Southwest *N. rustica* L. was domesticated by Native tribes because its high nicotine content could be used to produce visions and altered states of consciousness that allowed smokers to communicate with spirits, diagnose and treat illnesses, and otherwise deal with the supernatural. Von Gernet (2000:72) has suggested that the special status accorded to this plant because of its hallucinogenic properties led Native communities to use it as a gift to fulfill obligations to ancestors or deities, who, in return, were expected to provide certain blessings. The supposed opportunities for supernatural communication afforded by pipe smoking have led some to speculate that the initial users of pipes were shamans or priests who maintained their important roles in Eastern Woodland Native societies as spiritual intermediaries and healers (Hall 1997; Mathews 1980; von Gernet 1992, 1995, 2000; Winter 2000:29).

Documentary records that relate aspects of different religious or spiritual practices amongst Algonquian speaking groups of the Virginia and North Carolina coasts note the existence of priests who served as religious leaders (Beverley 1947[1705]:212-213; Rountree 1992:100; Smith 1986b:172; Stratchey 1953:88). Especially among the Powhatan these individuals were considered to be very powerful. They acted as advisors and guides to both chiefs and commoners in addition to administering medicines and performing sacrifices to deities. However these accounts consistently note that priests carried rattles as a symbol of their status, not pipes (Rountree 1992:100; Stratchey 1953:96).

The possibility remains that priests used pipes in certain circumstances to demonstrate their power or maintain their influence over lay people. Given that English settlers often viewed Powhatan culture through a somewhat narrow lens, it is possible that priests were using pipes in spaces that escaped their notice or were blocked from view. A number of English settlers acknowledged that they were not allowed in certain areas that were considered private or restricted in Native social landscapes, such as the *Quiocosin* or temples, which were solely the territory of priests and chiefs (Beverley 1947[1705]:196; Lawson 1967[1709]:211; Stratchey 1953:95). Accounts from two English individuals who did enter the restricted space of the *Quiocosin* or were able to gain access to the knowledge of the priests, respectively, suggest that pipes were being used in spaces that were normally shielded from English eyes.

Robert Beverley (1947[1705]:196-198), a Virginia planter, provided one of the few descriptions of the interior of a Powhatan temple. He and his companions broke into one while the village's Native inhabitants were away. In addition to describing the interior of the temple, Beverley also examined the image of the Powhatan deity Okeus who was enshrined in that space. He noted that the "image, when drest up, might look very venerable [or life like] in that dark place" and went on to briefly describe how priests could manipulate the image to look more lifelike to visitors to the temple. Samuel Purchas, who interviewed a Powhatan priest named Uttamatomakin when he visited London in 1616-1617, recorded that one such manipulation included placing a lit tobacco pipe in the image's mouth with a priest standing behind in the gloom to draw the smoke in (Purchas 1617:955 in Rountree 1992:135). This account provides one key circumstance when Powhatan priests may have been using pipes in spaces generally shielded from colonists' eyes to maintain their power and influence over lay people. Furthermore, the fact that a pipe was supposedly used by a deity indicates that pipes were associated with powerful figures in Powhatan society.

Despite the possible association with priests in Powhatan culture, other references indicate that pipe smoking may have been used by other individuals to perform social practices that might fall within the realm of priests. An account from Jesuit priest Father Andrew White describes how the Patuxents, an Algonquian speaking community of Indians who habited what is now southern Maryland, used tobacco smoking as a means of communicating with their god:

> In the Matchcomaco, or temple of the Patuxans, this ceremonie was seene by our traders; at a day appointed the townes about mett together, and built a great fire, then standing all about the same, lifted up their hands to heaven Crieing *Taho Taho,* after this brought forth a bagge of *Poate,* which is their tobacco, with a great tobacco pipe, and carried it about the fire, a young man following it . . . they filled the pipe, and gave to every one a draught of smoake from it which they breathed out on all parts of their bodies, as it were to sanctifie them to the service of their god. (White 1634:45).

It is somewhat difficult to interpret the social status of people involved in this ritual because it is particularly vague regarding which individuals or groups were involved in the ceremony. Nevertheless, the account does not indicate that the use of pipes within the ceremony was restricted to priests.

It might be difficult to tie pipe use to priests or shamans specifically, but documentary evidence confirms that pipes were owned or used by individuals who held other positions of importance in Middle Atlantic Native societies. Accounts from Jamestown settlers detail a number of instances where pipes were affiliated with high status individuals in Powhatan society. William Stratchey (1953:123) observed that "those Indians which hauv twoo or more women take much [tobacco for smoking] but such as haue as yet no appropriate women take little or none at all." Among the Powhatan married men, as opposed to unmarried men, were the members of society who participated in political or religious affairs. Moreover, having two or more wives was a symbol of high status (Rountree 1992:91). Stratchey's account indicates that only men of a certain status were permitted to smoke.

Other accounts directly link pipe use to chiefly individuals in some Native societies. George Percy's description of his meeting with the *Werowance* of Rapahanna provides direct evidence of the use of pipes by a Powhatan *werowance*, or a district or petty chief. "He caused his Mat to be spread on the ground, where he sat down with a great Majestie, taking a pipe of Tobacco: the rest of his company standing about him" (1969a[1608]:137). In a similar vein John Smith's encounter with the three "kings" of the Mannahoacs (1986:177) during his exploration of the Chesapeake Bay associates pipes with these powerful men. "When those four Kings came and received Amoroleck: nothing they had but Bowes, Arrowes, Tobacco-bags, and Pipes." It is worth noting that the Mannahoacs are believed to have been Siouan speakers (Hantman 1990), which demonstrates that the use of pipes by male individuals of high status was not limited to Algonquian groups.

Given the accounts described above, one might expect that John White's watercolor of the "Indian Elder or Chief" or DeBry's engraving of "A Cheiff Lorde of Roanoac" (De Bry 1590; Hariot 1893[1588]) would have included a pipe as an accessory to show the Chief's social position. Instead of a pipe, however, a large square of copper hangs from his chest. Nevertheless, as noted in Chapter 1, the only known illustration of *mamanatowick*, or the paramount Chief Powhatan, pictured on the original printing of

John Smith's 1612 *Map of Virginia,* depicts him holding a tobacco pipe. Although it remains unclear whether this engraving was meant to depict a real life event or whether the pipe was simply a symbol of Powhatan's power, the inclusion of the pipe affirms that pipes were associated with high status males in Powhatan society.

In addition to being an accessory of high status individuals in Algonquian and Siouan speaking Native societies, John Smith's (Smith 1986:106) encounter with the Iroquoian-speaking Susquehannocks indicates pipes were important possessions for warriors. When describing his run-in with a group of Susquehannock warriors one of the few details Smith noted was that one of the warriors carried a "pipe 3 quarters of a mile long, prettily carved with a Bird, a Beare, a Deare, or some such devise at the great end." This passage is noteworthy because it reveals that the Susquehannock male warrior described by Smith had chosen to carry his pipe with him on a long distance journey where possessions had to be chosen carefully because of limited space. His decision to carry the pipe indicates that these objects were an important item to male members of Susquehannock society who held positions of elevated status in their communities.

Besides being used and carried by certain individuals, documentary evidence suggests Native chiefs or community leaders also smoked pipes during rites or ceremonies. Many historic accounts describe instances where pipes were used to greet or welcome visitors to Native villages. For example, Jamestown settler Ralphe Hamor noteed that upon his arrival for a meeting with Powhatan "the first thing hee [Powhatan] offered us was a pipe of Tobacco, which they called Piffimore, whereof himself first dranke, then gave it to me and when I had drank what I pleased, I return his pipe, which with his own hands he vouchsafed to take from me" (1971[1617]:39-40). George Percy's description of a reception by Natives at the Town of Kecoughtan describes another instance in which a pipe was offered as a welcome: “When they had ended their ceremonies they went into their houses and brought out mats . . . the chiefest of them sate all in rank . . . we sate down . . . on a Mat right against them. After we were well satisfied [from eating] they have us of their Tabacco, which they took in a pipe made artificially of earth as ours are” (1969a[1608]:136). Additionally, Beverley (1947[1705]:143-144) noted that Virginia Native communities regularly used these types of ceremonies to welcome visitors: “They have a peculiar way of receiving strangers, and distinguishing whether they come as friends or enemies, though they do not understand each other's language: and that is by a singular method of smoking tobacco.” He also noted that these interactions took place between the leaders of the two communities. “The chief man of the Indians, to whom the strangers come, takes two or three whiffs, and then hands it to the chief of the strangers” (1705:144). In these cases the communal smoking of a pipe was used to establish alliances or friends between visitors and important members of the Native community.

It should be noted that although most of the Powhatan chiefs described by the Europeans were men, women in Powhatan society could also become *weroansquas* or chiefs by inheriting ruling positions in their chiefdoms (Archer 1969[1607]; Rountree 1992:89, 103-4; Smith 1986b:173). Given that individuals who held chiefly roles were able to smoke pipes, it is possible that certain women may also have engaged in this practice. An account from Englishman Gabriel Archer alludes to this possibility. Archer’s (1969[1607]:92) description of a visit to Appomattox by a small group of Englishmen reveals that they met the “Queen” of that town and were greeted with "accustomed Cares, Tobacco, and welcome." In light of the fact that the chief of a village was prescribed to take tobacco with visitors, one could presume that the Queen or *weroansqua* smoked with Archer and his companions. Unfortunately, Archer did not say this specifically so the evidence is not definitive.

The smoking of pipes to establish social bonds is the most well-known use of these objects. However, it is important to note that leaders could also refuse to smoke a pipe to communicate hostility or a desire to sever ties between two groups. Another encounter documented by Percy alludes to this possibility. When the English first encountered the Appomattox in 1607 "one of the chiefest . . . with his arrow readie in his Bow in one hand, and taking a Pipe of Tobacco in the other, with a bold uttering of his speech, demanded of us our being there, wiling us to bee gone. Wee made signes of peace, which they perceived in the end, and leg us land in quietnesse" (1969a[1608]:138). Rountree (1992:125) has suggested that the Appomattox chief was offering the English two options, war or peace, represented by the arrow and pipe respectively, which presumably they were expected to choose between. She interprets the choice to use "signes of peace" as the English choosing the pipe.

The "kings" of the Mannahoacs also received the English and their Native guide, Amoroleck, with objects that could be interpreted as symbols of war and peace, "Bowes, Arrowes, Tobacco-bags, and Pipes." Smith never notes that they had to choose between these options, perhaps because they had already made signs that they were friends (1986:177). Finally Beverley (1947[1705]:144) noted that a refusal to smoke a pipe could be "a sign of war" amongst Virginia Native groups. So although pipes could be used to establish alliances, political leaders could also use them to communicate enmity.

Apart from engaging in the act of communal smoking, Natives also exchanged or shared pipes as a gift in the Maussian (2002[1950]) sense to generate social relationships between two parties. Smith's account of his interactions with male Susquehannock warriors noted that the "*Sasquesahanocks* came to the discoverers with skins, Bowes, Arrowes, Targets, Beads, Swords, and Tobacco pipes for presents" (Smith 1986:106). Additionally, pipes could be exchanged for other materials. During Smith's encounter with the Mannahoacs he noted: "Our pistols they tooke for pipes, which they much desired, but we did content them other Commodities" (1986:177). It is interesting to note the different ways Smith interprets his encounters with the Susquehannocks and Mannahoacs. He suggests pipes from the Susquehannocks were presents, while his use of the term commodity during his exchange with the Mannahoacs seems to indicate that he saw this interaction as more of a market-based transaction. Regardless of how Smith made sense of these interactions, it is likely that both the Susquehannocks and Mannahoacs were operating under an ideology of reciprocity that saw exchange as a means through which to establish social relationships (Mallios 2006; Mauss 2002; Thomas 1991).

Pipes were an important possession for high status individuals, primarily adult males, in a number of Middle Atlantic Native societies. It is not surprising then that historic and archaeological evidence indicate that pipes were associated with these same individuals in death. As noted in Chapter 2, the Powhatan interred *werowances* in temples that were kept separate from the burials of other community members (Arber 1910:75; Curry 1999; Jirikowic 1990; Rountree 1992:133; Stratchey 1953:95; White 1585). Stratchey's description of the burial rite for *werowances* indicates pipes were part of the burial accompaniments that were interred with these individuals. He noted that when the deceased *werowances* of the Powhatan were laid to rest within their temples, the attendants would lay by the dead "all of his ritches in severall baskets, his Apooke (Tobacco) and Pipe, and any one toy which in his life, he held most deere in his fancy" (1953:94). Stratchey's account is noteworthy because it is the only one that specifically mentions pipes being interred with the burials. Smith's account of this ritual speaks more generally of the "wealth" of kings being interred with them at their feet in baskets (Smith 1986:122).

Of course it is difficult to know whether Stratchey observed the ritual process firsthand, and if not, what source he gathered this information from. As a number of researchers have noted (Curry 1999; Jirikowic 1990; Potter 1989, 1993), the archaeological signatures of these above ground mortuary "temples" are nearly nonexistent, so it is difficult to procure material evidence that can corroborate or challenge Stratchey's account. Nevertheless the fact that he mentions pipes specifically as one of the few items interred with high status individuals strengthens their association with these individuals.

Archaeological investigations from other areas of the region indicate that the association of pipes with high status individuals in death was not limited to the Powhatan. The deposition of stone pipes in Late Woodland period accretional mounds in southeastern North Carolina and northwestern Virginia (Dunham 1994; Fowke 1894; Irwin 2004; MacCord 1966; Valentine 1903) indicates pipes were items associated with Siouan speaking individuals who were commemorated by receiving special burial rites. Although the degree to which the individuals in these contexts were considered to be ranked or of a higher status than other individuals in their communities has been debated (Hantman 1990; Dunham 1994; Dunham et al. 2003) the fact remains that pipes were associated with mortuary rituals that serve to differentiate individuals from other members of the population. Additionally, although in many cases the gender of individuals associated with pipes could not be determined, in the John East (Dunham 1994; Holland et al. 1953), McLean (MacCord 1966) and Hayes Creek Mounds (Valentine 1903) pipes were directly associated with adult male burials which supports the association of pipes with this gender and age group.

Besides the interment of pipes in mound contexts, studies of burial accompaniments from other parts of the region have identified associations between male burials and pipes. Clay pipes were consistently interred with Late Woodland elder adult male burials in Siouan speaking communities located along the Dan and Eno River basins in southern Virginia and northern North Carolina (Eastman 1999, 2001). Pipes were also found to be associated with adult male burials amongst Late Woodland and Contact period Siouan speaking groups who occupied the Ridge and Valley areas of southwestern Virginia (Lapham 2005).

While archaeological data does indicate a strong association between adult males and pipes, there is material support for the association of pipes with women. For example, although Eastman identified an affiliation between pipes and males during the Late Woodland Period, that pattern changed in the Middle Contact period (1650-1670). One variation was a female burial directly associated with a pipe. Additionally, there was a shift in the mean age of individuals associated with pipes as younger adults were also interred with these objects during later periods. Lapham (2005) noted a trend at the

Contact period Trigg site (44MY3) as a few younger adult males were also buried with pipes. She interpreted pipes found in these burials as prestige items and concluded that the shift in mortuary patterning was evidence of efforts by these individuals to use resources from their participation in the fur trade to obtain certain items that were originally only available to elder members of the community.

Given that women were also known to have positions of power in Contact period Native societies, I conducted a brief survey of burial data from Late Woodland sites in the study area to examine whether there was material evidence of pipes being associated with female burials. This survey revealed a few instances of female burials that were directly associated with pipes. The locations of these burials are illustrated in Figure 4.1 and information about each burial is listed in Table 4.1. The immediate pattern illustrated by the map is that the burials seem to be clustered around the northern part of the study area with two exceptions. In contrast, however, the burials are not clustered in one part of north but are widely spread east to west. Although the sample sizes are too small to conduct statistical tests of this pattern, it suggests the interesting possibility that this practice was more prevalent and widespread in the northern part of the study area.

Another interesting result of this assessment was that there seem to be no similarities in terms of the women's age, or burial type. The ages of the women associated with pipes ranged from young to senior adults. Thus there is no clear association of pipes with elder women or women who were buried in high status burials. Although it is tempting to dismiss these burials as exceptions or outliers to the more consistent pattern of males being associated with these items, researchers have advocated paying more attention to exceptions of "gendered" objects in burial contexts (Arnold and

Wicker 2001). Consequently, based on available evidence it would seem that the majority of pipes were associated with high status males in Native societies but it cannot be assumed that all pipes were being used to signal or express male identity by Late Woodland Native peoples of the Middle Atlantic. The limited association of pipes with female burials in the Late Woodland period suggests that women could also have partaken in this practice to a limited degree.

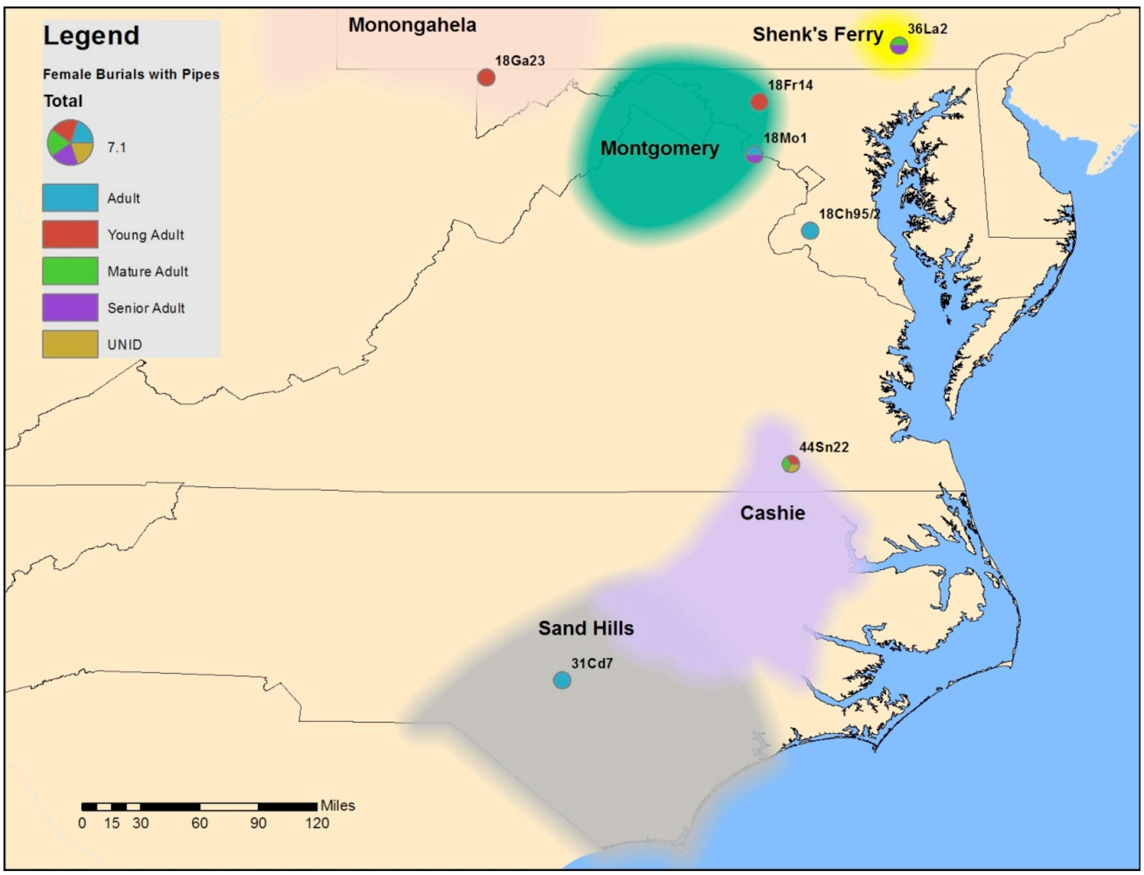


Figure 4.1: Geographic Distribution of Female Burials Interred with Pipes

Table 4.1: Female burials with pipes

Site	Burial No.	Age	Pipe	Time Period
31CD7	Skeleton 72	Adult	2 chlorite pipes	LWI
18GA23	1	Young adult	clay pipe	LWI
18FR14	4-36A	20-29 yrs	clay pipe	LWII
18MO1	2	Senior adult	clay pipe stem	LWII
18MO1	6	Adult	clay pipe bowl	LWII
36LA2	1	Elder adult	clay pipe	LWII
36LA2	9	Mature adult	clay pipe	LWII
44SN22	18	18 yrs	clay pipe	LWII
44SN22	106	~ 35 yrs	clay pipe	LWII
44SN22	14	UNID	clay pipe	LWII
44SN22	52C	~30 yrs	large steatite pipe	LWII
18CH95/2	Ossuary	Adult	clay pipe	Contact

Determining who was using pipes in Native communities in the Contact period becomes more complicated. Historic accounts note the participation of a larger number of social groups in smoking. For example, John Lawson, who chronicled his interaction with Natives as he traveled the backcountry or Piedmont of what is now North and South Carolina from 1700 to 1701, specifically describes women using pipes. He noted that amongst the Congerees "The Women smoak much Tobacco (as most Indians do.) They have Pipes, whose Heads are cut out of stone, and will hold an Ounce of Tobacco, and some much less" (1967[1709]:30).

Besides evidence of women and children using pipes, a number of researchers have noted that the numbers of locally made and imported European pipes on Contact period Native sites increased dramatically (Eastman 1999; Ward and Davis 1993). These variations in material patterning indicate that the segments of the population who were smoking pipes may have shifted in later periods, although as previously noted there is some evidence of limited associations of pipes with females during earlier periods.

Based on documentary and material evidence a number of researchers have concluded that pipe smoking practices shifted from a sacred, restricted practice in prehistory to a secularized, widespread practice in the decades after European contact (Irwin 2004; Nassaney 2004; Turnbaugh 1992; Ward and Davis 1993). These interpretations are based on the increased frequency of both locally made and imported white clay pipes on historic sites and the inclusion of a greater portion of the population in the practice of smoking. While I agree that there were shifts in the pipe smoking practices of Natives, I argue that this interpretation does not consider that pipe smoking could have served multiple purposes among Native populations during both the Late Woodland and Historic periods. For example, an account by Thomas Hariot that describes smoking among the Roanoke of North Carolina in the late sixteenth century suggests pipe smoking may have also played a medicinal role:

> "They use to take the fume or smoke thereof by sucking it through pipes made of claie into their stomacke and heade; from whence it purgeth superfluous fleame & other grosse humors, openeth all the pores & passages of the body, by which meanes the use thereof not only preserveth the body from obstructions but also if any be, so that they have not beene of too long continuance, in short time breaketh them: whereby their bodies are notably preserved in health." (1893[1588]:25).

Hariot did not specify which members of the population were using pipes to keep themselves healthy. Even if it were only adult males, however, this would still indicate that smoking had dual purposes. If pipes could be used for medicinal purposes as well as spiritual ones in the Late Woodland period, it is difficult to say with certainty that these pipes were used strictly for sacred purposes versus those that are distinctly secular.

Additionally, just because other segments of the population were smoking does not mean elder males or leaders stopped engaging in the practice of smoking in the ways it was used in earlier periods. Eastman (1999) noted that pipes continued to be associated with elder males on Siouan sites well into the Contact period. Beverley's (1705) account of the use of Native pipe smoking amongst Virginia groups to create alliances suggests it was still used to create alliances and connections amongst different groups well into the Contact period.

The participation of a larger segment of the population in pipe smoking during the Contact period complicates efforts to decipher the possible social meanings of stylistic variation. Instead of expressing information about high status individuals, pipes from Contact period sites could be related to efforts of multiple social groups to signal specific messages about identity or status. Therefore it is possible that the types and forms of attributes on pipes from Contact period sites will change as they are linked to a larger percentage of the population.

Producers

A number of researchers have argued that in addition to considering how stylistic variation may be related to the users of objects, it is important to examine what documentary records and material characteristics reveal about the social and cultural practices that guide the production of objects (Dietler and Herbich 1998; Sackett 1985; Stark 1999). When it comes to Native pipes produced in the Late Woodland and early Contact periods in the Middle Atlantic, however, there is hardly any information regarding the age, gender, or status of the individuals who produced these objects. None of the documentary records from Jamestown or missionary accounts describe the production process of pipes or the individuals involved. Stratchey is the only one to provide any details regarding pipe production amongst the Powhatan, noting that a special clay was used, "which the Indians called Assesqueth, . . . which is more smooth and fine, then I haue ellsewhere seene any" (1953:39). Unfortunately he recorded no observations regarding the process or people who used this clay to make pipes. However, his account does present the interesting possibility that the type of clay used for pipes differed from that used for other ceramics.

The only details regarding pipe production among Native groups in the Middle Atlantic come from Lawson's (1967[1709]:208) eighteenth century account from his travels and interactions with different Siouan-speaking Native groups in the Carolinas. He observed that males were the primary producers of clay pipes but that these males were of a particular social standing. "And those who are not extraordinary Hunters make Bowls, Dishes, and Spoons of Gum-wood, and the Tulip-Tree; others (where they find a Vein of white clay, fit for their purpose), make Tobacco-pipes, all of which are transported to other Indians that perhaps have greater Plenty of Deer and Other Game" (Lawson 1967[1709]:208). This account suggests that males of a certain social standing, i.e. those who were not necessarily considered useful for other tasks, were the primary producers of pipes. However, it would seem that these males were producing pipes for trade rather than to be used within the community for rituals. Lawson does not mention whether these same individuals were producing pipes used for ceremonial purposes as well.

Lawson's account is particularly interesting because it suggests that Natives were producing pipes well into the eighteenth century in certain areas of the region. This is noteworthy because the extent to which Native groups were involved in pipe production during the seventeenth and eighteenth centuries in the Middle Atlantic has been a matter of debate among researchers. Unlike prehistoric pipes, researchers have intensely debated the identity of the producers of seventeenth century pipes. The pipes that have received the most attention from researchers are variously known as "Chesapeake pipes" or "locally-made pipes" because they are made from local clays that are thought to come primarily from the Coastal Plain area of Virginia. The clays used to make these pipes range in color from buff to brown. They also exhibit distinctive decorative motifs. Their distribution primarily clusters in the Coastal Plain of Virginia but examples have been found in the North Carolina Coastal Plain and Piedmont (Eastman 1999; Magoon 1999; Ward and Davis 1993). The production of these pipes has variously been attributed to European settlers, Native communities who continued to live along the coast, and African American slaves who were being brought to the New World during this period.

Harrington (1954) was one of the first to speculate about the identity of the producers of these pipes, suggesting that they could have been created either by Natives still living in settlements along the coast or English settlers copying Native designs. It is clear that English settlers were producing at least some of the pipes found on seventeenth century sites as colonial records list the occupation of one of Jamestown's settlers, Robert Cotton, as a pipe maker (Kelso and Straube 2004; Smith 1986:162). Another English pipe maker, John Bennett, was also apparently at work in Charles County, Maryland during the seventeenth century as he was ordered to appear in court on charges of clay pipe collecting on a Sunday (Weisiger 1980:179 in Emerson 1994:44).

Besides considering *who* was producing these pipes, some studies focused on the reasons *why* European settlers might be producing these objects rather than using imported white clay pipes from England. Henry (1979) suggested that poorer planters produced pipes from local clays in difficult economic times when they could not afford white clay pipes that were being imported from England and the Netherlands. Miller (1991) concluded that the concurrent increase of locally made pipes and Dutch pipes in the Pope's Fort assemblage indicated that the inhabitants increasingly turned to these pipes when trade with the British became more difficult in the latter half of the seventeenth century.

A shift in the discussions surrounding these pipes occurred in the late 1980s when Emerson (1988, 1994, 1999) attributed their production to African American slaves on the basis of similar decorative structures and motifs found on locally-made pipes and those found on the west coast of Africa. He argued that locally made pipes were a particular result of interactions between African slaves and European settlers during the seventeenth century and the need for Africans to display aspects of their identity during a time when their ability to mark their identity had become more difficult. Initially Emerson completely excluded Native groups as possible producers because he argued that few Indians were present in Virginia during the period of production. However, he later acknowledged that attributing the production to African Americans did not completely negate the participation of Natives in pipe-making traditions in the Chesapeake. Nevertheless, he did argue that Natives were not the primary source of these pipes. He based his conclusion on the differences in the decorative motifs found on Native pipes and locally made pipes and the fact that the start of their production period coincides with the arrival of West Africans in Virginia via the slave trade in the early-to-mid seventeenth century.

Other researchers have argued that locally made pipes were material evidence of the continued presence of Native groups in the Coastal Plain. Prior to Emerson's argument, MacCord (1969) used the presence of locally made pipes with Native motifs, along with other aspects of Native material culture such as ceramics, to argue that the seventeenth century Camden site (44CE3) had been occupied by a Native group called the Machotick. In direct response to Emerson, Mouer et al. (1999) used similarities between design elements found on Native ceramics and materials and those found on locally made pipes to argue that Natives were the primary producers of locally made pipes. Magoon (1999) used a similar strategy, linking motifs found on Late Woodland Jordan's Landing site (31BR7) on the North Carolina coast with those from seventeenth century locally made pipes from other North Carolina sites to argue that some of the motifs found on locally made pipes had antecedents in Native decorative structures. He also argued that the presence of pipes which exhibited similarities to locally made pipes on a historic site in North Carolina (Croatan, 31DR7) extended the geographic locale of these pipes outside of that originally suggested by Emerson. Magoon argued that this was an indication that not all of these pipes were necessarily produced by African slaves but also could have been produced by Native groups on the Coast.

Archaeological and documentary evidence also indicates that Siouan groups in the Piedmont continued to produce pipes into the seventeenth and eighteenth centuries. Eastman (1999:137) noted that pipes with designs similar to those found on locally made pipes were found in late seventeenth century contexts on the Lower Saratown (31RK1) and Early Upper Saratown (31SK1) sites. Furthermore, she noted that the small punctates used to make these designs differ from the dentate stamping that was more typical of pipes on the Coast. The use of different tools suggested that Natives on these sites were producing their own versions of pipes by copying those from the Coast. Lawson's account mentioned above provides documentary evidence that Siouan Native groups living in the Piedmont of North Carolina were producing pipes for trade well into the latter part of the seventeenth century.

While the debates regarding the ethnicity of the individuals producing locally made pipes lasted for some time, more recent studies have shifted to consider what the production of locally made pipes can tell us about the interactions and social processes in Virginia and elsewhere during the seventeenth century. Mouer (1993) suggested that locally made pipes should be viewed as hybrid or creolized objects that were the result of the unique social interactions that were taking place between white planters, African American slaves, and Natives in Virginia during this period. Sikes (2008) has made an argument following a similar vein by noting that some of the motifs found on locally made pipes, such as stars, were universally known to all groups involved in their production. She suggests stars were likely chosen as decorative motifs precisely because they were common and accessible to all groups present in the seventeenth century Chesapeake.

Other researchers have considered what similarities and differences between locally made pipes reveal about the social networks that were in place in the Middle Atlantic. Agbe-Davies (2004a, 2004b, 2010) examined how elite social networks and sponsorship of pipe production impacted the production and circulation of locally made pipes among six different seventeenth century sites in the Chesapeake. Luckenbach and Kiser (2006) traced the distribution of certain motifs among the Virginia Coastal Plain and linked their production to certain individuals and production workshops. Although they identify most of the producers as English colonists they do argue that a Native worker on the Nomini plantation may have produced some pipes.

Although the participation of Maryland and Virginia Native groups in pipe production has been debated, the Susquehannocks are known to have continued producing pipes well into the seventeenth century in southeastern Pennsylvania (Kent 1984). A number of pipes that exhibit material characteristics similar to those found on pipes from Susquehannock sites in southeastern Pennsylvania are also present at the Pope's Fort site in southern Maryland, suggesting that either Susquehannocks were trading pipes with the English at the fort or that the English were copying Suquehannock traditions.

The debates discussed above demonstrate it is difficult to determine which groups were producing locally made pipes during the seventeenth century in the Middle Atlantic. Consequently, some of the pipes found on the seventeenth century Native sites included in this study may in fact have been produced by European settlers or African American slaves. I have tried to control for this by only using collections from sites that exhibit evidence of being occupied by Native groups. However, it many cases it is only possible to presume that these pipes were used but not necessarily produced by Native peoples. Nevertheless, these pipes can still provide information about production techniques and decorative attributes that provide insights into social relationships and connections that were present in the region during the Contact period.

Summary

In this chapter I used archaeological and ethnohistorical evidence to identify the social and cultural contexts of pipe use and production. Understanding which Native groups used pipes and how they used them provides an interpretative framework for the stylistic analyses that follow. I contend that the historical accounts and archaeological research surveyed above demonstrate three main points: 1) that tobacco smoking pipes were important ritual objects that served multiple purposes in Native communities ranging from communal or individual expressions of power, friendship, or enmity to offering gifts to ancestors to providing medicinal relief, 2) that pipes were associated with high status individuals (males and females) in the Late Woodland but that a larger portion of Native communities likely smoked during the early Contact periods and 3) although it is difficult to discern which groups were producing pipes during the Late Woodland period, a number of different social groups were involved in the production of pipes during the Contact period.

Hypotheses

Now that I have provided the necessary background of my study area and the material class of interest in this investigation, I will outline the four hypotheses that will guide my analysis of the social processes behind the distributions of pipe attributes in the Middle Atlantic region:

Hypothesis 1: The spatial mapping of pipe attributes throughout the region will align with historically defined physiographic, linguistic, or cultural complex boundaries. Alternatively, the distribution of attributes may take the form of clinal or random distributions or clustering that are not isomorphic with any of the accepted definitions of cultural or environmental territories previously recognized by archaeologists. Such patterning could suggest alternative models of regional social organization and allow me to reject this hypothesis.

Hypothesis 2: The mapping of pipe attributes will reveal significant patterns of smaller, localized clustering. If clustered attributes take the form of decorative elements or structures their variation could provide insight into the social process of intra-community signaling. Alternatively, clinal, or random distributions of pipe attributes or the alignment of pipe attributes with cultural area or physiographic boundaries would lead to the rejection of this hypothesis.

Hypothesis 3: The integral role of pipes in rituals that facilitated social interaction and exchange will be reflected by the widespread distribution of decorative pipe attributes over the region, or a large part of the region, although these distributions may not necessarily be continuous. Decorative attributes are more prone to exhibiting such distributions as they are more visible and easily copied (Agbe-Davies 2010:79; Carr 1995:186-194; Stark 1999:29). If the attributes are widely distributed in a 'down-the-line' model, this would suggest relatively open access to the symbols of importance. If the attributes are widely distributed but are only found in specific ritual contexts, such as burials, that suggests the maintenance of ritual ties was restricted to certain individuals or social groups. Alternatively, if these presumed iconological pipe attributes are randomly or clinally distributed, their role as ritual items will be reconsidered. Finally, the results from chemical compositional analysis will be used to attempt to differentiate the actual exchange of pipes from the sharing of information about decorative elements between groups.

Hypothesis 4: With the extensive social and political changes occurring between A.D. 1000 and 1700, it is expected that the attributes found on pipes, and their patterning, will vary over time. As noted in Chapter 3 previous research (Eastman 1999; Gallivan 2003; Lapham 2005; Stewart 1989) has demonstrated that exchange networks in the Middle Atlantic region shifted throughout the Late Woodland to Contact periods as the rise of social hierarchy and the arrival of Europeans and the growing fur trade market impacted the ways Native communities interacted. It is anticipated that these shifts could be reflected in one of two ways:

1) Following Stewart's (1994) results, if the use of certain attributes persisted throughout multiple centuries their distributions may shift from being more widespread among Late Woodland I sites to being more clustered among Late Woodland II sites to being more widespread again in Contact period contexts.
2) These shifts could be reflected in the overall regional patterning of attributes regardless of whether attributes persist through time. If this is the case regional patterning of multiple types of attributes may shift from more expansive and widespread distributions in the Late Woodland I period to more clustered distributions among Late Woodland II period sites, to more widespread distributions among Contact period sites.

Alternatively, if the distributions of pipe attributes do not demonstrate any significant shifts from one period to another or stay relative stable through time, I will reject this hypothesis.

Having creating the interpretative framework for my study and outlined my hypotheses, I will now turn to explaining the details of my data. In the next few chapters I will illustrate and explain how the distributions of pipes compare and contrast with cultural boundaries previously outlined by archaeologists. I will investigate whether the consideration of a different class of material culture and its relationship to various contingents of a society provides a way of escaping from the cultural complex model and a means of illuminating the presence and role of other social groups that existed within these boundaries.

Chapter 5 : Data Collection, Chronological Organization, and Site Assemblages

Introduction

Now that I have provided the cultural history background for my study area, discussed why pipes are an important class of material culture, and outlined my hypotheses, I will shift my focus to explain the methodology used to build the dataset. This chapter focuses on the sites, assemblages, and attributes that serve as the basis for my analysis. First, I detail my criteria for site selection and how the boundaries of the study area were determined. Second, I explain the chronological organization of the sites that were included in the study. Third, I discuss some general spatial and temporal trends that became apparent during an initial comparison of the assemblages in the dataset. Finally, I provide a brief explanation of the pipe attributes that were chosen for analysis.

The Dataset

Before explaining the particulars of this dataset, it is first necessary to explain the methodology used for data collection. As previously mentioned this study is centered in the Middle Atlantic region, which encompasses a territory starting as far south as North Carolina and running as far north as New York, although as noted in Chapter 2 the exact borders remain undefined and continue to be a source of debate. Given that I was interested in documenting aspects of pipes that were related to their roles in the pan-regional ritual practice, it was necessary to create a survey area that would allow me to examine spatial patterns on different sites throughout the region. Concurrently, it is important to note there were areas in the Middle Atlantic where pipes have already been extensively studied. For example, pipes from sites associated with Iroquoian speaking groups in northern Pennsylvania and New York have been the focus of intensive study (Hayes (ed.) 1992; Kuhn 1986; Kuhn and Sempowski 2001; Wonderley 2005). Additionally, pipe assemblages from sites located in the southern and far western territory of North Carolina are the subject of a forthcoming dissertation (Blanton 2012). In an effort to make my dataset more manageable and concentrate on the area where pipes had received the least attention, I limited my scope to a smaller portion of the region: southern Pennsylvania, Delaware, Maryland, Virginia, and North Carolina.

Despite the minimization, however, the study area remained expansive enough that it was necessary to choose a focal point from which to begin data collection and extend outwards. Virginia and Maryland were chosen as the point of departure because a preliminary survey of site reports indicated that prior to this study little attention had been paid to Late Woodland period Native pipes beyond descriptive listings in site reports. Once the focal point was established, I then conducted a survey of site reports and archaeological literature to identify relevant collections from southern Pennsylvania, Delaware, and northern North Carolina.

An equally important goal of the site selection process was to include enough sites to obtain a representative sample of the study area. A significant effort was made to include collections from all three of the major physiographic provinces in the region due to the fact that previous studies have demonstrated this geographic breadth is necessary if one hopes to capture the vast amount of variability present amongst the different Native societies that inhabited these areas (Dunham 1994; Egloff 1992; Gallivan 2003; Gold 2004; Jirikowic 1995; Kavanaugh 1982; Klein 1994; Mouer 1981; Rountree and

Davidson 1997; Turner 1976). Additionally, it is was necessary to include multiple sites that were situated within the same cultural area or were assigned similar linguistic affiliations by previous researchers to evaluate how the distributions of pipe attributes aligned with the cultural and linguistic groups described in Chapter 2.

In addition to achieving a wide spatial distribution, different site types were also included in the sample. Although Late Woodland settlements in the Middle Atlantic region are characteristically nucleated and palisaded villages located on the floodplain terraces of major rivers, archaeologists have identified evidence of other site types in the region (Davis et al. 1997a; Egloff et al. 1987; Gallivan et al. 1999; Gardner 1986; Potter 1993). Although large village sites comprise the majority of the sample (n = 50), I also made an effort to include smaller hamlet sites (n = 6) and dispersed village sites (n = 1) to capture as much variation as possible.

Besides settlement sites, pipes from mortuary assemblages were also examined because a survey of archaeological site reports and previous research indicated that a significant quantity of pipes had been excavated from these contexts. Although pipes from individual primary burials found on habitation sites in the region were included in general site assemblages, other types of mortuary features, such as mounds (n = 10) and ossuaries (n = 5), used by Native groups in the Middle Atlantic were spatially separate from habitation sites. These features were often excavated as separate archaeological sites so those assemblages had to be located and examined in addition to those from habitation sites.

Figures 5.1a and 5.1b illustrate the distributions of all 72 sites included in the study in relation to: a) cultural complex boundaries, b) linguistic/physiographic boundaries. Despite my endeavors to include sites that would give my research area a wide geographic and temporal expanse, it must be acknowledged that this sample of sites cannot be considered representative of the entire region that I initially identified as my survey area. Certain factors impeded my ability to gain access to collections from sites in certain parts of the study area. For example, collections from sites located in the southwestern area of Pennsylvania that were housed in the Carnegie Museum of Natural History were not available for analysis by outside researchers. Consequently no site assemblages from that area were able to be included. Additionally, despite the best efforts of Delaware state archaeologists only a few pipe fragments from the State's repository could be located. The lack of availability of collections greatly reduced my ability to draw conclusions about Native pipes from this area.

In contrast to areas where collections weren't available for study, there were other locales within the study area where archaeological assemblages were available but lacked pipes. Despite the fact that four Late Woodland Native villages have been excavated in the Virginia Piedmont, Spessard (44FV143, Gallivan et al. n.d.; Gallivan 2004); Wingina (44NE4, MacCord 1974; Gallivan 1997); Wood (44NE143, Gallivan 1999:165), and Partridge Creek (44AH193, Tourtellotte 1990; Gallivan 1999) in what is considered to be Ancestral Monacan territory (Hantman 1990, 1993, 1998) only two pipe fragments were recovered from archaeological contexts from these sites. This lack of pipes from archaeological contexts could be related to the history of private collecting in this area, both from expeditions by institutions such as the Valentine Museum in the late nineteenth and early twentieth centuries (Valentine 1903) and by individuals like Wirt Robinson in the early to mid twentieth century (Harrington 1950). A survey of the collections at the

Valentine Museum and Wirt Robinson collection revealed that there were significant numbers of pipes in the respective collections but most lack provenience and therefore could not be included in this study. Nevertheless, archaeological and ethnohistorical evidence suggest that the Ancestral Monacans were the builders of the Lewis Creek Mound complex (Dunham et al. 2003; Hantman et al. 2004, cf. Boyd and Boyd 2003) so pipes from these contexts were included to provide some insight into the pipe use and production amongst Late Woodland Ancestral Monacan communities. Monacan pipe use during the sixteenth and seventeenth century remains a subject for future study.

Finally, despite many inquires with archaeological researchers who worked on Maryland and Virginia’s Eastern shores, no archaeological collections with pipes could be located from these areas. Ultimately, I visited five museums, five state archaeological repositories, and three universities to collect information on attributes and contextual data on 2543 pipe specimens from 72 Late Woodland and Early Contact Period sites in the Middle Atlantic.

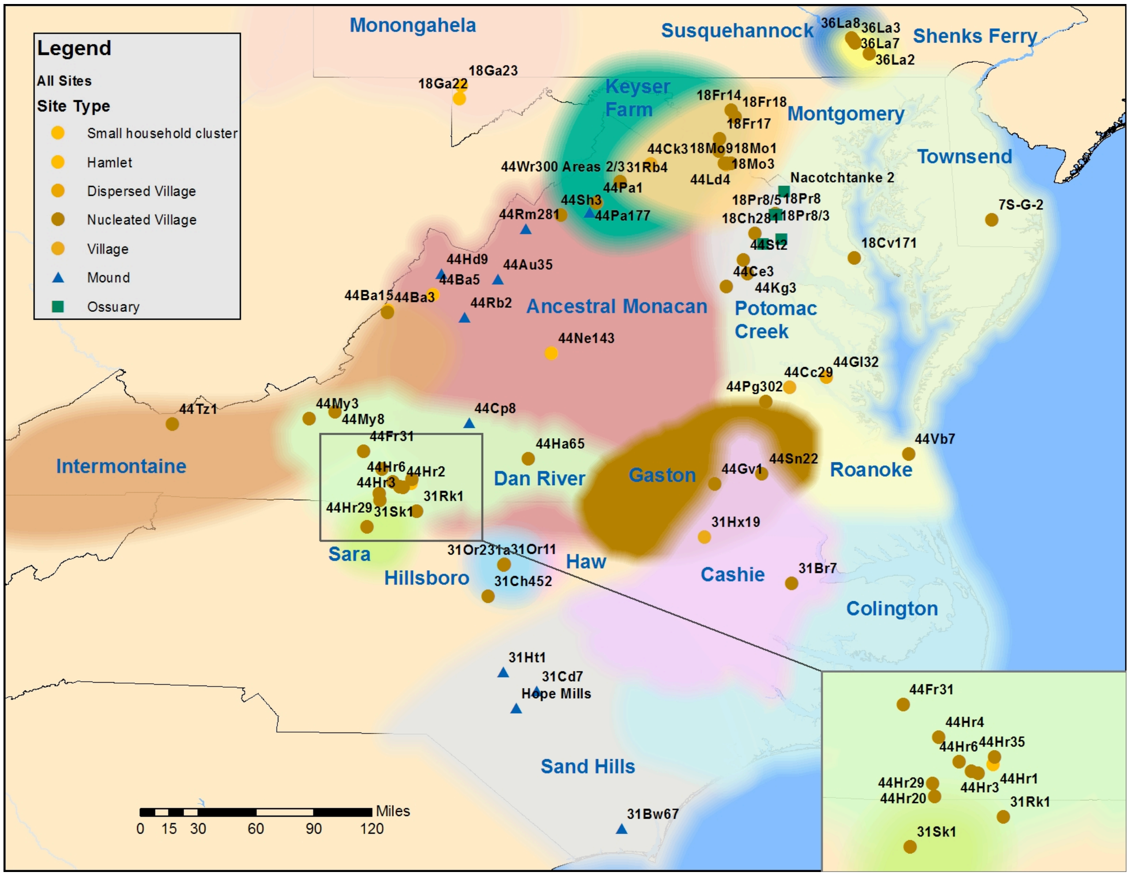


Figure 5.1a: All sites included in study compared with Cultural Complex Boundaries

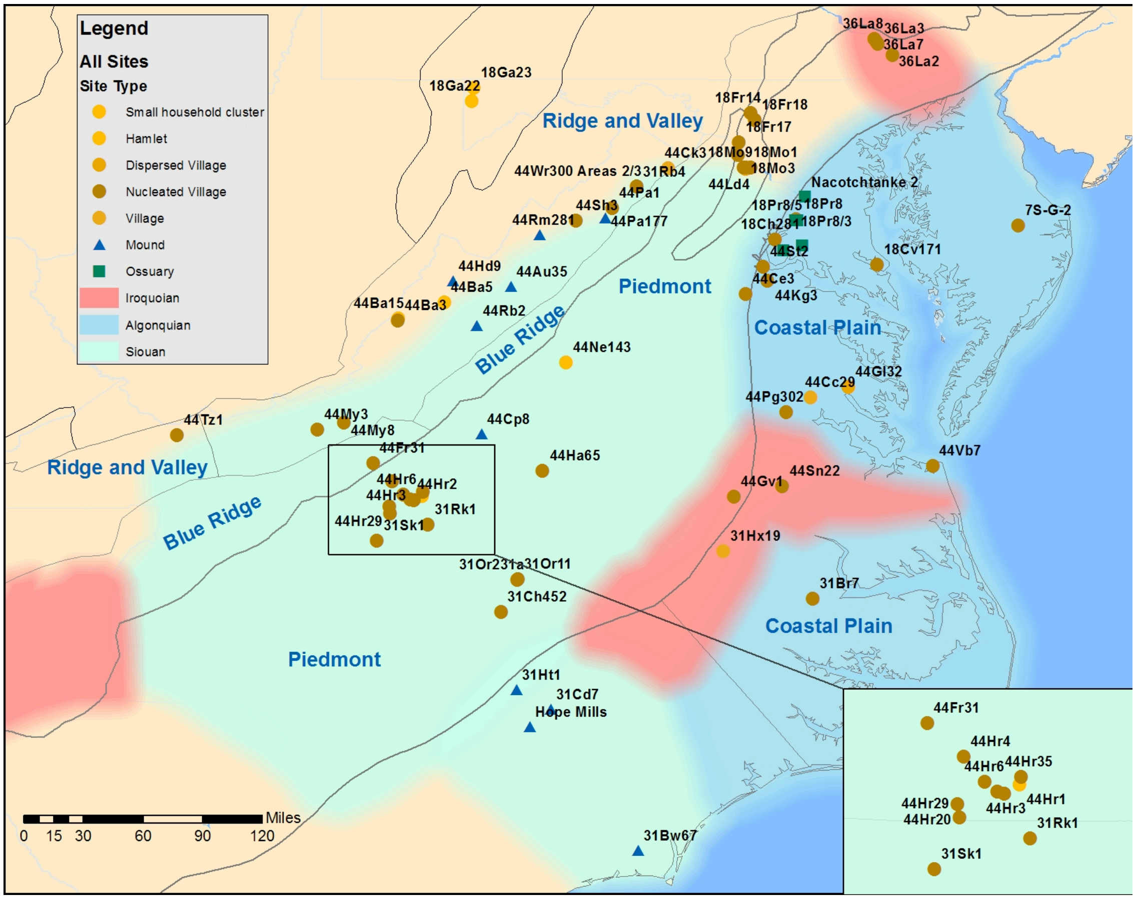


Figure 5.1b: All sites in study compared with approximate language territories overlaid with physiographic boundaries

Chronological Organization

As previously noted one of the limiting factors of cultural complex boundaries is that they stress the homogeneity and continuity of Native practices at the expense of diversity over time and space. Although many Native groups did maintain certain practices, such as the production of certain types of pottery and lithics, for centuries, as noted in Chapter 2, attribute based analyses of ceramics and lithics indicate that changes were taking place in production networks through time. Moreover, as discussed in Chapter 4, shifts in political and social systems were also taking place in Native communities during the Late Woodland and Contact periods that impacted pipe smoking and production. Given the evidence of these changes, it was necessary to explore whether there might be temporal variation in the dataset that would give some indication of changes taking place among these groups that is not captured by simply mapping the distributions of pipes across all of the sites simultaneously.

The sites encompassed within this dataset covered a large time span, A.D. 900 to 1700. In order to establish a basis for examining changes over time, sites were assigned to three sub-periods: Late Woodland I – A.D. 900-1200, Late Woodland II – A.D. 1200-1607, and Contact and Colonialism – A.D. 1607 to 1700. These divisions are not arbitrary but align with the sub-periods used by previous researchers in the region (Dent 1995; Eastman 1999; Gallivan 2003; Gardner 1986; Gold 1999; Grumet 1995; Jirikowic 1995; Lapham 2005; Potter 1993; Ward and Davis 1999) and were implemented so that the results reported here could easily be integrated with the conclusions and interpretations from previous syntheses that had been conducted in the region. Tables 5.1, 5.2, and 5.3 provide a summary of all of the sites included in the study and dates based on radiocarbon and other dating forms and relevant sources.

Table 5.1: Available radiocarbon dates for sites in study

Period/Sites	Site	Context	Calibrated Dates A.D. 2 sigma Range Lower Range	2 sigma Upper Range	Source
Late Woodland I (A.D. 900-1200)					
Ancestral Monacan					
44AH193	Partridge Creek	Fea 10	983	1180	Tourtellotte 1990; Gallivan 1999:165
		Midden	970	1250	Gallivan 1999:165
		Fea 24	983	1277	Gallivan 1999:165
		Fea 12	1004	1287	Gallivan 1999:165
		Fea 22	1126	1279	Gallivan 1999:165
44NE143	Wood	Fea 27	880	1269	Gallivan 1999:165; Fowke 1894
		Post 94	989	1283	
		Fea 1A	1019	1295	
Montgomery Complex					
44LD4	Fisher Site	--	960	1100	Curry and Kavanagh 2004; Slattery and Woodward 1992; McKnight and Gallivan 2007; Pullin and Lewes 2002:49
44CK3	Kerns	Midden area	1075	1215	Slattery and Woodward 1992:144; Curry and Kavanaugh 2004
18FR14	Biggs Ford	Fea 4	1080	1200	Kavanaugh 1982:88; Kavanaugh 2001:8; Curry and Kavanaugh 2004:27
Monongahela					
18GA22	Sang Run	Fea 11	1040	1290	Wall 1989
		Fea 10	1170	1300	Wall 1989

18GA23	Friendsville				Boyce-Ballweber 1987
44BA5	Huffman	Fea 15a	779	794	Geier and Warren 1982a; Means and McKnight 2010
			1128	1133	Geier and Warren 1982a; Means and McKnight 2010
			1152	1316	Geier and Warren 1982a; Means and McKnight 2010
			1354	1389	Geier and Warren 1982a; Means and McKnight 2010
		Fea 29d	985	1255	Geier and Warren 1982a; Gallivan 1999:166; Means and McKnight 2010
		Fea E1	1052	1081	Geier and Warren 1982a; Gallivan 1999:166
			1128	1133	Geier and Warren 1982a; Means and McKnight 2010
			1152	1316	Geier and Warren 1982a; Means and McKnight 2010
			1354	1389	Geier and Warren 1982a; Means and McKnight 2010
		Fea 28a	1167	1327	Geier and Warren 1982a; Gallivan 1999:166
			1342	1395	Geier and Warren 1982a; Means and McKnight 2010
		Fea 28AL. 4	1410	1519	Geier and Warren 1982a; Means and McKnight 2010
Late Woodland II (A.D. 1200-1607)					
Ancestral Monacan					
44AH193	Partridge	Fea 40	1031	1296	Tourtellotte 1990; Gallivan 2003

	Creek				
		Fea 37	1051	1373	
		Fea 39	1268	1401	
31RK1	Lower Saratown	Fea 41	1169	1392	Ward and Davis 1993; Eastman 1994b:12
44HR1	Leatherwood Creek	House 1 Floor	1212	1293	Gallivan 1997; 1999:165
		House 4 Pit	1307	1616	Gallivan 1999:165
Montgomery Complex					
18MO3	Shepard		1320	1442	Wall 2001; Dent and Jirikowic 1995
		Midden area	1210	1310	Curry and Kavanagh 2004:27, Slattery and Woodward 1992:144
		Midden area	1240	1360	Curry and Kavanagh 2004:27, Slattery and Woodward 1992:144
18MO9	Winslow Site	Midden	1175	1375	Slattery and Woodward 1994:144; Curry and Kavanaugh 2004:27
		Refuse Pit #12	1265	1425	Slattery and Woodward 1994:144; Curry and Kavanaugh 2004:27
		House Pattern	1330	1410	Dent 2003a:4; Curry and Kavanaugh 2004:27
18FR18	Rosenstock	Feature 6	998	1220	Curry and Kavanagh 2004:Table 3
		Feature 5 (W 1/2)	987	1277	Curry and Kavanagh 2004:Table 3
		Feature 12	1026	1279	Curry and Kavanagh 2004:Table 3
		Feature 5 (E 1/2)	979	1390	Curry and Kavanagh 2004:Table 3

		Feature 17	1063	1403	Curry and Kavanagh 2004:Table 3
		Feature 28	1164	1401	Curry and Kavanagh 2004:Table 3
		Feature 27	1159	1427	Curry and Kavanagh 2004:Table 3
		Feature 4 (35-52 cm blw plowzone)	1285	1418	Curry and Kavanagh 2004:Table 3
		Feature 4 (20-31 cm blw plowzone)	1299	1465	Curry and Kavanagh 2004:Table 3
		Feature 5 (57-100 cm blw plowzone)	1333	1446	Curry and Kavanagh 2004:Table 3
		Feature 5 (E 1/2, charred bark)	1290	1621	Curry and Kavanagh 2004:Table 3
		Feature 5 (20-27 cm blw plowzone)	1310	1627	Curry and Kavanagh 2004:Table 3
		Feature 17 (Sec. 3, Lvl 3)	1426	1647	Curry and Kavanagh 2004:Table 3
18FR17	Nolands Ferry	Fea 2	1010	1140	Peck 1979:14
		Fea 2	1395	1545	Peck 1979:14
		Fea 2	1145	1265	Peck 1979:14
		Fea 5	1530	1650	Peck 1979:14
		Fea 7	1435	1555	Peck 1979:14
		Fea 14	1025	1165	Peck 1979:14
		Fea 14	1490	1610	Peck 1979:14
Dan River					
44HR4	Philpott	Fea TP-1	1213	1391	Davis et al. 1998:83

		Fea TP-B	1260	1408	Davis et al. 1998:83
44HR3	Belmont	Refuse filled pit	1229	1391	Davis et al. 1997:89
		Refuse filled pit	1402	1611	Davis et al. 1997:89
44HR6	Koehler	Fea 56	1250	1433	Eastman 1994b:97; Coleman and Gravely 1992
		Fea 106	1277	1402	Eastman 1994b:97; Coleman and Gravely 1992
		Fea 122	1258	1445	Eastman 1994b:97; Coleman and Gravely 1992
		Midden Area	1170	1370	Curry and Kavanaugh 2004; Kavanaugh 2001;
		Refuse Area	1265	1425	Slattery and Woodward 1992, Crane and Griffin 1963
44HR20	Dallas Hylton	Fea 52	1276	1431	Eastman 1994b:98; Davis et al. 1997:85
		Fea 10	1300	1439	Davis et al. 1997:85
31SK1	Early Upper Saratown	Fea 2	1276	1450	Eastman 1994b:11, 1999:65, 2001
44HR2	Box Plant	Fea 15	1279	1435	Eastman 1994b:95; Davis et al. 1997:70
		Fea 32	1295	1434	Eastman 1994b:95; Davis et al. 1997:71
44FR31	Otter Creek	Feature 1	1281	1427	Egloff et al. 1987; Eastman 1994c:60
44HR35	Stockton	Fea 7	1285	1417	Davis et al. 1997d:79

44HR29	Gravely	Fea 7, Zone 3	1307	1474	Davis et al. 1997:65
		Fea 11	1302	1455	Davis et al. 1997:65
Intermontaine					
44BA15	Noah's Ark	Fea 8	1190	1436	Geier and Warren 1982; Gallivan 1999:165
		Fea 45	1223	1407	Geier and Warren 1982; Gallivan 1999:165
		Fea 31	1242	1409	Geier and Warren 1982; Gallivan 1999:165
		Fea 12	1243	1435	Geier and Warren 1982; Gallivan 1999:165
	Perkins Point	Fea 1	1448	1666	Whyte and Geier 1982; Means and McKnight 2010
			1784	1796	Whyte and Geier 1982; Means and McKnight 2010
			1462	1642	Means and McKnight 2010
44BA3		Fea 63	1279	1681	MacCord 1982; Whyte and Geier 1982; Eastman 1994b; Gallivan 2003
			1738	1755	Whyte and Geier 1982; Means and McKnight 2010
			1762	1802	Whyte and Geier 1982; Means and McKnight 2010
			1937	1951	Whyte and Geier 1982; Means and McKnight 2010
		Fea 69	1409	1524	Whyte and Geier 1982; Means and McKnight 2010

			1558	1631	Whyte and Geier 1982; Means and McKnight 2010
		38L. 4 W1/2	1691	1729	Means and McKnight 2010
			1810	1923	Means and McKnight 2010
			1952	1956	Means and McKnight 2010
44TZ1	Crab Orchard	Subterrean Structure	1360	1480	McIlhaney 1986
		Fea 41	1450	1690	MacCord and Buchanan 1980:150
		Subterrean Structure	1555	1665	Egloff and Reed 1980:132
Potomac Creek					
44ST2	Potomac Creek Site	Feature 25	950	1215	Blanton et al. 1999:Table 4
		Feature 23	1260	1300	Blanton et al. 1999:Table 4
		Feature 17	1260	1410	Blanton et al. 1999:Table 4
		Feature 1 (Section E)	1280	1415	Blanton et al. 1999:Table 4
		Feature 4	1300	1455	Blanton et al. 1999:Table 4
		Feature 12	1425	1640	Blanton et al. 1999:Table 4
		Feature 6/7	1460	1645	Blanton et al. 1999:Table 4
		Feature 10	1455	1655	Blanton et al. 1999:Table 4
Keyser					
18FR14	Biggs Ford	--	1285	1611	Kavanaugh 2001:11
18MO1	Hughes	Feature 45	1470	1590	Dent and Jirikowic 1990; Jirikowic 1995:Table 1

		Feature 45	1310	1430	Dent and Jirikowic 1990; Jirikowic 1995:Table 1
44PA1	Keyser	04-04L. 5	1327	1342	Barber, p.c. 2008, Means and McKnight 2010
		04-04L. 5	1394	1475	Barber, p.c. 2008, Means and McKnight 2010
		06-03 L. 13	1296	1453	Barber, p.c. 2008, Means and McKnight 2010
		04-07L. 10	1455	1637	Means and McKnight 2010
		05-10L. 1	1442	1529	Means and McKnight 2010
		05-10L. 1	1543	1634	Means and McKnight 2010
		04-08L. 9	1437	1528	Means and McKnight 2010
		04-08L. 9	1545	1545	Means and McKnight 2010
		04-08L. 9	1551	1634	Means and McKnight 2010
		04-08L. 10	1450	1532	Means and McKnight 2010
		04-08L. 10	1536	1635	Means and McKnight 2010
		05-13L. 11	1427	1524	Means and McKnight 2010
		05-13L. 11	1558	1631	Means and McKnight 2010
		07-06L. 5 N 1/2	1442	1529	Means and McKnight 2010
		07-06L. 5 N 1/2	1543	1634	Means and McKnight 2010
		07-06L. 5 N 1/2	1442	1529	Means and McKnight 2010
		07-06L. 5 N 1/2	1543	1634	Means and McKnight 2010
44VB7	Great Neck	Fea 29	1270	1441	Painter 1978; Hodges 1993, 1998; Gallivan 2004
		Fea 163	1409	1627	
44SN22	Hand Site		1580	1640	Smith 1984; Knepper et al. 2006

Hillsboro					
31OR11	Wall Site	Posthole #1	1297	1954	Eastman 1994b:3, Ward and Davis 1993
		Burial 1-83	1422	1955	
		Posthole #3	1283	1658	
18CV171	Cumberland	Fea 1	1510	1640	Williams 1983
Contact (A.D. 1607-1710)					
44KG3	DeShazo	Fea 3	1322	1954	Eastman 1994a:109; Long 1965:246;
44MY3	Trigg	Fea 416	1515	1635	Buchanan 1984:415; Lapham 2002:86
		Fea 110	1635	1795	Buchanan 1984:415; Lapham 2002:86
31RK1	Lower Saratown	Fea 46	1406	1646	Ward and Davis 1993, Eastman 1999
31CH452	Mitchum	Fea 7	1600	1670	Ward and Davis 1993
31OR231a	Jenrette	--	--	--	Ward and Davis 1993

Table 5.2: Date ranges for other sites based on artifact analyses

Period/Sites	Site	Date Range		Source
Late Woodland II				
Intermontaine				
44MY8	Shannon	1550	1600	Benthall 1969
Shenk's Ferry				
36LA2	Shenk's Ferry Site	1300	1575	Kent 1984
Potomac Creek				
18PR8	Accokeek	1300	1600	Stephenson et al. 1963
36LA7	Schultz	1575	1600	Kent 1984
Contact				
36LA8	Washington Boro	1600	1625	Kent 1984
44HA65	Abbyville	1600	1650	Wells (ed.) 2002
44GV1	John Green	1607	1650	MacCord 1970
31SK1	Early Upper Saratown	1607	1650	Eastman 1999, 2001
36LA3	Strickler	1640	1665	Kent 1984
18CH281	Posey Site	1650	1700	Dent and Jirikowic 2001:52;

				Harmon 1999
31HX19	Halifax	-	-	CFAR 2003
44CE3	Camden Site	1680	1710	MacCord 1969; Hodges and McCartney 1986; Hodges 1986; Turner 1990b;

Table 5.3: Date ranges for burial sites in study

Site Designation	Site	Context	Date Range		Source
<u>Late Woodland I</u>					
Mounds					
31CD7	McLean	Burial	870	1070	Herbert 2002; Irwin 2004
					Irwin et al. 1999; MacCord 1966
44RB2	Hayes Creek	Primary Burial	900	1350	Dunham 1994:Table 15
44HD9	Clover Creek	Carbonized Corn Kernels*	1180	1265	Gold 1999:Table 4.7
44PA177	Brumback	Primary Burial	900	1350	Dunham 1994:Table 15
44AU20	Lewis Creek	Burial #21*	990	1050	Gold 1999:Table 4.7
		Burial #15*	1030	1160	Gold 1999:Table 4.7
		Looted Mound Area*	1010	1060	Gold 1999:Table 4.7
44AU35	John East	Fea 34, Submound Pit*	1000	1060	Gold 1999:Table 4.7; Dunham 1994
44RM281	Bowman	Middle of mound matrix. S17	600	900	Dunham 1994:Table 15, 589
		At the center, core burial sequence, Bone Bed D	1300	1400	Dunham 1994:Table 15, 589
<u>Late Woodland II</u>					
Mounds					
44AU35	John East	Just above burial #128, Submound Pit	1220	1450	Gold 1999:Table 4.6; Dunham 1994
		Mid-mound sediment*	1220	1400	Gold 1999:Table 4.6; Dunham 1994
Ossuaries					
18CH95/2	Warehouse Point II-2	--	1585	1642	Curry 1999
18CH95/3	Warehouse Point II-3	--	1585	1642	Curry 1999
--	Nacotchtanke 2	--	1593	1623	Curry 1999
18PR8/3	Accokeek Creek 3	--	1566	1598	Curry 1999

18PR8/4	Accokeek Creek 4	--	1566	1598	Curry 1999
18CH89/2	Nanjemoy Ossuary 2/Juhle 2	--	No contact period materials		Curry 1999
44ST2/2	Potomac Creek	--	No European artifacts		Stewart 1992:10
44ST2/4	Potomac Creek	--	No European artifacts		Stewart 1992:10
<u>Contact</u> Ossuaries					
18PR8/5	Accokeek Creek/Susquehannock	--	1674	1675	Curry 1999
44ST2/1	Potomac Creek	--	European artifacts		Stewart 1992:9

* 1 sigma radio carbon dates

The first designation, A.D. 900-1200, is based on archaeological research that indicates shifts were taking place in the subsistence and settlement patterns in the region during this period. Such interpretations draw from archaeobotanical evidence that indicates an increase in horticulture and the use of cultigens, such as beans and maize, during the period from A.D. 800-1000 (Dent 1995; Gallivan 1999; Gardner 1986; Hantman and Gold 2002; Potter 1993; Smith 1986; Stewart 1993). Additionally, the size of settlement structures also shifts during this period, but do not necessarily immediately transition to large nucleated or dispersed villages. In some parts of the region smaller, intermediate-sized communities were the norm as groups moved to take advantage of productive soils located in different floodplain territories (Custer 1984; Gallivan 2003; Potter 1993; Ward and Davis 1999). Thus Late Woodland I settlement patterns are often a mixture of smaller hamlet settlements as well as some larger villages. Finally, although there is little evidence of structured political hierarchies during this period, the appearance of accretional burial mounds in northwestern Virginia and southeastern North Carolina indicates certain individuals may have acquired special social status that was marked by receiving special treatment upon their death (Dunham 1994; Hantman 1993; Irwin et al. 1999).

The second period, A.D. 1200-1607 marks alterations that took place in the social systems of Native societies as dispersed communities coalesced into larger villages similar to those generally described in historic accounts. These communities incorporated agriculture more intensively into their subsistence base around the beginning of the thirteenth century (Custer 1984; Dunham 1994; Gallivan 1999; Gold 1999; Phelps 1983, 1984; Potter 1993; Stewart 1989, 1994; Turner 1992; Ward and Davis

1999). Additionally, as noted in Chapter 2, the rise of social hierarchy and increasingly sedentary lifestyle of groups in different parts of the region impacted burial rites (Curry 1999; Dunham 1994; Jirikowic 1990), the storage of surplus (Gallivan 2003, Potter 1993; Ward 1985) and also led to an increase in warfare (Feest 1978; Potter 1993; Rountree 1992), which impacted exchange and interaction networks during this period (Gallivan 1999; Stewart 1989; 1994).

The final division between the Late Woodland II and Contact and Colonialism periods, coincides with the arrival of the English at Jamestown. Drawing the division at 1607 aligns with the divisions used by other researchers but is somewhat problematic for this particular study because of the wide geographic breadth of the study area. For example, short-lived European settlements, such as Roanoke colony in North Carolina, and the Ajacan mission along the York River in Virginia (Mallios 2006; Rountree and Turner 2002) did interact with Native coastal groups in the latter half of the sixteenth century. However, the records that survive from these brief forays indicate Natives introduced the English to smoking pipes during this time (Hariot 1893[1588]). Thus it would seem that European influence on Native smoking was negligible and that Native production and use of smoking pipes was not greatly affected by these encounters.

However, when a small group of English settlers established their colony at Jamestown in 1607, smoking and pipe production had become much more widespread throughout Europe. There is even evidence of a pipe maker at Jamestown, Robert Cotton (Kelso and Straube 2004) and the market for locally made pipes grew exponentially within the first half of the seventeenth century. Consequently, I suggest that the sustained arrival of the English at Jamestown had more of an impact on Native perceptions of smoking than the other brief settlements. Moreover, the settlement at Jamestown proved to be the starting point of the arrival and permanent settlement of Europeans in the Middle Atlantic region and the introduction of European produced pipes into Middle Atlantic Native societies. Thus, I chose 1607 as the beginning of the Contact period.

One other caveat that must be noted is that this temporal framework omits an additional temporal division other researchers have employed in their studies, alternatively called the Protohistoric or Contact period, which spans from A.D. 1500-1607. There were a few reasons I chose not to separate sites whose dates fell within this period with those from Late Woodland II or the Contact Periods. For practical purposes, there were very few sites in the survey with occupation spans that fall exactly between these dates. The majority of occupations either began in the fourteenth century or continued well into the first quarter of the seventeenth century. Moreover, although a number of groups on the Atlantic coast from Florida to New England engaged with different European groups during the sixteenth century, Native groups in the interior, such as the Monacans, Tutelo, and Sara, did not experience sustained changes that were the result of European arrival and settlement until well into the seventeenth century. Sustained engagement between Native groups and European settlers didn’t occur until the mid-to-late seventeenth century as settlers moved into the interior to find suitable farmland or engage in the fur trade (Bushnell 1930; Eastman 1999; Hantman 1990; Lawson 1967[1709]; Lederer 1672; Lapham 2005; Ward and Davis 1993, 1999). Consequently, the Protohistoric divide is appropriate to use when discussing Native groups along the coast, or those further north who experienced changes brought about by the arrival of Spanish missions or early English exploratory missions in the mid-sixteenth century. However, given that the geographic range of this study also encompasses Native groups who did not experience such shifts until well into the seventeenth century it seemed as though delineating an additional division would be acknowledging shifts that may not have actually been perceived by the Native groups in all areas of my study. Consequently, I decided to demarcate the last temporal period at the beginning of the stage of more sustained contact at 1607.

Finally, I should note I am aware that drawing a division at 1607 reifies the prehistoric/historic divide that has been eschewed by a number of scholars in favor of a longer term look at cultural continuity and change (Gallivan 2007; Lightfoot 1995; Silliman 2005). However by choosing to carry the scope of this study up to and beyond the point of contact I endeavor to demonstrate that a *long duree* (Braudel 1972[1958]; Sahlins 1985) perspective will elucidate the social processes at play in this part of the region. Such a perspective demonstrates the changes that occurred after Europeans arrivals were yet another part of a long sequence of social shifts that had been taking place in Native societies for centuries. At the same time, it is important to recognize that the arrival of the English did introduce new kinds of pipes and new pipe smoking practices. While Native groups in the Middle Atlantic region incorporated pipes and other European objects into their social contexts according to their own social conventions, several researchers have suggested that they changed certain aspects of those conventions while doing so (Eastman 1999; Gallivan 2007; Lapham 2005; Mallios 2006; Potter 2006[1989]; Ward and Davis 1993) or that they deliberately eschewed Europeans and their goods (Hantman 1990, 1993). It is necessary to acknowledge that the arrival of the English and their interactions with Middle Atlantic Native groups likely impacted pipe use and production. However, I maintain that these changes were not abrupt or immediate but occurred over decades as these groups interacted. Nor did they wipe out previous conceptions of pipes in Native cultures.

Although categorizing sites into different time periods helps to elucidate changes over time, three challenges arose when assigning sites to these different periods that necessitate some additional explanation. The first was that even though all three temporal periods encompass several centuries, the occupation span of several sites in the dataset did not fall neatly into these divisions. In many cases, sites where several radiocarbon dates had been taken had temporal spans that extended beyond the temporal divisions imposed by the author (see Table 5.1). In most of these cases, however, the primary investigator of the site had either averaged the dates, or chosen a span of time where the majority of dates overlapped as the primary occupation. For example, the 13 radiocarbon dates taken from the Rosenstock village exhibited a span from A.D 900 to 1500. However, Curry and Kavanaugh (2004:26) noted that the greatest overlap of these dates was from A.D. 1335-1425. Consequently, the assemblage from this site categorized as a Late Woodland II period site.

An additional challenge was introduced by the presence of sites with multiple occupations that spanned multiple temporal periods. Six sites fell into this category: Abbyville (44HA65), Lower Saratown (31RK1), Early Upper Saratown (31SK1), Biggs Ford (18FR14), Overpeck (36BU5) and Werowocomoco (44GL32). When possible, pipes from feature or excavation contexts that had been dated using associated radiocarbon dates or relative dates from ceramics or other artifacts were split among different temporal periods.

However, substantial portions of the pipes included in this sample are not from feature or excavation contexts that had been directly dated. Typically, data generated from dated feature contexts is considered preferable by archaeologists because it enables tight chronological control and the ability to link artifact patterning more concretely to certain kinds of human behaviors. Nevertheless, Late Woodland pipe fragments were not available in large enough quantities to justify the outright exclusion of entire assemblages where the majority of pipes were recovered from surface or plowzone contexts that were associated with a single occupation. In an effort to gain as comprehensive a view of pipes as possible, data was collected on pipes from plowzone, surface, and arbitrary or natural stratigraphic levels from many sites. In instances where a site exhibited multiple occupations, the pipes recovered from contexts that could not be associated with a particular temporal period were not included in the analysis. Two assemblages, one from Abbyville (44HA65) and one from Early Upper Saratown (31SK1) had pipes from plowzone and surface contexts that were not included in the analysis. Unfortunately the entire pipe assemblages from both Overpeck (36BU5) and Werowocomoco (44GL32) were excavated from stratigraphic contexts that could not be assigned to a temporal subperiod. Consequently, these assemblages were not included in frequency analyses because of lack of temporal information. However, I will mention the presence of distinctive attributes from these assemblages during parts of analysis.

The second challenge was that the divisions created by Dunham (1994) for the Lewis Creek burial mound complex do not neatly align with the temporal divisions used to delineate shifts between settlements. Rather than setting the division between the first and second periods at A.D. 1200, Dunham noted that marked differences between burial deposits, such as the shift from primary inhumations to secondary communal burials, began to emerge at A.D. 1300. Thus his first division is from A.D. 900-1300. Given that the majority of this division overlaps with the Late Woodland I period used by other researchers, I have grouped contexts with an A.D. 1000-1300 time range from the mounds into my discussion of Late Woodland I period pipes. While I recognize that this could result in pipes that are technically associated with Late Woodland II deposits (A.D. 1200-1300) being grouped in the Late Woodland I period, I evaluated each context individually by examining the burial types to see whether they are more indicative of those Dunham puts in the Late Woodland I (primary, individual burials) and Late Woodland II (secondary collective burials). All of the pipes from the A.D. 900-1300 period contexts were buried with individual inhumations, which are associated with the earlier part of the Late Woodland so it seems that this categorization likely does not misrepresent the temporal period.

Finally, not all of the sites used in this study had associated radiocarbon dates. While many archaeological studies generally exclude sites that are not radiocarbon dated to maintain chronological control over the dataset, in order to attain information about as many pipes as possible, I chose to incorporate samples from sites so long as they had been dated by ceramic seriation or other legitimate relative dating methods. For example, a number of the mounds in the Lewis Creek mound complex have not been radiocarbon dated but as noted in Chapter 2, Dunham (1994) has carefully worked out a relative chronology of the vast majority of the deposits in these mounds. Additionally a number of sites in Susquehannock territory have not been radiocarbon dated but Kent (1984) has created chronologies based on pottery seriations and the presence of historic artifacts (Table 5.2 summarizes the sites that have been dated using these methods).

Figures 5.3a, 5.3b, and 5.3c illustrate the spatial distributions of all the sites assigned to each of the three time periods delineated for the study. It immediately becomes clear that when broken down according to time period, the sites cannot be said to offer a representative sample of the whole region. Additionally, it is clear that there are far more sites from the Late Woodland II period than from the Late Woodland I and Contact periods. The larger number of Late Woodland II period assemblages in the sample is likely the result of two factors. The first is that the rising population and concentrations of occupants in the large village settlements of the Late Woodland II period generated more artifacts in general and specifically more pipes. A related issue is that these types of village settlements are generally more visible archaeologically while the hamlet sites, which tend to be the more prevalent settlement type of the Late Woodland I period, leave a smaller archaeological footprint. Thus the prevalence of Late Woodland II sites could be indicative of the focus of archaeological research in the region. Finally, as a number of other scholars have attested (Gallivan 2003; Hantman et al. 2009), it has been difficult to identify Contact period sites in the Coastal Plain and Piedmont areas of Virginia.

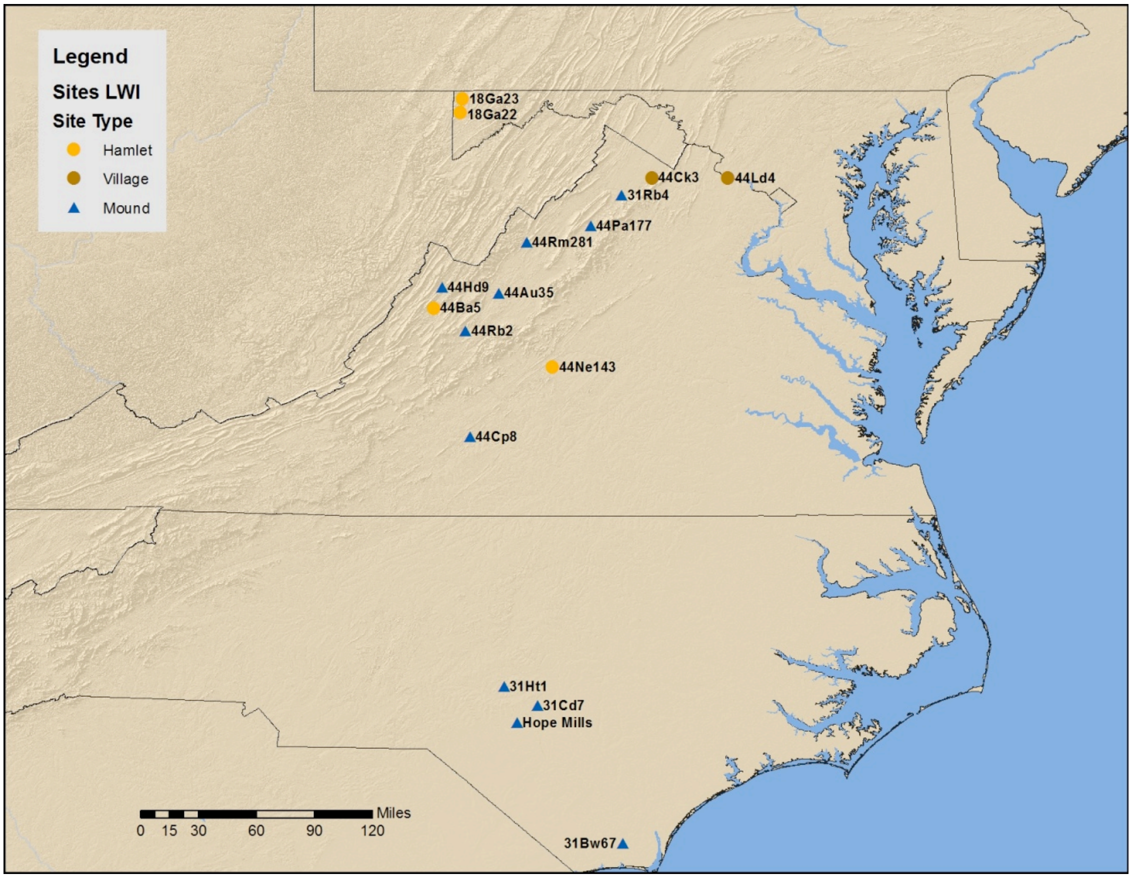


Figure 5.2a: Late Woodland I Sites

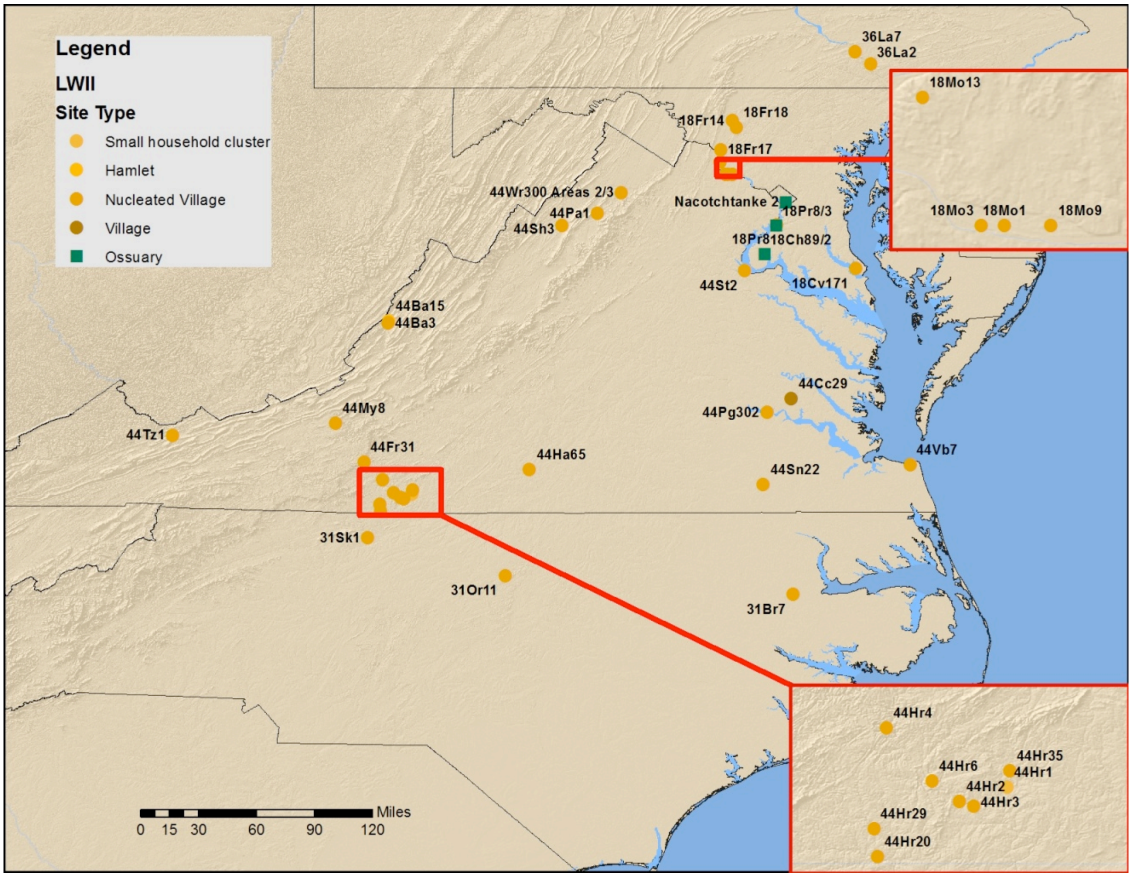


Figure 5.2b: Late Woodland II sites in sample

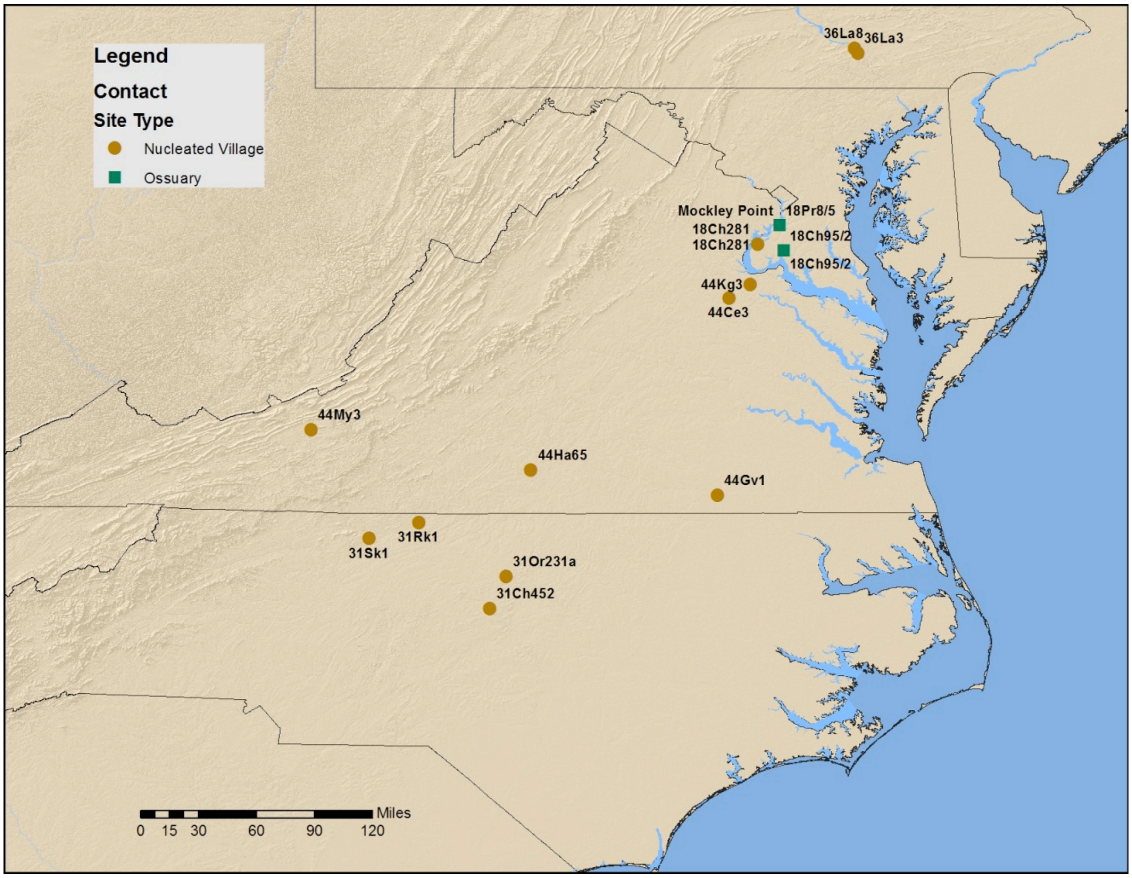


Figure 5.2c: Contact period sites in sample

One surprising result from my search of collections was the lack of Contact period Coastal Plain sites with significant pipe assemblages. This is noteworthy because of all the ethnohistoric literature that describes the large village populations of this area. Even the Native village of Werowocomoco, the seat of Chief Powhatan, which has been thoroughly excavated by the Werowocomoco Research Group (Gallivan 2007), produced very few pipes, 30 very small fragments total and all in plowzone contexts. One might have expected that Werowocomoco, given that it an important component of the Powhatan ritual landscape (Gallivan 2007) might have showed more evidence of pipe use. Additionally, the extensive excavations at Paspahegh village (44JC308, Lucketti et al.

1994), a community of Natives who were controlled or at least influenced by Powhatan, recovered no traces of Native smoking pipes. The lack of smoking pipes at these sites is not necessarily surprising in light of ethnohistoric evidence that suggests pipe use was restricted to chiefs and priests and eventually interred with them in charnel houses that are difficult to identify archaeologically. However, a comparison of the lack of pipes at these sites in Powhatan territory with the size of assemblages from Late Woodland II period Potomac Creek (44ST2) and Accokeek Creek (18PR8) sites, which were composed of 290 and 303 fragments respectively, provides an interesting contrast. The Potomac Creek and Accokeek Creek sites are associated with the Patawomeke who are believed to have been outside Powhatan's influence. The difference in the assemblage sizes between these sites was intriguing because it suggested that perhaps there were significant differences in the ways Native groups were using pipes. Based on the difference in sample sizes between sites in this small sample, I decided to examine variation in assemblage sizes in the entire sample to see if any patterns became apparent.

Variation in Assemblage Sizes

Looking at the sample as a whole, there was a large amount of variation in the assemblage sizes from different sites. Raw counts of fragments and whole pipes varied from a minimum of one or two on some sites and a maximum of 450 fragments and whole pipes on the Late Woodland II Wall site (31OR11). A histogram of raw counts from all the habitation sites included in the study was skewed to the left and exhibited a number of breaks (Figure 5.3). The skewed distribution was caused by the fact that 31 sites, or 57 percent of the sites in the dataset, had assemblages that were under 25 fragments. Additionally the relatively long tail suggests a large amount of variation at the upper end of assemblage size. This was caused by the large assemblage sizes of five sites, Accokeek Creek (18PR8), Potomac Creek (44ST2), Wall (31OR11), Strickler (36LA3), and Jenrette (31OR231a).

The wide range of counts is not surprising. Whenever a large group of sites that were investigated under a variety of techniques is brought together in one study there is bound to be variation. However, the sources of this variation were not immediately apparent. Was the variation due to differences in excavation techniques, differences in the types and sizes of sites these pipes came from, or perhaps differences in the way different Native groups used pipes? I decided to analyze the differences in more detail to determine what some of the underlying sources of variation were before conducting attribute analyses. I should note that I only included habitation sites in this portion of the analysis because mound sites have been so heavily looted (Dunham 1994) it was difficult to determine whether raw counts were actually representative of the number of pipes originally associated with these contexts. Additionally, ossuaries had smaller collections of pipes (one or two per ossuary), which would skew the results.

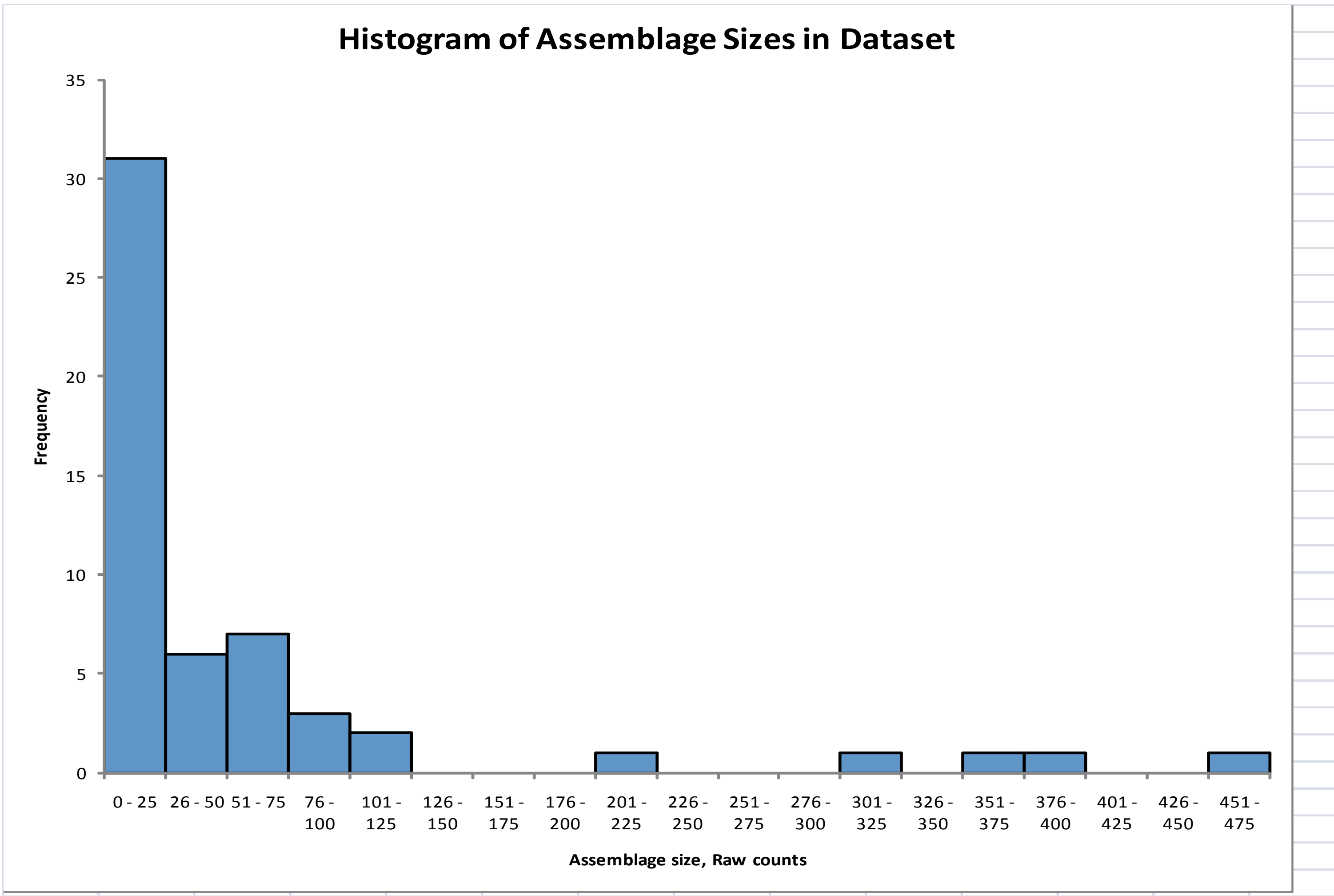


Figure 5.3: Frequency of different assemblage sizes in dataset

Because I was more interested in the scale of difference, I transformed assemblage sizes by computing the logarithm of each data value. The first possible source of variation I investigated was whether the differences in the size of assemblages may have related to the time period in which the site was occupied. For example, Late Woodland I sites would be expected to have smaller assemblages as sites tended to be hamlets comprised of a few households rather than large, nucleated villages. Nevertheless, there were also two nucleated villages in the sample that dated to the Late Woodland I period, Kerns (44CK3), and Fisher (44LD4). Additionally, some of the Late Woodland II sites included in the study, such as Noah's Ark (44BA15) and Leggett (44HA23) were classified as hamlets or internally dispersed villages. Given that there was some diversity in habitations amongst the different periods, I was curious as to how assemblage sizes would compare.

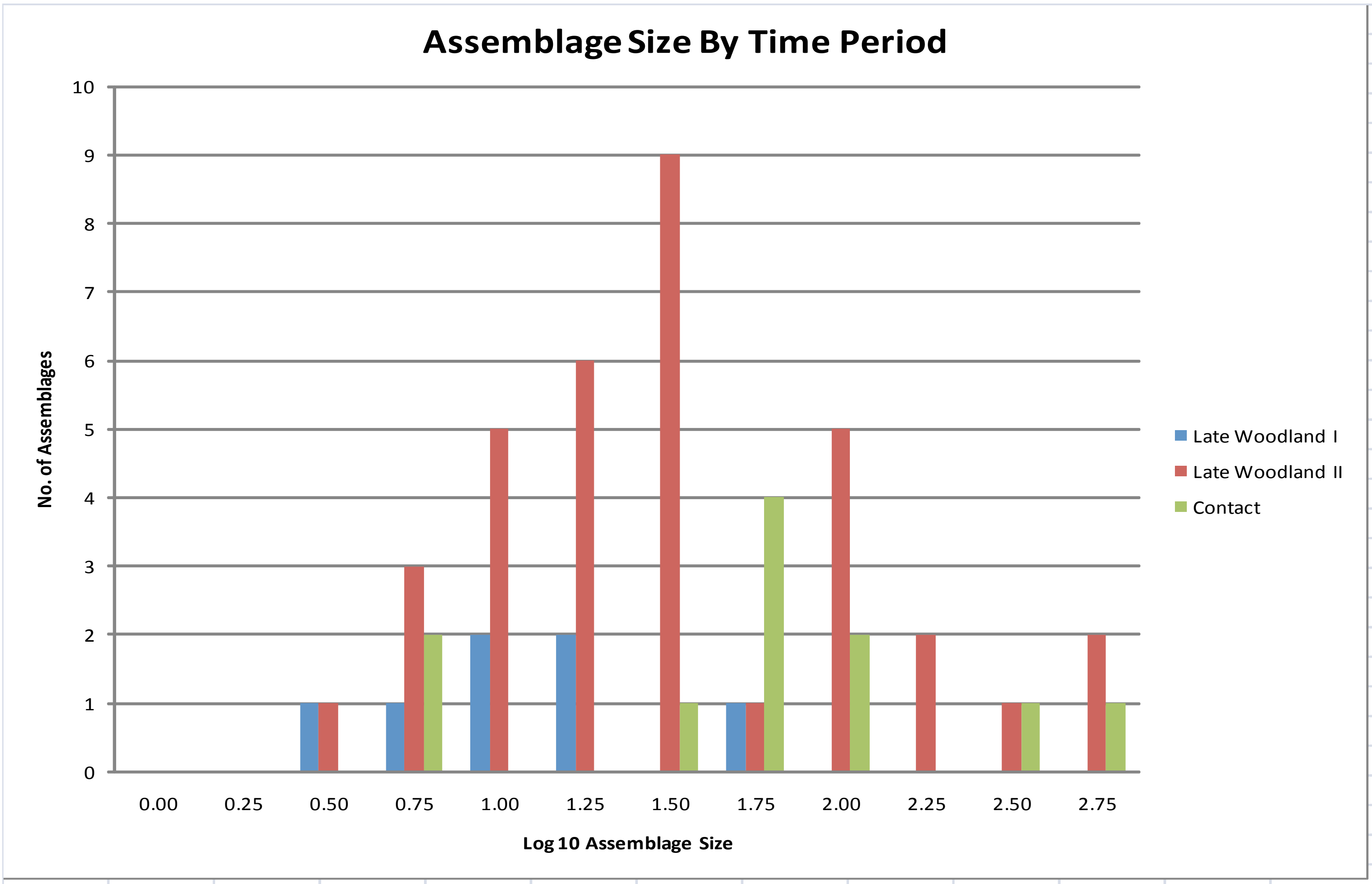


Figure 5.4: Comparison of assemblage sizes by time period

As illustrated in Figure 5.4, in general Late Woodland I sites exhibited smaller assemblage sizes in relation to the other periods. The one exception is the assemblage from the Fisher (44LD4) village, which was much larger than the rest of the assemblages from the Late Woodland I period. Nevertheless, there was a fair amount of overlap between assemblage sizes from the Late Woodland II and the Late Woodland I periods. Two smaller Contact period assemblages overlapped in size with Late Woodland I assemblages but for the most part, Contact period assemblages were also on the larger end of the scale. A one-way ANOVA test showed that the differences in the averages between log transformed assemblage sizes were statistically significant ($F(2,17) = 6.9$, $p = .006$). So although in general the size of assemblages varied through time in particular the histogram illustrates there is a large amount of variation among Late Woodland II assemblages. I will return to this shortly.

In addition to temporal changes, I was curious as to whether the type of habitation site might also have impacted assemblage size. Were all of the smaller assemblages associated with hamlets? As shown by the histogram in Figure 5.5, there is no distinct break between the assemblage size between hamlets and villages, rather there is a large amount of overlap. This was because there was a great deal of variation in size among village sites. A number of sizeable Late Woodland II nucleated village sites, including Crab Orchard (44TZ1), Noah's Ark (44BA15), Perkins Point (44BA5), Cumberland (18CV171), Noland's Ferry (18FR17), Biggs Ford (18FR14), Rosenstock (18FR18) and the Great Neck site (44VB7) had assemblage sizes that were smaller than most of the other villages, containing generally less than 20 fragments.

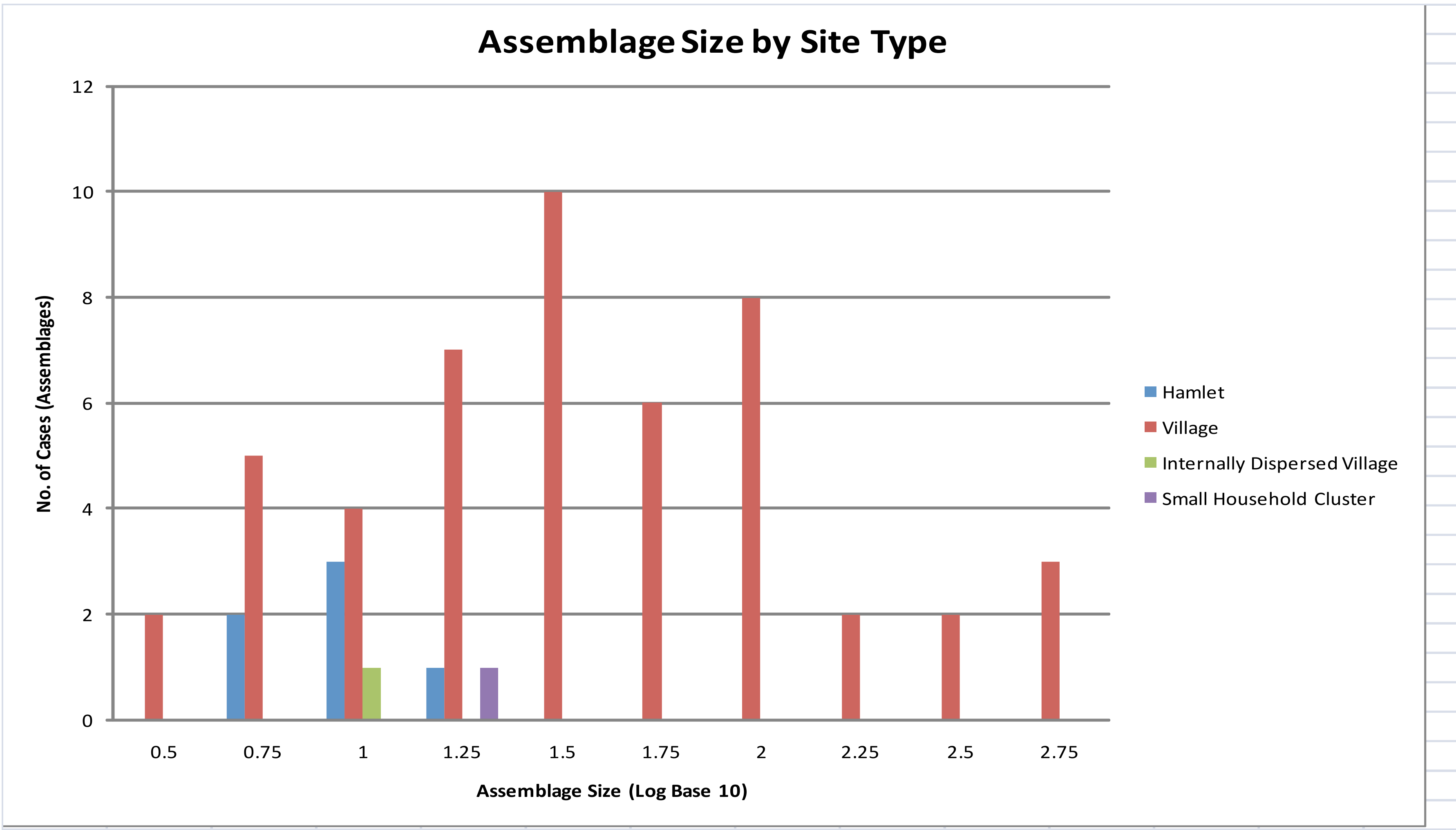


Figure 5.5: Comparison of assemblage sizes by site type

Figures 5.4 and 5.5 illustrate that there considerable variation in assemblage size among Late Woodland II period sites. I examined this pattern more intensively to try and understand what might be behind it. To investigate whether the variation could be a result of the amount of excavation conducted at the sites, I compared the percentage of the site that was excavated with assemblage size. Again, because I was interested in differences in scale, I used the log-transformed values of assemblage size. It should be noted that information about the percentage of the site excavated was only available for 21 out of the 32 Late Woodland II period sites but as the histogram in Figure 5.6 shows, the variation in assemblage size among these sites still demonstrated a normal distribution. To measure the correlation between assemblage size and the percentage of site excavated, the data was plotted in a scatterplot and evaluated using a Pearson's Correlation co-efficient. The Pearson's Correlation co-efficient (r) is used to measure the strength of the relationship between the two variables. The square of r (r^2) measures the proportion of variance in one variable explained by the other. The statistical program R was used to generate the scatterplot and conduct the correlation test. The results of the Pearson's test revealed a positive but very weak relationship between the two variables ($r = .126$, $p = .586$, $n = 21$). The p value of .586 indicates that the correlation is not statistically significant.

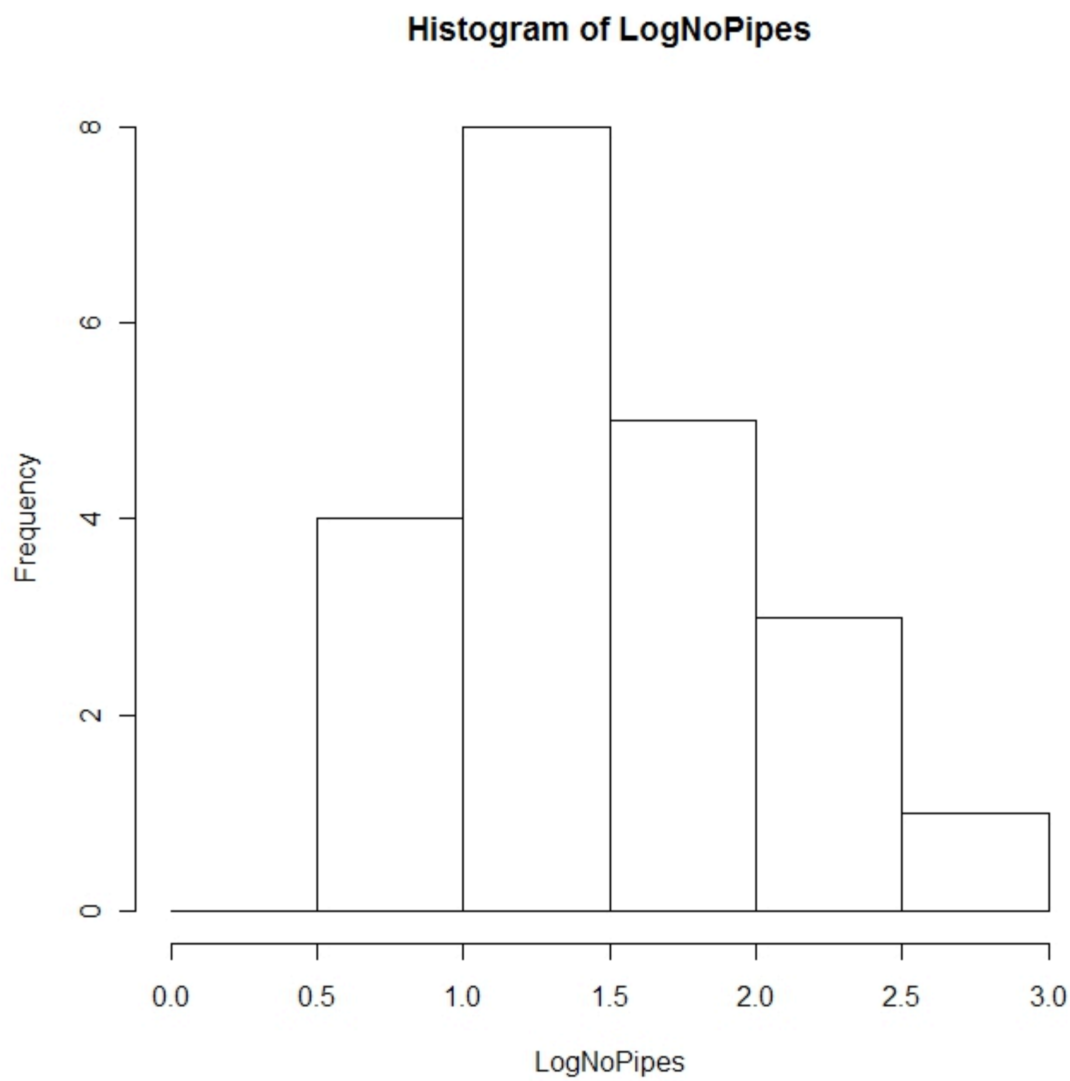


Figure 5.6: Histogram of assemblage sizes of 21 Late Woodland II sites

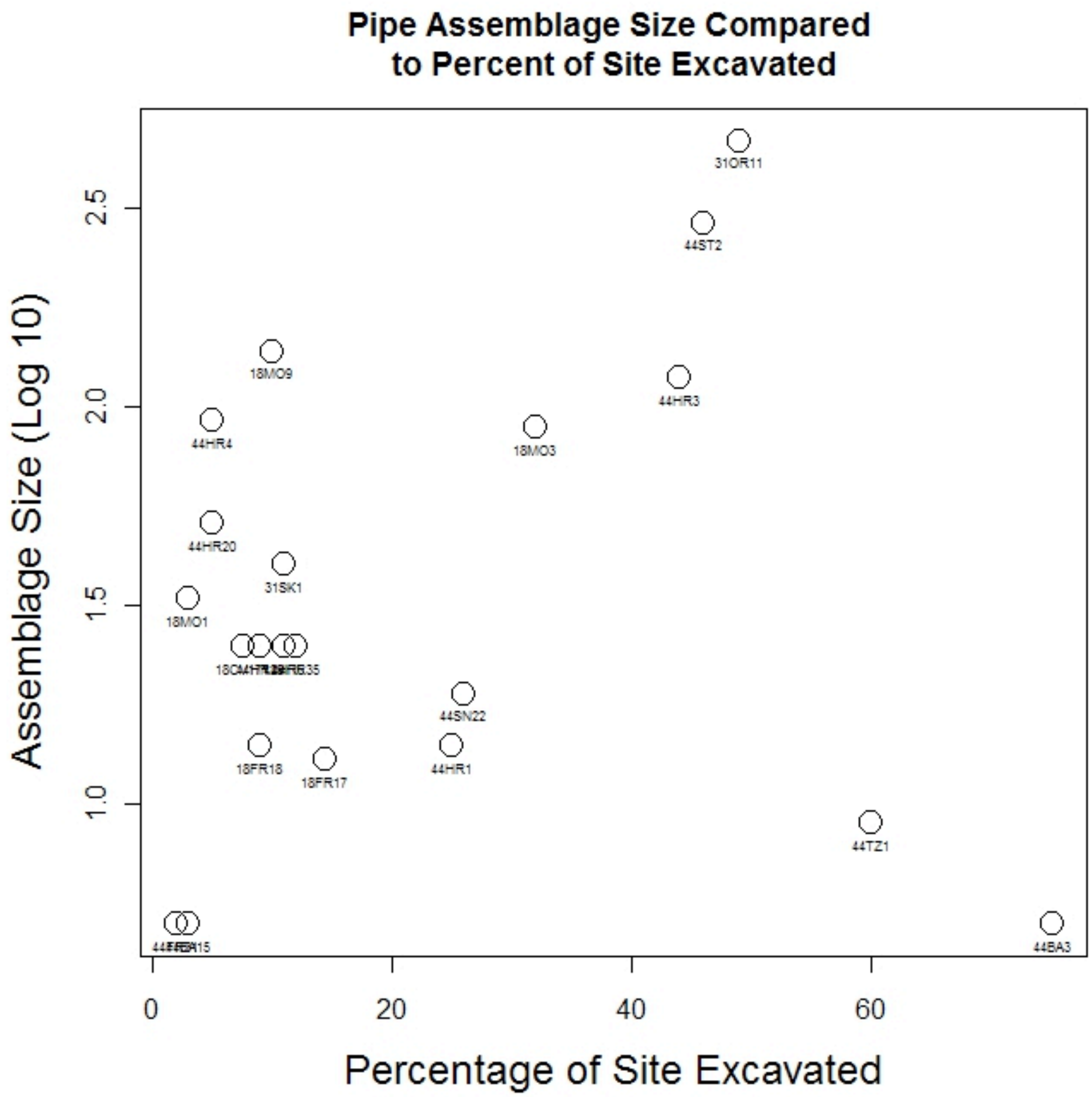


Figure 5.7: Pipe assemblage size compared to percent of site excavated

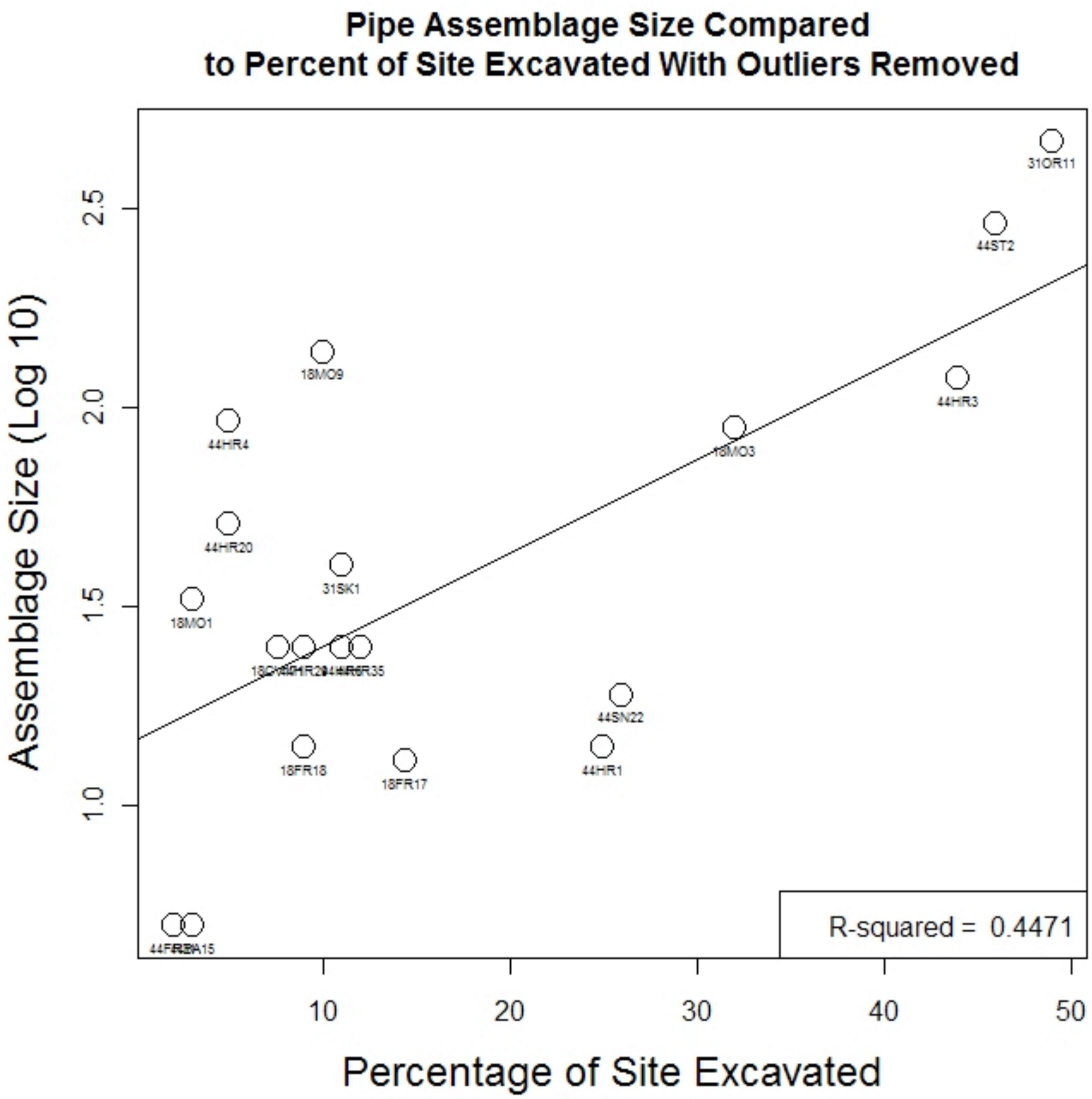


Figure 5.8: Scatterplot of pipe assemblage size compared to percent of site excavated with outliers removed and regression line

However the scatterplot also revealed that two sites seemed to be outliers, 44VB7 and 44BA5. Once those outliers were removed the relationship between pipe assemblage size and percent of site excavated became much stronger (r = .668, *p* = .001, n = 19). A linear regression analysis also showed that a significant proportion of variance in assemblage size was dependent on percent of site excavated ($r^2 = .4471$, $p = .001$, n = 19). Thus it seems unlikely that the variation in assemblage size is indicative of any cultural or social differences in pipe use. It is probable that the variation is a result of differences in the amount of the site excavated. Consequently, when considering the variables that could be causing patterning in pipes it is necessary to contemplate whether relationship between assemblage size and the percent of the site excavated could be impacting the results of my analyses.

Finally, I compared the geographic distribution of assemblage sizes to see if there was any patterning in their spatial distribution. However, as Figures 5.9a, 5.9b, 5.9c illustrate, there were no significant differences in the spatial patterning of assemblage sizes when compared between the three main physiographic provinces in the region. There also seem to be no significant spatial patterns when assemblage size is compared with cultural complex boundaries (Figures 5.10a, 5.10b, 5.10c).

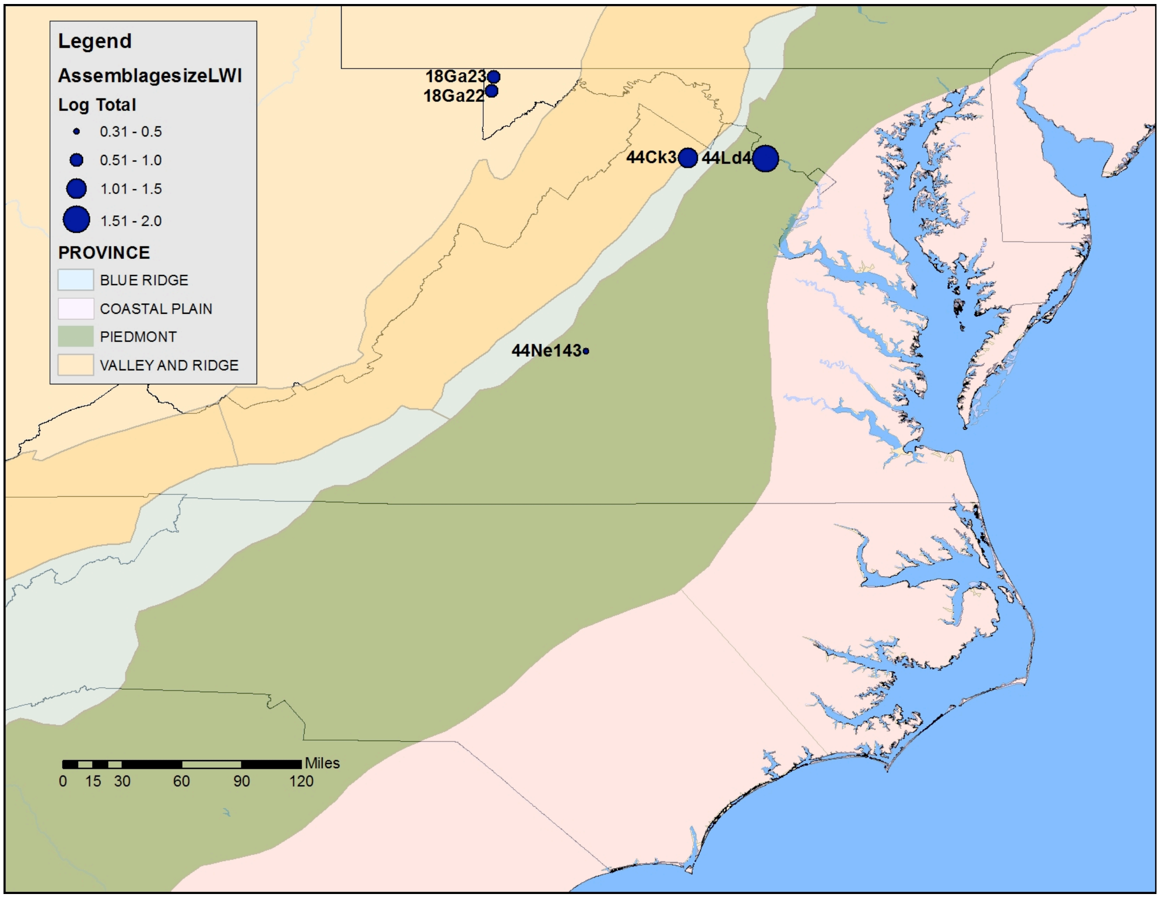


Figure 5.9a: Spatial distribution of assemblage sizes (Log 10) among Late Woodland I period sites

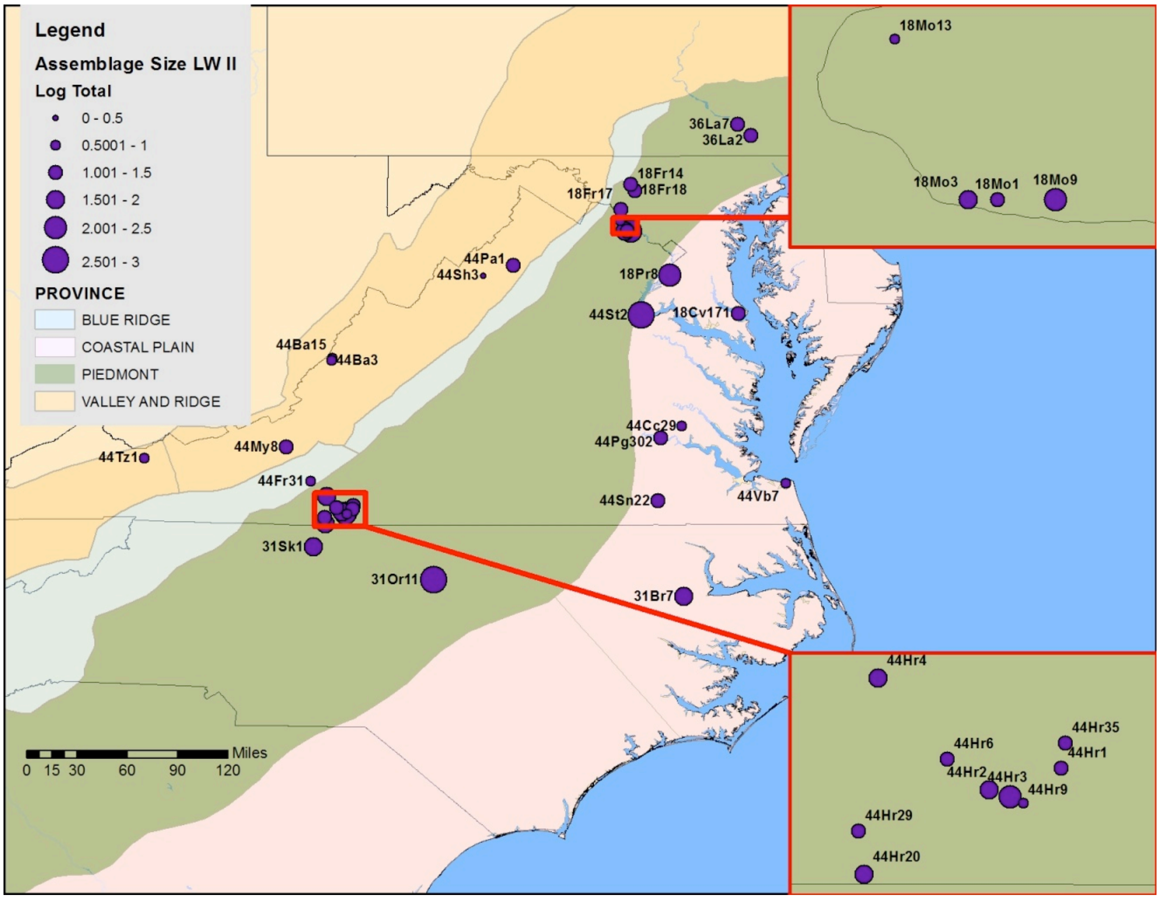


Figure 5.9b: Spatial distribution of assemblage sizes (Log 10) among Late Woodland II period sites

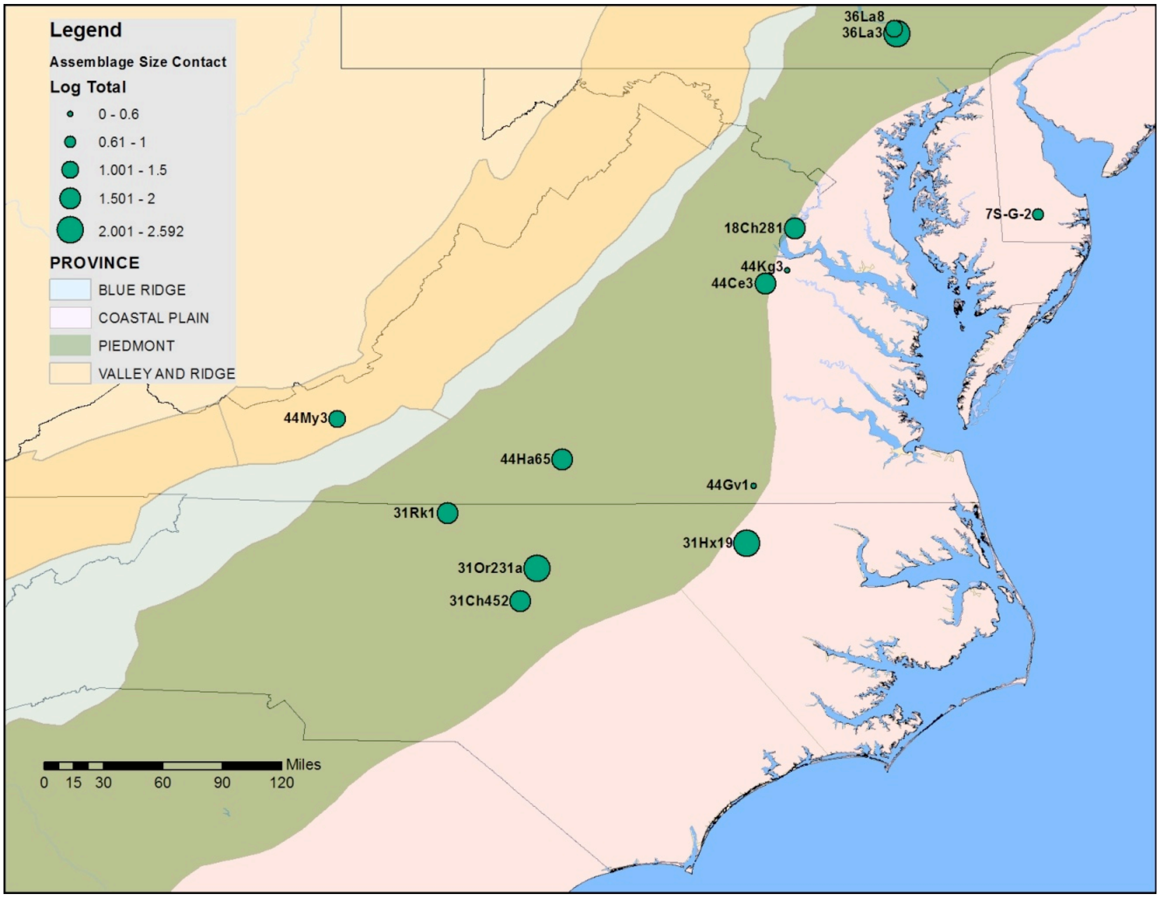


Figure 5.9c: Spatial distributions of assemblage sizes (Log 10) among Contact Period sites

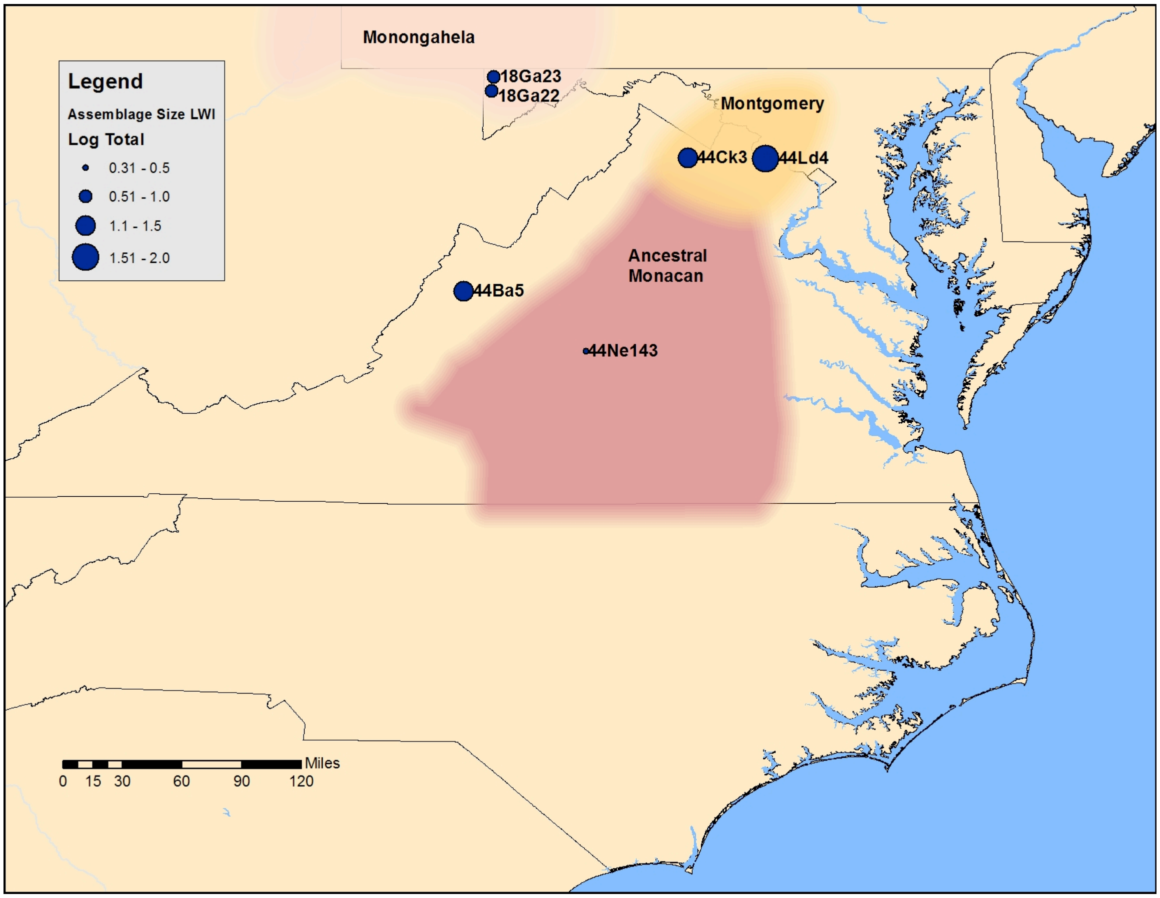


Figure 5.10a: Spatial distribution of assemblage sizes (Log 10) of Late Woodland I period sites compared with cultural complex boundaries

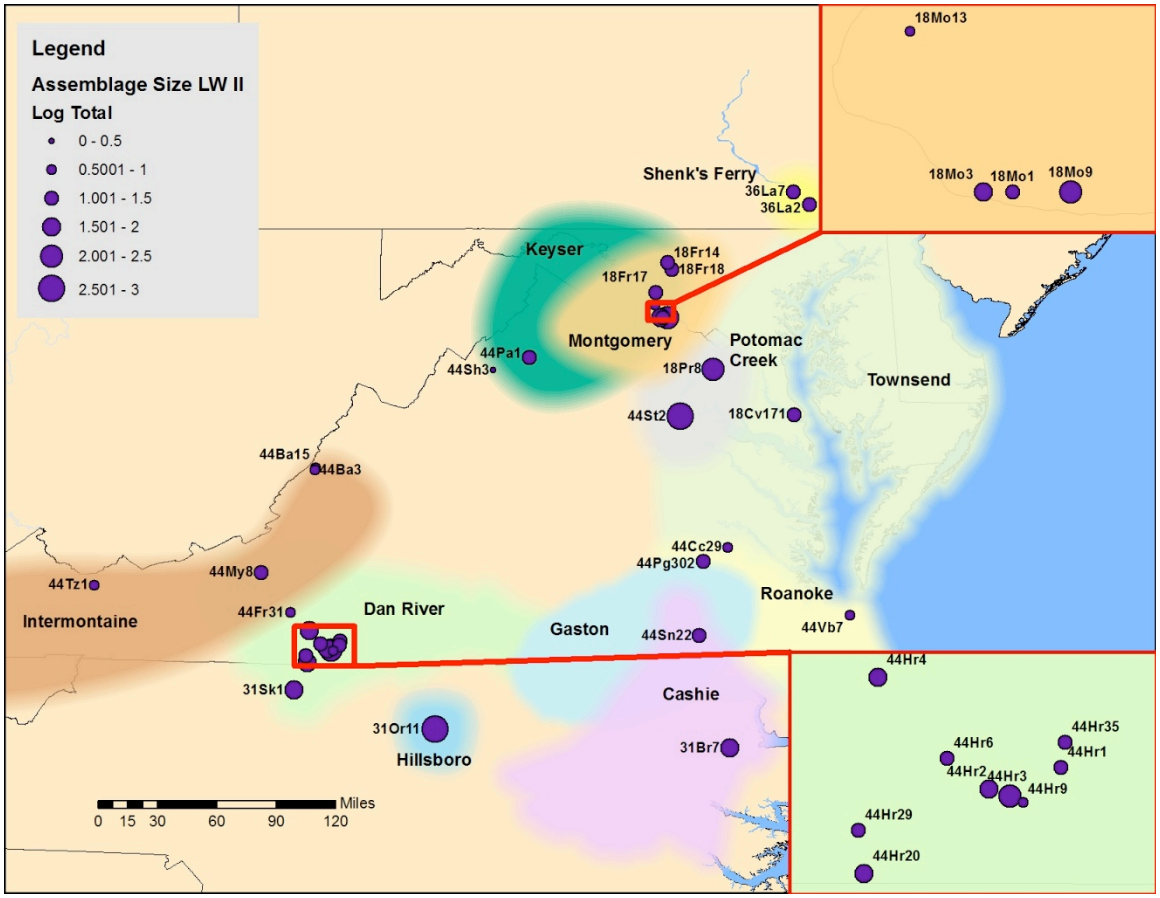


Figure 5.10b: Spatial distribution of assemblage sizes (Log 10) of Late Woodland II sites compared with cultural complex boundaries

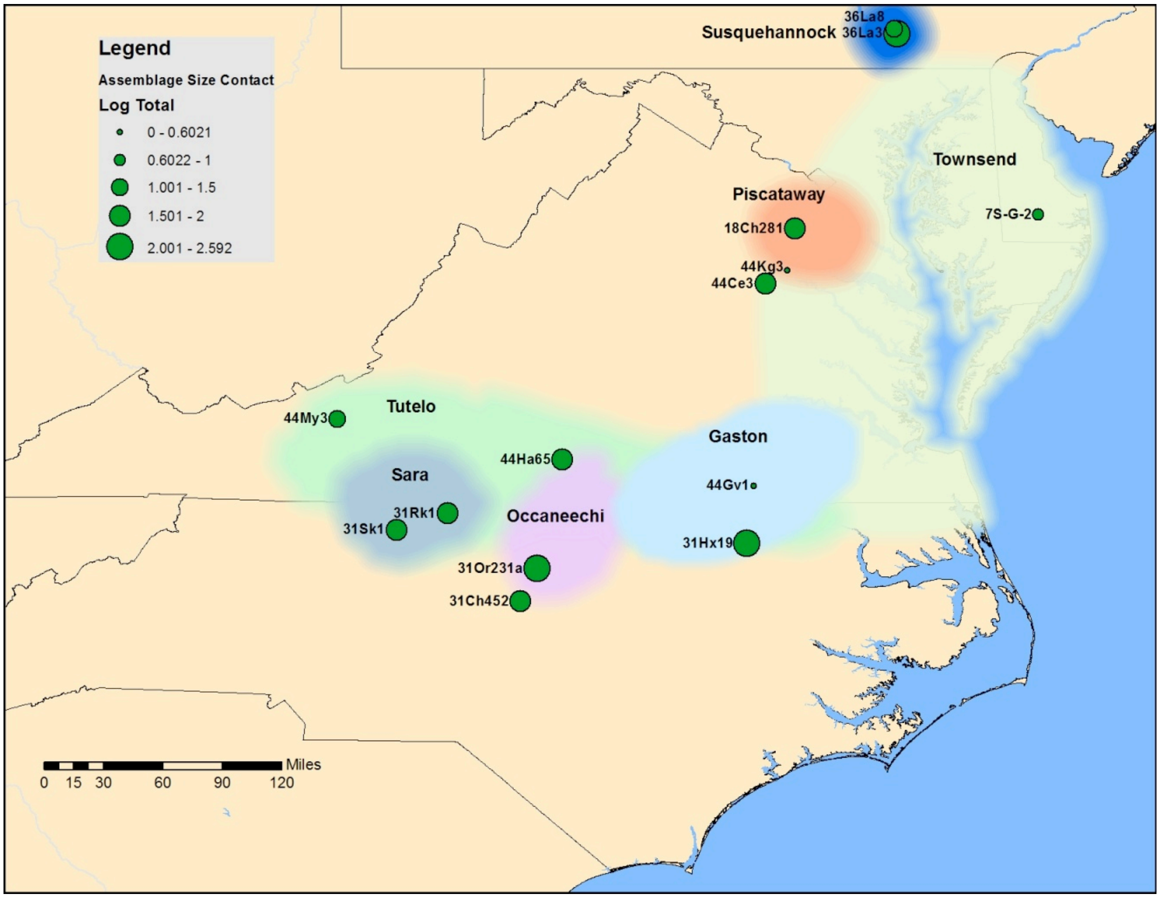


Figure 5.10c: Spatial distributions of assemblage sizes (Log 10) of Contact period sites compared with cultural complex boundaries

While some of the variation in assemblage size seems to be tied to population growth and the coalescence of Native groups into consolidating villages, these factors do not explain all of the variation found in the dataset. The wide range of variation found in the assemblage sizes of the Late Woodland II period sample of sites is interesting. Although the size of the assemblages found at the Potomac Creek, Accokeek Creek and Wall sites are due in part to the fact that a large percentage of these sites was excavated, it does not necessarily explain why other large Coastal Plain villages which have been thoroughly excavated, lack pipes. A similar phenomenon is apparent in the Piedmont, where a number of village sites have been thoroughly excavated but have revealed few pipes. The general lack of pipes at some larger village sites begs the question of whether Native groups in different parts of the region were using pipes in different ways. Was pipe smoking more of a ubiquitous practice at the Potomac Creek site? Clark and Rountree (1993) and Potter (1993) have noted that that the term "Patawomeke", the Algonquian name for the Potomac Creek, means trading center. Perhaps pipes were an important part of exchange practices at Potomac Creek and thus were used in greater quantities than in other parts of the area. Although it is difficult to draw conclusions without large assemblages from the sites associated with the Powhatan chiefdom, the results of even this initial analysis suggest pipes might provide some insights interesting insights into social differences between groups in the region that are not accessible through analyses of ceramics or projectile points.

Attributes

In addition to creating a sample of assemblages that was representative of the study area, it was necessary to devise a methodology to systematically analyze pipes. I endeavored to design a methodology that would capture attribute variation, including both decorative and technical attributes from all parts of the pipe. This decision was based on a number of different rationales. The first is that previous researchers have suggested that the most visible parts of an object and decorative designs on it would be used to communicate aspects of communal identity (Wiessner 1983, 1985; Wobst 1977).

Other researchers have suggested that such attributes are more likely to exhibit widespread distributions because they are more likely to be emulated and incorporated into production networks (Agbe-Davies 2010; Stark 1999). In terms of pipes, it was clear that decorative aspects on the bowl would serve as the most visible parts of the pipe, and therefore should be included. Additionally, in some cases researchers have argued that noting the position of the decoration on the bowl, i.e., whether a decoration is facing either towards or away from the smoker, can provide important insight into the purpose or use of the pipe (Paper 1992). In addition to bowls, stems, whether separate pieces or permanently attached to the bowl, can also be considered significant within a ritual context (Hall 1997). Moreover, even if stems were permanently attached, a preliminary survey of site reports suggests that stems could exhibit differentiations in form and decorative aspects that differed from those displayed on bowls. Thus, I determined that stem attributes should be recorded, and more importantly, recorded separately from bowl attributes so I could study whether there were distinct variations in the decorative attributes recorded on both areas.

In addition to decorative attributes, I also elected to include technical attributes in my analysis, owing to the fact that decorative aspects are generally linked to certain types of social behaviors. As Sackett (1982), Stark (1999), and others have shown, the technical choices made by artisans provide evidence of other forms of social processes or connections. Anthropologists of technology suggest that such attributes can be used to look at the mode of operation (Dietler and Hierbich 1998) in which a particular class or artifacts was produced, or allow researchers to identify different “communities of practice”

(Sassaman and Rudolphi 2001), which helps archaeologists identify communities that used similar production techniques but provides a more detailed understanding that the concept of cultural areas or ethnic boundaries. Moreover, the inclusion of technical attributes in my project answers requests made by previous pipe researchers (Agbe-Davies 2004a, 2004b) to move the focus of investigations beyond decorated, whole specimens, because these specimens are generally not representative of the variation contained within the entire pipe assemblage (Agbe-Davies 2004a:113-114). In reality, site reports and some preliminary survey indicated that the majority of samples in my dataset would likely be mostly comprised of decorated and undecorated fragments from all parts of the pipe. Therefore, I choose to include both decorative and technical attributes from all parts of the pipe, so that the largest number of specimens, whether decorated or undecorated, whole or fragmented, could be utilized and my sample would be as representative as possible.

Once I had decided the general types of characteristics to include, it was necessary to choose the specific attributes and create specific and explicit definitions that would allow me to be consistent when recording and describing said attributes. In order to gain insight into what attributes might be useful, I conducted a survey from previous studies of prehistoric and historic pipes (Agbe-Davies 2004a, 2004b; Grillo et al. 2003; Henry 1979; Irwin 2004; Luckenbach and Kiser 2006; Miller 1991; Paper 1992; Rafferty 2001, 2004) and archaeological reports from Late Woodland and Contact period sites that provided descriptions of pipes. Interestingly, but not surprisingly, my survey of literature revealed that pipes have been described in a variety of ways with varying amounts of consistency. Many researchers of historic pipes had created their own typological systems and placed emphasis on different pipe attributes in their descriptions depending on the focus of their research. In addition, reports on pipes from prehistoric sites described pipes in varying amounts of detail, depending on how the number of pipes compared to the volume of other types of artifacts present at the site. Most gave basic descriptions of the pipes that included dimensions, any surface treatments, and general information on decorations, focusing on the most complete and elaborately decorated examples. On the other hand, some gave more detailed descriptions of whole pipes and fragments and compared pipes recovered to those known from other assemblages. While the inconsistency of the information was initially frustrating, it ultimately proved to be somewhat useful as the different foci provided a broad base of attributes to draw from. Consequently, this study uses some attributes that have been utilized in previous studies, but includes a larger range. Ultimately I chose 21 attributes that I suspected could exhibit variation that would be connected to conscious or unconscious social processes. These attributes are described in detail in Appendix I.

In addition to choosing attributes I also attempted to define descriptive terms that I could use to consistently characterize aspects of each attribute. It should be noted that while some of these were drawn from site reports and cataloguing manuals, others were created in the midst of analysis when no previously defined terms applied. All of these terms are also listed and explained in further detail in Appendix I.

Finally, metric measurements were also taken of a number of attributes, including bowl rim diameter, stem width, bore diameter width, etc. These measurements were taken to examine whether the coefficient of variation could be used to identify differences between the tools or techniques used by different communities of practice.

Data Storage

Once I had identified which attributes would be appropriate for this study, I designed an Excel spreadsheet to record and store all of the data. Initially I planned to use an Access database with linked relational tables. However, as will be explained in the next section, I had already determined that my next stage of analysis would utilize ArcGIS. While ArcGIS can handle Access files, it is easier to import individual Excel spreadsheets and create relationships between those spreadsheets within ArcGIS. Thus I opted to use Excel to record my data.

Ultimately, the spreadsheet contained 66 columns. While there were only 21 attributes, additional columns were necessary to record curatorial information, such as site numbers, artifact and cataloging numbers. This information allowed me to conduct intrasite as well as intersite analyses. Moreover, some attributes had multiple facets that had to be recorded separately. For example, every decorative aspect had multiple characteristics such as design motif and production technique, and each was recorded in a separate column. In the end, four separate design columns were created to capture bowl decorations and three design columns were created to capture stem designs. Following Agbe-Davies (2004b) I attempted to keep each variable as separate as possible in order to avoid the problem of knowing whether the patterns I was seeing were a result of my inferences and bias, or actually observed facts. Additionally, separate columns were created to record finishing techniques that were applied to the rim of the bowl or the mouthpiece. I also designated a column that contained unique ID numbers for each specimen and individual columns for the catalog and artifact numbers that were associated with the specimen during its recovery and placement into storage. Finally, I included three columns that allowed me to record notes or comments, whether photographs were taken, and if they were, their file numbers, and any contextual information about the archaeological deposit the specimen was associated with.

Choosing a Classification System

Once data collection was complete, the second phase of research consisted of identifying and classifying significant variations of attributes. Classifications are vital to archaeologists because they create standardized analytical units, or categories, for comparison. Debates within the discipline have revealed that there are a variety of ways to classify artifacts and that there are inherent biases that must be acknowledged with the use of certain techniques. For example, Dunnell (1971) differentiates between paradigmatic and taxonomic classification techniques used by archaeologists. Paradigmatic classifications are based on the intersection of two or more dimensions of variation, for example, bowl shape and stem shape. On the other hand, taxonomic classifications place emphasis on the *order* in which attributes are considered. Taxonomic systems were used to create the ceramic and projectile point typologies in the Middle Atlantic. And, as previously explained in Chapter 2, researchers in the Middle Atlantic then used the distributions of different ceramic and projectile points types to delineate social boundaries. While type comparison is useful for studies that are looking for boundaries on a larger scale, the use of this method is not necessarily the best approach for a project that seeks to identify more intricate patterns of variation that may be related to different social groups. For example, using a taxonomic classification system, pipes of the same stem shape may be considered more alike than pipes with the same bowl shape. However, if I used a hierarchical classification system that was based on a particular order of attributes, what order would I place the attributes in? Other researchers (Agbe-Davies 2004b) have noted that in past studies of historic period Chesapeake pipes, bowl shape was often the primary organizing principle, with decoration being the next variable. Yet, the fact that one group made an elongated, rather than a bulbous bowl, doesn't necessarily mean it was related to their expression of identity as a group or as an individual any more than the stem shape. In reality it was difficult to say with any certainty what attributes would have been significantly linked to aspects of identity expression or social processes, whether conscious or unconscious. Thus, a hierarchical classification system that gave greater weight to certain attributes did not provide the best method for a research project that was an initial exploration of the relationship between pipe attributes and social organization. Given that this study is the first to classify which pipe attributes are "similar" or "different" and exhibit patterning on a regional scale, it was important to explore as much of the variation present in the dataset as possible without imposing an intuitive hierarchy of divisions on the dataset. Rather, I needed a method that would allow me to investigate variations of each individual attribute separately to discern their patterning before grouping them together in any way.

To manage this problem, I followed an approach utilized in a recent study of historic pipes in the Middle Atlantic that also focused on the relationship between pipe attributes and a particular kind of social group that had not been addressed in previous studies, the "workshop" group. Anna Agbe-Davies' (2004a and 2004b) study of the production and exchange of locally made pipes relied on a non-taxonomic classification system that shifted the focus of study to individual attribute variation rather than the creation of typologies. Non-taxonomic classification allows researchers to concentrate on the variation of individual attributes, rather than typologies as a whole, which provides a better understanding of the variation present in a dataset. Other researchers of style (Carr 1995; Plog 1983, 1990, 1995) have also advocated giving equal weight to each individual attribute rather than using a hierarchical ranking system and the use of attributes instead of whole artifacts as the analytical units of analysis (Rouse 1971) when investigating variation in a dataset. The end result of this method is a series of cross-cutting groups based on individual attributes rather than typologies of whole artifacts. Consequently, this project utilizes a different approach of classifying artifacts that captures more of the variation present in the dataset, which can be then be used to investigate different types of social organization.

While using a non-taxonomic classification method might offset some of the inherent bias that could be introduced into the classification system, another important question was whether these groups created by my analysis would actually reflect the differentiations or categories used by past peoples. A number of researchers studying style have disputed whether classificatory systems created by archaeologists accurately represent the categorical systems used by past peoples (Binford 1986; Hodder 1982; Shanks and Tilley 1982). Consequently, archaeologists have attempted to identify "emic" categories in the archaeological record, arguing that our understanding of artifacts must be linked with the ways they were used and understood by past peoples (Hodder 1982). While the relationship of some pipe attributes, such as effigies and other decorative aspects, to certain aspects of social identity has been identified by previous researchers (Otto 1992; Rafferty 2001, Carr et al. 2006), it was not clear which attributes would relate to certain aspects of identity and almost impossible to say with any certainty that the patterns identified in my analysis were the same differentiations used by past peoples to assert particular aspects of their identity. While ethnographic and ethnohistoric records provide some information that can be used when classifying particular attributes, such as effigies of particular animals (Hall 1997; Otto 1992; Rafferty 2001), there is little guidance about Native perceptions of more abstract designs or other parts of the pipe. For this reason, I should clarify that I fully recognize the difficulty of identifying the social categories of past peoples with any certainty and that my interpretations of differentiations may not be the same ones used by the producers of these objects. Nevertheless I have tried to identify as many of bias that could affect my results and offset them by choosing certain procedures that minimize my subjective input.

Before I could make my interpretations, however, it was necessary to determine what kinds of patterns the pipes exhibited. My decision to compare individual attributes meant that the methods I used to classify and group variables must be able to recognize variation not only in a broad range of variables, but also varying contexts etc. In previous studies, statistical tests have been run on individual variables to explore the variation present in a dataset. In addition to those analyses, however, I chose to utilize a tool that in the past few decades has become increasingly important to archaeologists dealing with large sets of spatially referenced data: ArcGIS. ArcGIS is a Geographic Information System (GIS), a program that is designed to handle and process spatially referenced information. ArcGIS has become a vital tool for archaeologists because it allows researchers to organize and store large amounts of data and provides a way of visualizing data that enables the recognition of spatial patterning in large datasets. In many cases, ArcGIS is seen as the ideal tool for storing and investigating archaeological data at the regional level. In the next four chapters I will use this tool, along with statistical analyses, to examine the spatial distributions of pipes and what they can tell us about Native social dynamics.

Chapter 6 : The Social Motivations for Multiple Forms

Introduction

In the next four chapters I discuss the results of my spatial analyses of different pipe styles. This chapter explores the spatial distributions of different pipe forms that were identified in the dataset and their characteristics. I examine how the different forms of pipes, considered here separately from attributes carved into pipes and incised and rouletted motifs that were added onto pipe forms, were also potentially a venue for stylistic expression. As I noted in Chapter 2, previous descriptions of variations in pipe forms in the Middle Atlantic have often been couched in a cultural-historical framework. While researchers have acknowledged variations in forms, changes have often been considered as temporal markers or as markers of different cultural groups. Thus, such research has been largely descriptive and focused on the chronological variation of pipe forms as a diagnostic tool.

Yet archaeologists have also argued that differentiations of forms in certain classes of artifacts, such as ceramics (Chilton 1999; Plog 1980) and projectile points (Andrefsky 2005; Binford 1979; Jelinek 1976) can provide additional information beyond temporal frameworks such as insights into differences regarding functionality and the social processes linked to stylistic variation. While establishing a chronological and typological framework is important, this discussion utilizes the interpretative window opened by previous research (Agbe-Davies 2004a, 2004b, 2010; Drooker 2004; Eastman 2001; Irwin 2004; Mann 2004; Trubowitz 1992, 2004; Rafferty 2001; Rafferty and Mann 2004) and takes the examination further to consider what variation of tobacco pipe forms reveals about the social dynamics of Native societies and cultures that used them. As I explain below, there is no question that a good deal variation in pipe forms is related to chronological change. Nevertheless, I argue the presence of multiple pipe forms in site assemblages from the settlement sites in this study should not solely be considered as indicative of occupation length or cultural affiliation. Although all pipes were used to smoke tobacco (or a mixture of tobacco and other materials), differentiation in form and choice of raw materials are also a kind of stylistic expression that can be tied to efforts of social differentiation, or the expression of particular communal cosmological worldviews (Lechtman 1997; Stark 1998). This chapter explores how different pipe forms in the Middle Atlantic may relate to social dynamics or networks in addition to serving as diagnostic temporal markers.

I begin this chapter by outlining the seven different forms that were used by Native groups in the region during the Late Woodland and Contact periods. Next, I demonstrate that although some of the variation in the dataset is due to diachronic change, multiple forms coexisted during the same period and even within some of the archaeological assemblages included in this study. This indicates there are likely other processes behind the presence of multiple forms. Third, I examine the variations of attributes for each form and their temporal and geographic distributions. These attributes include variations of raw material, bowl rim shapes, bowl body shapes, stem/bowl juncture shapes, stem shapes, and mouthpiece shapes. I compare the geographic distributions of these attributes with the cultural complex and physiographic boundaries discussed in Chapters 2 and 3 to see whether different forms are isomorphic with the boundaries set by previous researchers. I should note that because elbow pipes comprise the largest part of the sample and contain the most variability, I have devoted Chapter 6 to a discussion of this form and to examining the variation among fragments whose forms could not be determined, which also comprise a large part of the dataset.

Finally, in the last section of this chapter I evaluate my hypotheses and discuss the possible social meanings of the presence of different forms in the assemblages that comprise my sample. I argue that variation is linked to other social factors that are tied to the unique role of pipes, including their roles in interaction networks, efforts by individuals to signal their status or position in society, or as part of their role in the smoking complex to communicate with ancestors.

Overview of Different Forms

My analysis of the 2543 pipes and pipe fragments revealed that seven different pipe forms were represented in varying quantities. These seven forms are tubular, platform, bent tube, reed stem, effigy, multi-stemmed, and elbow. Figure 6.1 illustrates five of the six different forms that will be discussed in this chapter. Table 6.1 summarizes the number of pipes and pipe fragments that can be attributed to each form in the dataset.

Previous studies of pipe form variation in the Middle Atlantic region have primarily attributed differences to a progressive evolution of forms that became more sophisticated over time, starting with tubular pipes and ending with elbow pipes. Joseph McGuire (1899), using collections from the United States National Museum, created one of the first typologies that espoused this progressive development. His typology identified temporal and spatial distributions of different pipe forms over the whole of North America, including an area he identified as the Atlantic coast, which roughly approximates the borders of what is today known as the Middle Atlantic region. McGuire (1899:626) identified the first nonperishable smoking implements in the area presently known as the Middle Atlantic as tubular in form and dating to the late Archaic period (3000 B.C. to 1000 B.C.) (Figure 6.1a). One of the earliest known smoking pipes was excavated from the Eva site in Tennessee in a context that dated to approximately 2000 B.C. (Lewis and Lewis 1961:66). The "classic" form is a parallel-sided tube with a wide distal opening and a narrow-bored proximal end. Rafferty (2001, 2004:xi) has noted the tendency of stone versions of these pipes to be interred in mounds associated with the Adena and Middlesex cultures from northeastern New York and Delmarva Peninsula in Delaware, Maryland, and Pennsylvania. These cultures are believed to have occupied these areas during the Early Woodland period from approximately 1000 B.C. to A.D. 200.

Multiple scholars have noted that the shift from the Early to Middle Woodland period (200 to 900 A.D.) in the Eastern Woodlands is associated with a dramatic change in form as pipe assemblages transformed from being dominated by tubular forms to being comprised of platform pipes (Hall 1997:118; Rafferty and Mann 2004:xiii; von Gernet 2000:73) (Figure 5.1b). These pipes take the form of a flat or curved base platform that contains the pipe bore, with a cylindrical bowl located in the center. Rarer forms include effigies in which the plain cylindrical bowl was replaced by an animal figure. Platform pipes also often tend to have alate or phalanged stems, meaning that the sides of the stem flatten into an edge and the cross-section looks like a biconvex shape. They are also known as “monitor” pipes because of their resemblance to the Civil War Union ironclad gunboat of the same name. As a result of their role in the Hopewell trading sphere platform pipes are associated most closely with the Middle Woodland Ohio Valley Hopewell but they are found in the north and southeast as well (Hall 1997:120; King 1977:11; Rafferty and Mann 2004:xii).

Figure 6.1: Five of the six pipe forms discussed in this paper, a. Tubular, b. Platform, c. Bent tube, d. Reed stem, e. Effigy (Images courtesy of the Smithsonian's National Museum of Natural History, University of North Carolina Research Laboratories of Archaeology, and the University of Pennsylvania State Museum).

The third pipe form in the dataset, called the bent tube pipe has also been identified in limited quantities among Woodland Middle Atlantic sites (Figure 6.1c). MacCord (1966) and Irwin (2004) have noted that bent tube pipes appear to be amalgams combining elements of platform and tubular pipes. Instead of being mounted on the base, the bowl is more of a continuation of the stem but is at an obtuse rather than right angle. Bent tube pipes also exhibit alate stems that are biconvex in cross-section. As I discuss below, this form is found in contexts that date to the late part of the Middle Woodland and extend into the early part of the Late Woodland period. Most of these forms were carved out of different lithic materials and are associated with mound and burial contexts.

Tubular, platform, and bent tube pipes have generally been considered as precursors to forms where the base is bent away from the stem at an obtuse angle, a modification that is more prevalent among pipes dating to the Late Woodland period (1000 to 1400 A.D.) (Rafferty and Mann 2004:xii). McGuire identified pipes with this feature as elbow pipes (1899:628). While they did exist in elementary forms during the Early and Middle Woodland periods, Rafferty and Mann (2004:xii) note that elbow pipes became the dominant form of smoking implement from the eleventh century onward in North America, although tubular pipes continue to be used by groups at this time. As previously noted I will discuss this form in more detail in Chapter 7.

Although the elbow form predominated during the Late Woodland and Mississippian periods in the Eastern Woodlands, effigy and reed stem forms also played a prominent role among certain groups. Effigy forms that included stylistic elements related to the Southeastern Ceremonial Complex were used by Mississippian peoples of the Southeast (Brain and Philips 1996; Brown 1989). A variety of effigy forms that incorporated zoomorphic and anthropomorphic imagery were used by Iroquoian groups of the Northeast (Kuhn 1986; Mathews 1980; Noble 1992; Wonderley 2005). Reed stem pipes were also popular amongst Mississippian, Fort Ancient[2], and Northeastern Iroquoian groups (Brain and Phillips 1996; Drooker 2004). As discussed in Chapter 3, reed stem pipes are especially distinctive because unlike the forms previously discussed

[2] Although I recognize that the terms "Mississippian" and "Fort Ancient" are also problematic labels that generalize and mask social variation that was present in the territories associated with these societies, I use these terms to distinguish different communities of practice that shared and utilized very different forms of material culture than the various Native communities found in the Middle Atlantic. These groups were by no means homogeneous entities and exhibit a great deal of variation in their material cultural practices (Anderson 1994; Meyers 2011; Pollack et al. 2002).

they consisted of two separate pieces, a bowl and a stem that each played an important symbolic role. The stem, which is generally a piece of reed, was inserted into the bowl so that it could be smoked. In many cases, however, only the stone or clay bowl has survived in the archaeological record.

Finally, although no examples of this type were identified in the dataset, one cannot fail to mention the iconic calumet pipe, which for many has come to symbolize the Native "peace pipe." These pipes, generally carved out of soft, red "pipestone" from Minnesota are best known for their role in ritual ceremonies carried out throughout the Southeast and Plains that facilitated intersocietal interaction. While the initial timing of these ceremonies in the Southeast has been debated (Brown 1989; Springer 1981) there is no question that these pipes served a pivotal role in ceremonies of peace as well as war (Hall 1989).

Moving into the Contact period, the elbow form continued to predominate but the availability of different raw materials increased as Europeans introduced their own pipes into the repertoire of smoking options. Although North American Natives had introduced the concept of pipe smoking to Europeans, it didn't take long for Europeans to adapt it to their own particular interests and needs. European innovations included the large-scale production of white clay pipes as well as pewter pipes or pipe-liners for pipes made of perishable materials, such as wood, which were also used by Native groups in parts of the region (Ward and Davis 1993).

Additionally, elbow pipes made out of local clay, variously known as terra cotta, Chesapeake, or locally made pipes, have been of particular interest to archaeologists in the Middle Atlantic region due to their possible ties to a number of different social groups, including Natives, African Americans, and European settlers (Agbe-Davies 2004b, 2010; Emerson 1994, 1999; Luckenbach 2004; Magoon 1999; Monroe 2002; Monroe and Mallios 2004; Mouer 1993; Mouer et al. 1999; Sikes 2008). A number of scholars have noted that the increased availability of pipes in the seventeenth century caused the practice of smoking to become more "democratized" among Native groups as a large proportion of the population, including women, began to smoke (Rafferty 2004; Ward and Davis 1993). Nevertheless, other scholars have noted a resurgence among certain northeastern Native groups to make smoking a restricted activity and reassert a preference for their own pipes (Nassaney 2004; Trubowitz 1992, 2004). Additionally, the calumet and other forms also played a role in creating and cementing social relationships between Europeans and different Native groups (Mann 2004).

As illustrated in Table 6.1, elbow pipes were by far the most prevalent form identified in the dataset. As previously noted, variations of this form will be covered in the next chapter. The next largest group was comprised of tubular pipes. The quantities of the rest of the minority forms are much smaller, ranging from 1 to 20 fragments or whole specimens. While the small sample size of many of these forms may seem to indicate that they can be dismissed, as I will argue below, it is precisely because of their modest presence that they are deserving of attention.

Table 6.1: Summary of forms

Form	Count
Elbow	754
Tubular	184
Platform	20
Bent Tube	17
Reed Stem	20
Effigy	28
Multi-Stemmed	1
Unidentifiable	1519
Total	2543

Temporal Variation of Different Forms

Tubular Pipes

Although researchers generally attribute the tubular form to Early Woodland period it has been noted that the tubular form was used into the Late Woodland period (Rafferty and Mann 2004). Although not as prevalent as the elbow form, tubular forms present in the dataset demonstrate a large degree of stylistic variability. Table 6.2 summaries the different attributes that were identified among the tubular forms examined in this study.

Table 6.2: Attributes of tubular pipes

Class	**No. of Examples**
Conical Tubular	27
Curved Conical Tubular	3
Trumpet	9
Restricted Rim	8
Onion Bowl	14
Flared Rim	4
Unique Forms	4
Tapering Stems	75
UNID	40
Total	184

Conical Shape

One of the most distinctive tubular forms is the conical tubular pipe. The label conical is derived from the shape of these pipes. As noted by Rafferty (2001:140), "the defining character of a conical tube is that the diameter of both the exterior of the pipe and the interior bore expand from proximal (bore or mouthpiece) end to distal (bowl) end, typically with the distal end being at least 150% the diameter of the proximal end". In contrast to the abrupt demarcation between the bowl and stem that is found on elbow or platform pipes, conical pipes exhibit tapering that progresses from stem to bowl and gives the impression of a general cone shape**.** Judging from the exterior shape alone, it is often difficult to determine where the bowl ends and stem begins. Additionally, all of the conical pipes in the dataset have rounded bowl rims and rounded mouthpieces. No embellishments were molded or carved into or on these forms and few received any surface treatments. The whole conical clay pipe from the Bowman Mound (44RM281), pictured in Figure 6.2a, is representative of this form.

Conical tubular pipes have typically been associated with Early Woodland and Middle Woodland contexts in the Eastern Woodlands (Eastman 1999; McGuire 1899:397; Rafferty 2001). Nevertheless, the presence of conical pipes on several Late Woodland period sites in this dataset suggests a longer time span of use. Five were found in northwestern Virginia mounds in contexts that date to the Late Woodland I (see Table 5.5). Two others recovered from the Stockton site (44HR35) also seem to date to the Late Woodland I period occupation of the site. Davis et al. (1997d) suggested these two pipes likely either dated to the early Dan River phase (A.D. 1000 to 1250) occupation phase or a brief Uwharrie phase (A.D. 800-1200) component identified at the site. Material evidence suggests at least one likely dates to the early Dan River

Figure 6.2a: a) Conical tubular pipe from Bowman Mound (44RM281); b) Curved conical tubular pipe from Bowman Mound (44RM281); c) Tubular pipe from the Potomac Creek site (44ST2) (Photographs courtesy of the Smithsonian Institution's National Museum of Natural History)

settlement. One fragment was found in a straight-sided circular pit with a flat bottom. Of the ceramics analyzed from the pit context, no Uwharrie phase ceramics were identified, only Dan River phase pottery. However, only a sample of the ceramics from this pit were analyzed, so it is possible that Uwharrie phase ceramics were present not included in the analyzed sample. Nevertheless, a small triangular point also found in this pit, either a

Clarksville or Caraway point, is the type used by Dan River inhabitants (Coe 1965; Davis et al. 1997d:64). The association of the pipe with this point provides further evidence that at least one conical pipe was used and deposited during the early Dan River phase period. Given that radiocarbon evidence points to two occupations at the site, one in the eleventh century and one in the fourteenth century, it is possible this pipe could date to the eleventh century occupation. Nevertheless, it still pushes the time span for this form into the Late Woodland period. Unfortunately the other fragment was recovered from a surface context and could not be dated.

However, it should be noted that a number of the conical specimens in the dataset cannot be dated with certainty to the Late Woodland period (see Table 6.3). The extensive time span of the deposits excavated at Accokeek Creek means that the two conical pipes from this site could date anywhere from the ninth to the sixteenth centuries (Stephenson et al. 1963). While it might have been possible to distinguish a date for these pipes based on stratigraphic information, the archaeological context information for these pipes has disappeared. Thus it is not possible to say whether these pipes date to the Late Woodland or Middle Woodland period occupation of the site.

A similar problem exists for the Hand (44SN22) site although contextual information is available that helps provide more insight. The majority of artifacts from the site date to a sixteenth-seventeenth century Nottoway occupation but a radiocarbon date recently acquired from Burial 55 indicates that particular burial and a portion of the other burials from the site date to the late Middle Woodland/early Late Woodland period, approximately A.D. 690-900 (Knepper et al. 2006:212-214). Although

Table 6.3: Conical pipes

Site No.	Site Name	Distal:Proximal Ratio	Distal (mm)	Proximal (mm)	Time Period
31Cd7*	McLean Mound	2:1	34.42	17.08	LWI
44Rm281	Bowman Mound	1.87:1	43.90	23.48	LWI
44Rm281	Bowman Mound	2.15:1	33.00	15.38	LWI
44Rm281	Bowman Mound	1.49:1	31.28	21.00	LWI
44Hr35*	Stockton	UNID	UNID	14.35	LWI
44Hr35*	Stockton	UNID	UNID	UNID	UNK
44Sn22*	Hand	1.86:1	28.2	15.10	LWII?
44Sn22*	Hand	3.2:1	36.1	11.10	LWII?
44Sn22	Hand	3.27:1	36.39	11.10	LWII?
44Sn22	Hand	1.98:1	42.00	21.20	LWII?
31Or11	Wall	2.27:1	24.63	10.83	LWII
31Or11	Wall	1.99:1	23.87	11.99	LWII
31Or11	Wall	1.8:1	22.74	12.63	LWII
31Or11	Wall	1.71:1	23.29	13.55	LWII
31Or11	Wall	1.82:1	25.93	14.28	LWII
31Or11	Wall	1.92:1	27.25	14.16	LWII
31Or11	Wall	2.14:1	22.41	10.43	LWII
31Or11	Wall	1.99:1	23.87	11.99	LWII
31Or11	Wall	1.55:1	23.61	15.39	LWII
18Pr8	Accokeek	1.83:1	34.90	19.30	LWII?
18Pr8	Accokeek	1:45:1	23.40	16.10	LWII?
44St2	Potomac Creek	2.06:1	18.27	8.85	LWII
44St2	Potomac Creek	1.66:1	18.99	11.42	LWII
44St2	Potomac Creek	2.18:1	22.94	10.52	LWII
44St2	Potomac Creek	1.87:1	19.48	10.38	LWII
44St2	Potomac Creek	1.99:1	17.33	8.69	LWII

*Identified as conical by previous researchers

the researchers suggested that this date only applies to a certain subset of burials that received special fire treatment and contained a particular suite of artifacts the fact remains that other burials in this ossuary could date to this earlier period. Consequently, it is necessary to carefully examine the rest of the burials to see whether they also show signs of dating to this earlier period.

Two of the conical pipes from the Hand site were interred in a burial that contained two secondary, bundled individuals. The only other artifact associated with the burial, a stone drill, does not provide any further diagnostic information. However, a few other pieces of material evidence indicate that these burials and pipes likely date to at least the Late Woodland period. The burial lacks the artifacts, such as shark's teeth and antler combs, and the special fire treatment that demarcated the Middle Woodland period burials at the site. Moreover, individual bundle burials are a burial practice typically associated with Late Woodland Iroquoian groups who occupied both the inner and outer Coastal Plain (Hutchinson 2002; Phelps 1983) and researchers have identified the group who occupied the site as Iroquoian (Smith 1984). Consequently, based on the burial characteristics, it seems likely that these pipes date at least to the Late Woodland period.

The third conical pipe was also interred with a bundle burial of a female who was laid to rest with a large variety of burial goods including a Newsom triangular point, turkey metatarsals, three antler drifts, a bone spatula, and a turtle carapace. The last conical pipe was recovered from a general excavation context. Unfortunately neither of these pipes were associated with artifacts that provide any assistance in pinning down their temporal associations.

The presence of pipes in other assemblages that date to later time periods, however, suggests an even later Late Woodland II date for some of the conical pipes included in this study. Two of the assemblages that contained conical pipes, Wall (31OR11) and Potomac Creek (44ST2) are from sites that date well into the Late Woodland II period. While all of the examples of this form were recovered from general stratigraphic contexts rather than features, neither of these sites has substantial Middle Woodland or Late Woodland I components (Blanton et al 1999; Stewart 1992; Ward and Davis 1999). The Late Woodland II dates of these sites suggest that these pipes are in fact from Late Woodland II contexts. Consequently, the temporal range for the use of this pipe spans the entire Late Woodland period.

Curved Conical

Three stone tubular pipes recovered from two mound contexts exhibited the general conical form but also displayed a unique trait. Two stone pipes found with two separate burials in the John East Mound (44AU35), and one stone pipe interred with a burial at the Bowman Mound (44RM281), exhibited the conical shape but the body was slightly curved (see Figure 6.2b). The pipes from the John East Mound come from two burials that have been dated to the Late Woodland I period (A.D. 1000-1300) based on Dunham's relative chronological sequence (Dunham 1994:672). The context for the pipe from the Bowman Mound is less clear, although it is one of six that were all excavated from bone beds by Fowke (1894). Dunham dated all of these bone beds to the Late Woodland II period (A.D. 1300-1400). Consequently it would seem that the curved conical pipe was also used well into the Late Woodland period. These were the only stone pipes that exhibited this trait and based on evidence available to date, are all associated with the Ancestral Monacan groups who utilized the mounds.

Trumpet

Another form of tubular pipe present in the dataset was distinguished based on the relationship between the stem and bowl. These pipes have been labeled as "trumpet", a term coined by Wells (2002). Like conical pipes, trumpet tubular pipes also expand from the proximal to distal end (Figure 6.3). However, this expansion is less dramatic and does not fit the 1:1.5 ratio criterion set for conical pipes. In addition, trumpet forms have thinner walls and usually exhibit evidence of finishing, such as burnishing or smoothing. Nine examples of this form were positively identified in the dataset along with one possible fragment.

Figure 6.3: Trumpet Pipe with a cut mouthpiece from the Abbyville site (44HA65). (Photo courtesy of the Southern Halifax Museum)

Figure 6.4:Tubular pipe with a flared bit from the Abbyville site (44HA65). (Photo courtesy of the Southern Halifax Museum).

Based on available information, the production and use of the trumpet form dates to the Late Woodland period. At the Great Neck (44VB7) site the single trumpet pipe that could be identified came from a burial context that likely dates to the fourteenth century based on the presence of Townsend ware ceramics in the fill (Hodges 1998:152). At the Abbyville (44HA65) site, these pipes come from a number of different contexts located on the Southern Terrace. The occupation of the Southern Terrace likely dates somewhere between A.D. 1100-1450 based on the presence of Clarksville Type II pottery in feature contexts (Wells 2002). The terminal date of A.D. 1450 leaves open the possibility that these pipes date to the same time period as the one from Great Neck but more examples of this form are needed to help refine its chronological timeframe. Unfortunately the samples from the John Green site have no archaeological provenience but are either from the protohistoric or Contact period (MacCord 1970).

A variant of the trumpet pipe is what I have called a restricted rim tubular pipe. These forms exhibit elongated bowls that flare outwards from the stem bowl juncture to the rim and have inverted lips (Figure 6.5). Like the trumpet pipe, only a few of these forms were identified in the dataset. The eight examples of this form were found on four sites: Wall (31OR11), Edgehill (44CC29), Abbyville (44HA65), and Accokeek Creek (18PR8). Additionally, two examples of this form were also found at the John Green site (44GV1) (Painter 1967). The Wall and Edgehill examples date to the Late Woodland II period but it is difficult to say for certain whether the pipes recovered from the Abbyville and Accokeek Creek sites date to this period because they only have a general site provenience. The examples from the John Green site date to the Protohistoric or Contact period.

Figure 6.5:Tubular pipe with restricted rim from the Abbyville site (44HA65). (Photo courtesy of the Southern Halifax Museum)

Onion Bowl

Unlike conical and trumpet pipes, where the bowl is more of a continuation of the stem, a number of other tubular pipes exhibited very distinctive bowl shapes. One distinctive shape present in the dataset was first identified by Coe (1952) as an "onion bowl" form (Figure 6.6). These tubular pipes have a distinct bulbous bowl that sits parallel to the stem. Coe first identified this bowl form at the Wall site (31OR11) and included this pipe form as a trait of his Hillsboro focus (Coe 1952:311). Ward and Davis (1993, 1999) and Eastman (1999) have noted the presence of pipes with these bowls on Late Woodland II sites located along Smith and Dan Rivers and on later Contact period sites associated with the historic period Sara, a Siouan-speaking Native community who lived in Virginia and North Carolina. Ward and Davis (1993:203) have noted that earlier versions of these pipes have trumpet-like bowls while later versions have more well-defined bulbous bowls and straight stems.

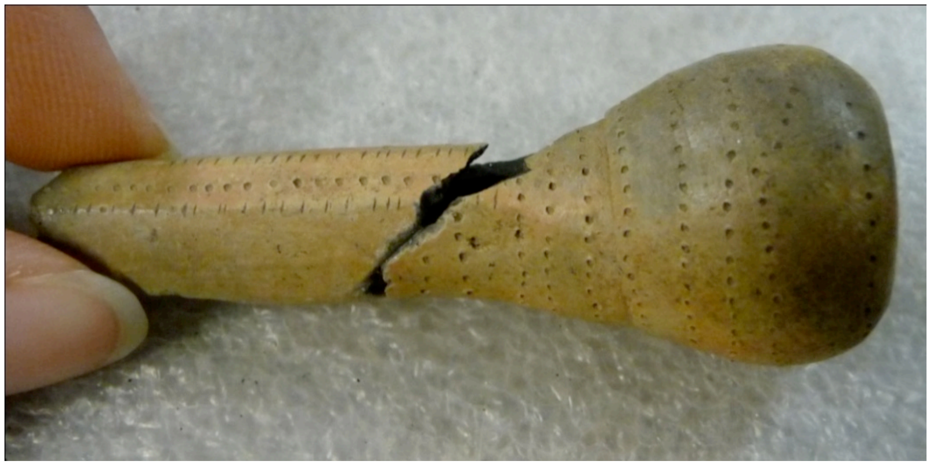


Figure 6.6: Onion bowl pipe from the Halifax site (Picture courtesy of the North Carolina State Office of Archaeology)

A variation of this form was also identified in the dataset. Four tubular bulbous pipe bowls fit the criteria for onion bowls but exhibited rims that are dramatically inverted and then flared outwards (Figure 6.7). The four examples of this form are distributed on four different sites, Box Plant (44HR3), Stockton (44HR35), Abbyville (44HA65), and Philpott (44HR4) that all date to the Late Woodland II period.

Figure 6.7: Tubular bulbous bowl with flared rim (Picture courtesy of the University of North Carolina Research Laboratories of Archaeology)

Tubular Stems

While whole and fragmented examples of tubular pipes can be differentiated on the basis of bowl/stem ratio and different bowl shapes, stem shapes of tubular pipes were surprisingly similar. Seventy-five tubular specimens from 13 different sites consisted of circular stem and mouthpiece fragments. These stem and mouthpiece fragments had partial bowls or the stem bowl juncture present but exhibited no salient features that allowed them to be distinguished from each other. At times some forms exhibited tapering but beyond noting the dramatic tapering that might have been indicative of the conical pipes, recording this trait was not particularly useful. Consequently, these fragments could not be categorized in any way beyond being identified as tubular pipes based on external appearance.

Given the lack of distinguishing characteristics on their exterior form, I attempted to differentiate between these pipes by examining variations in bore diameter size. A number of researchers have examined bore diameter size to identify characteristics that might be related to different production techniques. My efforts draw from the work conducted by Harrington (1954), Binford (1962), and Deagan (1971) and Mallios and Monroe (2004) that determined variations in bore diameter size on historic white ball clay and colonoware pipes could be used as diagnostic markers to date contexts. While the regression formulas created for dating by Binford (1962) and Heighton and Deagan (1971) have their strengths and weaknesses (McMillian 2010) they nevertheless point to the fact that bore diameters can be sensitive markers of temporal variation. Additionally, other studies, such as Blanton, Pullins and Dietrich (1999) and McMillian (2010) have suggested variations in bore diameter measurements can also be related to social differences, such as the variations of production methods being used at the same site or regional differentiations in pipe making traditions. For example, Blanton et al. (1999) examined 30 fragments from their excavations of the Potomac Creek site and found that, in general, the tubular pipes had bore diameters that averaged 7/64s of an inch. They contrasted this smaller size with larger bore diameters of elbow pipes (8/64ths of an inch) also found in the assemblage and suggested that these differences could be related to different pipe making traditions present at the site. Whether these traditions existed simultaneously, however, is unclear.

Following these studies I attempted to differentiate possible variations that might be related to social or temporal differences in pipe production by creating a histogram of bore diameter sizes. Harrington (1954) was the first to use a histogram to compare bore diameter size to examine whether there were any breaks in the distribution that might indicate variation. In Harrington's case, the breaks were related to change over time in production techniques. However, in the case of prehistoric pipes, I anticipated that breaks could be linked to production methods used at a particular site or previously defined cultural or linguistic territory, as well as changes over time. However, the histogram of all the samples whose bore diameters could be measured, pictured in Figure 6.8 below, revealed that the sample size from most of the sites was too small to be informative. Moreover, the one assemblage that did have a fairly large sample size, Potomac Creek (44ST2), exhibited a relatively normal curve. This distribution does not negate the pattern determined by Blanton et al. but does indicate that there is a great deal of intra-assemblage variability within the tubular form found at Potomac Creek. This could indicate the presence of multiple producers and an overall lack of standardization. The lack of distinction between the sites suggests that bore diameter size is not the most robust measure of intersite or intrasite variability.

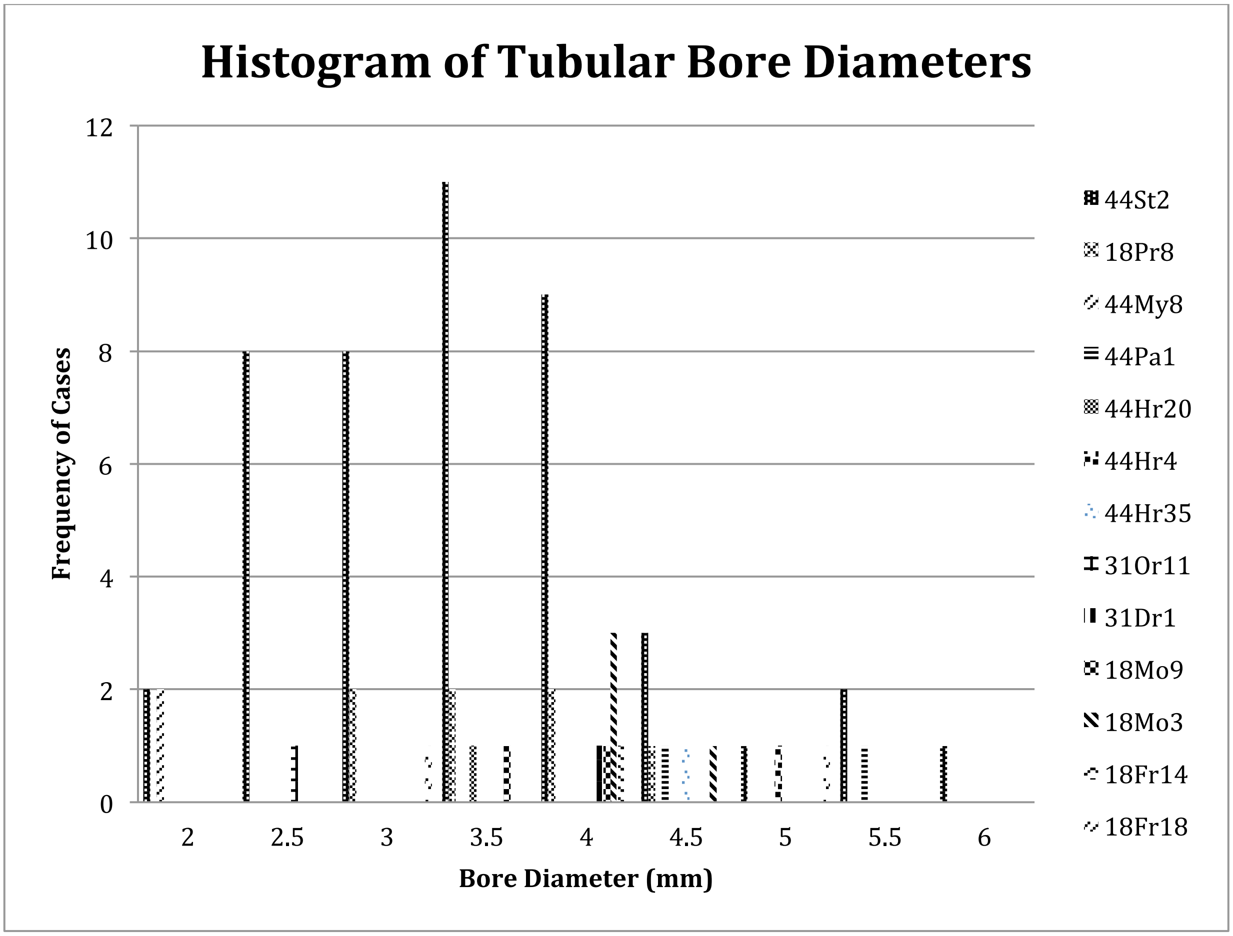


Figure 6.8: Histogram of tubular bore diameters

Unique forms

Besides the attributes that could be categorized, a few completely unique tubular forms were identified in the dataset. Two of the exceptional tubular pipes were uncovered at the Potomac Creek (44ST2) site. One pipe has a well-formed bulbous bowl that joins with a circular stem and ends in a distinctive expanding oval bit. The other exhibits an elongated bowl that joins with a triangular stem and flared bit. Another tubular pipe from the Belmont site (44HR3) is also a unique specimen. This pipe could be categorized as a transitional form, as it looks like a tubular pipe but has a bowl that angles away from the stem ever so slightly. This pipe was produced from a distinct red clay and has a horizontal line of punctuates encircling the rim. Finally one tubular pipe from the Stockton site (44HR35) is represented by a bowl fragment and was distinguished by a unique rim peak. This pipe was found in a pit radiocarbon dated A.D. 1285-1417. This pipe was found in the same feature as an elbow pipe and represents one of the most concrete examples of the possible contemporaneous use of multiple forms.

Finally, 41 tubular fragments present in the dataset were too fragmented to discern any information from them. Additionally one tubular form, made of steatite from the Philpott site (44HR4) was a blank.

Platform Pipes

Nineteen platform pipes were also present in the dataset. In the Eastern United States, platform pipes are most strongly associated with Middle Woodland Hopewell contexts. However their inclusion on a number of sites in this study extends their use into the Late Woodland I and II periods. As illustrated in Table 6.4, the majority of specimens that can be dated are associated with mound contexts (Dunham 1994:Table 15; Irwin et al. 1999). A number of these samples date to Late Woodland I period contexts. Two additional examples, both recovered from a bone bed in the Bowman Mound (44RM281), date to the Late Woodland II period, as they were interred with a context that Dunham (1994:636) dated to A.D. 1400. Additionally, one example from the Dallas Hylton (44HR20) site was found in Feature 67, a bell-shaped pit that also contained Dan River series ceramics dating to the A.D. 1250-1450 occupation of the site (Davis et al. 1998a:16). Six of the other samples from the Late Woodland II and Contact period occupation sites, however, were found in plowzone or surface contexts and thus the use of these forms cannot be attributed with certainty to the Late Woodland period. Nevertheless the presence of this form in contexts that date to the Late Woodland period indicate that Eastern Woodland Native groups used platform pipes for eight centuries or more.

Table 6.4: Platform pipes

Site	Site Designation	Raw Material	Bowl Shape	Stem Shape	Mouthpiece Shape	Time Period	Source
Shannon	44My8	Clay	UNID	UNID	UNID	UNK	Benthall 1969
Potomac Creek	44St2	Clay	UNID	Alate	UNID	UNK	Stewart 1992
Abbyville	44Ha65	Chlorite	UNID	Alate	Oval/biconvex	UNK	Wells 2002
Abbyville	44Ha65	Steatite	Cylindrical	Alate	Oval/biconvex	UNK	Wells 2002
Early Upper Saratown	31Sk1	Clay	Bulbous	UNID	UNID	UNK	Wilson 1983; Ward and Davis 1993
Winslow	18Mo9	Clay	UNID	UNID	UNID	UNK	Slattery and Woodward 1992
Noland's Ferry	18Fr17	Clay	UNID	Alate	UNID	UNK	Peck 1980
Accokeek Creek	18Pr8	Steatite	Elongated/ Flared	Alate	Oval/biconvex	UNK	Stephenson et al. 1963
McFayden Mound	31Bw67	Stone	UNK	UNK	Oval/biconvex	UNK	South 1962
John East Mound	44Au35	Clay	Cylindrical	Alate	Ovular	UNK	MacCord and Valliere 1986
Senedo Mound	44Sh129	Steatite	UNID	UNID	UNID	UNK	Dunham 1994
McLean Mound	31Cd7	Chlorite	Elongated	Alate	Oval/biconvex	LWI	Irwin et al. 1999, Irwin 2004
McLean Mound	31Cd7	Chlorite	Cylindrical	Alate	Oval/biconvex	LWI	Irwin et al. 1999, Irwin 2004
McLean Mound	31Cd7	Chlorite	Cylindrical	Alate	Oval/biconvex	LWI	Irwin et al. 1999, Irwin 2004
McLean Mound	31Cd7	Chlorite	Cylindrical	Curved	Oval/biconvex	LWI	Irwin et al. 1999, Irwin 2004
Brumback Mound	44Pa177	Steatite	UNID	Alate	UNID	LWI	Dunham 1994
Bowman Mound	44Rm281	Steatite	UNID	UNID	UNID	LWII	Dunham 1994
Bowman Mound	44Rm281	Steatite	UNID	UNID	UNID	LWII	Dunham 1994
Dallas Hylton	44Hr20	Clay	UNID	Alate	UNID	LWII	Davis et al. 1998

Bent Tube pipes

The bent tube pipe form is represented by 17 examples in the dataset (see Table 6.5). Coe (1952) was one of the first researchers to note the presence of this form on the Gaston site (31HX7). MacCord (1966) and Irwin (et al. 1999, 2004) have discussed this form in detail and describe it as a transitional form between platform and elbow pipes. All but one of the pipes with this form in the dataset were excavated or collected from mound or individual burial contexts. The one exception to this pattern is a bent tube pipe excavated from a midden area at the Hand site (44SN22). It should be noted that other examples of this form were recovered from the Poole or Keyawee site (31RD5) and the Gaston site (31HX7) in North Carolina (Coe 1952; Irwin 2004; Ward and Davis 1999) that were not directly examined as part of this research but I will include them in the discussion based on stylistic information available in site reports.

MacCord (1966) and Irwin (et al. 1999; 2004) have established that bent tube pipes from the Sandhill mounds began to be used between 800 and 1000 A.D. based on radiocarbon dates from these contexts. Irwin (2004) has argued that these mounds were likely used from roughly A.D. 800 to 1300, which provides a rough relative date for the use of bent tube pipes interred in these mounds.

I established date ranges for three of the bent tube pipes from the Lewis Creek Mound Complex using Dunham's relative dating scheme. The steatite bent tube pipe from Brumback Mound (44PA177) was collected by Gerald Fowke from a context located 10-15 feet from the center of the mound that Dunham dates to A.D. 1000-1100 (Dunham 1994:Table 7; Fowke 1894). Holland, Evans, and Meggers (1953) excavated a chlorite schist pipe from the John East Mound (44AU35) that was directly associated with a double stone-covered primary burial located in the mound matrix. According to Dunham's relative chronological sequence for the John East Mound, these burial forms date to A.D. 1000-1300 (Dunham 1994:Figure 75). A radiocarbon date of A.D. 1070-1160 (1σ) was obtained from a submound pit burial located about a foot beneath the burial with the pipe (Gold 1999:Table 4.7) supports Dunham's chronology.

Table 6.5: Bent tube pipe attributes

Site	Site No.	Raw Material	Bowl Shape	Rim Flange	Stem Shape	Depositional Context	Time Period	Source
Leesville Mound	44CP8	Steatite	Cylindrical	Present	Winged	Center of mound, unk depth	UNK	Davenport and Judge 1952; Dunham 1994
Leesville Mound	44CP8	Steatite	Cylindrical	Absent	Winged	Center of mound, unk depth	UNK	Davenport and Judge 1952
Hand	44SN22	Chlorite	Elongated	Present	Alate	Burial 52-A	UNK	Smith 1984
Hand	44SN22	Steatite	Elongated	Absent	Winged	Burial 59-D	UNK	Smith 1984
Hand	44SN22	Clay	Elongated	Absent	Winged	Midden	UNK	Smith 1984
Hand	44SN22	Clay	Elongated	Absent	Winged	Burial 106	MW/LWI	Smith 1984
Hand	44SN22	Clay	Elongated	Absent	Winged	Burial 48	MW/LWI	Smith 1984
Hand	44SN22	Chlorite	Elongated	Present	Alate	Burial 101-B	MW/LWI	Smith 1984
McLean Mound	31CD7	Chlorite	Elongated	Present	Winged	SK 72	LWI	MacCord 1966; Irwin 2004
McLean Mound	31CD7	Chlorite	Cylindrical	Present	Winged	SK 264	LWI	MacCord 1966; Irwin 2004
McLean Mound	31CD7	Chlorite	Cylindrical	Present	Winged	Sp 29 (also 30)	LWI	MacCord 1966; Irwin 2004
McLean Mound	31CD7	Chlorite	Bulbous	Absent	Winged	Sq 29	LWI	MacCord 1966; Irwin 2004
Brumback Mound	44PA177	Steatite	Cylindrical	Absent	Alate	5-10 ft southwest of center	LWI	Dunham 1994
John East Mound	44AU35	Steatite	Cylindrical	Absent	Alate	Burial S6	LWI	Holland et al. 1953; Dunham 1994
Hayes Creek Mound	44RB2	Steatite	UNK	UNK	UNK	Burial 1	LWI	Valentine 1899; Holland et al. 1953
Gaston	31HX7	Chlorite	Cylindrical	Present	Alate	Burial 7	MW/LWI	South 1959; Coe 1964
Keyauwee	31RD1	Chlorite	Cylindrical	Present	Alate	Burial	LWII	Ward and Davis 1999:137

Valentine (1903) excavated another example of the bent tube form was excavated from a primary stone-covered burial in the Hayes Creek Mound (44RB2). Although Valentine did not describe the pipe as a bent tube form, Holland et al. (1953:4) subsequently noted that the bent tube pipe found in the John East Mound was "similar to the stone pipe from the Hayes Mound." I confirmed this similarity by a visual examination of the Hayes Creek Mound pipe in the Valentine museum collection. Dunham also places the time frame for this burial type in the early part of the Late Woodland (A.D. 1000-1300).

Finally, although two bent tube pipes were also dug out of the center of Leesville (44CP8) Mound, these pipes have no vertical stratigraphic provenience, making it impossible to assign more than a general Late Woodland date (Davenport and Judge 1952; Dunham 1994). Integrating this information with Irwin's (2004) date range for the McLean Mound indicates that the fourteenth century is the *terminus ante quem* for the interment of these pipe forms in the mounds.

While the chronological time frame of bent tube pipes from the two mound complexes in my study area suggests the Late Woodland was their primary period of use, a few other specimens found outside of these complexes complicate this timeframe. The presence of five bent tube pipes in six different Hand (44SN22) site burials again brings into question the chronological context of either the pipes or some of the burials associated with this site. Smith (1984) designated all five of these burials to different subperiods of his site chronology but all of these subperiods were attributed to the sixteenth century Nottoway occupation. Burial 48 was associated with the Southhampton

II. Burial 52A and C were grouped with Southhampton III. Burial 106 was categorized as with Southhampton I and Burial 101-B as Southhampton IV. Burials 52-B and 59-D do not seem to have been associated with a subphase. If these burials did date to the sixteenth century this would greatly extend the chronological time frame for the bent tube pipe.

However, a reexamination of burial treatments and additional objects interred with these six burials suggests that at least five of these individuals were likely interred during the terminal Middle Woodland/early Late Woodland occupation of the site identified by Knepper et al. (2006). Burials 48 and 52 A/C received the fire ceremony treatment that also distinguished Burial 55 that was radiocarbon dated to the terminal Middle Woodland period (2σ, A.D. 690-970). Roanoke Large Triangular projectile points were interred with two other two burials, three points with Burial 101-B and two with Burial 106 respectively. Davis and Daniel (1990:9) attribute this lithic type to the Middle Woodland and early Late Woodland periods. The presence of these lithics puts the time frame of internment at roughly the same point as the burials associated with bent tube pipes in the mound contexts. The two other burials with bent tube pipes, 52-B and 59-D did not have any other associated artifacts or burial treatments that might help date these specimens. One additional bent tube pipe was recovered from the Hand site from a midden context but does not provide any additional information that helps with temporal context. However, the five in situ examples found at the Hand site support the terminal Middle Woodland/early Late Woodland date suggested by MacCord and Irwin.

Two additional examples of the bent tube form have been recovered from sites located in northern Piedmont of North Carolina. Stanley South and a small crew excavated the Gaston site (31HX7) in the 1950s (South 1959). The materials from the Gaston site exhibited three different components, Clement, Vincent, and Gaston. Vincent and Clement sherds are considered to be diagnostic markers of the Early Woodland and Middle Woodland period (Ward and Davis 1999), while Gaston sherds date to the Late Woodland (Coe 1965). The crew uncovered a bent tube stone pipe from Burial 7. Eight Gaston sherds and 11 Clement sherds were associated with the burial (South 1959:Table VII). Based on the fact that some of the burials contained Gaston sherds and others did not, South interpreted Burial 7, among others, as dating to the later occupation of the site, which took place during the Gaston period. However, the fact that both Clement and Gaston sherds are present in the burial seems to indicate that a terminal Middle Woodland/Late Woodland date is appropriate. Consequently, it would seem that the bent tube pipe fits the time frame of use suggested by the pipes in mound contexts and a number of the pipes at the Hand site.

In contrast to the rest of the pipes discussed here, a single bent tube pipe at the Keyauwee, or Poole (31RD1) site was recovered from a context that dates well into the Late Woodland II period. This pipe was the singular object interred with burial No. 24 that was completely decimated by plowing. Although the Keyauwee site was never radiocarbon dated, Coe (1937) attributed the site to the eighteenth century village occupied by the Keyauwee that Lawson visited during this travels in the North Carolina Piedmont. Ward and Davis (1999:137) have assigned a slightly earlier date to the site, categorizing it as part of the Late Woodland period Caraway phase, which dates from A.D. 1500-1700. They note that the shell and bone artifacts interred with individual burials at the site are similar to grave goods found at sites dating to the Hillsboro (A.D. 1400-1600), late Dan River (A.D. 1200-1450), and Early Saratown (A.D. 1460-1600) phases. The Late Woodland II occupation of the site places the *terminus post quem* of the internment of this pipe several centuries after the rest of the examples present in the dataset. It is possible that the Keyauwee pipe was produced at the same time as other bent tube pipes in the area and kept for hundreds of years as an heirloom. It is also possible that it represents an extremely late production of this type of form. Regardless, it is likely that this pipe was extremely distinctive when used for ceremonies given that it represents one of the very few, or perhaps the only example of this form in use in the sixteenth or seventeenth centuries.

Reed Stem Pipes

Reed stem forms in the dataset represent a dramatic departure from the platform and bent tube varieties previously discussed. Two major variations of the reed stem form were found in the dataset, stub stem and ovoid forms. Examples of these different forms and their attributes are illustrated in Figures 6.9 and Figure 6.10.

Stub-Stemmed

Ten of the reed stem forms can be categorized as stub-stemmed (see Table 6.6). Stub-stemmed forms are elbow-shaped and have a short stub stem. This form is generally contrasted with other reed stem forms that completely lack a stem. As illustrated in Table 6.6, all but three of the specimens were recovered from Late

Woodland II contexts. One example from the Early Upper Saratown (31SK1) site and two examples from the Accokeek Creek (18PR8) site could not be dated with certainty because they were from general site contexts.

Figure 6.9: Examples of stub-stemmed pipes in the dataset, a) stub-stemmed pipe from 44TZ1, b) stub-stemmed pipe with ground bit from 44HR3, c) pipe with elongated bowl and rounded stem from 44ST2. Comparative forms: d) Pee Dee pipe from the Town Creek Mound assemblage, e) Qualla phase pipe from Peachtree Mound assemblage. (Image 5.9a courtesy of the Southern Halifax Museum, Images 5.9b, 5.9d, and 5.9e courtesy of the University of North Carolina Research Laboratories of Archaeology, Image 5.9c. courtesy of the Smithsonian Institution's National Museum of Natural History.)

Table 6.6: Stub stem pipes

Site	Site No.	Raw Material	Bowl Shape	Time Period
Potomac Creek	44ST2	Clay	Elongated	LWII
Crab Orchard	44TZ1	Clay	Cylindrical	LWII
Early Upper Saratown	31SK1	Clay	Cylindrical	LWII
Early Upper Saratown	31SK1	Chlorite schist	Squared	UNK
Accokeek Creek	18PR8	Clay	UNID	UNK
Accokeek Creek	18PR8	Clay	UNID	UNK
Belmont	44HR3	Clay	Cylindrical	LWII
Hand	44SN22	Steatite	Elongated	LWII
Shenks Ferry	36LA2	Clay	UNID	LWII
Shannon	44MY8	Clay	UNID	LWII

Ovoid

The other variety of reed stem pipe present in the sample fit the criteria of forms known as "ovoid" (Drooker 2004). Ovoid pipes completely lack a stem. Rather, a large hole is drilled into the bowl for the insertion of a reed or bone stem. Table 6.7

summarizes the attributes exhibited by the ten examples of these pipes and Figure 6.10 illustrates some of variations found in this form. Table 6.7 demonstrates that the majority of these forms are associated with Late Woodland II and Contact period contexts.

Table 6.7: Ovoid pipes

Site	Site No.	Ovoid Form	Raw Material	Context	Time Period
Overpeck	36BU5	Keel?	local clay	Surface	UNK
Trigg	44MY3	Ovoid	steatite	Feature 49/41	Contact
Trigg	44MY3	Ovoid	sandstone	Burial 172	Contact
Abbyville	44HA65	Ovoid	steatite	Burial	Contact
Abbyville	44HA65	Ovoid	steatite	Burial	Contact
Potomac Creek	44ST2	Ovoid	chlorite schist	Plowzone	LWII
Crab Orchard	44TZ1	Ovoid/Barrel	chlorite schist	Burial 75	LWII
Crab Orchard	44TZ1	Ovoid/Barrel	gray-green shale	Burial 90	LWII
Crab Orchard	44TZ1	Ovoid/Rectanguloid	limestone	Burial 24	LWII
N/A	44WR300 Areas 2/3	Ovoid	sandstone	Burial	LWII

Figure 6.10: Examples of different ovoid pipes excavated from the Crab Orchard site. (Image adapted from MacCord and Buchanan 1980:Figures 11, 14, and 15).

Effigy Pipes

While the exact temporal onset for the use of effigy forms (Figure 6.11) is unclear, Noble (1992) has noted that the Ontario Neutral Iroquois' smoking complex, which included effigy pipes, began its florescence as early as A.D. 1350. Mathews (1980) has noted that effigies tend to be found in noticeable quantities starting in 1500 AD in the New York area. Mathews (1980) has also suggested that the quantities of these forms dramatically increased on postcontact sites associated with a number of New York Iroquoian-speaking groups although in some areas effigies continued to be a minority form (Wonderley 2005).

Figure 6.11: Bear effigy pipe from the Strickler site (36LA3). (Photo courtesy of the Pennsylvania State Museum).

Kent (1984) has already noted that effigy forms increased in popularity among the Susquehannocks in the last quarter of the sixteenth century and in a manner similar to other Iroquoian-speaking groups, by the middle of the seventeenth century, effigy pipes proliferated at the Strickler (36LA3) site (ibid:151-152). It should be noted that the small sample size studied here is not representative of the quantity of stone effigy pipes present on Susquehannock sites, such as Strickler. A large number of stone effigy pipes were present in the "Susquehannock" collection of the Pennsylvania State Museum. These pipes were finely carved examples of effigy forms but the majority of these artifacts were donated from private collections and the knowledge of their temporal and spatial provenience had long disappeared. Therefore, they could not be included in this study. However, the designation of these pipes as "Susquehannock" by museum curators and archaeologists (Kent 1984; Witthoft and Kinsey1936) provides further evidence that these forms were popular among the Native peoples who occupied sites on the floodplain terraces of the Susquehanna River. Table 6.8 shows that like reed stem pipes, these pipes were associated with Late Woodland II and Contact period contexts.

Table 6.8: Effigy pipes

Site	Site Designation	Raw Material	Zoomorphic/ Anthropomorphic Form	Direction	Time Period
Accokeek Creek	18Pr8	clay	Bird	EAS	LWII
Shenk's Ferry	36La2	clay	Fox	EFS[1]	LWII
Philpott	44Hr4/Vir 199	clay	Weeping Man	UNID	LWII
Schultz Farm	36La7	steatite	Owl effigy	UNID	LWII
Overpeck	36Bu5	clay	Human face	UNID	LWII/Contact
Overpeck	36Bu5	clay	Turtle	UNID	UNID
Strickler	36La3	clay	Bird	EFS	Contact
Strickler	36La3	clay	Bird	EAS	Contact
Strickler	36La3	clay	Fox	EFS	Contact
Strickler	36La3	clay	Bird	EFS	Contact
Strickler	36La3	clay	Bird	EFS	Contact
Strickler	36La3	clay	Owl effigy	EFS	Contact
Strickler	36La3	clay	Bear	EFS	Contact
Strickler	36La3	steatite	Maskette	EAS	Contact
Strickler	36La3	clay	Running Deer	UNID	Contact
Strickler	36La3	clay	Bird	EFS	Contact
Washington Boro	36La8	steatite	UNID	UNID	Contact

Washington Boro	36La8	stone, unknown	Human faces/maskettes	EAS	Contact
Abbyville	44Ha65	clay	UNID	UNID	Contact
Early Upper Saratown	31Sk1	clay	Man? Bird?	EAS[2]	Contact
Camden	44Ce3	clay	HLCDL	UNID	Contact
[1] = Effigy Faces Smoker, [2] = Effigy Away from Smoker					

Multi-stemmed Form

One completely unique form present in the dataset was the multi-stemmed form. The one example of the pipe with this form was found on the Late Woodland II period Dallas Hylton (44HR20) site in southern Virginia (Figure 6.12). This form is completely unique to this time period but was produced in fairly large quantities by both the Pamunkey and Catawba Natives occupying reservations along the Pamunkey and Catawba Rivers in Virginia and South Carolina, respectively. These two groups were part of a small contingent of Native peoples who continued producing ceramics and pipes well into the nineteenth and twenty centuries (Davis, Riggs, and Plane 2006; Speck 1928). They produced multi-stemmed forms, better known as the “pipe of joy” for trade with American settlers. While Davis et al. (1998a) have already suggested that this pipe may be a precursor to this form, it is difficult to tell given the nearly three century year time gap between its production at the Dallas Hylton site and the widespread production of the pipes created by the Pamunkey and Catawba. Regardless of whether the two are linked, this pipe represents a unique effort.

Figure 6.12: Multi-stemmed pipe from the Dallas Hylton (44HR20) site (image courtesy of the University of North Carolina Research Laboratories of Archaeology)

Temporal Diversity

Now that I have dated the examples of different forms to the best of my ability, I will compare their temporal ranges. While tubular, platform, bent tube, and elbow forms are generally considered to be more popular during particular periods, the researchers mentioned above have acknowledged that forms did not always adhere to strict temporal boundaries. My comparison of pipe forms from Late Woodland and Contact period Middle Atlantic contexts affirms that although elbow pipes were the predominant form used during these periods, a variety of other forms were also present in the assemblages surveyed in this study.

I would like to briefly focus on the diversity of forms present in this sample and its implications for our understanding of Native social landscapes in the Middle Atlantic region. Figures 6.13a, 6.13b, and 6.13c are maps of the study area that illustrate the proportions of different forms present in each site assemblage. It should be noted that these charts and their proportions only reflect the fragments and whole pipes whose forms could be identified. Thus the size of the pie chart present on the map scaled to reflect the total number of samples that could be identified to form, not the size of the entire assemblage that also included unidentifiable fragments. Moreover, site assemblages that did not contain any fragments whose forms could be identified are not pictured on these maps.

A few noteworthy trends are revealed through a comparison of these three figures. Three forms, elbow, tubular, and platform pipes, are found in contexts that date to all three periods. However, it should be noted that the one example of a platform pipe excavated from the Abbyville (44HA65) site is from a surface context and cannot be dated with certainty to the Contact period. The other forms present in the dataset have more restricted time spans. With the exception of the example from the Poole site (31RD5), bent tube pipes only appear on sites dating to the Late Woodland I period. Effigy and reed stem forms do not appear in the region prior to the thirteenth century but their presence extends into the Contact period. Finally the singular instance of a multi-stemmed pipe dates to the Late Woodland II period.

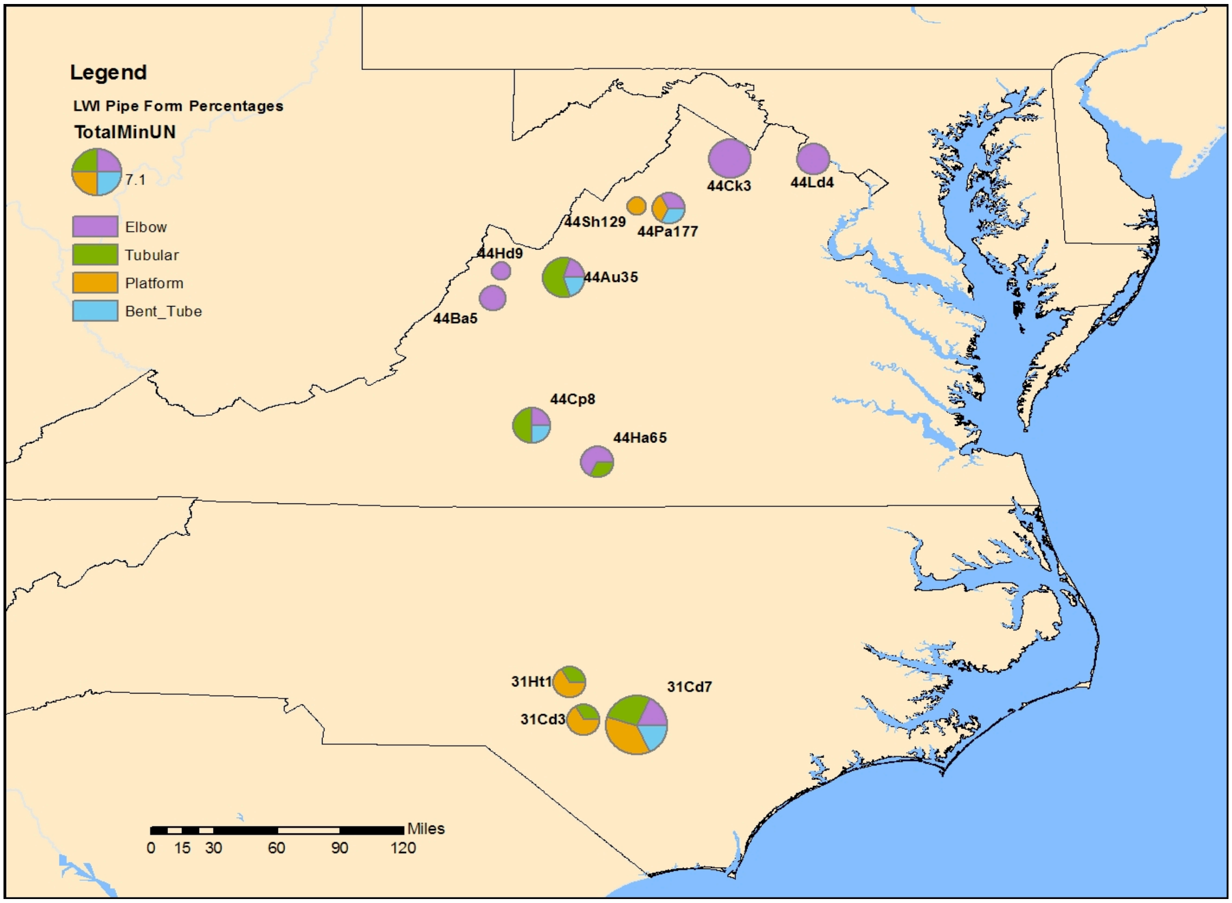


Figure 6.13a: Proportions of different forms on Late Woodland I assemblages (Pie chart for reference in legend is scaled to assemblage size of 7.1 pipes)

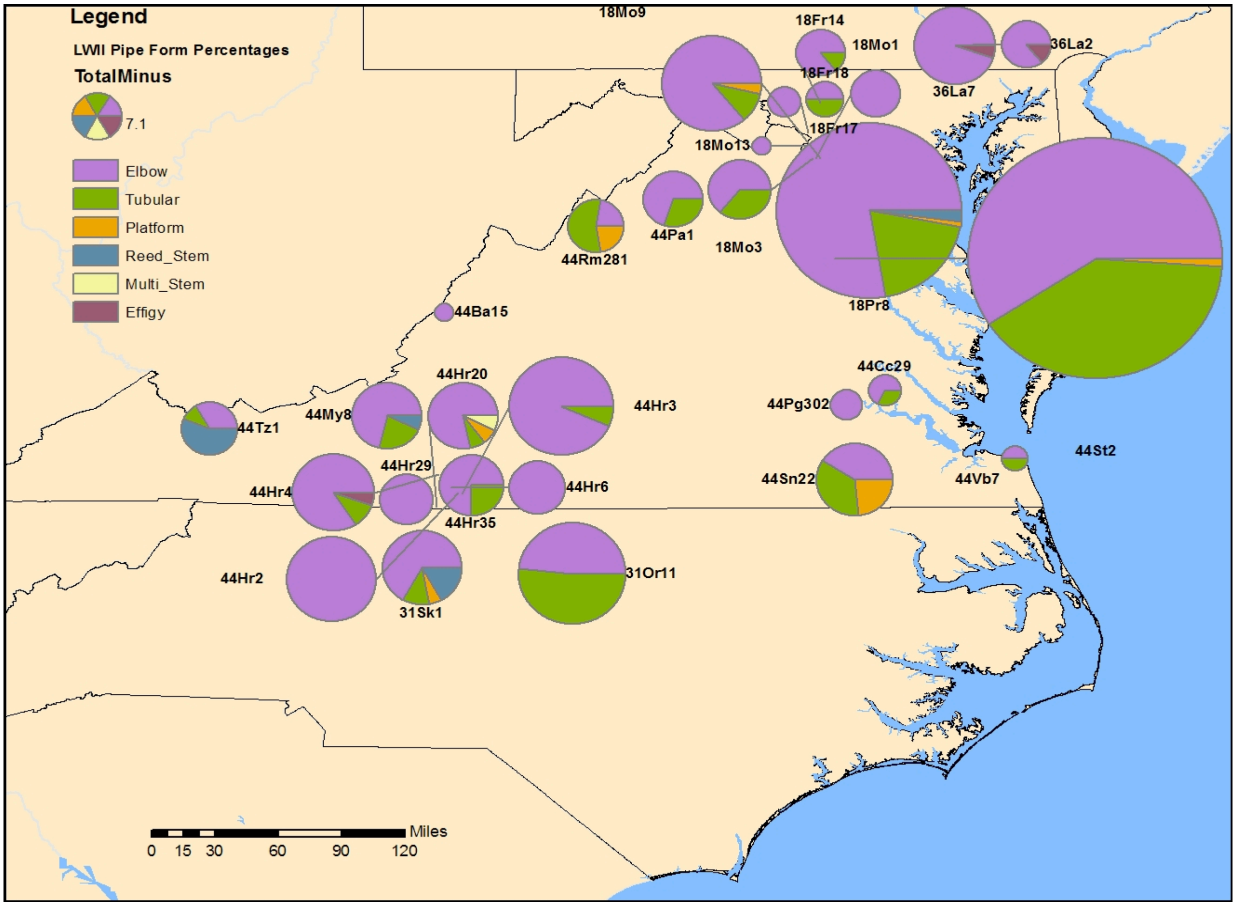


Figure 6.13b: Proportions of different forms present on Late Woodland II site assemblages (Pie chart for reference in legend is scaled to assemblage size of 7.1 pipes)

The variability of the time spans of different forms demonstrates that Native groups were using multiple forms during different periods. A comparison of these three figures reveals that the fewest forms were used during the Late Woodland I period, while the most were used the Late Woodland II period. However, the fact that the Late Woodland II period seems to exhibit the most diversity of pipe forms is interesting given that previous researchers have suggested the more open, long range social networks that were an integral part of interactions during the Late Woodland I period broke down as sedentariness and warfare amongst Native groups increased during the Late Woodland II period (Stewart 1989, 1994).

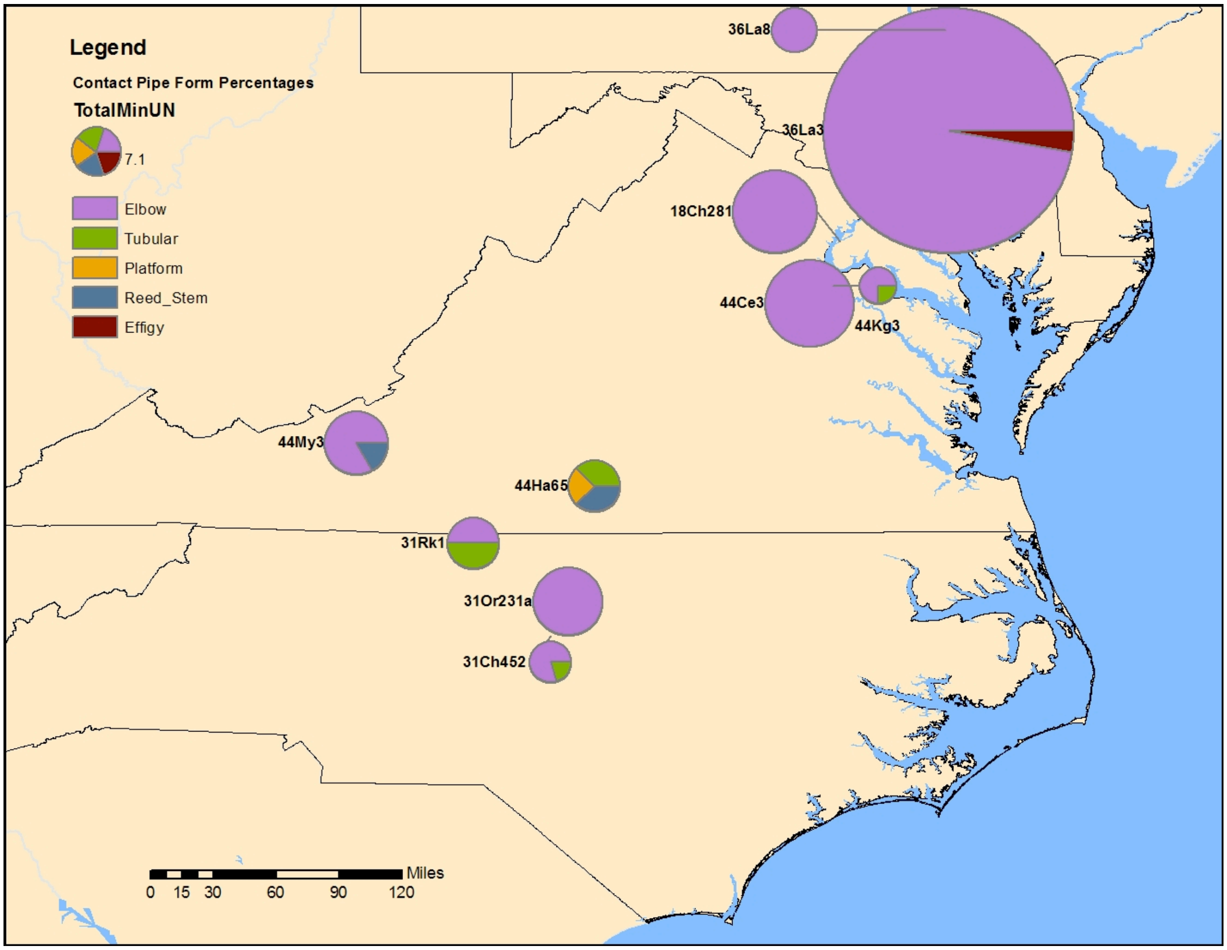


Figure 6.13c: Proportions of different forms present in Contact period site assemblages (Pie chart for reference in legend is scaled to assemblage size of 7.1 pipes)

Although the patterns mapped in the figures above suggest that the Late Woodland II period exhibited the highest assemblage diversity, it is also useful to test visual patterning suggested by GIS with more rigorous statistical methods to evaluate whether the patterns are in fact significant (Kvamme 1994, 1999; Lock and Harris 1992). The pattern suggested by mapping the proportions of pipes was evaluated by measuring the diversity of pipe forms in all of the assemblages for each of the three periods. Assemblage diversity can be measured in two ways: the number of different classes in an assemblage (richness) and the frequency of the distribution of cases between different types or classes (evenness) (Kintigh 1989:26). In this particular case, each pipe form represents a different class. A richness measure directly compares the number of different classes found at each site. A measure of evenness compares the uniformity of examples present in the different classes identified by the researcher.

For my analysis I chose to focus on richness rather than evenness due to the nature of pipes and their role in Native communities. Evenness tends to minimize the importance of a particular class when it is present in smaller quantities in the sample. However, in the case of a pipe, the presence of only one or two examples of a particular form is likely linked to their roles as important ritual objects that were only used by a limited portion of the population. Arguably, their rarity makes them more significant but this type of social process is not accounted for in the evenness measure. Consequently I chose to compare the richness of different classes, in this case the seven different forms, which were present in each assemblage. I should note that if I could not determine whether an example dated to the LWI, LWII, and Contact period I did not include it in the richness calculation. Table 6.9 summarizes the different richness values calculated for the sites in the study.

After determining the richness scores for each site, I decided to aggregate the richness scores for all sites whose time ranges fell into a particular period. Table 6.10 is a comparison of the mean richness scores for Late Woodland I, Late Woodland II, and

Table 6.9: Richness scores by time period

Site	Site No.	Richness	Period
Kerns	44CK3	1	LWI
Fisher	44LD4	1	LWI
Clover Creek Mound	44HD9	1	LWI
Brumback Mound	44PA177	3	LWI
Lewis Creek Mound	44AU20	2	LWI
John East Mound	44AU35	2	LWI
Bowman Mound	44RM281	2	LWI
McLean Mound	31CD7	4	LWI
Hand	44SN22	1	LWI
Hayes Creek	44RB2	1	LWI
Huffman	44BA5	1	LWII
Hughes Site	18MO1	1	LWII
Shepard	18MO3	2	LWII
Winslow	18MO9	3	LWII
Mason Island	18MO13	1	LWII
Bigg's Ford	18FR14	2	LWII
Noland's Ferry	18FR17	1	LWII
Rosenstock	18FR18	2	LWII
Keyser Farm	44PA1	2	LWII
Hand	44SN22	2	LWII
Shannon	44MY8	3	LWII
Shenks Ferry	36LA2	2	LWII
Schultz	36LA7	2	LWII
Early Upper Saratown	31SK1	4	LWII
Noah's Ark	44BA15	1	LWII
Wall	31OR11	2	LWII
Potomac Creek	44ST2	3	LWII
Accokeek Creek	18PR8	4	LWII
Jordan's Journey	44PG302	1	LWII
Great Neck	44VB7	2	LWII
Crab Orchard	44TZ1	3	LWII
Otter Creek	44FR31	3	LWII
Box Plant	44HR2	1	LWII
Belmont	44HR3	2	LWII
Koehler	44HR6	1	LWII
Philpott	44HR4	2	LWII
Dallas Hylton	44HR20	4	LWII
Gravely	44HR29	1	LWII

Stockton	44HR35	2	LWII
Abbyville	44HA65	2	LWII
Mitchum	31CH452	2	Contact
Trigg	44MY3	2	Contact
Abbyville	44HA65	2	Contact
DeShazo	44KG3	1	Contact
Posey	18CH281	1	Contact
Camden	44CE3	1	Contact
Washington Boro	36LA8	2	Contact
Strickler	36LA3	2	Contact
Lower Saratown	31RK1	1	Contact
Jenrette	31OR231a	2	Contact
Bowman Mound	44RM281	3	Contact
Abbyville	44HA65	2	Contact

Table 6.10: Mean richness scores by time period

Time Period	No. of Sites	Mean Richness	Standard Deviation
Late Woodland I	10	1.800	1.032
Late Woodland II	30	2.070	0.944
Contact	12	1.750	0.944

Contact period sites. The table also includes the number of sites that were included in each period.

The aggregation of the richness scores supported the pattern suggested by mapping the distributions, the Late Woodland II period did exhibit the highest richness of forms overall. However, as also illustrated in the table, high standard deviations suggested that the differences in the average richness between different periods may not be significant. A t-test was run to evaluate this question. Inspection of plots revealed that richness values were normally distributed for all three time periods. However, a F-test comparing variances between LWI and LWII, LWII and Contact values, and LWI and Contact means showed that variances were not equal. To compensate for the lack of equal variance two-sided t-tests with Welch's adjustments were run to evaluate whether the mean richness was significantly different for all three comparisons. T-tests showed that means from the three subperiods were not significantly different (LWI and LWII t(14.37) = 0.722, p =.2409; LWII and Contact t(30) = 1.2725, p = 0.1064; LWI and Contact t(14.195) = 13.42, p =.4476)). Thus, despite the fact that there was variation between time periods, the results of the statistical analyses do not indicate the average number of forms used differed significantly through time.

Nevertheless, it is worth noting that both the GIS and statistical analysis demonstrated that Native groups in the region were using multiple forms during each sub-period. In particular, the Late Woodland II period seems to have the presence of the most forms. For example, the boxplot in Figure 6.14 indicates that there was a wider range of forms in use during the Late Woodland II period in comparison to the other two sub-periods. The wide range in forms in the Late Woodland II

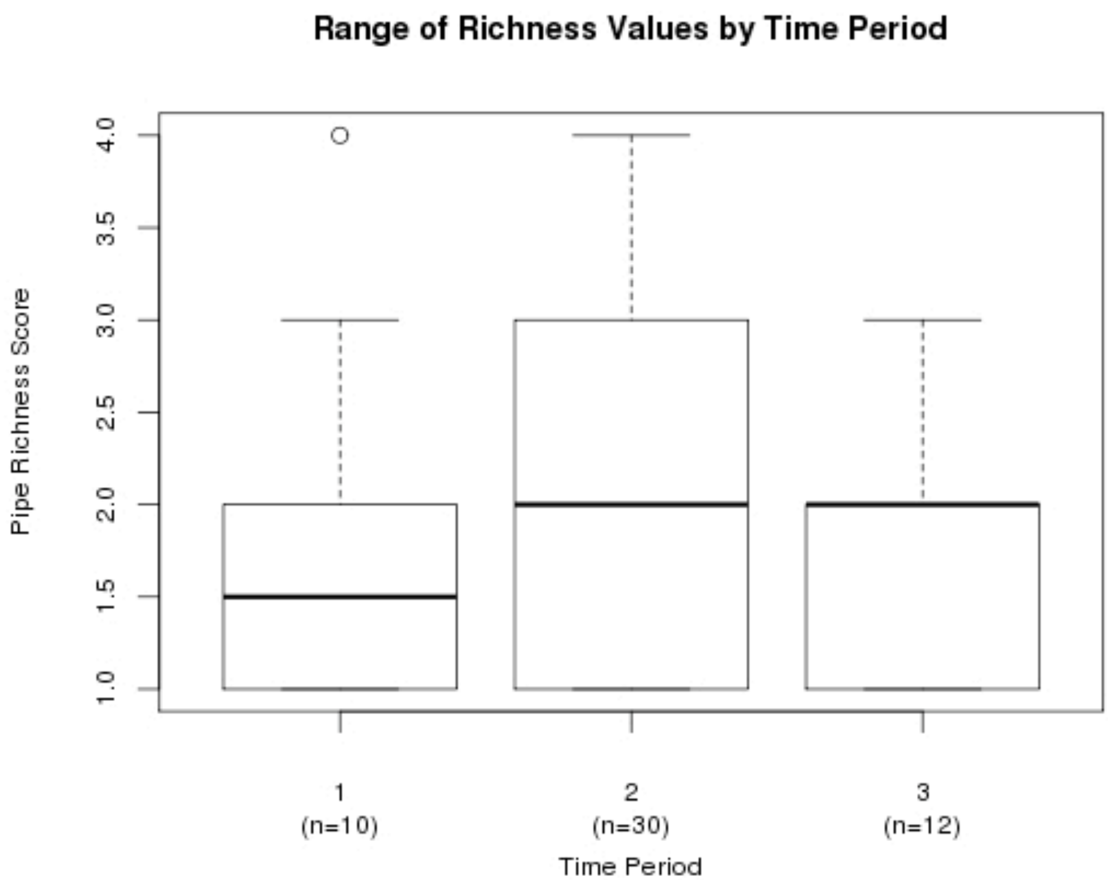


Figure 6.14: Boxplot of Richness Values by Time Period, 1= LWI, 2=LWII, 3=Contact

period indicated it might be worthwhile to examine what factors may have been causing this variability. Given that as many as four forms occurred on some sites, it seemed likely that the presence of multiple forms might be related to social factors rather than chronology.

One immediate issue introduced by this comparison, however, is that the Late Woodland II period also has the highest number of sites that were included in the analysis. Moreover, as I discussed in Chapter 5, a number of Late Woodland II sites tend to exhibit the largest pipe assemblage sizes of all the sites included in my study. Researchers have cautioned the use of richness measures due to the strong relationship between richness and sample size (Kintigh 1989; Neiman 1995). Larger assemblages often demonstrate a tendency to have more classes of artifacts than smaller assemblages. There are varying opinions on the degree to which researchers should apply complicated statistical measures to attempt to control for sample size issues before calculating richness values (Kintigh 1989; Neiman 1995; Plog and Hegmon 1993). However, before applying these methods it is useful to consider the possible archaeological causes behind differences in sample sizes and how these could impact research questions.

In Chapter 5, I noted that the larger pipe assemblage sizes from Late Woodland II sites were a reflection of archaeological excavation methods, such as the amount of excavation conducted on a site. To see if the pattern of higher richness values among Late Woodland II assemblages could be a factor of assemblage size I chose to compare each assemblage richness score with the assemblage size of ceramics that were also excavated from the site to examine the relationship between sample size and richness. Following Thomas (1986:427) I transformed ceramic counts to log10 values. This transformation converts a nonlinear relationship into one that is easier to evaluate using linear trends in the data. Figure 6.15 is a scatterplot of pipe richness scores versus log transformed ceramic assemblage sizes.

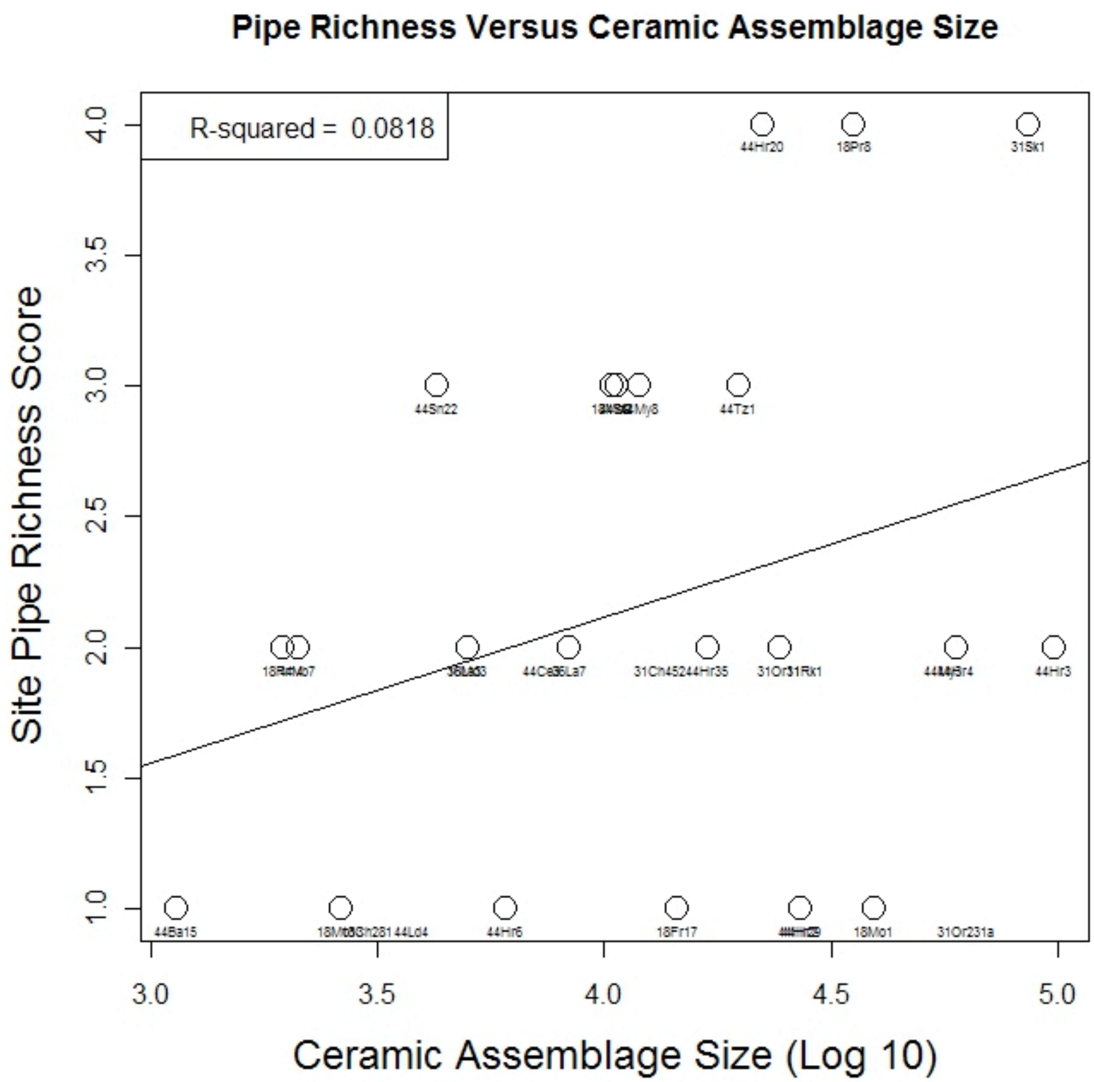


Figure 6.15: Pipe Richness Versus Ceramic Assemblage Size (R^2 value is adjusted)

A Pearson's correlation coefficient demonstrated that there is a positive correlation between ceramic assemblage size and pipe richness value is (r =.28). However, the relationship was not significant (t = 1.3678, p = 0.18, df = 21). A regression analysis also indicated that there was a positive but weak relationship between richness and pipe and ceramic assemblage size. This is because smaller assemblages had a wide range of forms but overall the assemblages with the highest richness scores tend to be the larger ones. The statistical tests revealed that the percentage of variation explained by assemblage size is low enough that it shouldn't impact the results. Although there are more forms of pipes in larger assemblages it is still worth searching for evidence of whether social factors could have caused the presence of these different forms.

Since pipe richness scores are not strongly correlated with assemblage size, it would seem that these scores are related to social factors rather than serving as a reflection of excavation methods. Consequently, pipe richness may serve as an indicator of the other social processes. A note of caution must be extended however. Just because two different forms were used on the same site during the same time period does not necessarily mean they were used simultaneously by individuals who occupied the site at the same time. There were only a handful of sites in which multiple pipe forms were found in datable contexts that could be considered contemporaneous. The most concrete examples of the contemporaneous use of different forms are found at the Wall (31OR11), Stockton (44HR35), Winslow (18MO9), and Biggs Ford (18FR14) sites. At each of these sites, elbow and tubular pipes were found in the same levels of a feature context, or in the case of the Winslow site, in the same level of an excavation square, but only 14 inches apart. These examples suggest that individuals living on these sites had choices in terms of what form of pipe they could use when smoking. More generally it is possible to conclude that different groups were using different forms during the same period in the region and that instances of multiple forms are not purely tied to chronological variation.

Now that I have shown that variability in forms is not solely a factor of diachronic change, I will explore the spatial distributions of the variability found within each of the six minority form categories to see if their distributions align with the boundaries indicated by previous research. I discuss the temporal and geographic distributions of embellishments that were appended to or carved into bowl, stem, and mouthbit areas. I should first note that this chapter focuses on embellishments that were built into the form and does not include a discussion of decorative embellishments that were added onto the form using incising or rouletting. I will discuss the distributions of rouletted and incised forms on all of the forms in this study in Chapter 8.

Geographic Distributions and Social Boundaries

Tubular Pipes

ArcGIS was used to look at the spatial distribution of the different pipe forms discussed above. In addition to their long temporal span, conical pipes are also widely distributed throughout the region (Figure 6.15a). Consequently, their use does not seem to be tied to any particular cultural area in the dataset. Rather conical pipes seem to be a somewhat conventional form that continued to be used by a number of different groups into the Late Woodland period.

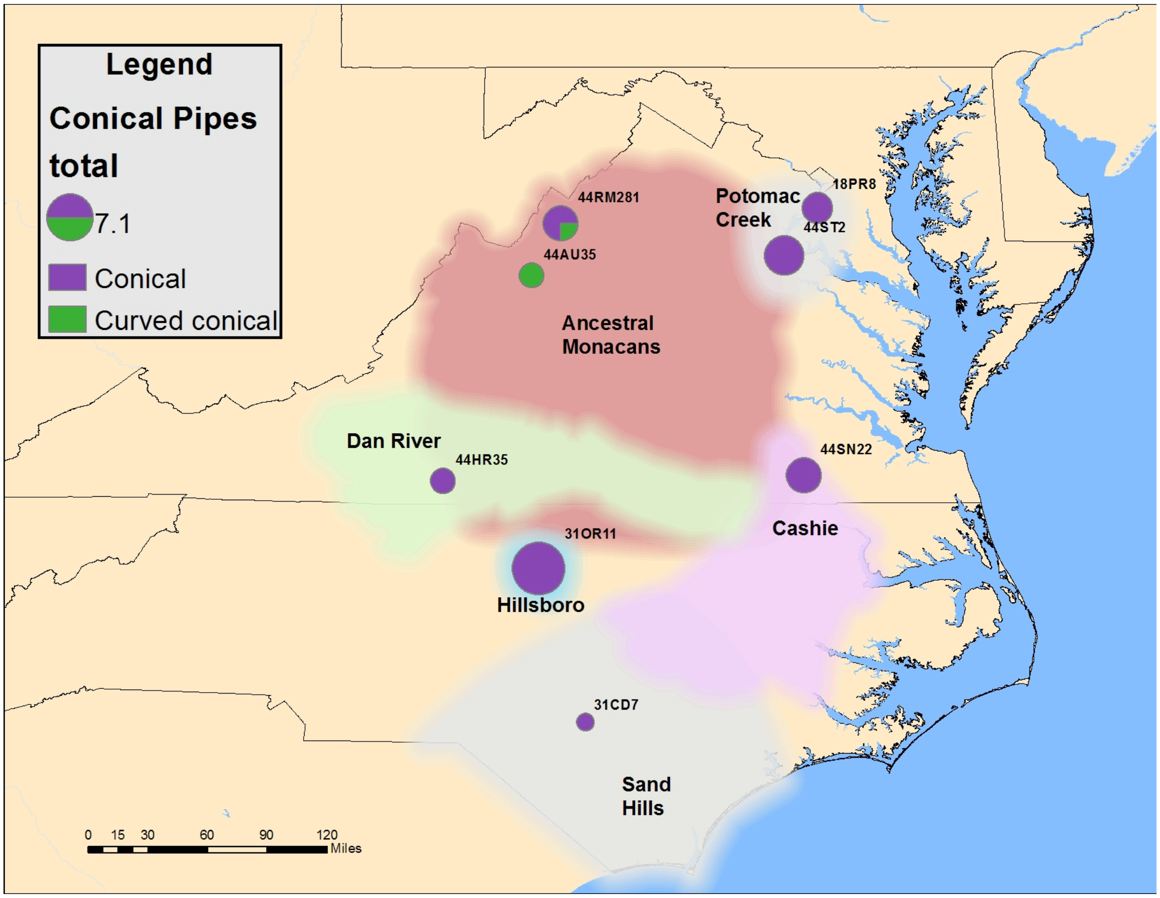


Figure 6.16: Distribution of conical pipes compared with cultural complex boundaries

Notably, the geographic distribution of trumpet shaped pipe forms is much more restricted than the distribution of conical pipes but this could also be due to their smaller sample size. The nine samples were spread amongst three sites: Abbyville (44HA65), Great Neck (44VB7), and the Lower Saratown site (31RK1). Two of these sites fall within the boundaries of the Dan River cultural complex while the occupation at Great Neck is associated with the Townsend/Roanoke complex. Notably, the Abbyville site had seven examples of these pipes while Great Neck and Lower Saratown only had one (see Figure 6.17).

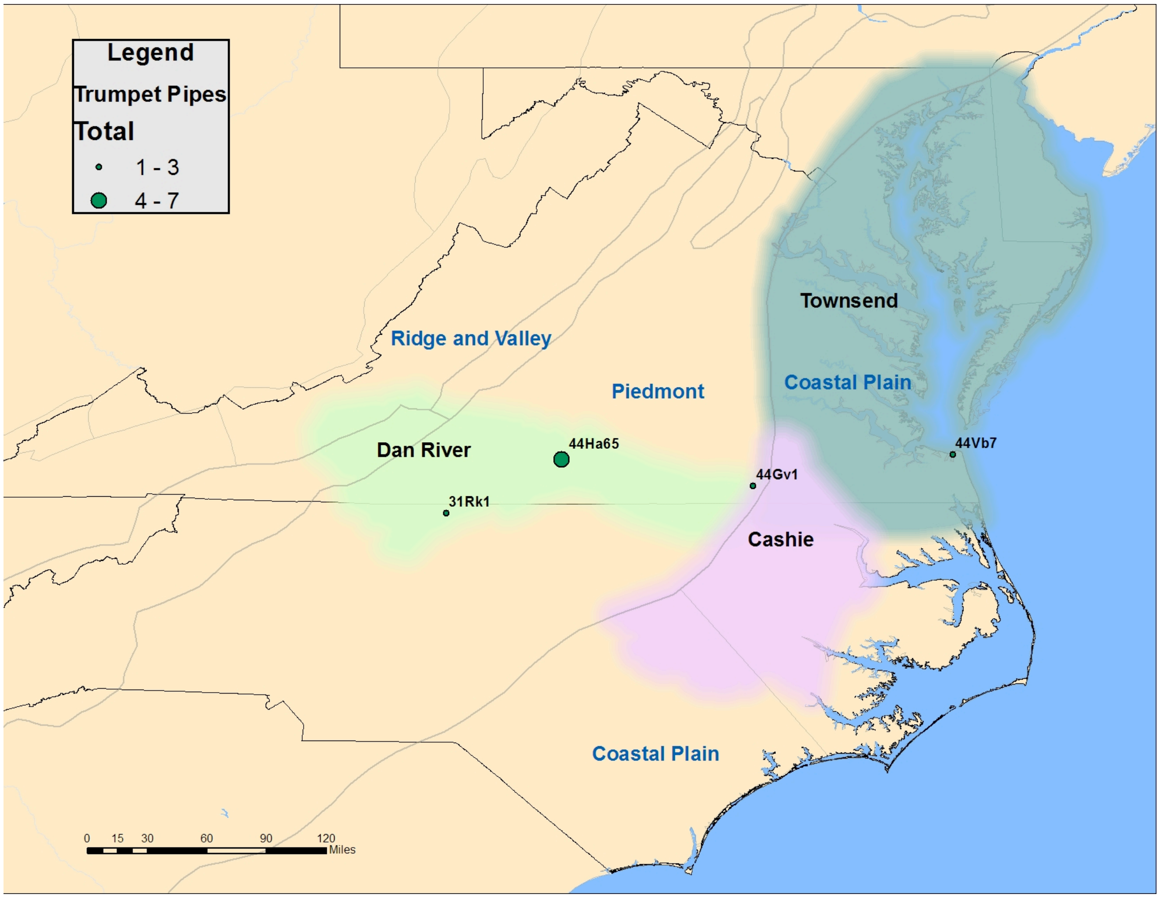


Figure 6.17: Distribution of trumpet pipes compared with cultural complex boundaries and physiographic boundaries

Despite the fact that all of the trumpet pipes share the same expanding bowl and slight tapering, there were a number of different bit forms present. One trumpet pipe from the Abbyville site, pictured in Figure 6.4, had a cut bit. Another trumpet pipe from the Abbyville site exhibited an expanded oval mouthpiece. I could not examine this pipe in person but judging from the picture in the site report this bit is strikingly similar to mouthpiece bits exhibited by a number of tubular and elbow pipes recovered from the Potomac Creek, Accokeek Creek, and the Keyser sites farther north. I discuss these bits in more detail in the next chapter. While it is possible that the mouthpiece form from the Abbyville site is an independent innovation that is not related to the pipes from sites further north, the connection is worth noting in the hopes that this relationship can be further investigated in the future.

In contrast to the expanded bit, the trumpet pipe specimen from the Great Neck Site (44VB7) (Hodges 1998:Figure 26) exhibits a flared bit. Additionally, three trumpet stem and mouthpiece fragments illustrated in the Abbyville site report exhibit flared bits that are very similar to the one from the Great Neck site. Unfortunately only one of the pipes from Abbyville was available for direct examination (the other two are pictured in the site report). The sample size available for direct comparison (n = 2) was too small to draw any concrete conclusions about whether these pipes were locally produced at each site or were produced at one site and traded to the other. However, one possible insight is provided by the differences in clay types that could be observed. The pipe from Great Neck site was produced from a fine paste with no inclusions. In contrast, the three pipes that exhibited a similar bit from Abbyville were produced from a buff-colored clay with hematite inclusions. Despite the similarity in form these pipes were clearly produced using different clays. The fact that the three pipes from the Abbyville site (44HA65) were made using the same clay suggests they might be part of the same pipe-making tradition. At the same time, the contrast between the clay used to make these pipes and the one found at Great Neck site suggests differences in raw material procurement that could be linked to different pipe-making traditions.

A few additional examples of trumpet pipes were reported by Painter (1967) from the John Green (44GV1) site. These examples were from the collection of Mr. Loy Carter of Clarksville, Virginia. Unfortunately this collection could not be located for examination but the illustrations of the pipes show that at least one is of same form as the trumpet pipes recovered from archaeological contexts. The presence of a trumpet at this site expands the geographic distribution of this particular form but as illustrated by Figure 6.16, it remains clustered in the southern part of the study area but shows a wide east to west distribution.

As illustrated in Figures 6.17 and 6.18, the distribution of pipes with restricted rim bowl rim shapes is widespread and crosses the boundaries of a number of cultural complexes and linguistic groups. Unlike the trumpet pipe, the distribution of restricted rim pipes was more widespread. I attempted to see whether the examples of this form exhibited standardizations in form that might help determine whether they were made at one site. However, again the sample size was small. Measurements of the rim diameter of the five samples for which data was available did not provide much insight. The average rim diameter was 22.84 mm with a standard deviation of 3.385 mm. It is worth noting that the rim diameters of the four examples of this shape found at the Wall site had a standard deviation of 3.093 mm, which indicates that intrasite variation was fairly minimal. Although the dataset is not large enough to assess standardization of production techniques, again variation was generally low. Additionally, the example from the Edgehill site has a beveled edge, which is a unique trait.

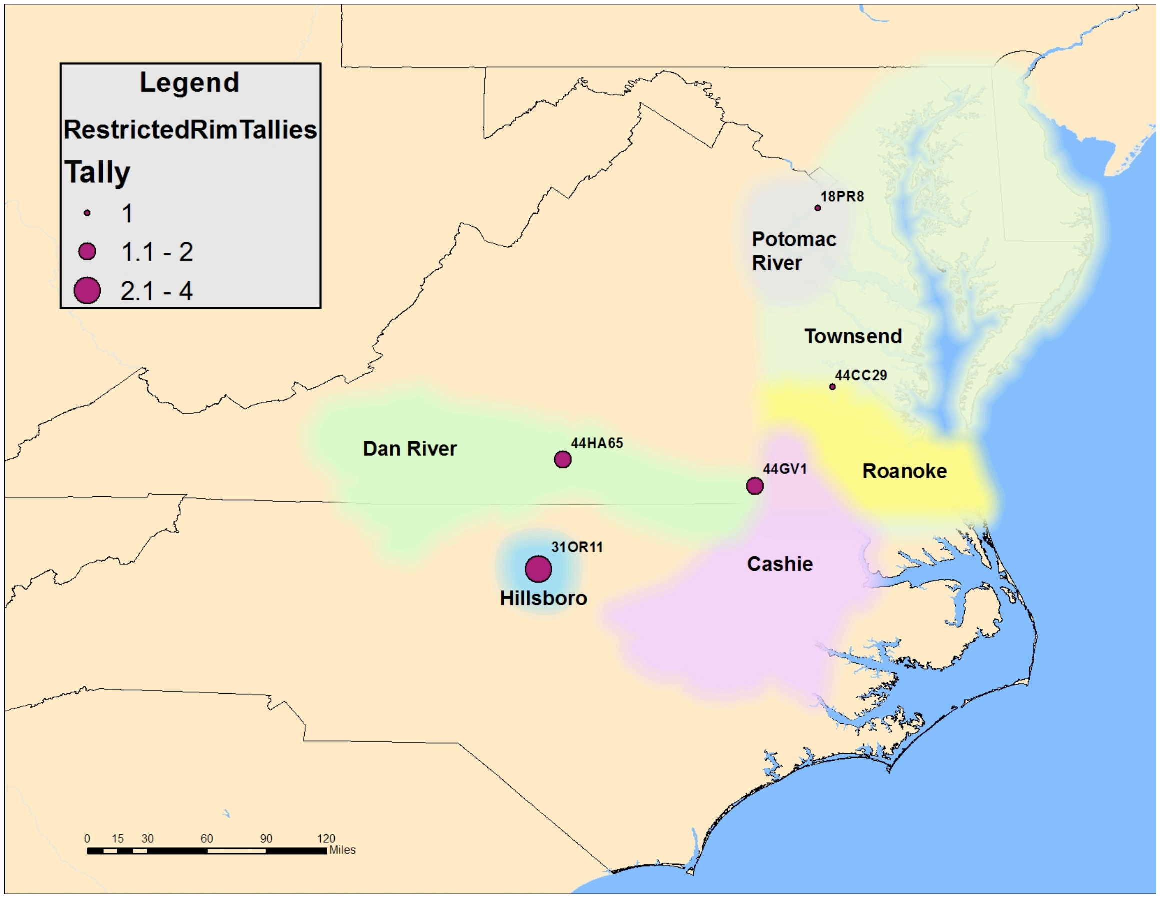


Figure 6.18: Distribution of restricted rim tubular pipes compared with cultural complex boundaries

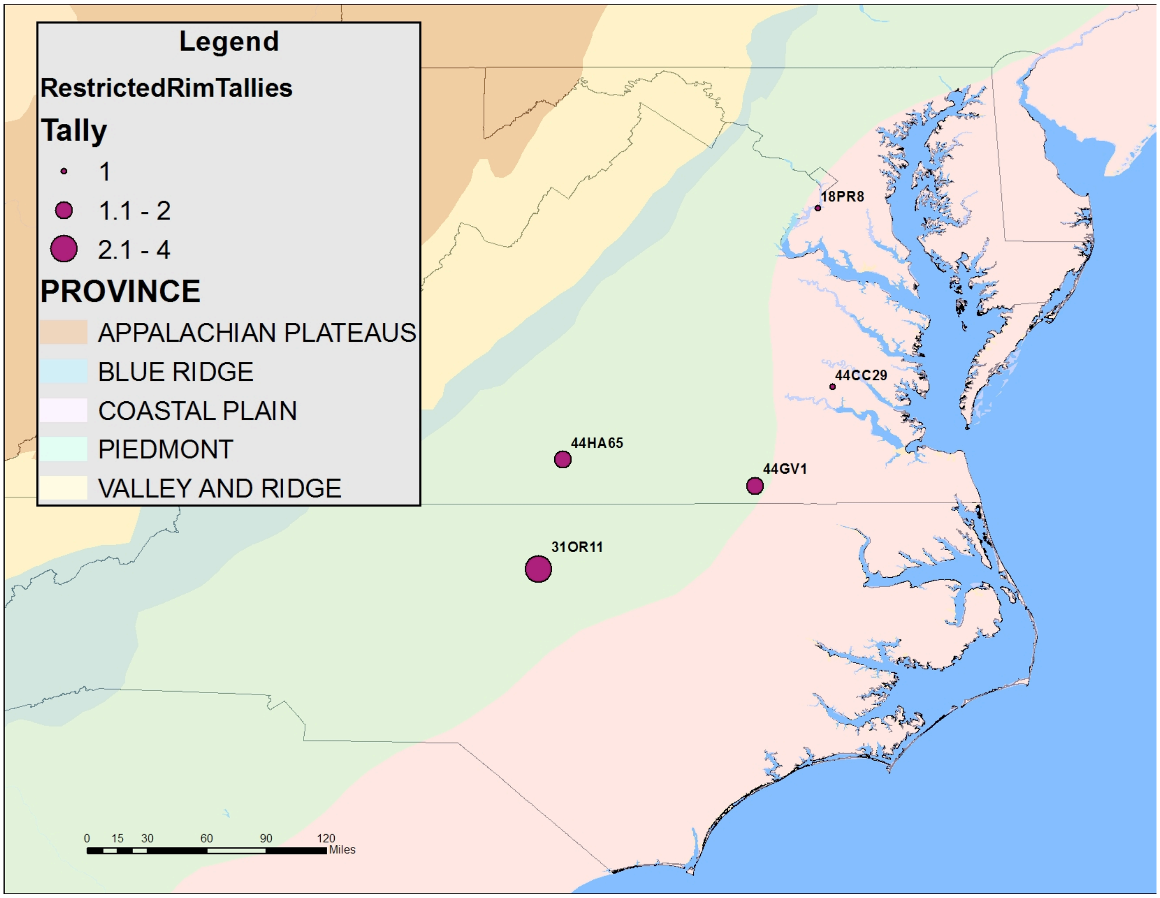


Figure 6.19: Distribution of restricted rim tubular pipes compared with Physiographic provinces

Onion Bowl

Thirteen examples of this form identified in the dataset adhere to the Dan River and Hillsboro cultural complex territories previously noted by researchers (Figure 6.20). An additional example of this form, however, was also found on the Halifax site, which dates to the Contact period (Dr. Billy Oliver, personal communication). The presence of this bowl form in the territory associated with Cashie ceramics expands its geographic distribution outside of Dan River and Sara homelands. Nevertheless, the presence of bulbous bowls with everted rims on the same sites as onion bowls provides evidence of intra-site variability within the form.

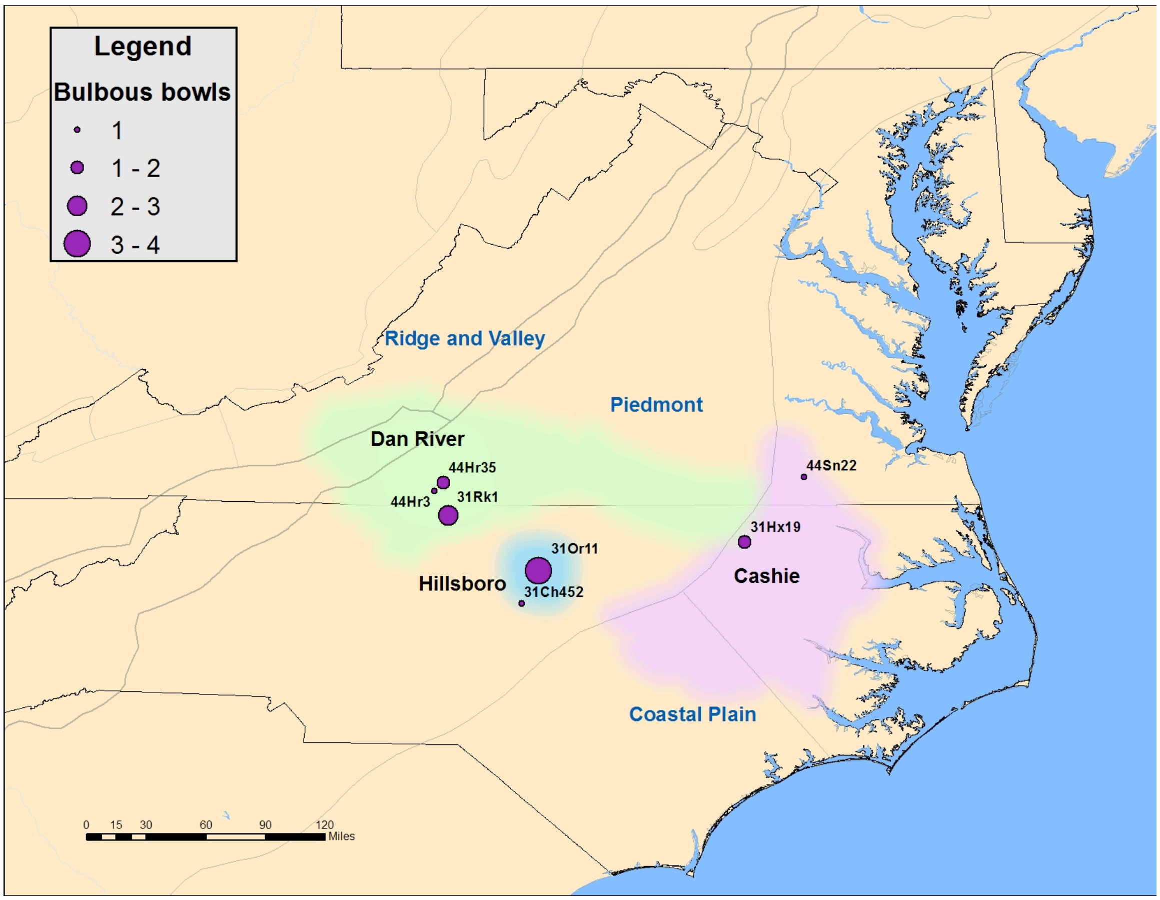


Figure 6.20: Distribution of tubular pipes with bulbous/onion bowls

One last example of a tubular form with a bulbous bowl almost seems to be an amalgamation between a restricted rim bowl and an onion bowl. This bowl fragment was recovered from the Hand site (44SN22) from a general excavation context (Smith 1984:Figure 40, No.3). While it exhibits a bulbous bowl, the bowl is slightly elongated which causes it to look different from the typical onion bowl pipe form. The decorations on this bowl form, however, are not typical of pipes found in the Dan River drainage. While most of the onion bowl forms found in the dataset were plain, the example from the Hand site is elaborately decorated with incised chevrons and lines of small punctuations. Consequently, it seems to be a unique example.

Spatial Distributions of Tubular Pipes

Although the sample sizes of tubular pipes with differing attributes was too small to do any statistical comparison, it was possible to look at the spatial distribution of the tubular form as a whole and compare it with the boundaries of different physiographic provinces. The maps of tubular pipes shown above suggested that they were primarily associated with sites located in the Piedmont and Coastal Plain provinces. Tables 6.11, 6.12, and 6.13 are contingency tables that compare the presence or absence of tubular pipes among Late Woodland II sites in different physiographic provinces. However, a Fisher's test comparing the presence and absence of tubular pipes at sites across the region showed that the presence/absence of tubular pipes between different provinces was not significantly different (Coastal Plain and Piedmont $p = 0.1281$; Coastal Plain and Ridge and Valley $p = 0.6437$; Piedmont and Ridge and Valley $p = 0.4065$). The lack of spatial difference may be because conical pipes exhibited such widespread distributions that included some Ridge and Valley sites. Additionally, some tubular forms only represented by stems (which were not mapped) were also found on Ridge and Valley sites.

Table 6.11: Contingency table comparing presence/absence of tubular pipes between Coastal Plain and Piedmont sites

Tubular	Coastal Plain	Piedmont	Total
Yes	7	7	14
No	3	12	15
Total	10	19	29

Table 6.12: Contingency table comparing presence/absence of tubular pipes between coastal plain and ridge and valley sites

Tubular	Coastal Plain	Ridge and Valley	Total
Yes	7	4	11
No	3	3	6
Total	10	7	17

Table 6.13: Contingency table comparing presence/absence of tubular pipes between Coastal Plain and Ridge and valley sites

Tubular	Piedmont	Ridge and Valley	Total
Yes	7	4	11
No	12	3	15
Total	19	7	26

Platform Pipes

Platform pipes, despite their small sample size, exhibited a wide distribution throughout the region (Figure 6.21). Unlike tubular forms, however, platform pipes did not exhibit as much patterned variability of bowl or stem attributes. All of the bowl forms that could be identified (n = 8) were either cylindrical or elongated in shape but their distribution does not seem to be patterned (Figure 6.21). Cylindrical bowls exhibit sides that run straight from the stem bowl juncture to the rim of the bowl. Elongated bowls also exhibit relatively straight sites but may exhibit a slight flaring or curving (see Figure 6.22a and b).

Typical of the platform form, six pipes had bowls that were centered on the stem but three other pipes, from McLean Mound, John East Mound, and the Dallas Hylton site, had bowls set at the distal end of the pipe rather than in the middle of the stem. All eight of the mouthpieces that could be identified in the sample were oval/biconvex or ovular. Eleven of the nine stems that had identifiable shapes were alate. The last pipe stem that could be identified is a very distinctive curved form (Figure 6.22b). MacCord (1966) and

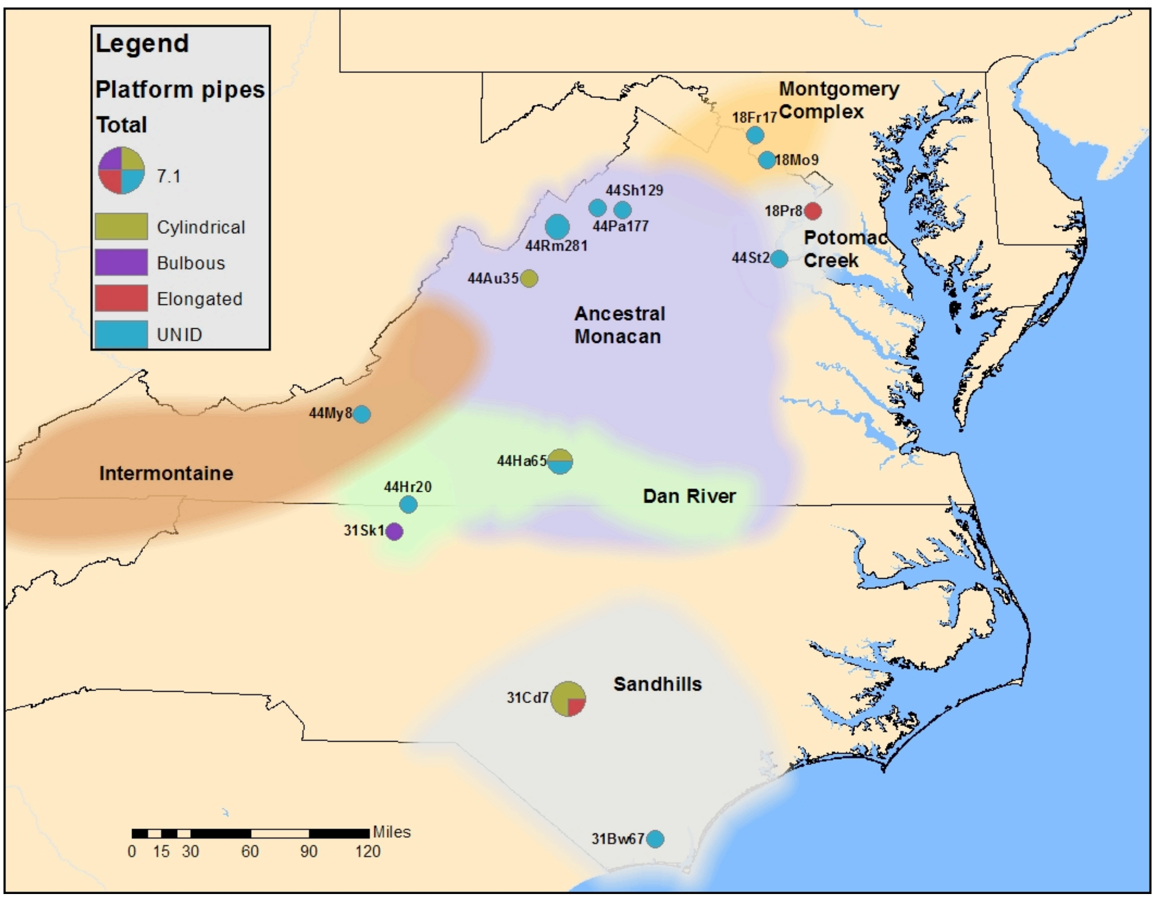


Figure 6.21: Spatial distribution of bowl forms of platform pipes

Figure 6.22: a) Platform pipe from the Accokeek Creek site with elongated bowl, b. Platform pipe from McLean Mound with cylindrical bowl and curved stem (Pictures courtesy of the University of Michigan Museum of Anthropology and the University of North Carolina Research Laboratories of Archaeology)

Irwin (et al. 1999; 2004:48) has noted that this stem is a unique characteristic. I have not found any evidence to the contrary which suggests this form would likely have been quite visibly distinctive and striking.

One trait that set platform pipes apart from other forms was the high percentage of stone platform pipes in the sample. Twelve out of 18 pipe samples or 65 percent were ground or pecked from either chlorite or steatite. In contrast three percent of tubular pipes (6/184) and two percent of elbow pipes and pipe fragments (53/2373) were made of stone. While it is necessary to acknowledge that the high proportion of stone platform pipes relative to clay ones could be due to the small sample size of platform pipes in the dataset, the rarity of these forms in the sample set likely represents their rarity in the region as a whole during this time period. Thus the difference in proportions of raw material is likely representative of a significant pattern.

Tables 6.14 and 6.15 are contingency tables that list the frequency of platform pipes of different raw materials compared with those of elbow pipes and tubular pipes respectively. A Chi square test for raw material comparison of platform and elbow pipes returned a χ^2 value of 287.46 (df =1, p < .001). The same test of raw material comparison of platform and tubular pipes returned a χ^2 value of 84.341, (df=1, p < .001). This indicates that the type raw material is dependent upon the form of pipe.

Table 6.14:Contingency table comparing raw material of platform and elbow pipes

Raw Material	Platform	Elbow	Total
Stone	12	53	65
Clay	6	2373	2379
Total	18	2426	2444

Table 6.15: Contingency table comparing raw material of platform and tubular pipes

Raw Material	Platform	Tubular	Total
Stone	12	6	18
Clay	6	185	191
Total	18	191	209

Differences in raw material are important to consider because such variations could signal important differences between how objects were perceived or used (Lechtman 1997; Stark 1998). For example, the amount of labor involved in carving a pipe out of stone would have been much higher than making one out of clay and likely would require more expertise. Consequently, Native groups may have endowed a stone pipe with a different value than a clay pipe because of the additional effort that went into its creation. One piece of evidence that supports this hypothesis is additional material evidence that Native peoples of the Virginia Piedmont and Ridge and Valley accorded objects made of steatite with important ritual significance (Hantman and Gold 2002:277-279; Klein 1997:178). The internment of stone pipes in mound contexts, which were significant ritual monuments that were important markers of the social landscape for the Ancestral Monacans (Dunham 1994; Dunham et al. 2003), further supports the social significance of stone forms. However, it is should be noted that clay pipes were also found in the mounds.

In addition to the type of raw material used, the effort expending in the procurement of stone should also be considered. As noted in Chapter 3, large natural outcrops of stone are very rare in the Coastal Plain. Yet, as shown in Figure 6.23, at least a few stone pipes are found on sites in the Coastal Plain province. This demonstrates that geophysical boundaries did not prevent Coastal Plain Native groups from procuring stone pipes, either by engaging in exchange or traveling for the necessary raw material or for the finished product. The extra effort expended to procure these pipes suggests that they may have been endowed with more significance than clay pipes that could have been produced from local materials.

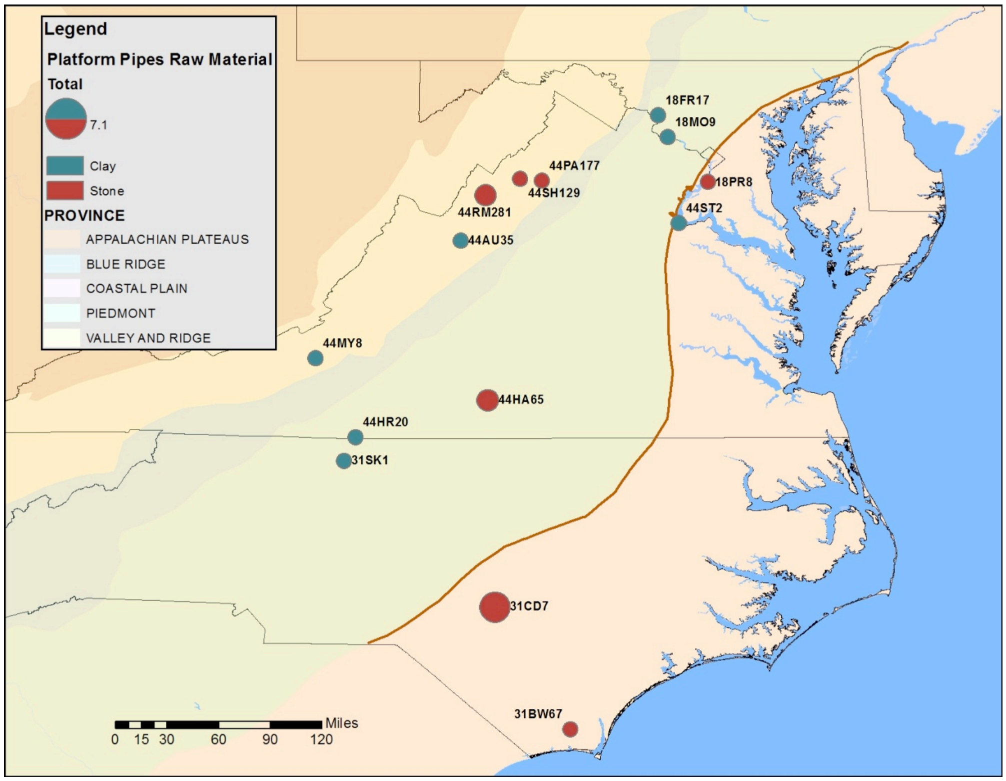


Figure 6.23: Spatial distribution of raw materials of platform pipes

The fact that the majority of these pipes were found in mounds and made from stone also introduces the possibility that they were used in a different way than clay pipes, which could be considered more expendable. Stone objects are more likely to last for longer periods than clay, which suggests these pipes could have been curated and used for long periods before they were interred with individuals in the mounds. One unusual specimen from the Bowman Mound (44RM281) provides evidence that curation may have been taking place. This pipe, made of steatite, looks at first glance like an elbow form. However, Carpenter (1950) first noted that there is evidence of smoothing along the front distal edge of the stem that suggests this may have originally been a platform pipe that was broken and then repaired so it could continue to be used. I confirmed the presence of this alteration when I examined the pipe at the Smithsonian's National Museum of Natural History. It is illustrated in Figure 6.24. The alternation suggests that some platform pipes were not simply discarded when they broke but were repaired and continued to be used, albeit in a different form. The extra effort expended to keep this pipe in use suggests that platform and other stone pipes may have been curated for long periods. If this were the case, then they were likely considered to be communal, rather than personal, objects. Furthermore, in this role pipes, like other objects taken out of circulation, could be considered valuable, powerful objects because they embodied ancestral connections (Weiner 1985). The fact that many of these objects were permanently removed from circulation by being interred with individuals in mound contexts, also serves as evidence of their important and powerful role in Native society.

Figure 6.24: Altered platform pipe from Bowman Mound (44RM281) (Picture courtesy of the Smithsonian Institution's National Museum of Natural History)

Bent Tube Pipes

Like platform pipes, bent tube pipes also exhibited a wide distribution throughout the region (Figures 6.25 and 6.26). Additionally, 82 percent (n = 14/17) of bent tube pipes were carved from either steatite or chlorite. The high percentage of stone bent tube pipes also suggests that this pipe form could have held special significance to Native peoples in the region. Tables 6.16 and 6.17 compare types of raw materials between bent tube, elbow, and tubular pipes. Fisher's tests comparing the frequencies returned p values of < 0.001 when comparing differences in stone and clay frequencies between both bent tube and elbow and bent tube and tubular pipes. This indicates that the difference is not one related to sampling error or random change.

Table 6.16: Contingency table comparing raw material of bent tube and elbow pipes

Raw Material	Bent Tube	Elbow	Total
Stone	14	53	67
Clay	17	2373	2390
Total	31	2426	2457

Table 6.17:Contingency table comparing raw material of bent tube and tubular pipes

Raw Material	Bent Tube	Tubular	Total
Stone	14	6	20
Clay	17	185	202
Total	31	191	222

Seven of the stone bent tube pipes were recovered from sites in the Coastal Plain (Figure 6.25). Again the presence of stone pipes on these sites indicates that Native groups living on the Coastal Plain were either traveling into the interior or participating in exchange networks to procure finished pipes or raw material. The extra effort expended to procure and produce these pipes suggests that they may have been endowed with more significance than clay pipes that could have been produced from local materials.

In contrast to platform pipes, no bent tube forms exhibited evidence of being repaired or altered to prolong their use. However, the presence of repeated, overlapping geometric motifs incised into many of these forms does suggest they were used multiple times and perhaps by multiple individuals or groups. I will discuss these motifs more in Chapter 8. Moreover, the presence of this form at the sixteenth/seventeenth century Keyauwee site could also have been the result of curation although more material evidence is needed to test this hypothesis.

Small sample sizes prevent a definite conclusion regarding whether the bowl or stem shape of bent tube pipes was patterned. Seven of the seventeen bent tube forms consisted of tall, cylindrical or elongated bowls with thick rim flanges that extended outwards from the rim of the pipe. Eight specimens exhibited bulbous or elongated bowls that lacked this flange (see Table 6.5). In addition to bowl differentiations, 10 specimens exhibited more pronounced stem flanges than others. Irwin (et al. 1999, 2004) has labeled these pipes as “winged” bent tube pipes. While bent tube pipes as far north as southern Virginia exhibit winged stems, the two pipes recovered from the John East and Brumback Mounds do not exhibit winged stems (see Figure 6.27a and b for a visual comparison). These pipes also do not exhibit the pronounced rim flanges present on other pipes. This suggests that perhaps some groups located farther to the north were creating pipes with the same general form but choosing not to embellish the form in the same way. Figure 6.26 illustrates the wide distribution of this form as well as the distribution of the winged vs. alate stems.   Figures 6.27a and b provide a visual comparison of pipes with winged vs. alate stems.

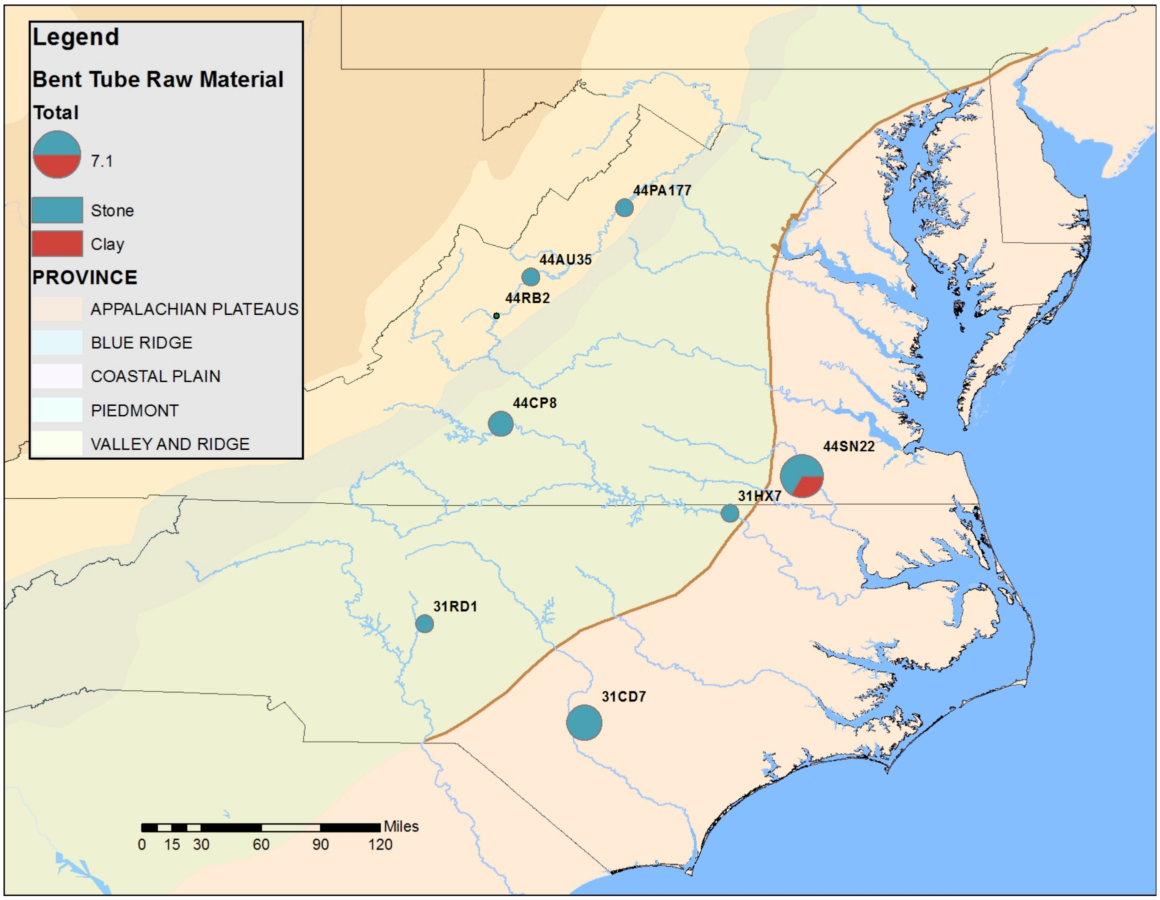


Figure 6.25: Distribution of bent tube pipe raw material compared with physiographic boundaries

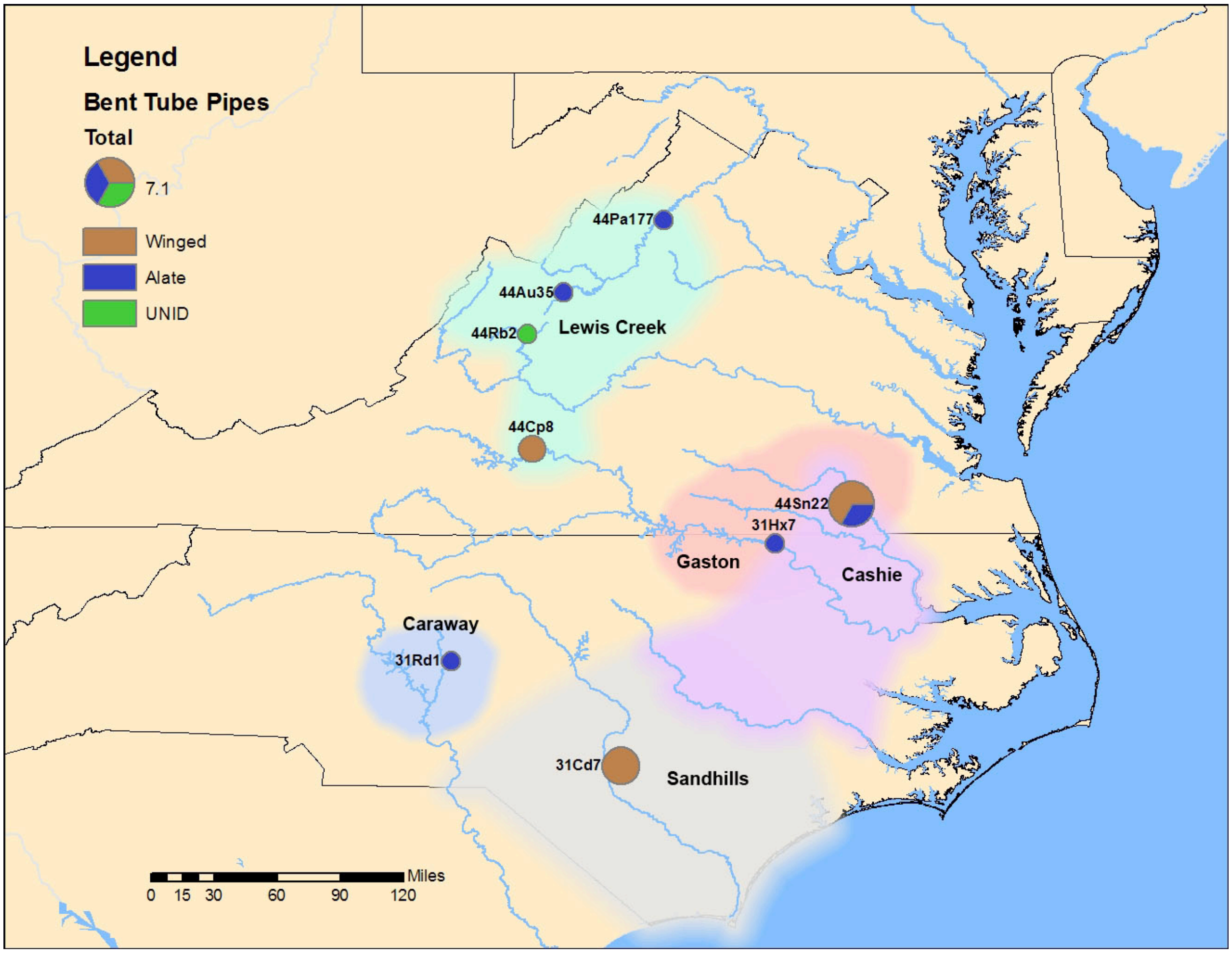


Figure 6.26: Distribution of bent tube forms present in the dataset

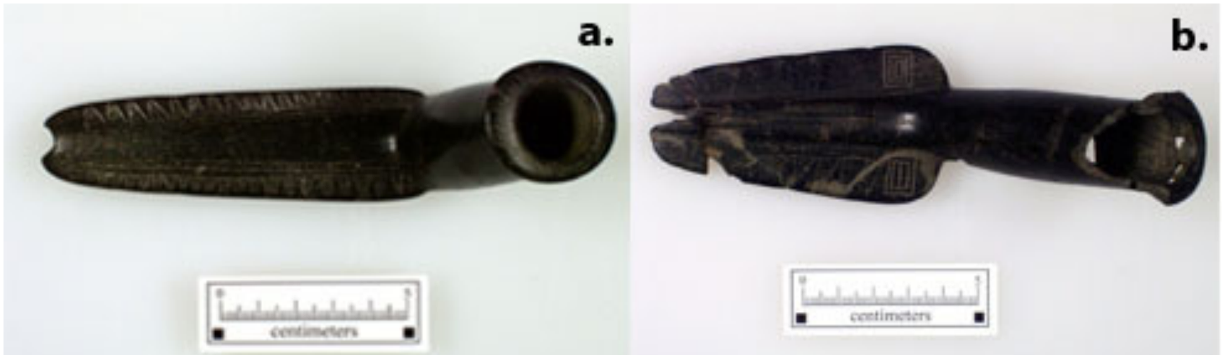


Figure 6.27: a. Alate bent tube pipe from Gaston (31HX7) site, b. Winged bent tube pipe from Keyauwee (31RD1) site (Pictures courtesy of the University of North Carolina Research Laboratories of Archaeology)

Reed Stem Forms

While all but one of the examples of stub-stemmed pipes have rounded stems, the bowl shapes exhibit a great deal of variety. The singular example from the Crab Orchard (44TZ1) site exhibits a cylindrical bowl shape (Figure 6.9a) while the pipe from the Belmont site (44HR3) exhibits a short, slightly bulbous bowl and a bit that has been ground down, presumably so it could be inserted into the reed stem (Figure 6.9b). The stub-stemmed pipe from the Potomac Creek (44ST2) site exhibits an elongated bowl (Figure 6.9c). One of the stub stemmed pipes from Early Upper Saratown, which is carved from chlorite, exhibits a squared bowl. The two stub stemmed pipes from Accokeek Creek (18PR8) and one from Shenk's Ferry (36LA2) are represented only by rounded stem fragments and stem bowl junctures so no bowl shape could be determined.

The two specimens from Early Upper Saratown (31SK1) and the Hand (44SN22) sites are the only examples to exhibit embellished bowl or stem attributes. The pipe from 31SK1 exhibits prominent flanges on both the bowl rim and stem bit. While the steatite stub-stem pipe from the Hand site exhibits a similar bowl rim flange, the rest of the pipe bears little resemblance to the other examples discussed here. Rather than a rounded stem the pipe exhibits a short, flat, platform that allows it to sit upright. It also exhibits a rounded slightly bulbous bowl. I have not been able to locate a similar looking form in any of the other assemblages included in this study, which suggests it may be a unique example of this form.

Stub-stem pipes are not considered to be typical forms used by Middle Atlantic groups. Stub-stem pipes are more often associated with Native communities who occupied Pee Dee phase sites in the southern North Carolina Piedmont and Pisgah phase sites in the Appalachian summit of North Carolina from roughly A.D. 1000 to 1500 and A.D. 1000 to 1450, respectively (Dickens 1976; Ward and Davis 1999:132, 160). However, sites with stub-stem pipes in the Middle Atlantic region were occupied in the sixteenth and seventeenth centuries (Eastman 1999; Egloff and Reed 1980; Smith 1984; Stewart 1992) and were widely distributed throughout the region (Figure 5.28). This period coincides with the proto-Cherokee Qualla phase in North Carolina (A.D. 1350 to 1700, Ward and Davis 1999:181) and Dallas phase associated with Muskogean-speaking Mississippian peoples (A.D. 1300-1600, Sullivan (ed.) 1995:xx) in Tennessee.

Other artifact types found on southwestern Virginia and northwestern North Carolina sites also exhibit Mississippian influence. Citico-style gorgets found in some of the burials at Early Upper Saratown (31SK1) and more widely in a number of Late Woodland contexts in southwestern Virginia also indicate connections with Mississippian or Cherokee groups in Tennessee or North Carolina (Brain and Phillips 1995; Egloff 1992; Meyers 2011; Sullivan (ed.) 1995; Ward and Davis 1999). Additionally, Jeffries

(2001) and Meyers (2011) have noted that the presence of a large platform mound in Lee County, located in the far tip of southwestern Virginia, indicates that this area could have been occupied by a Mississippian chiefdom on the frontier of what is traditionally

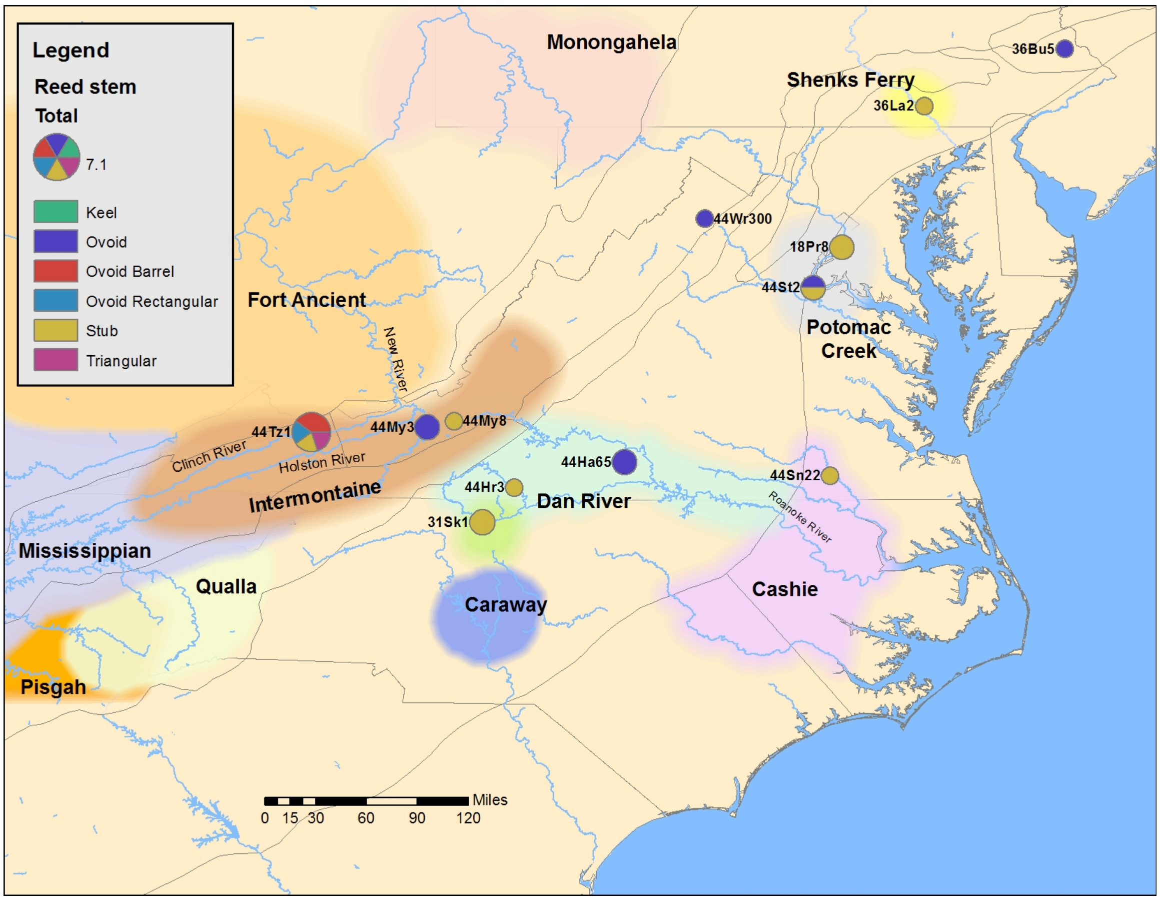


Figure 6.28: Distribution of reed stem pipes in study area

considered Mississippian territory. Finally ceramics with shell temper and complicated stamped surfaces have been found on a number of sites in southwestern Virginia that are considered material evidence of Mississippian influences or connections (Egloff 1987, 1992; Meyers 2011). Egloff (1992:214) has attributed the presence of ceramics with plain surface treatments and shell temper on southwestern Virginia sites to influences from direct interactions with the Cherokee and/or Muskogean-speaking peoples of Tennessee.

I suggest that stub-stem pipes from the Crab Orchard (44TZ1), Shannon (44MY8), and Early Upper Saratown (31SK1) sites, along with shell gorgets and ceramics, serve as material evidence of the social connections between Native groups in southwestern Virginia, northeastern Tennessee, and western North Carolina. The Tennessee River system, which includes the Clinch, Holston, and Powell rivers (see Figure 6.28), likely served as the avenue through which inhabitants of Crab Orchard, Shannon, and Early Upper Saratown sites gained access to extralocal objects and ideas (Egloff 1992:189; Lapham 1999:94). It is also possible that such objects traveled up the Great Indian Warpath, identified by Myer (1928:749-758) that ran from Alabama to New York. This route extended from Alabama and Georgia and linked these areas to eastern Tennessee, then continued to the valley of the North Fork of the Holston River, to the New River of interior southwest Virginia and into West Virginia.

The stub-stem forms at Potomac Creek and Accokeek Creek could also be tied to connections with the Mississippian groups. Ceremonial shell masks with the weeping eye motif, another Mississippian iconographic tradition, have been found in that territory (Brain and Phillips 1996; Potter 1993) suggesting that exchange networks between Natives in this area and groups in the southeast were active although given the distance between these areas it is more likely that these objects were obtained through down-the-line exchange networks rather than direct interaction. The ties between the stub-stemmed pipes from Belmont (44HR3), Shenks Ferry (36LA2) and Hand (44SN22) sites and

Native peoples from the southeast is more tenuous, however, given the lack of additional evidence of interaction with these peoples.

It is worth noting that despite the fact that the pipes from different sites in Maryland, Virginia, and North Carolina shared the general stub-stem form, they do seem to be locally produced variations of the form, rather than items that were produced in Tennessee or further south that traveled through exchange networks. Another researcher, Eastman (1999:133,135), who analyzed the stub stem pipe from 31SK1, also observed that the style of the does not seem similar enough to have been produced by the individuals who were part of the Mississippian pipe making tradition. A visual comparison of the specimens discussed here with a pipe excavated from the Pee Dee phase Town Creek Mound (Figure 6.9d) and a Qualla phase pipe form from the Peachtree Mound (Figure 6.9e) illustrates that most of the examples discussed here do not really resemble Pee Dee or Qualla forms beyond the general stub stem. Consequently, it would seem that interregional influences were impacting local production networks.

Ovoid

The largest cluster of these pipes is associated with a site in southwestern Virginia, Crab Orchard (44TZ1) (Figure 6.28). Additional examples were present in the Trigg (44MY3), Potomac Creek (44ST2), and Cabin Run (44WR300) assemblages. Ovoid pipes are typically associated with Northeastern Iroquoian groups of New York and Canada and Fort Ancient peoples who inhabited areas of Ohio, Kentucky, and West Virginia during the fifteenth and sixteenth centuries (Drooker 2004, see Figure 6.28 for the rough boundaries of the Fort Ancient cultural area). In general, the occupation dates for the sites that have ovoid pipes fall within this time frame, with the exception of 44WR300. However, given the small sample size, it is somewhat difficult to determine whether Native groups in Maryland and Virginia were acquiring these pipes from Iroquoian groups from the northeast or the Fort Ancient groups located farther west.

Yet some connections can be postulated based on similarities shared by other artifact types and artifacts from either Fort Ancient groups or Northeastern Iroquoian groups. For example, although a number of researchers have suggested that the Crab Orchard assemblage exhibits more evidence of connections with groups in the south, certain materials also suggest influences from groups occupying areas north and west of the site. Ceramics excavated from the Crab Orchard site that exhibit strap handles similar to those found on Madisonville phase Fort Ancient pots have been interpreted as evidence that the Native inhabitants of this site were trading with Fort Ancient groups (Gardner 1986; MacCord 1986). Additionally an unusual structure at the Crab Orchard site that is believed to have been used as a public meeting house is similar in size and shape as structures found at the Fort Ancient Buffalo site in West Virginia (Egloff and Reed 1987:147).

Egloff (1992:189) has noted that influences from the northwest and Ohio River valley likely came to southwestern Virginia by way of the New River. The presence of ovoid pipe forms provides evidence of linkages between Crab Orchard inhabitants and other Native groups occupying areas to the north and west. The presence of ovoid pipes on the Trigg site (44MY3) as well as other similarities in material culture (MacCord

1984:179) suggests that these social connections extended further east of the Crab Orchard site and persisted into the Contact period.

The ovoid forms located further north in the study area may represent connections to Iroquoian groups further north rather than west. The pipe recovered from 44WR300 Areas 2/3 is one of the earliest examples of this form found in the study area. Although the radiocarbon dates for this site range from a lower limit of A.D. 786 to an upper limit of A.D. 1417, Gallivan's (1999:Table 5-3) synthesis of radiocarbon dates from the site produced a two-sigma mean range of A.D. 1226-1290. This date range precedes the time period during which ovoid pipe production came to fruition on Fort Ancient sites by roughly a century. However, ceramics and another pipe present at the site provide evidence of other possible social connections. Snyder and Fehr (1984) noted that the ceramics from the site exhibit complex zoned incised decorative motifs that resemble those found on Overpeck incised wares. These ceramics are associated with the Overpeck site (36BU5) and other Late Woodland sites associated with Iroquoian-speaking groups located in eastern Pennsylvania. In addition, a second pipe interred with the burial had similar attributes as pipes recovered from the Overpeck site, such as a bulbous bulge at the stem/bowl juncture and a hanging triangle motif. Consequently, it is possible that both pipes from 44WR300 represent items obtained through exchanges with Iroquoian groups from the Northeast. The ovoid form from the Potomac Creek site could have traveled through a similar exchange network given that its location on the Potomac River granted access to northeastern Pennsylvania and areas further north.

Two ovoid pipes recovered from the Abbyville site provide evidence of another type of social process that introduced this form into the Virginia Piedmont. Wells (2002) speculated that in addition to a Dan River period habitation, evidence of a Contact period habitation on the Central Terrace exhibited distinctive material culture that differed from the material remnants of earlier occupations. Wells argued that certain attributes present on these materials, such as ceramics with castellated rims, indicated the latest occupation of the site may have been a village occupied by an Iroquoian-speaking group. Killgrove (2002:54) supported this interpretation by noting that the style of burials in this area of the site, which consisted of two or three individuals interred together, appears to be unique to Iroquoian groups. Wells (2002) categorized two green chlorite ovoid reed stem pipes excavated from burials in this area of the site as part of these "intrusive" materials. Consequently, it would seem that the two examples of ovoid pipes at the Abbyville site did not end up in the area through trade. Rather the Iroquoian inhabitants who migrated into the area and occupied the site could have carried knowledge of how to produce reed stem pipes with them and those continued to use it in their pipe production.

Spatial Distributions of Reed Stem pipes

The GIS analyses shown earlier in the chapter suggested that pipes might be distributed differently between the three physiographic provinces in the region. To test this I conducted a Fisher's test of the presence and absence of reed stem pipes on sites in different physiographic provinces in the region. Tables 6.18, 6.19, and 6.20 are contingency tables that compare the presence and absence of reed pipes between different physiographic provinces on Late Woodland II sites. Fisher's tests showed a significant difference between the presence and absence of reed stem pipes in the Coastal Plain and Piedmont (p = 0.0005), and the Piedmont and the Ridge and Valley (p = 0.01043). However, there was not a significant difference in the presence or absence of reed

Table 6.18: Contingency table comparing presence/absence of reed stem pipes between Coastal Plain and Piedmont sites

Reed Stem	Coastal Plain	Piedmont	Total
Yes	7	1	8
No	3	18	21
Total	10	19	29

Table 6.19:Contingency table comparing presence/absence of reed stem pipes between Coastal Plain and Ridge and Valley sites

Reed Stem	Coastal Plain	Ridge and Valley	Total
Yes	7	4	11
No	3	3	6
	10	7	17

Table 6.20:Contingency table comparing presence/absence of reed stem pipes between Piedmont and Ridge and Valley sites

Reed Stem	Piedmont	Ridge and Valley	Total
Yes	1	4	5
No	18	3	21
Total	19	7	26

stem pipes in the Coastal Plain and Ridge and Valley (p = 0.6437). Based on this comparison, it would seem that Natives living on Piedmont sites were not using reed stem pipes to the same extent as Native groups living in the Ridge and Valley and Coastal Plain physiographic provinces.

Effigy Pipes

Like reed stem pipes, effigy forms are typically associated with groups outside the boundaries of the study area, such as Iroquoian-speaking groups in the Northeast and Mississippian groups in the Southeast. It is likely that the presence of effigy pipes in the dataset signals connections with these groups. Seventy-six percent (n = 16) of the effigy pipes present in the dataset were recovered from sites in Pennsylvania (see Table 6.8). These pipes were associated with five sites, Shenk's Ferry (36LA2), Schultz (36LA7), Overpeck (36BU5), Washington Boro (36LA8) and Strickler (36LA3). Twelve of the pipes incorporated zoomorphic effigies that included one bear, one turtle, two foxes, and six birds, one of which could be identified as an owl. Four examples exhibit anthropomorphic forms. Two had human faces carved into the back of the bowl while the other two displayed multiple faces that encircled the bowl. Twelve of these pipes were produced from clay and four from steatite or other types of stone.

Although the sample size is small, the presence of effigy pipes on Susquehannock sites and the Overpeck site are material evidence of the relationships their inhabitants had with other Northeastern Iroquoian-speaking groups. During the Late Woodland period Iroquoian groups in upstate New York and Canada produced and smoked zoomorphic and anthropomorphic effigy pipes with animal and human figures carved into the bowl and stem of the pipe (Champdelaine 1992; Mathews 1980; Otto 1992).

One carved clay bird effigy identified in the Accokeek Creek assemblage (Stephenson et al. 1963:Plate XXII) resembles the carved effigies discussed above. However, this form also exhibits bands of cord-wrapped tool impressions that led

Stephenson (et al. 1963:135) to categorize this pipe as a "variant" of his Potomac Cord Impressed type. The presence of the cord wrapped tool decorations suggests this pipe was produced at the Accokeek Creek site rather than being exchanged with groups farther north or south. It seems likely that this pipe represents an interesting amalgamation of interregional influences combined with the local decorative tradition associated with the Potomac Creek and Accokeek Creek sites. However, given that this is the only effigy sample present in the Accokeek Creek assemblage, it is difficult to discern whether it was inspired by influences from Northeastern or Southeastern groups. Bird effigies tend to be more prevalent among Northeastern groups, but are also found on pipes from the Southeast.

Although the Accokeek assemblage is one of the largest in the dataset, the carved bird effigy is the only effigy present. The lack of effigy forms is interesting given their close proximity to Susquehannock sites and the fact that ethnohistoric documents indicate that the Susquehannocks were traveling into the area, at least during the early part of the seventeenth century. The scarcity of this form may be a consequence of timing given that the use of the effigy form among Susquehannock groups was not widely popularized prior to the last quarter of the sixteenth century, which is the time frame in which the inhabitants of Potomac Creek and Accokeek Creek were migrating to different villages, Moyaone and Patawomeke.

One effigy form recovered from the Philpott site (44HR4) and another from Early Upper Saratown (31SK1) may be evidence of influence or interactions with Mississippian groups. The effigy pipe from the Philpott site is especially noteworthy because it exhibits the "weeping eye" motif. This effigy was molded into the bowl area of a tubular pipe. The weeping eye motif consists of a human face with incised lines running below the eyes. These motifs can take on a number of forms, and the lines underneath the eyes vary from simple straight incisions to zigzag motifs (Brain and Phillips 1996). Davis et al. (1998b:49) were the first to note the similarity of this effigy pipe to others found in the deeper Southeast. This motif has been found on artifacts from other sites in Virginia, such as shell gorgets from the Ely Mound in southwestern Virginia (Brain and Phillips 1996:75-76; Meyers 2011) and shell masks from the Potomac Creek territory (Hall and Chase 1999; Potter 1993) but this is the only pipe with this motif in the dataset. Moreover, it is actually the only instance of this effigy on a pipe based on a search of archaeological literature. Davis et al. (1998b:50) also noted that stem area below the effigy exhibited evidence of being ground suggesting that the pipe may have broke close to the bowl but continued to be used in the modified form of a reed stem pipe. The other example from Early Upper Saratown (31SK1) consists of a whole bowl but it is difficult to discern whether the effigy is a bird or a man's face.

Variations in the directions of effigies provide some insight into other social processes that may have impacted these forms. Mathews (1979), and Paper (1998, 1992) have suggested that the differences in the direction of effigies, whether they were facing to or away from the smoker could be indicative of different types of smoking rituals in Native communities. Mathews (1976, 1979) argued that Iroquoian pipes exhibiting effigies that faced towards the smoker represented the smoker's guardian spirit. She suggested that these pipes were likely smoked by a particular individual and could have been used to ask for assistance or intercession. On the other hand, effigies facing away from the smoker (including pipes with multiple individuals that encircle the bowl) could have been used for ceremonies of communal importance. Paper (1988, 1992) has noted that effigies on reed stem or separate stemmed pipes are often oriented away from the smoker, which indicates they were used in communal or intertribal rituals with Native individuals from outside the immediate community.

Out of the twelve effigy pipes where the direction of the effigy could be determined, eight were facing towards the smoker, five were facing away and three had multiple heads that encircled the rim of the bowl. The other four examples were too fragmented to determine direction of the effigy. The eight effigies that were all facing the smoker were animal forms. This suggests the majority of the zoomorphic forms could have been individual possessions that were used to invoke guardian spirits. A supporting piece of evidence is that the effigy forms discussed here match the pipe forms described by Smith that were carried by the Susquehannock warriors he encountered at the head of the Potomac River. He noted that "One [warrior] had the head of a Woolfe hanging in a chaine for a Jewell; his Tobacco pipe 3 quarters of a yard long, prettily carved with a Bird, a Beare, a Deare, or some such devise at the great end" (Smith 1986:106). Although Smith does not mention the direction of the effigies on the pipes belonging to the Susquehannock warriors, given at least one was carrying a pipe with a zoomorphic motif with him does suggest that perhaps theses pipes did have an individualistic use.

Two of the five effigies facing away from the smoker were zoomorphic forms while three effigies were anthropomorphic motifs. The bird effigy from the Accokeek

Creek site as well as a bird effigy pipe from Strickler was facing away from the smoker. The rest of the pipes had maskettes. The pipes with these effigies could have been used for communal ceremonies.

The directionality of the other effigies present in the dataset is more elusive. The weeping eye motif was molded into a tubular form rather than an elbow form, which meant that the face would not necessarily have been facing to or away from the smoker directly but would actually have been pointed towards the sky or earth or any direction in between. While it is difficult to know for certain, the fact that the holes for the eyes, mouth, and nose of the weeping figure are drilled all the way through the interior surface suggests that smoke came through these holes. These holes may have been additional vehicles for transporting tobacco smoke to ancestor or spiritual guides. However, given that both terrestrial and celestial interlocutors existed, it is possible that this face could have been pointed upwards towards the sky or downwards towards the earth depending on who or what was meant to receive the gift. The effigy from the Early Saratown site is too fragmented to determine directionality.

Discussion

Now that I have investigated the temporal and spatial distributions of pipe forms I will evaluate how the patterning of different forms relates to my hypotheses about the relationships of pipes to social dynamics. Table 6.21 summarizes the patterning of different forms. I should note that although I have discussed the patterning of individual attributes throughout this chapter, this table focuses on forms because in many cases the sample sizes of individual attributes small enough that it made it difficult to draw significant conclusions. Nevertheless I will mention the distributions of attributes in my discussion of the hypotheses. The table is divided into three categories: 1) forms that exhibited more clustered distributions, 2) those that were widespread, and 3) forms that displayed indeterminate patterning. Those forms displaying distributions that were completely encompassed with the boundaries of one cultural complex or physiographic territory were grouped into Category 1. Forms that were grouped in Category 2 had widespread distributions that expanded outside of the boundary lines discussed in Chapters 2 and 3. Finally, Category 3 attributes were those whose patterning could not be determined, either because of small sample sizes (n < 5) or due to limitations of the dataset.

Hypothesis 1: Alignment with Cultural Complexes and Physiographic Provinces

Mapping different forms, attributes, and raw materials demonstrated that the boundaries of most of the forms and attributes did not align with cultural complex or physiographic boundaries. For example, one of the more notable patterns was the widespread distribution of tubular pipes, which were found to be spread out east to west across the region. Additionally, reed stem and effigy pipes were also widespread and found on sites spread across multiple cultural complexes and geographic areas. However, it is notable that reed stem pipes were not found in the Piedmont as often as they were on Ridge and Valley and Coastal Plain sites. It would seem that the sources for most of these forms are from groups living in areas west and north of the region and the differences in the distribution of reed stems may be evidence of different exchange networks that were operating in the region.

The distributions of stone pipes also proved to be noteworthy. One could expect that the distribution of stone pipes might be restricted to the Ridge and Valley and Piedmont areas, where natural outcrops were more accessible. However, this was not the case. Stone platform and bent tube forms were present on Coastal Plain sites, indicating that either individuals or groups in these areas were traveling into the interior to procure steatite or chlorite or engaging in exchange networks to obtain materials or finished products. Given that the vast majority of forms displayed widespread distributions, I reject this hypothesis and accept the premise that alternative models of regional social organization other than cultural boundaries were impacting pipe production and use.

Table 6.21: Distributions of forms

Form	Isomorphic with Previous Boundaries	Widespread	Indeterminate
Tubular		X	
Platform		X	
Bent Tube		X	
Reed Stem		X	
Multi-Stemmed			X

Hypothesis 2: Localized Clustering

Although the distributions of six out of the seven pipe forms were widespread throughout the region, some variations of particular forms, such as trumpet and restricted rim tubular pipes did show more clustered distributions. The use of these pipes seems to have been restricted to sites in the southern Piedmont and Coastal Plain of Virginia in areas near the Nottoway and Meherrin Rivers. Yet, even though the distribution was clustered it is associated with sites that are believed to have been occupied by multiple linguistic groups (Siouan, Iroquoian, Algonquian) and have been divided by multiple cultural complexes. The distribution of this particular pipe on sites throughout this area supports recent research that has suggested this area should be considered an area with a high level of interaction based on the presence of multiple linguistic groups and mixtures of ceramic attributes on single sites that are generally associated with multiple cultural or linguistic groups (Davis 2005; Gallivan et al. 2008).

Onion bowl tubular pipes were also clustered mostly in an area mostly associated with Siouan speaking peoples but were also found on sites associated with Iroquoian speakers. The fact that they are so visually distinctive from elbow pipes that were typical of the Late Woodland/Early Contact period indicates that perhaps they were meant to signal some particular social information about the user.

Additionally, although ovoid pipes were widespread, it should be noted that there was a fairly substantial cluster of pipes of this form at the Crab Orchard (44TZ1) site. Moreover, all of these forms were from individual burial contexts of adult males. While this was not the only place where these forms were found, it is worth noting that this is a localized cluster of these forms that could be significant.

Finally the only form to show absolute adherence to cultural boundaries was the curved conical pipe. This form was also very distinctive and only found in mound contexts located entirely within the boundaries of one cultural complex, that of the Ancestral Monacans. However, the small sample size (n = 3) precludes interpretation of this particular pattern.

Given that a few forms did exhibit localized clustering, I accept this hypothesis.

Hypothesis 3: Roles of Ritual and Exchange

While certain forms of tubular pipes exhibited more restricted distributions, overall the six forms discussed in this chapter exhibited widespread distributions over large parts of the region. However, different social dynamics could be behind the widespread distributions of these forms and attributes. It is possible that the popularity of some of these forms was widespread because they were conventional. For example, elbow pipes or conical tubular pipes may fall into this category. However, the widespread distributions of some of the more distinctive, uncommon forms, such as stone bent tube and stub-stem and ovoid reed stem pipes does support the idea that these forms were involved in rituals that facilitated social interaction and exchange.

An additional detail of note is that the deposition of bent tube and reed stem pipes were primarily confined to burial contexts. Eighty percent (8/10) of ovoid reed stem pipes were found in burial contexts. Ninety-four percent (16/17) of bent tube pipes were excavated from burial contexts. Moreover, the fact that the trumpet pipe from the Great

Neck (44VB7) site was recovered from what Hodges (1998:207) has categorized as a high status male burial, serves as further proof that these forms may have been linked to individuals of importance. Another trumpet pipe was also recovered from an elder male burial at the Abbyville (44HA65) site supports the idea that these distinctive forms may have been the personal possessions of high status males. The more restricted deposition of these forms supports the possibility that they may have had special significance to the groups who used them.

The depositional patterns of the other five forms however, were not as restricted. Tubular forms, stub-stemmed pipes and effigy pipes were found in other contexts such as middens, pits, and excavation stratigraphic levels as well as burial contexts. The discard patterns of these forms suggests that perhaps they had a different level or type of significance from the pipes interred in mound and other burial settings.

While the widespread distributions of the forms suggests I should accept this hypothesis, it is not clear whether the distributions are solely due to the movement of pipes through exchange and interaction networks or whether some of these forms were conventional. Thus I accept the hypothesis that pipes played an integral role in rituals that facilitated interaction but am forced to conclude that the level of access restriction unclear.

Hypothesis 4: Temporal Variation

While the forms of pipes certainly did vary over time their distributions did not align with either of the propositions put forth in this hypothesis. There is evidence that the use of different forms persisted throughout multiple temporal periods. This indicates that there was simultaneous use of multiple forms in each temporal period and even in some cases by individuals or groups occupying the same site. Nevertheless, although the overall amount of diversity of different forms increases dramatically during the Late Woodland II period and some of the forms during this period exhibit more clustered distributions, many of the forms that persisted throughout multiple periods displayed widespread distributions throughout all three periods. This is particularly interesting given that long distance trade networks are believed to have broken down during this period. Nevertheless, this period was also a time when social hierarchy was increasing and material expression or differentiation using certain objects was becoming a more important means of self-expression, is likely not a coincidence. The ownership and use of materials and objects from far off places were a key way of signaling or communicating status for Native leaders during the Late Woodland II and Early Contact periods (Eastman 1999; Hantman 1990; Rountree 1992; Mallios 2006; Potter 2006[1989]). Thus the higher diversity of forms during the Late Woodland period II could be due to the fact that some long distance trade networks continued to function and that individuals were using unusual or visually distinct forms to signal particular information about their status or role in the community. Overall, while there is variation in pipe forms it does not necessarily seem to follow the social and political changes taking place during the Late Woodland and Early Contact periods. Thus I am forced to reject this hypothesis.

Conclusion

Having demonstrated that social as well as temporal processes are behind the variability in forms, I will now briefly consider how some of the forms discussed may be tied to certain social processes present in the Middle Atlantic.

The persistent presence of tubular pipes on sites in the study area demonstrates that Natives continued using this form well into the Late Woodland period despite the fact that it has typically been associated with earlier periods. Moreover, variations in the distributions of certain tubular forms suggest that some may have been more common while the use of others was more geographically restricted. For example, conical pipes exhibited wide distributions that crisscrossed the cultural boundaries previously identified by researchers. Such a distribution suggests that their production and use was likely not linked to efforts by groups to express any type of collective identity but that conical pipes were a more conventional form. The wide distribution of this form may be related to open social networks and the low to moderate intensity of stylistic symboling that was prevalent during the late Middle and early Late Woodland periods throughout much of the Middle Atlantic (Gallivan 2003; Stewart 1989, 1994).

The lack of stylistic differentiation on conical pipes contrasts with the other tubular forms present in the dataset. Other forms, such as trumpet bowls, restricted rim tubular pipes, and onion bowls, exhibit distinctive attributes. Another notable aspect of these more distinctive forms is that most of them date to the Late Woodland II period. As noted in the previous section, the increased diversity of forms dating to this period could be a result of efforts by individuals to signal aspects of their identity as larger populations coalesced into villages and social hierarchy developed in the region. The unique examples of trumpet and restricted rim tubular pipes could also be material evidence of efforts of intra-community signaling.

The variability of tubular pipes in the dataset and their possible associations with high status individuals demonstrates that tubular pipes cannot be dismissed as the most simplistic form of pipe that was eventually abandoned in favor of the more “sophisticated” elbow pipe. With the exception of the onion bowl pipe, however, the use of the tubular form seems to have ceased in the Contact period. The disappearance of this form supports arguments made by previous researchers that a social shift was taking place in pipe smoking, perhaps due to the increasing availability of terra cotta and white clay elbow pipes.

Three pieces of evidence indicate bent tube pipes were particularly special or significant to Native groups. The first is that ninety-four percent (16/17) of pipes in the sample were all recovered from mound or burial contexts. The second is that the majority of these forms were made of either steatite or chlorite. The third is their widespread distribution. The uniqueness of these forms, combined with their distinctive raw material and their distribution suggests they may have been important prestige items. The restricted association, limited production, and wide geographic distribution of other types of material culture, including steatite bowls (Klein 1997) and Abbot Zoned pottery (Stewart 1998) have been interpreted as evidence of their role in elite exchange spheres during different temporal periods in the Middle Atlantic region (Hantman and Gold 2002). Unlike the more ubiquitous elbow pipe, these pipes may have been objects that were only used in certain ceremonies and then interred in restricted areas that were associated with important individuals or ancestors. Moreover, the durability of the stone introduces the possibility that these pipes were used for extended periods of time. Additionally, as Irwin (2004) has already noted the fact that the distribution of this particular form covers hundreds of miles indicates it was part of an important interaction network that linked Native groups from southern North Carolina to Virginia.

The restricted internment of many examples of these forms with only a few individuals in mound contexts and individual burials provides further evidence that these pipes held an important status in Native communities. However, the degree to which these pipes were personal possessions, or were considered communal property, is unclear. Coe (1995) has suggested that these forms were considered communal rather than individual possessions to the Native groups who interred them in the Town Creek mound. However, he does not provide any evidence for this assertion. Nevertheless, I concur with Coe, and suggest that the internment of these forms in contexts that served as important visual monuments on the Native social landscape that tied communities to their ancestors supports the idea that they were communal objects. Additionally, the fact that all of the examples of these forms were purposefully broken in the McLean mound before being interred with individuals suggests that the Native groups who created these mounds considered these pipes to be powerful objects that were not necessarily personal possessions.

The reed stem forms in the dataset are material evidence that social systems of connections extended to Native groups outside of the study area. The incorporation of the stub-stem form could be attributed to influences from many different groups such as the proto-Cherokee Qualla Native groups in North Carolina (A.D. 1350 to 1700, Ward and Davis 1999:181) or Muskogean-speaking peoples (A.D. 1300-1600, Sullivan (ed.) 1995:xx) in Tennessee. Influences from Native groups in these areas could have been introduced through social interactions during the exchange of other objects, such as shell gorgets or ceramics, or perhaps even during pipe smoking ceremonies that facilitated interaction that allowed the exchange of other objects.

I argue that the ovoid pipes in the dataset serve as evidence of social interactions with both Fort Ancient groups and Iroquoian groups from the Northeast. Ovoid pipes found at the Crab Orchard and Trigg sites are material evidence of social interactions with Fort Ancient groups in Ohio while the ovoid forms from 44WR300 and Potomac Creek suggest social connections with northeastern Native groups. However it is difficult to determine whether the ovoid examples in the dataset were produced by individuals at Fort Ancient sites and traveled to Virginia via exchange networks, or whether ideas about their production were incorporated into local production networks. Finally, the presence of this form in burials from the Contact period occupation at the Abbyville site may be related to a different social process, the migration of individuals rather than the exchange of artifacts. Consequently, the presence of reed stem forms in the dataset signifies the movements of objects, people, and ideas throughout the region.

On other notable aspect about ovoid pipes is that they exhibit a number of similar characteristics to platform and bent tube pipes. First, they are another exceptional form of which only a few examples are present. Additionally, all of these forms present in the dataset were made of stone. Finally, out of the 10 forms present in the dataset, seven were found in burials with elder male individuals (see Table 6.7). Again, the restricted association and limited production of these forms likely indicates that the individuals interred with them were individuals of prestige or status within their communities. Furthermore, the distinctive shape of these forms would also likely signal reminders of extralocal connections with other groups. However, there is one major difference between the depositional contexts of bent tube and platform pipes and ovoid forms. With the exception of the burial from 44WR300, all of the burials associated with ovoid forms were individual internments and were found in cemetery contexts, rather than communal mound or ossuary contexts. When contrasted with the depositional patterning of platform and bent tube pipes, it would seem that these pipes were individual possessions rather than communal objects. Consequently, the individuals associated with these pipes could have been using them to signal their own prestige or status by showing their connections with extralocal groups.

Finally, the presence of these forms begs the question of the degree to which the individuals and communities using them were also incorporating aspects from Mississippian, Fort Ancient, and Iroquoian rituals into their pipe smoking ceremonies. A number of researchers have suggested that reed stem or separate stemmed pipes had special significance due to the fact that the joining of the bowl and stem was a significant part of the ceremony (Coe 1995; Hall 1997; Paper 1988). This suggests that rituals involving reed stem pipes may have involved different customs than those which entailed smoking an elbow, bent tube, or platform pipes in which the bowl was already attached to the stem. Accordingly, the presence of reed stem pipes on sites in the Middle Atlantic not only symbolizes the social connections of these groups with more distant communities but also innovations within ritual practices and behaviors. Nevertheless, the limited number of these forms suggests that only particular groups were incorporating these changes. The geographic distribution of these forms reveals that often these groups were in territories where they likely would have been directly interacting with Mississippian, Fort Ancient, and Iroquoian peoples, so perhaps the incorporation of this form is the result of efforts to create social connections with these groups.

The limited number of effigy forms in the dataset suggests Native groups of the Middle Atlantic, with the exception of the Susquehannocks, did not use anthropomorphic or zoomorphic depictions as an integral part of their efforts to communicate with guardian spirits or ancestors. However, like reed stem forms, the limited number of examples that are present suggest that perhaps certain Native communities incorporated effigy motifs into rituals that included individuals from outside of their community. The zoomorphic and anthropomorphic forms popular amongst the Native groups occupying sites in what is now Pennsylvania are likely a consequence of the ties the occupants of these sites had to other Iroquoian-speaking groups from northern Pennsylvania and New York. The other identifiable motif, the weeping man effigy, indicates a connection to Mississippian groups farther south. The rest of the effigies from Maryland and Virginia are unique representations of the effigy form and indicate that a few individuals or groups may have been using pipes to a limited degree to communicate with animal and human spiritual advisors even if these advisors were not represented in the same way as in other areas. Overall, however, the lack of effigy pipe forms in the study area serves as material evidence of distinct differences in pipe smoking rituals between Middle Atlantic groups and Iroquoian groups from the Northeast and Mississippian groups from the Southeast.

This chapter has proposed that the different styles of pipe forms, in addition to attributes carved and added to these forms, can be interpreted as a means of stylistic expression. Although elbow pipes and fragments comprise the majority of the dataset, the presence of tubular forms may be linked to individuals' efforts to signal their status within their communities. Platform and bent tube pipes serve as material evidence of the social networks that traversed cultural and physiographic boundaries present in the Middle Atlantic region. Additionally reed stem and effigy pipes serve as tangible proof of social connections that Middle Atlantic groups forged with communities in neighboring territories and perhaps of innovations taking place in pipe smoking ceremonies. Furthermore, the associations of these different forms with individual and communal burial contexts indicates that some forms, such as bent tube and platform pipes, may have been considered communal objects, while others, such as tubular pipes or ovoid reed stem forms, could have been individual possessions. Now that I have addressed the variations of these forms, I will delve into the stylistic variation found among the most predominant form in the dataset, the elbow pipe.

Chapter 7 : The Geographic Distributions of Elbow and UNID Attributes

Introduction

In the last chapter I discussed the distribution and significance of five different pipe forms present in my dataset. I investigated what the presence of multiple forms revealed about the social processes present in Native societies throughout the region. I also examined what the variability within each of the minority forms, tubular, bent tube, platform, reed stem, and multi-stem, indicated about their possible social roles. In this chapter I turn the focus to the most predominant form in the dataset, the elbow pipe. I discuss the temporal and geographic distributions of embellishments that were appended to or carved into bowl, stem, and mouthbit areas of this pipe form. The division between my discussion of the rest of the forms and elbow pipes allows me to concentrate on the great amount of diversity that was present among different pipes that met the criteria for this form. It also gives me the opportunity to compare the distributions of different elbow attributes with embellishments found among the 1519 pipe fragments that could not be identified to form. The uncertainty of whether these fragments actually belonged to elbow pipes prevents me from saying with certainty that these traits were exclusively limited to elbow pipes. Nevertheless the inclusion of fragments was an important component of this dissertation given that I have argued the tendency of previous studies to focus on whole specimens has obscured insights that could be provided by fragments. The results discussed in this chapter substantiate that claim.

To allow direct comparison between attributes found on elbow pipes and those found among fragments not identified to form I have structured my discussion around five different parts of the pipe: bowl rims, bowl bodies, bowl/stem junctures, stems, and mouthpieces or bits. For each part I outline the different attribute classifications identified for each of these parts. I also use GIS to illustrate their spatial distributions. GIS maps were used to compare the proportions of all the attributes for each particular part found on every site. This allowed me to compare the spatial distributions of all the attributes found on each part for each of the three time periods included in this study, Late Woodland I, Late Woodland II, and the Contact period.

I should note that this chapter, like Chapter 6, focuses on embellishments that were built into the form and does not include a discussion of decorative embellishments that were added onto the form using incising or rouletting. I will discuss the distributions of rouletted and incised decorative motifs on all pipe forms in the next chapter. The separation between my analyses of embellishments built into or added onto pipes and the decorative motifs incised or rouletted into pipes was based on my hypothesis that embellishments built into the pipe forms might exhibit different patterning than shapes or motifs that were added onto the stems and bowls. In Chapter 4 I postulated that localized learning networks might have more of an impact on how an individual might shape a rim or mouthpiece. In the concluding section of this chapter I will discuss how the geographic trends identified here relate to my hypotheses.

Elbow Forms

Elbow forms were by far the most prevalent form in the dataset. This form was found at almost every site included in this study and was used by Native groups from the tenth through the seventeenth centuries and beyond. However, despite the fact that these pipes shared a general shape (a bowl that was set either at a ninety-degree or obtuse angle and permanently attached to the stem) many elbow specimens exhibited a great deal of intraform variation. In the sections below I discuss the variations found among each of the five basic parts of the elbow pipe and their geographic and temporal distributions.

Bowl Rim Attributes

Eleven distinct attributes were identified amongst elbow bowl rims present in the dataset. These shapes are summarized in Table 7.1 and the most predominant forms are illustrated in Figure 7.1. Figures 7.2a, 7.2b, and 7.2c illustrate the different bowl rim shapes present on Late Woodland I, Late Woodland II, and Contact period sites in the region. The small sample size available for the Late Woodland I sites (n = 12) makes it difficult to draw concrete conclusions but the most distinctive result is the prevalence of collared bowls (Figure 7.2a) at the Kerns site (44CK3). [3] When the distribution from Figure 7.2a is compared with Figure 7.2b, one can see a pattern emerging amongst

[3] To clarify, although collar and flange are both terms that can be used to refer to a projecting rim or ring, in this study the two terms were used to differentiate between two different types of rim decorations. The term "collar" was used to denote a thicker piece of clay appliqué that was found on some of the specimens that looked as though it was a separate piece that had been added to the bowl and generally took up a good portion of the bowl. "Flange" was used to demarcate a thinner, finer embellishment that was limited to the immediate rim and rim area of the bowl. I have used the terminology invoked by previous researchers. Although the differences in thicknesses between these two categories cannot be quantified because measurements were not taken, the difference is discernable to the naked eye as illustrated in Figure 5.3 below.

Montgomery Complex sites. The assemblages from two other Montgomery Complex sites, Biggs Ford (18FR14) and Noland's Ferry (18FR17) also contained collared pipes.

Table 7.1: Bowl rim shapes

Rim Shapes	Late Woodland I	Late Woodland II	Contact	Total
Rounded	3	68	43	114
Collar	5	5	0	10
Inverted	0	4	16	20
Flanged	1	14	5	20
Flared	0	6	5	11
Square Flange	0	9	1	10
Molded Point	0	1	0	1
Four Corners	0	0	2	2
Molded	0	0	1	1
UNID	3	37	14	54
Total	12	144	87	243

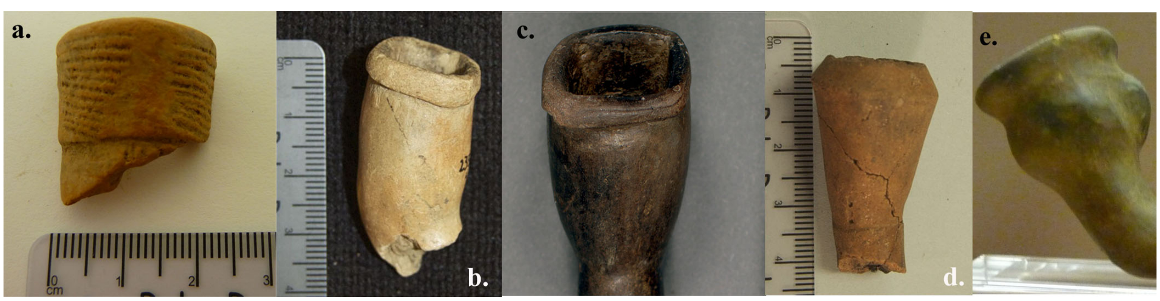


Figure 7.1: Bowl rim shapes in dataset: a) collar, b) flange, c) square flange, d) inverted, e) flared (Pictures courtesy of Maryland Archaeological Conservation Lab, UNC Research Laboratories of Archaeology, and the State Museum of Pennsylvania).

It is notable that the collared embellishment is only present on three sites out of the seven that have been grouped into the Montgomery Complex. Moreover, the fact that the three sites with collared pipes are spread out over two time periods is somewhat surprising. The current known occupation dates for Kerns (44CK3) end in the mid-thirteenth century and do not overlap with those of Biggs Ford (18FR14) or Noland's Ferry (18FR17). The sites whose occupation dates do fill this gap, Winslow (18MO9) and Shepard (18MO3), contain no evidence of collared bowl rims despite the fact that their assemblages are actually two to three times larger than the three assemblages that did contain collared pipes.

One last important point about collared bowls is that although the boundaries of this trait seem to align with the territorial boundaries previously circumscribed for the Montgomery Complex, examples of bowls with this rim embellishment have been found on sites in New York associated with the Owasco complex (Richie 1944:30). Although the criteria for this cultural complex have been questioned in the same manner as cultural complexes in the study area (Hart and Brumbach 2003) the distribution of pipes with collared rims outside of the study area is worth noting.

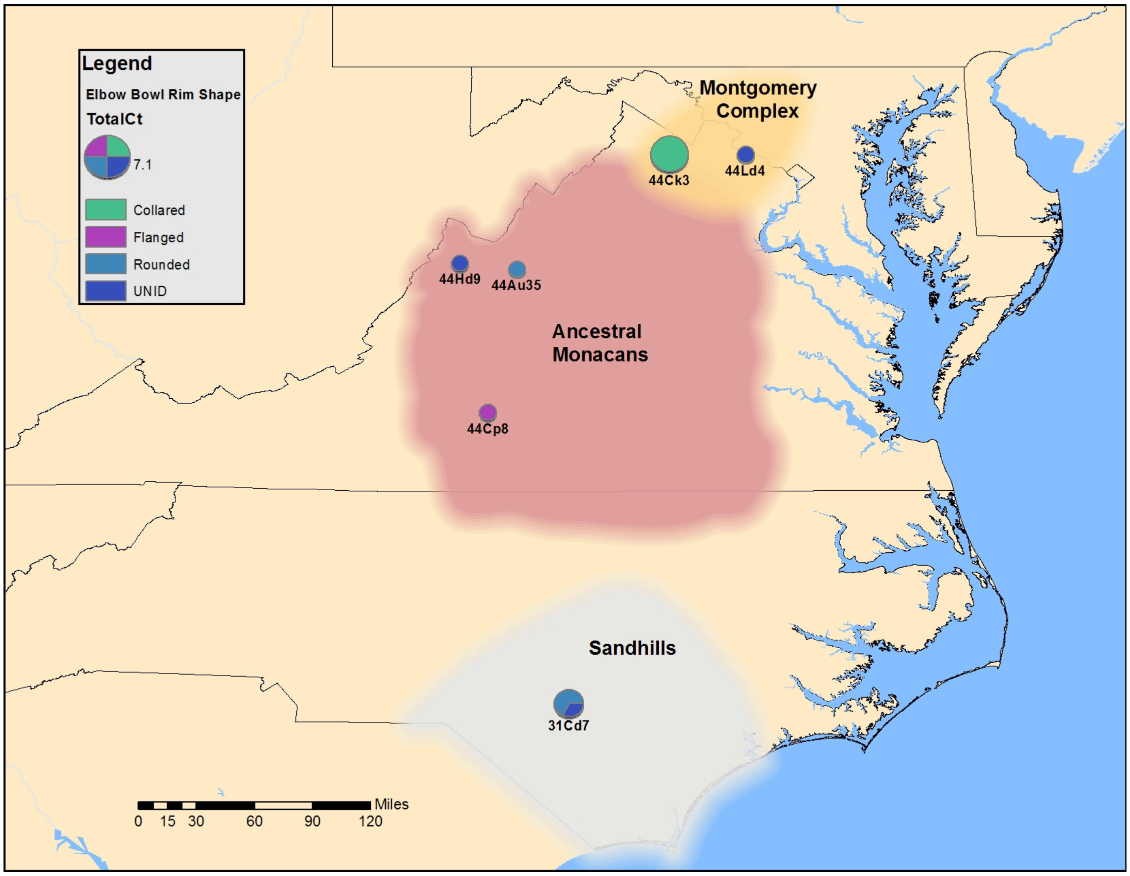


Figure 7.2a: Proportions of elbow bowl rim shapes on Late Woodland I sites

Another distinctive bowl rim embellishment found in the dataset was represented by 10 pipe bowls with thin squared flanges encircling the rim (Figure 7.2c). The squared flange is exclusively associated with sites associated with the Dan River cultural complex. Pipes with a thin round flange encircling the rim were found on a number of Dan River sites (Figure 7.1b) but were also found in sites that were outside of this cultural territory. A number of researchers (Davis et al. 1997 and 1998; Eastman 1999) have noted the tendency of pipes from sites located along the Smith and Dan Rivers in Virginia to exhibit flanges on rims and mouthpieces. Eastman's (1999:Figure 34) occurrence seriation suggested that these characteristics can serve as a chronological marker of Dan River phase sites. However, the rounded flange exhibited a slightly wider distribution that extends outside of the Dan River phase sites. In addition to the pipes found on Dan River sites, pipes with flanged rims were found on the Crab Orchard (44TZ1) and Shannon (44MY8) sites in southwestern Virginia, which are associated with the Intermontaine culture (MacCord 1989). Additionally one pipe in the

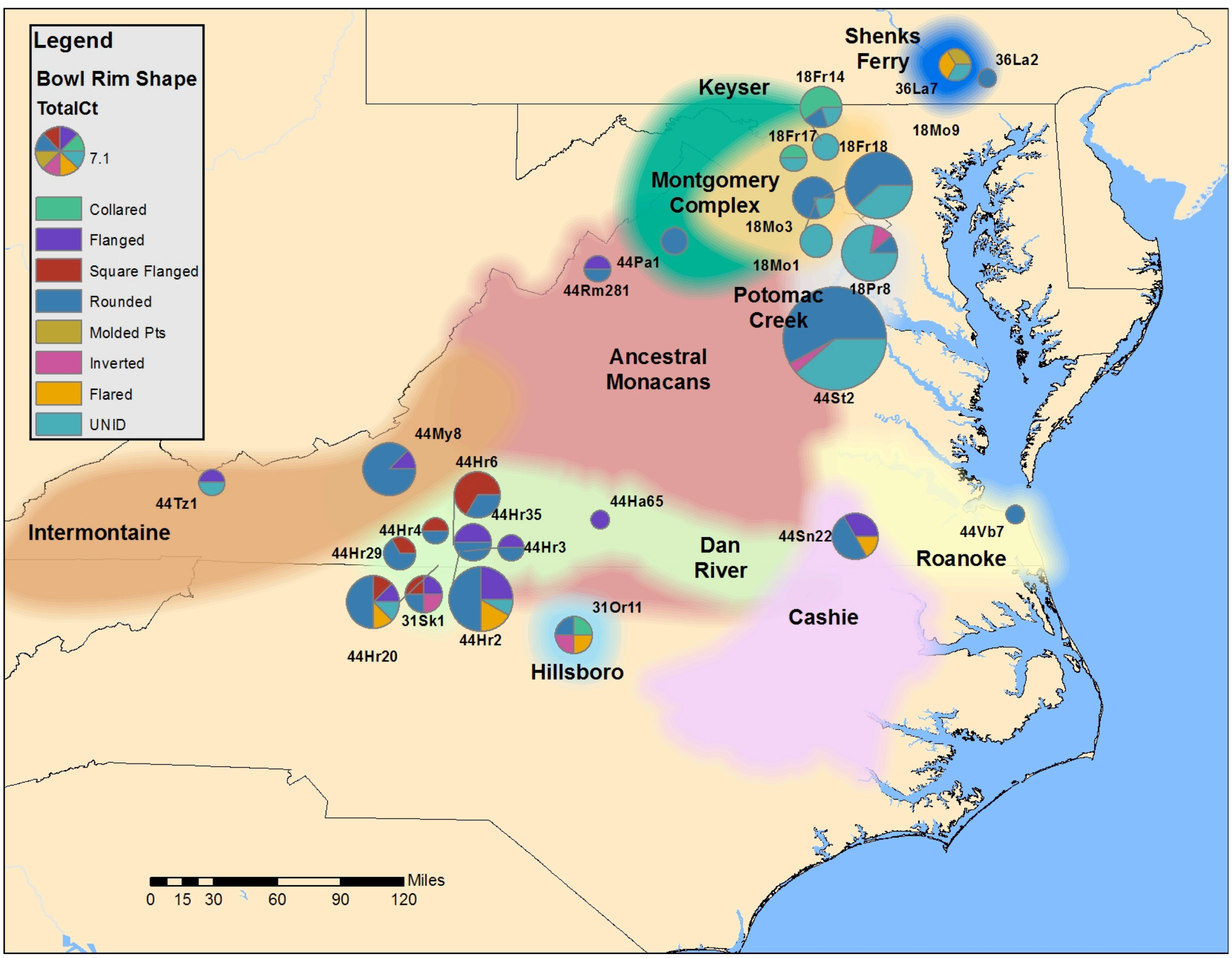


Figure 7.2b: Proportions of elbow rim shapes on Late Woodland II sites

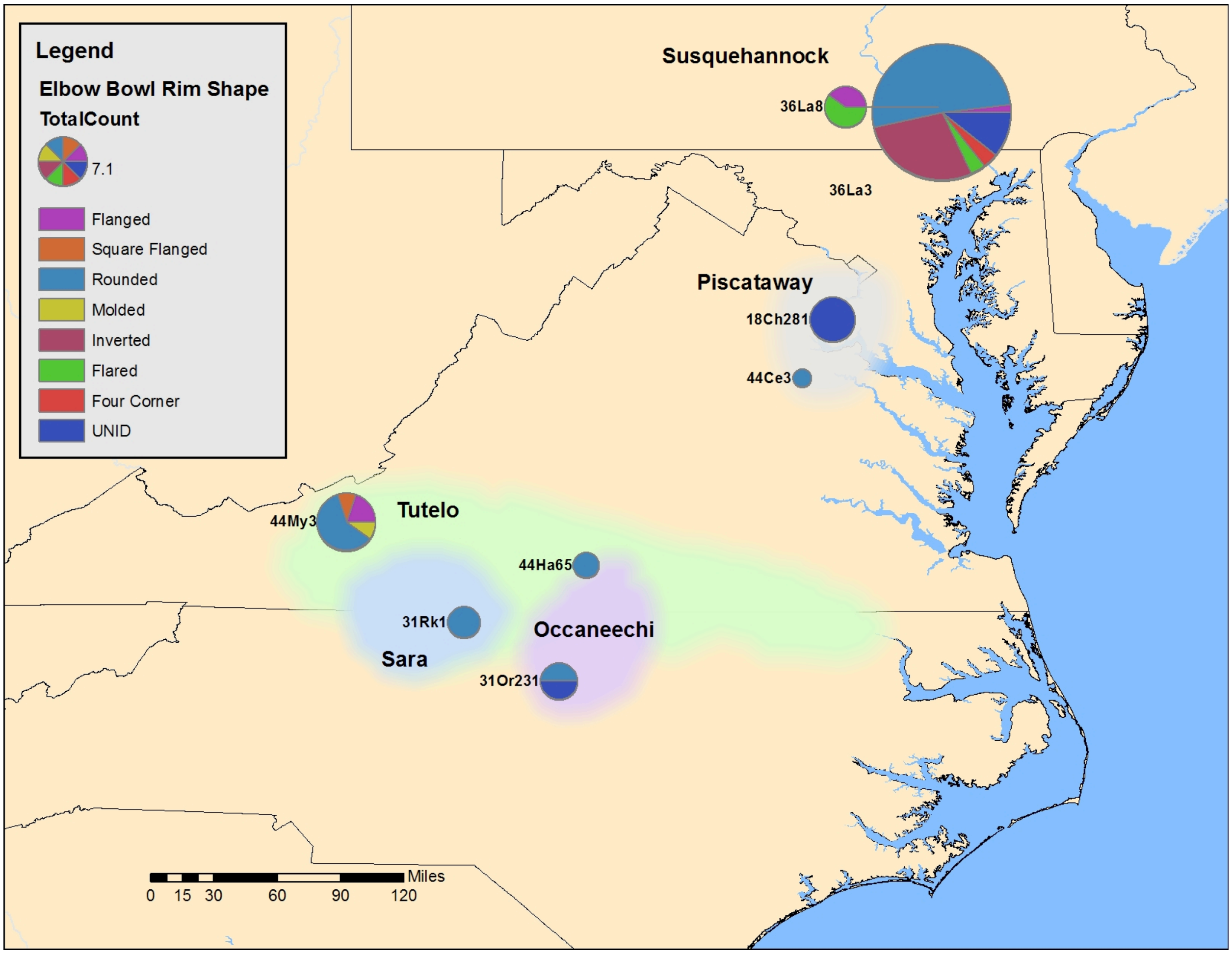


Figure 7.2c: Proportions of elbow rim shapes on Contact Period sites

Bowman mound (44RM281) considered to be part of the Lewis Creek Mound culture (MacCord 1986) also exhibited this embellishment. It is also worth noting that two other sites with flanged pipes, the Hand (44SN22) and Trigg sites (44MY3) were occupied during later periods than most of the Dan River sites. The presence of these attributes, in addition to the square flanged pipe on the Contact period Trigg site (44MY3), suggests that these distinctive embellishments may have been used to a limited degree until the seventeenth century.

The inverted rim was another characteristic found on pipes on a number of sites. As illustrated in Figures 7.2b and 7.2c the boundary of this distribution seemed to align with the sites associated with the Potomac Creek and Susquehannock complexes but there were also examples of this form outside of these areas. The majority of inverted rims in this area were part of what have been identified as tulip bowl pipes associated with the Stickler site (36LA3) (Kent 1984). The two inverted rims at the Accokeek Creek site were also classified as tulip bowl pipes by Stephenson (et al. 1963) and that categorization was affirmed by this researcher. Stephenson interpreted the presence of these bowls and stem fragments as evidence of the later Susquehannock occupation of the site in 1676. While this could well be the case, as I will discuss in the next chapter, a few pipes with ring bowls were also found on the site. The ring bowl decoration dates to a slightly earlier period. This suggests that some of these Susquehannock pipes may also have been associated with the earlier Late Woodland II period occupation.

The inverted rim examples from the Wall site (31OR11) and Early Upper Saratown (31SK1) sites differ from those found on Susquehannock and the Accokeek Creek site. The inverted rim pipe at the Wall site does not exhibit the gradual, more subtle curve found on tulip pipes but curves inward dramatically from a point lower on the rim (see Figure 7.1d). The inverted example from Early Upper Saratown also does not conform to the form of Susquehannock pipes.

Another attribute category solely associated with Susquehannock sites consists of three rims with areas that have been molded into points or corners. In one case, the rim was molded into a single point. Two other rims were molded into four corners, or castellations, which are considered a defining trait of pottery associated with the Native peoples who occupied the Susquehanna River.

In contrast to the more localized distributions of the rim shapes mentioned above, two traits identified in the dataset exhibited more dispersed geographic distributions. The trait with the most extensive distribution was rounded, unfinished rims. These rims had received no embellishment. The vast majority of bowl rims present in the dataset (n = 138) were rounded and this shape was found on pipes from all three time periods and nearly every site assemblage.

The other shape attribute in the dataset that exhibited a wide geographic distribution was the flared rim (Figure 7.2e). However, the wide distribution of this characteristic is a result of the fact that it was found in two areas that were distant from each other in time as well as space. The distribution of this form changes dramatically from the Late Woodland II to Contact period as flared rims were found on a number of sites on the border of Virginia and North Carolina during the Late Woodland II period, but are only found in southern Pennsylvania during the Contact period. However, it should be noted that the lack of flared rims in the southern Virginia locale during the Contact period could be due to the smaller sample size of sites.

Finally, the one unique rim characteristic that was identified in the dataset was a flange on a pipe that dated to the Late Woodland I period. This flange was actually an elaborate decoration on a pipe from the Leesville mound. The flange consisted of rounded pedal-like carvings that encircled the entire bowl. This was the only example of such a decoration present in the dataset.

Bowl Body Attributes

Bowl shape was the most difficult attribute to identify in the dataset due to the breakage patterns of pipes. Although a fairly large contingent of elbow bowl fragments was present (n = 322, see Table 7.2) a large number (n = 131) were small enough to preclude shape identification. This greatly contrasts with 431 elbow stem fragments, all of which could be identified to shape. The smaller number of identifiable bowls is at least partially due to the fact that bowls are thinner than stems and more fragile. Moreover, it is more difficult to identify a bowl shape from a fragment than a rim or stem shape. Nevertheless, those elbow bowl bodies whose shapes could be determined were assigned to one of ten categories, bulbous, cylindrical, elongated, bulbous/elongated, trumpet, flared, squared, rounded square, and tulip. These shapes are summarized in Table 7.2 and a number of them are illustrated in Figures 7.3 and 7.5. The distributions of the different shapes are illustrated in the Figures 7.4a, 7.4b, and 7.4c.

One general observation that can be offered about bowl shapes is bowls, unlike other areas of the pipe, exhibited a large number of traits that did not adhere to any boundaries that had previously delineated by researchers. Out of the ten shape categories examined here, only two attributes, tulip bowls and bulbous/elongated bowls, exhibited what could be characterized as more clustered distributions. The rest of the bowl shapes were widely dispersed throughout the region.

Pipe bowls with sides that curved outwards from the base but end in an inverted rim exhibited the most clustered distribution. All of the examples of these pipes (n = 20) were found on the Contact period Strickler (36LA3) site. All of the bowls with this shape are quite distinctive and fall into what Kent (1984) previously has described as "tulip" bowls.

The second category of bowl shape that exhibited a more restricted distribution was bulbous/elongated bowls. These bowls displayed widths that were wider than lengths but were not as short or squat as other bowls present in the dataset. These bowls were an amalgam of the characteristics used to differentiate two other categories, elongated bowls and bulbous bowls, which I will discuss below. A small concentration of sites along the Dan and Smith Rivers in southcentral Virginia had elbow pipes with this bowl shape. Other sites with these shapes were located further east, including Abbyville (44HA65).

Table 7.2: Elbow bowl shapes

Bowl Shape	Late Woodland I	Late Woodland II	Contact	Total
Elongated	0	35	8	43
Cylindrical	4	32	13	49
Bulbous	2	21	6	29
Bulbous Elongated	2	6	1	9
Flared	0	5	1	6
Squared	0	2	1	3
Trumpet	0	1	4	5
Rounded Square	0	1	0	1
Tulip	0	0	39	39
UNID	8	101	22	131
Total	16	204	95	315

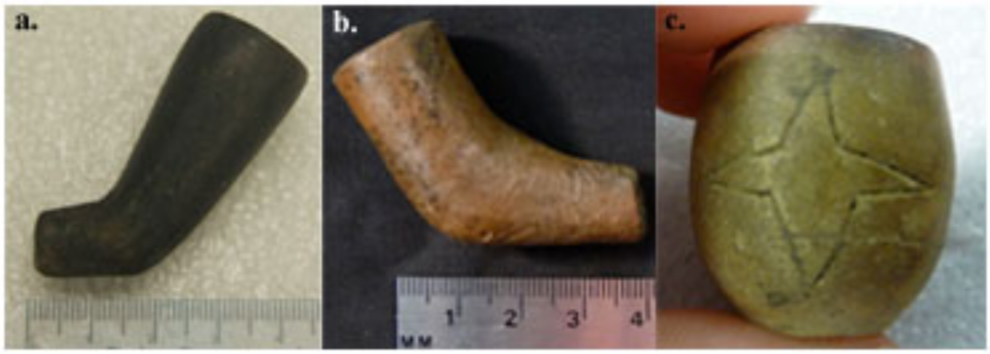


Figure 7.3: Bowl attributes in dataset: a) Elongated bowl, b) Cylindrical bowl, c) Bulbous bowl

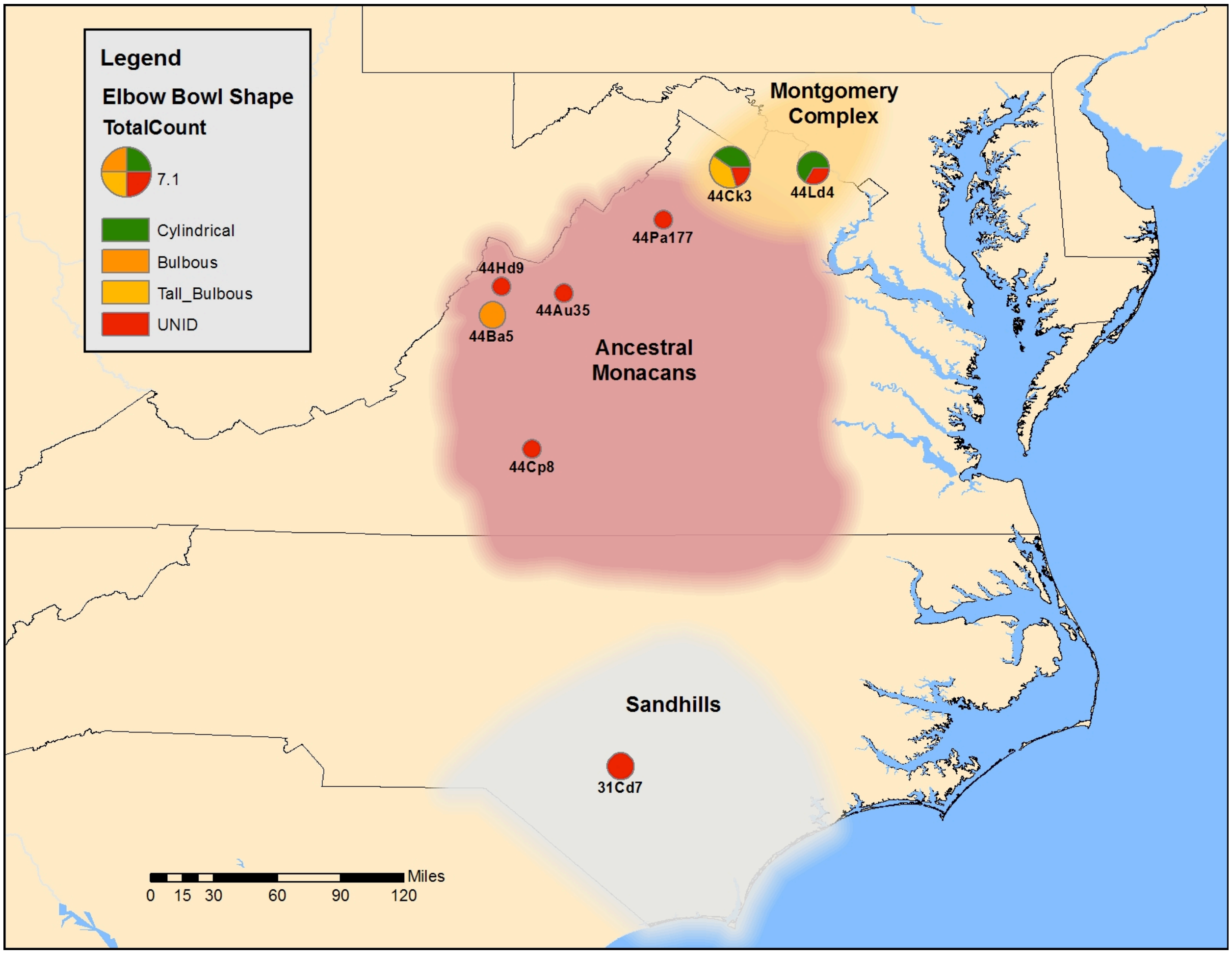


Figure 7.4a: Proportions of bowl shapes among Late Woodland I Period sites

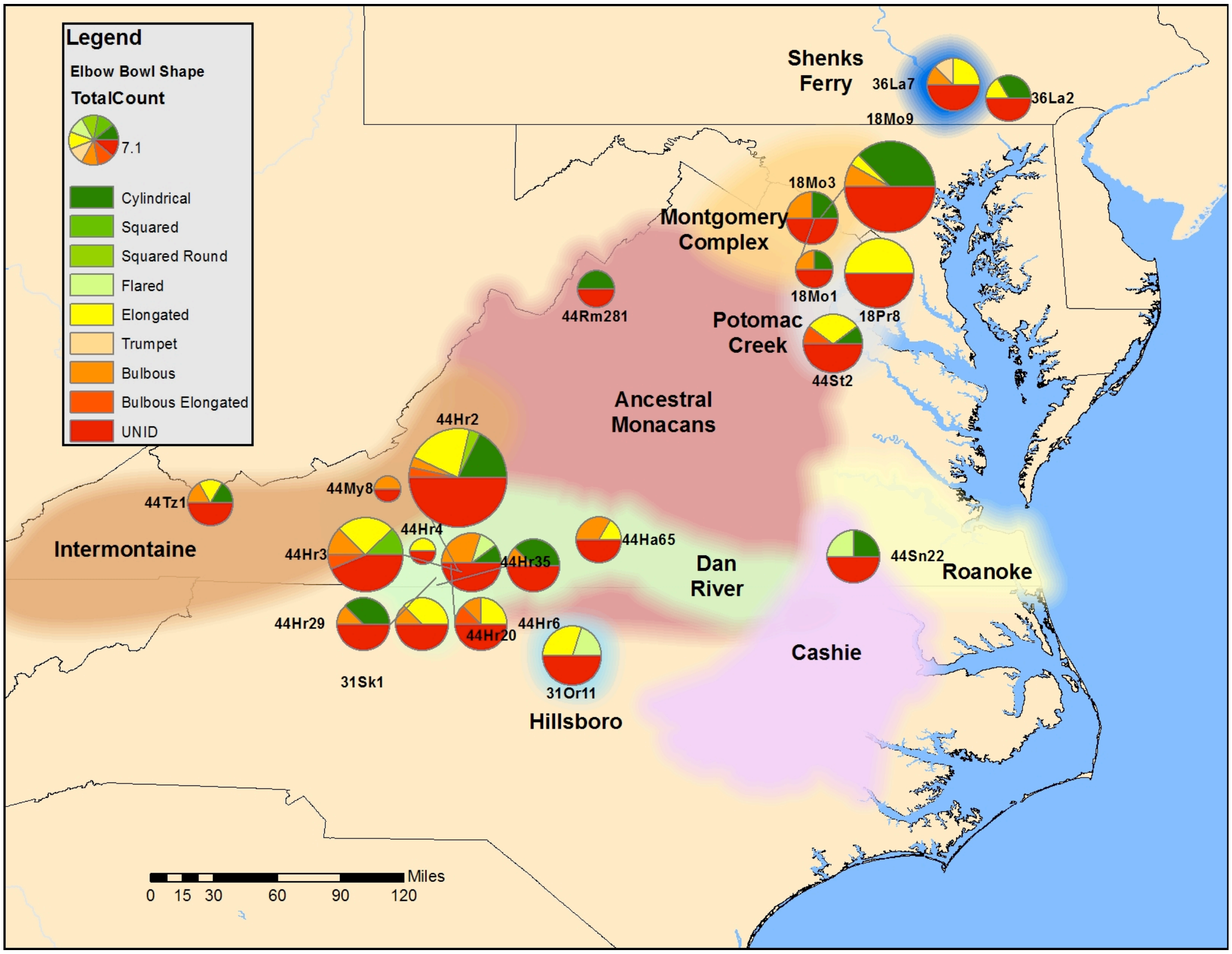


Figure 7.4b: Proportions of bowl shapes among Late Woodland II assemblages

Moving onto shapes that exhibited more dispersed distributions, the most prevalent shape in the dataset was the elongated bowl. These bowls were rounded but were not as squat or short as other varieties, such as bulbous bowls. Additionally, the sides were slightly convex, not straight like cylindrical bowls. No elongated bowls were found among Late Woodland I sites. However this shape exhibited a wide geographic range on Late Woodland II period sites from southeastern Pennsylvania to south central Virginia. This shape also exhibited a wide distribution on Contact period sites. Given the wide distribution its production and use does not seem to be tied to any particular area. Rather it seems to be a form that was used throughout the region.

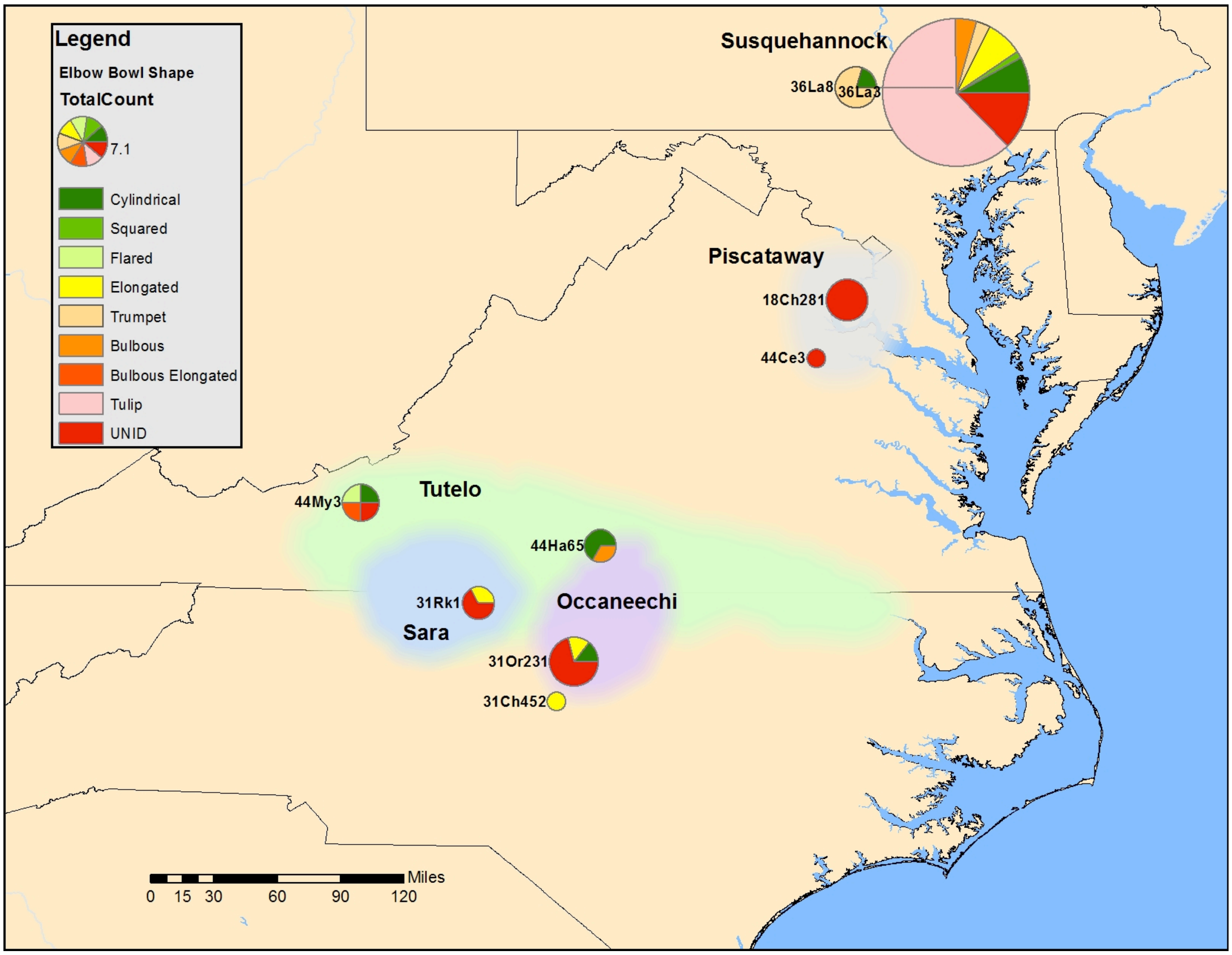


Figure 7.4c: Proportions of bowl shapes among Contact Period sites

The term cylindrical was used to describe bowls with long sides that did not curve in or out but ran straight or fairly straight from the base to the rim. A small number (n = 4) of cylindrical bowls were present on two Late Woodland I sites, Kerns (44CK3) and Fisher (44LD4), which are both located in northcentral Virginia and are considered to be part of the Montgomery Complex. While one might be tempted to associate this shape with Montgomery Complex sites the Late Woodland II and Contact period maps reveal that the cylindrical shape was found on sites all over the region and does not seem to be associated with any particular group in later periods. Currently it is difficult to determine whether this drastic variation of geographic range between the early and later periods is a product of the smaller sample size of sites in the Late Woodland I period or is actually representative of a some kind of wider spread adoption of this form in later periods. Further research of Late Woodland I sites is needed to provide more information on how this shape may have varied through time.

The next category of bowl attribute was the bulbous bowl or bowls that exhibited larger widths than heights. Although Coe (1952) and other researchers (Ward and Davis 1993, 1999) have discussed the distribution of tubular pipes with bulbous "onion bowls" amongst sites in southern Virginia and northern North Carolina, the distribution of this shape on elbow pipes has not been discussed. The sides of bulbous bowls sloped outwards and were convex shaped. Like cylindrical bowls, the geographic distribution of bulbous bowls was constricted during the Late Woodland I period. Only two examples of this shape were present in the Huffman site (44BA5) assemblage. Again however, in the Late Woodland II period, bulbous bowls are found in varying quantities on 12 sites that were spread out all over the region. Looking at Contact period sites, bulbous elbow bowls were only found on only two sites, Abbyville (44HA65) and Strickler (36LA3) but these sites are far removed from each other in geographic space. However, interestingly, at least one pipe with this shape at the Abbyville site was from the Central Terrace subarea, which is believed to have been occupied by a group of Susquehannocks in the first quarter of the seventeenth century (Wells 2002).

Flared bowls comprised the next category. These bowls exhibited bodies that flared outward from the base to the rim. In some cases these bowls also had flaring rims, but this category was used to capture the flaring shape that also occurred in the lower body of the bowl. I should also note that this shape encompasses Kent's (1984) trumpet bowl designation because in his description, the primary distinguishing factor are the flaring sides and rim of these bowls. In order to make this characterization comparable with other bowls demonstrating the same attribute, I did not distinguish between flared bowls and trumpet bowls when looking at the spatial distribution of this type using GIS.

The flared shape was found on a three Late Woodland II period sites in southern Virginia including Belmont (44HR3), Wall (31OR11), and the Hand site (44SN22). A bowl with this shape was also found on Schultz Farm site (36LA7) in southeastern Pennsylvania. Moving onto Contact period sites, this bowl shape was found in larger quantities on the Strickler site (36LA3), but only one example is found on a site further south, the Trigg site (44MY3).

Figure 7.5 illustrates that flared bowls, although sharing the same basic body form, exhibited a number of variations. For instance, the two bowls illustrated in Figure 7.5 exhibit are different heights, which impact the degree to which bowls flare outward. This demonstrates how, although some general categories can be created to capture basic similarities of forms, individual variation was still prominent.

Figure 7.5: Flared bowls in dataset (Pictures courtesy of the Smithsonian Institute National Museum of Natural History and Pennsylvania State Museum)

The final bowl shape identified in the dataset, squared bowls, comprised a very small proportion of the sample (n = 4) but were very distinctive. These bowls had four corners shaped into the body of the bowl so that they looked like a square when viewed from above. Only four examples of this bowl shape were found in the dataset. The first two were in the Late Woodland II period assemblage from the Belmont site (44HR3). The third was from the Contact period Strickler site (36LA3) assemblage. One unique variation of this shape came from the Box Plant site (44HR2). The squared bowl elbow pipes from the Belmont site were made of clay, while the squared bowl pipe from the Box Plant site was made of chlorite schist. Additionally, the squared bowl pipe from the Box Plant site is more rounded than the ones found at Belmont. Finally, the lone example from the Contact period Strickler site (36LA3) also exhibits characteristics that differ from the other two pipes. The squared pipe bowl from Strickler differed greatly from the other two clay pipes from the Belmont site in that its rim was molded into four corners. The other pipes had collared rims but the squared shape was not present in the body of the bowl.

Bowl/Stem Junctures

Ten different attributes were identified amongst elbow bowl/stem junctures present in the dataset. These characteristics are summarized in Table 7.3 and illustrated in Figure 7.6. Figures 7.7a, 7.7b, and 7.7c illustrate the different bowl/stem juncture shapes present on Late Woodland I, Late Woodland II, and Contact period sites in the region. Like bowl shapes, the majority of stem/bowl juncture shapes did not adhere to previously defined cultural and linguistic boundaries. Only two juncture shapes, curved junctures, and junctures with spurs coincided with the cultural boundaries previously identified by researchers. All pipes with curved junctures were associated with

Figure 7.6: Stem/Bowl juncture attributes: a) Flattened, b) Slight spur, c) Rounded, d) Bulbous, e) Long thin heel (Picture s courtesy of the Pennsylvania State Museum, Maryland Archaeological Conservation lab and the Smithsonian Institution National Museum of Natural History)

Table 7.3: Bowl/stem juncture shapes

SBJ Shape	Late Woodland I	Late Woodland II	Contact	Total
Flat	4	50	15	**69**
Slight Heel	0	37	5	**42**
Curved	0	3	27	**30**
Heel	1	15	3	**19**
Rounded	0	6	9	**15**
Spur	0	6	0	**6**
Bulbous	2	4	0	**6**
Long Rounded Heel	0	3	0	**3**
Slight Spur	0	1	0	**1**
Double Spur	0	1	0	**1**
Wing	0	1	0	**1**
UNID	8	43	32	**83**
Total	15	170	91	**276**

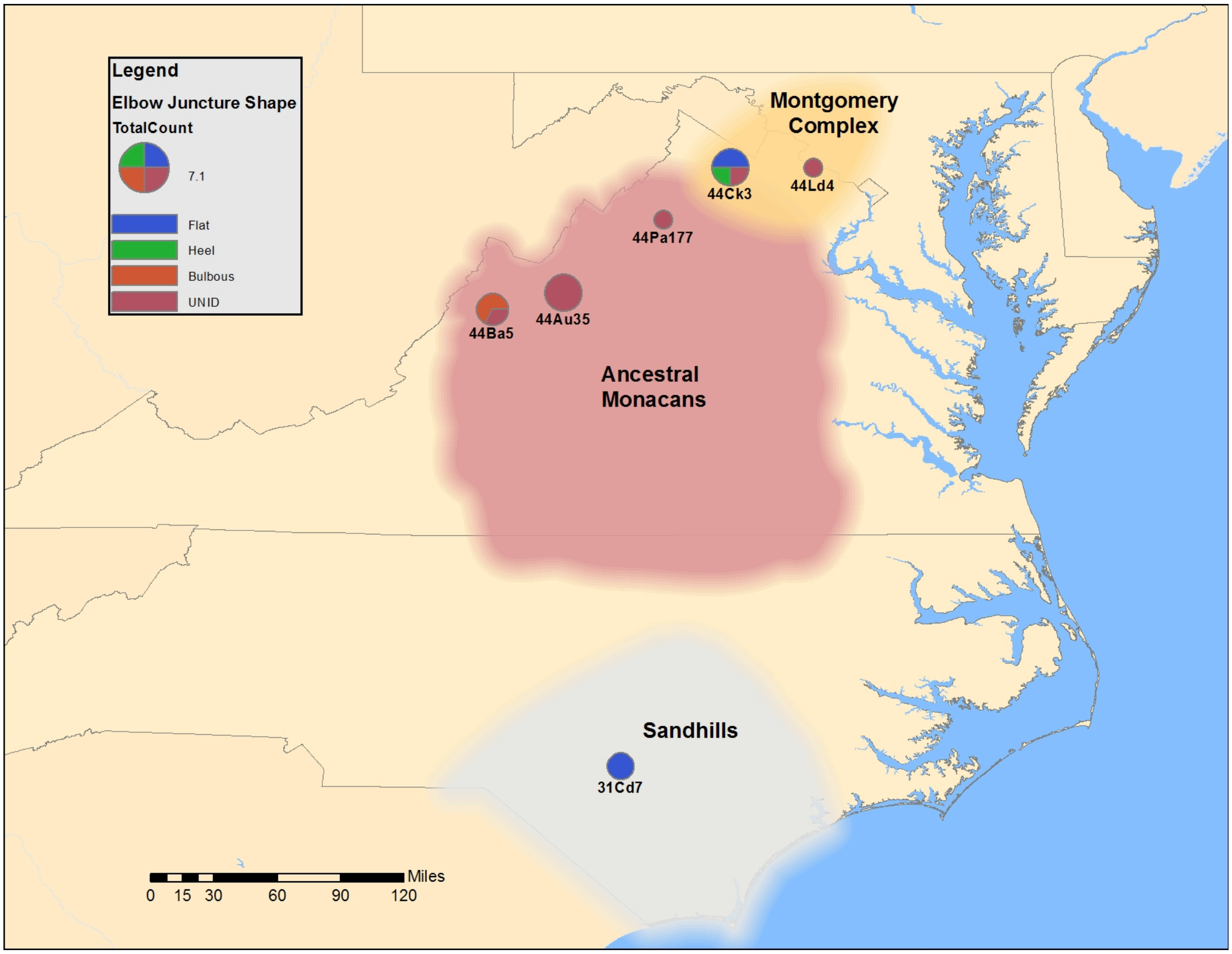


Figure 7.7a: Proportions of elbow juncture shapes present on Late Woodland I sites

Susquehannock sites. Additionally, all six elbow pipes that exhibited spurs were found in assemblages from sites in the Dan River cultural complex area.

The most widely utilized juncture shape was a flattened juncture. Flattened junctures were those where the exterior surface of the underside of the bowl base had been carved flat with a knife or another sharp implement. In essence the juncture was a flat surface for the bowl to sit upright on. Figures 7.7a, 7.7b, and 7.7c demonstrate that the production of this finishing technique was widespread throughout both time and space.

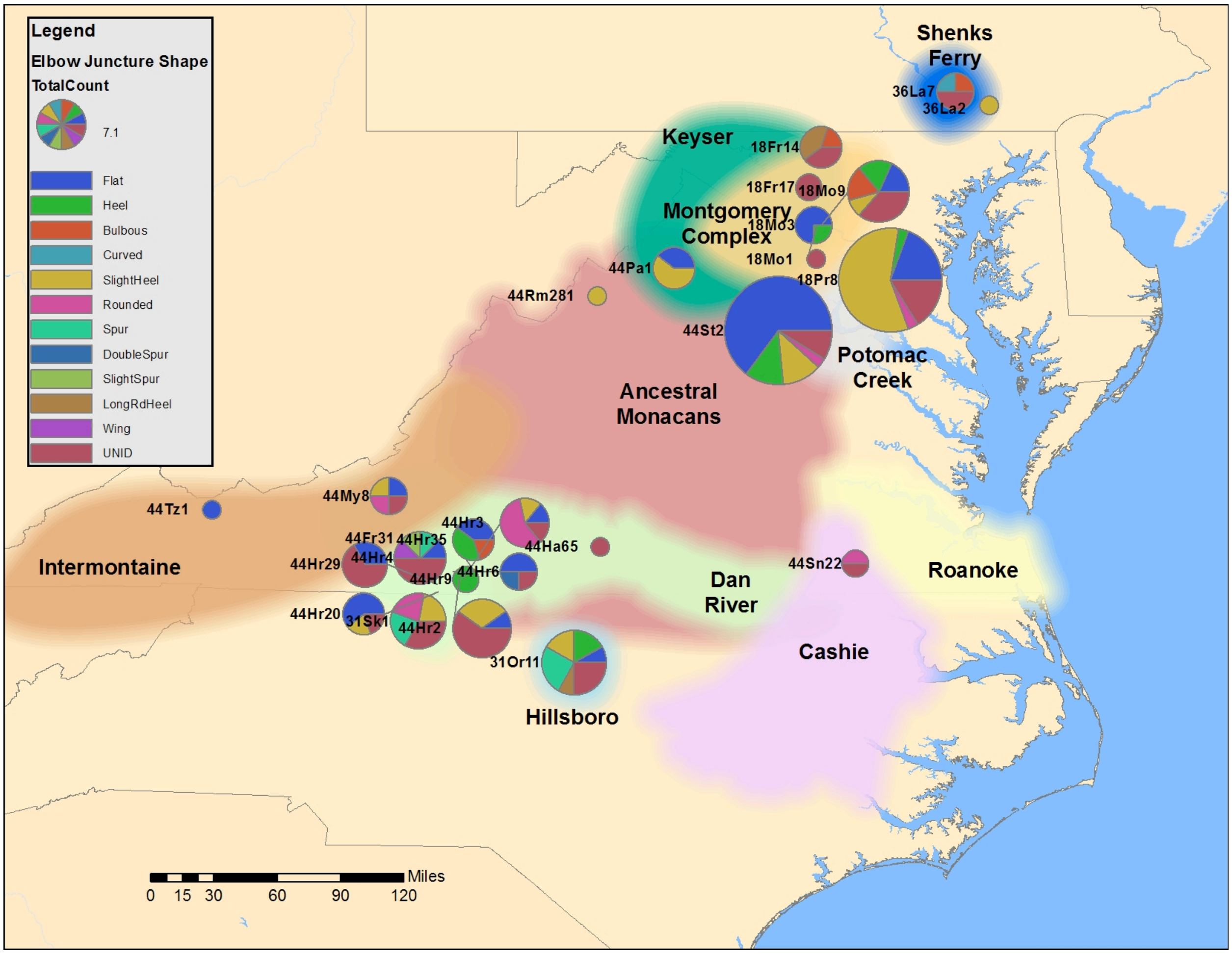


Figure 7.7b:Proportions of elbow juncture shapes present on Late Woodland II sites

Two other shapes that exhibited more embellishment but still had widespread distributions, were heels and slight heels. The term “heel” has been typically used to describe a raised, flattened pedestal that the bowl could rest on (Atkinson and Oswald 1969; Hume 1991; Grillo et al. 2003). A “slight heel” consisted of an area that was slightly raised and flattened at the base of the bowl but did not exhibit a pedestal. As illustrated in Figures 7.5a and 7.5b, this shape is found on 10 sites that are geographically spread out over the entire study area. Heeled junctures, although found in smaller quantities than slight heels were also widely spread throughout the region.

Interestingly, only 15 rounded junctures, which did not exhibit any finishing or

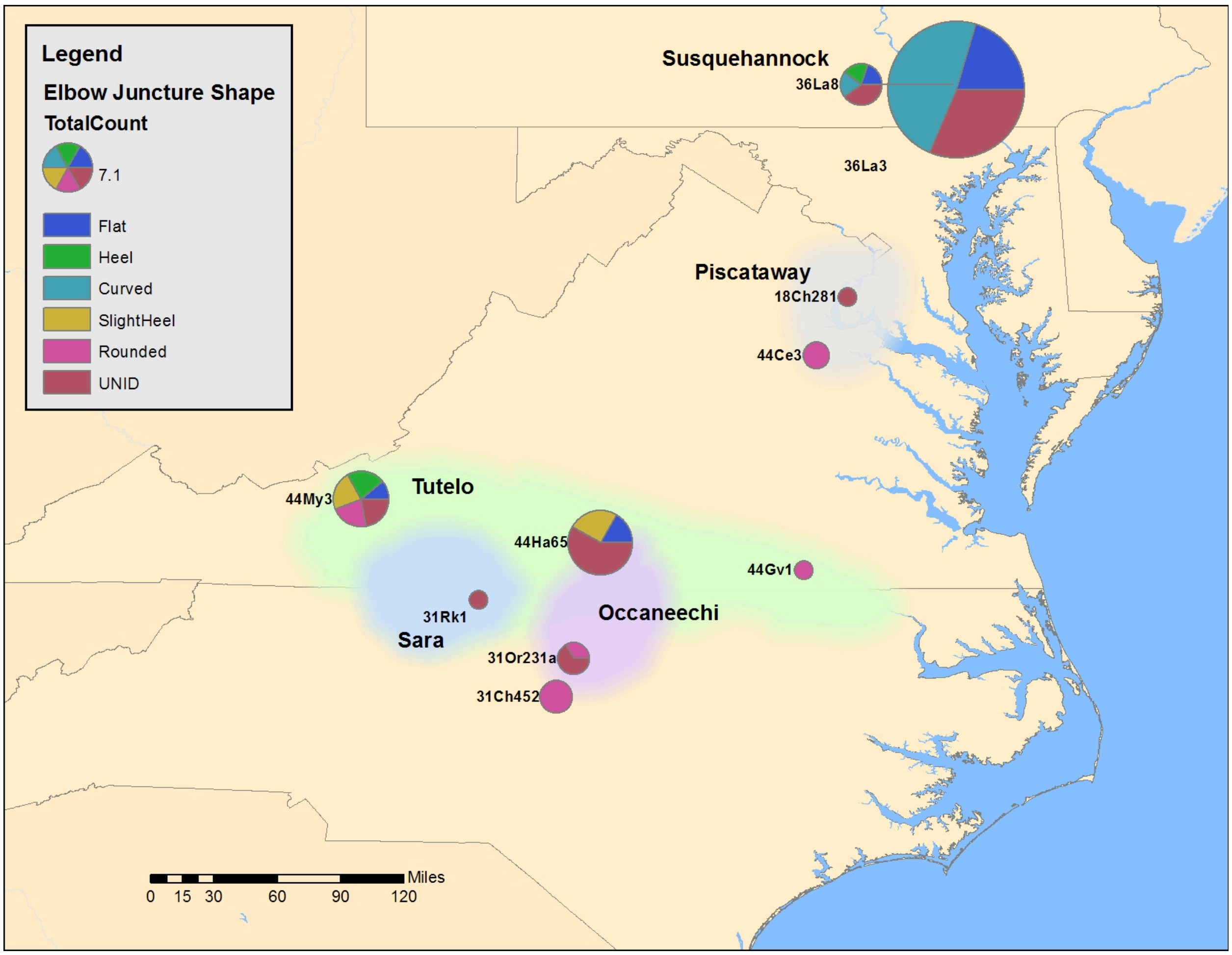


Figure 7.7c: Proportions of elbow juncture shapes present on Contact Period sites

embellishments, were identified in the dataset. All examples of rounded junctures were found on circular stems and were a continuation of the shape of the stem. Most of these examples were concentrated in southcentral Virginia but the distribution also extended to the Potomac Creek (44ST2) and Accokeek Creek (44ST2) sites in eastern Maryland and Virginia. Pipes with these junctures could not sit upright on their own, which is perhaps why so few of these examples were found in comparison to flattened junctures, or junctures with slight heels that could sit upright on their own.

Bulbous junctures consisted of a bulbous protrusion that had been carved into the base of the bowl. Bulbous junctures, despite their limited numbers, were widely distributed throughout the region. Junctures that exhibited this trait were found on sites spread throughout the region from Pennsylvania to North Carolina. One or two examples of this form were found at a number of different sites. Two of the examples of bulbous pipes were found on the Late Woodland I period Huffman site (44BA5) while each of the other four samples were found on a different Late Woodland II period site. Another juncture shape, a long rounded heel (Figure 7.6e), despite only being found on three pipes, was associated with two sites that were distant from each other, the Biggs Ford site (18FR14) located in northern Maryland, and the Wall site (31OR11). Although the sample sizes are small, the widespread distributions of these shapes are worth noting in case future examples are recovered.

Lastly, three different shapes, the slight spur, the double spur, and a winged juncture were each represented by one example in the dataset. Like the slight heel, the slight spur was a spur that was not as pronounced as the spurs found on other pipes in the dataset. The double spur consisted of two small spurs found on the bottom of the bowl that were pointing out at opposite angles from one another. The winged juncture had a separate piece of clay attached to its surface that pointed downward and ran along the bottom of the juncture and part of the stem. Each of these singular examples were found on different sites.

Stem Attributes

Eight different categories were created to capture the variation present amongst elbow stems, circular, squared, rectangular, triangular, alate, curved, and hexagon. These shapes are summarized in Table 7.4. Figures 7.8a, 7.8b, and 7.8c illustrate the different bowl rim shapes present on Late Woodland I, Late Woodland II, and Contact period sites. A select number of these attributes are illustrated in Figures 7.9, 7.10, and 7.11.

Like curved stem bowl junctures, curved stems associated with Susquehannock sites exhibited the most clustered distribution of the different types of stem shapes found in the dataset. The second largest category in the elbow pipe dataset was curved stems (Figure 7.7). These stems are very distinctive. As noted by Kent (1984:146-151) these stems are found on sixteenth and seventeenth century Susquehannock sites. As illustrated by Figure 7.8c, the largest quantities by far are found on the Striker site (36LA3). Interestingly, however, the complete examples of these forms are often characterized by bowl shape with a complete disregard for the stems. The bowl shapes, which were discussed above, have received the most attention because they exhibit changes that are time sensitive. Yet the curved stem is also extremely distinctive and for many is considered indication of the presence of Susquehannock individuals or contact with them.

For example Stephenson (1963:137-138) also identified examples of curved stems in the Accokeek Creek assemblage (18PR8). A reexamination of these stems by this researcher

Table 7.4: Elbow stem shapes

Stem Shape	Late Woodland I	Late Woodland II	Contact	Total
Circular	3	225	157	385
Squared	0	5	0	5
Rectangular	0	2	0	2
Triangular	0	2	0	2
Alate	2	2	0	4
Curved	0	4	28	32
Hexagon	0	0	1	1
Total	**5**	**240**	**186**	**431**

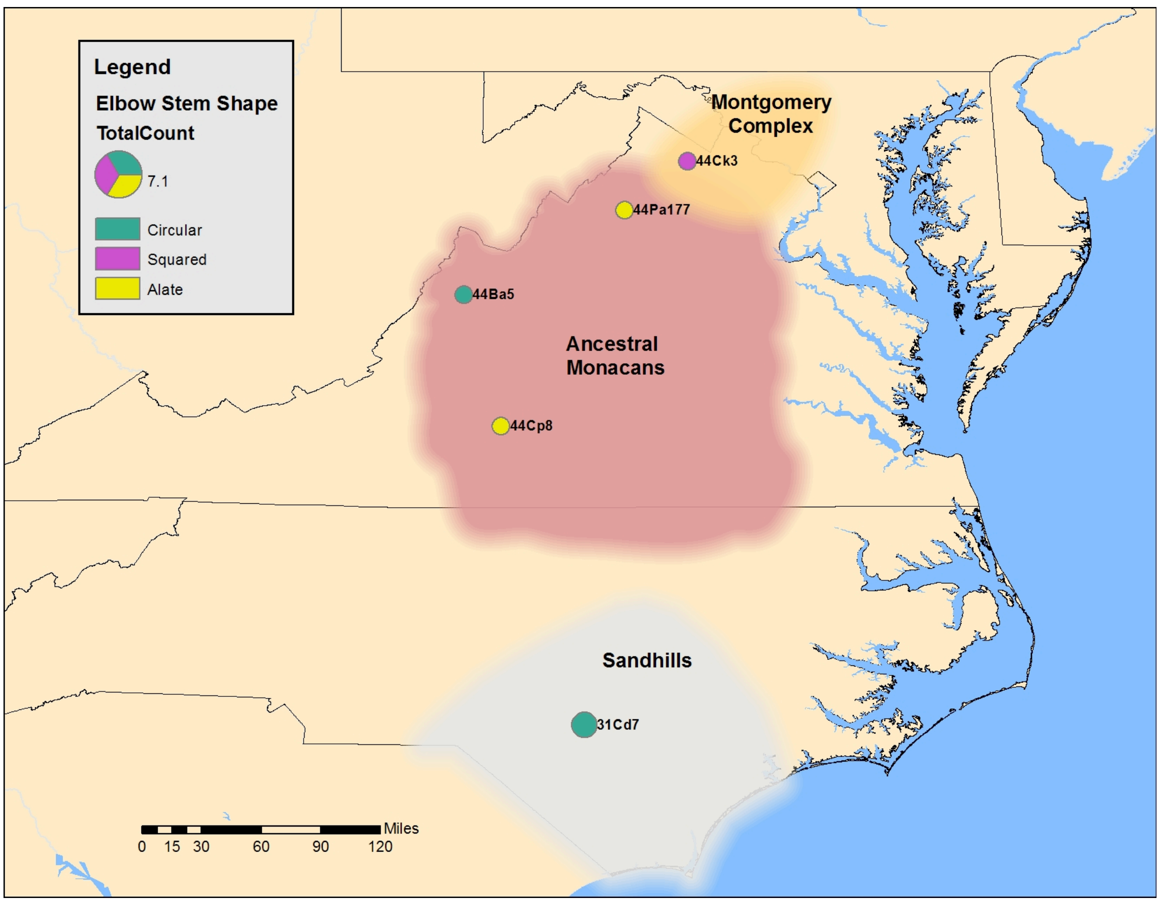


Figure 7.8a: Proportions of elbow stem shapes on Late Woodland I sites

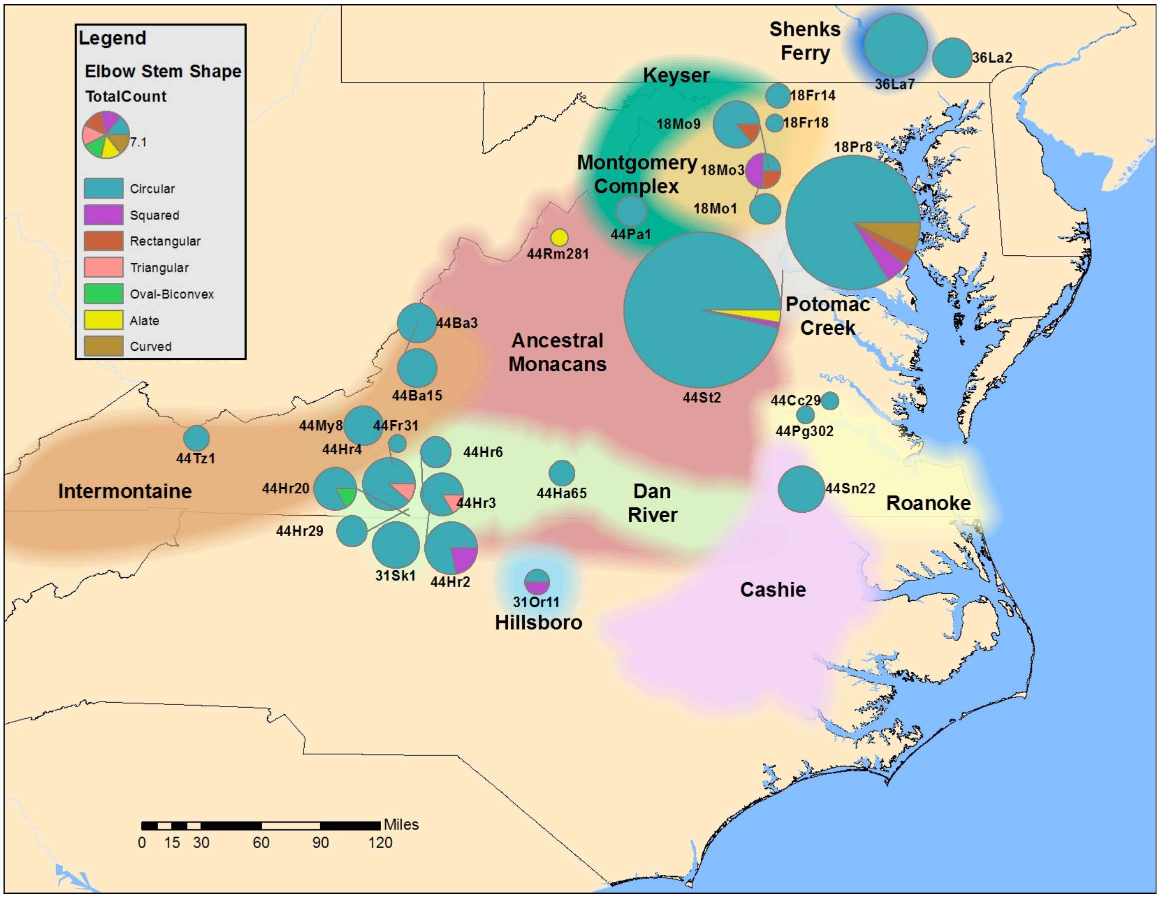


Figure 7.8b: Proportions of elbow stem shapes on Late Woodland II sites

confirmed their resemblance to those found in archaeological collections from Susquehannock sites (see Figure 7.9 for a visual comparison). As previously mentioned the presence of these stems is likely linked to the Susquehannock Fort occupation that was established in 1676 after a contingent of the Susquehannocks departed the Stricker site. The geographic distribution of these pipes only increased throughout the later half of the seventeenth century. They have been found on Contact period site assemblages as far south as North Carolina (Ward and Davis 1993; Eastman 1999:140). This could be due to the increased usage of the Great Warrior trading path which ran north/south throughout Virginia and North Carolina or due to the migrations of the Susquehannocks instigated by the infringement of the Seneca and European settlers into their original home territory.

The rest of the shapes present amongst stem fragments exhibited widespread geographic distributions. As illustrated by Table 7.4, the vast majority of stem fragments (n = 391) from identifiable elbow forms were circular. Not surprisingly, these figures demonstrate that the geographic extent of circular forms was extensive. Additionally, their production and use persisted from the tenth to seventeenth centuries and far outstrips that of all the other forms. None of the other shapes identified in this study spanned all three time periods.

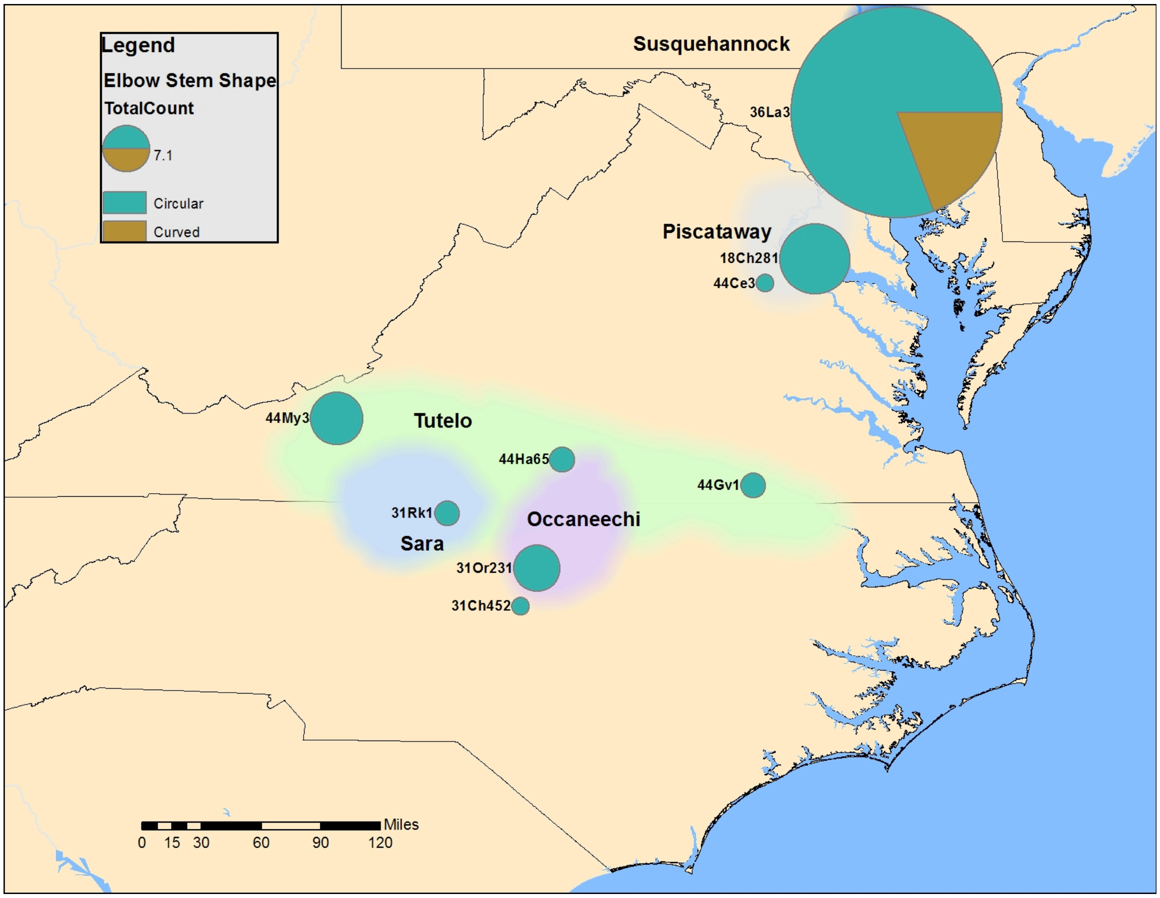


Figure 7.8c: Proportions of elbow stem shapes on Contact Period sites

Figure 7.9: (Left) Curved stem pipe from Strickler site (36LA3). (Right) Curved stem fragment from Accokeek Creek site (Photos courtesy of Pennsylvania State Museum and the University of Michigan Museum of Anthropology)

The next largest shape category present in the dataset were squared stems (Figure 6.10). The exteriors of these stems had been carved into four flat sides that met at four corners. Elbow pipes with squared stems were recovered from five sites, Potomac Creek (44ST2), Accokeek (18PR8), Wall (31OR11), Box Plant (44HR2), and Shepard (18MO9). Judging from the evidence available to date, only Native groups occupying sites during the Late Woodland II period employed this form. One squared stem elbow pipe from the Box Plant (44HR2) site was recovered from a radiocarbon dated pit context. This date returned a 2σ date range from A.D. 1295-1434, which places the use of this attribute in the latter half of the Late Woodland II period.

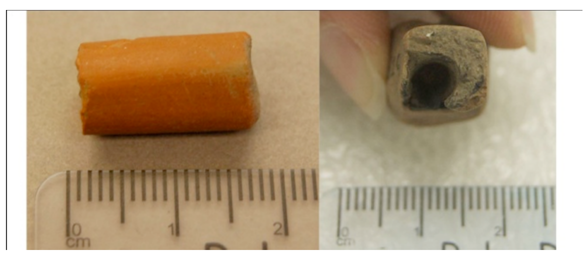


Figure 7.10: (Left) Circular Stem, (Right) Squared stem cross section (Photos courtesy of the Maryland Archaeological Conservation Lab and Smithsonian Institution's National Museum of Natural History

The presence of pipes with this attribute on sites occupied during the sixteenth century, such as the Wall site, suggests a long date range for this attribute. Nevertheless, no pipes from Contact period contexts exhibited this attribute.

The alate stem form was represented by four samples from four different sites. Alate stems had wings on each side of the bore (Figure 7.11). Due to the wings, the mouthpiece takes on a biconvex shape. The extremely limited presence of alate stems on elbow pipes is not surprising. As noted in the previous chapter this shape is generally restricted to platform and bent tube stems. Interestingly, three of the four alate stem samples in the dataset were found on stone pipes in three different mound contexts, Bowman (44RM281), Leesville (44CP8), and Brumback (44PA177). The majority of platform and bent tube pipes with this shape also came from mound contexts. The one pipe that exhibits this shape from the Potomac Creek site was recovered from a general plowzone context. It is the only example made of clay while the other three examples are made of stone. The presence of a clay pipe with the same shapes as stone pipes suggests that similar ideas may have been influencing pipe production in these different areas.

Mouthpiece Attributes

Mouthpieces were the area of the pipe that exhibited the most variability in shape. This is particularly interesting given that this is the part of the pipe that is likely to have been least visible because it was often covered or obscured when the pipe was smoked. Thirteen different categories were created to capture the variation present amongst elbow mouthpieces. These shapes are summarized in Table 7.5. Figures 7.12a and 7.12b illustrate the different mouthpiece attributes present on Late Woodland II and Contact period sites in the region. A selected number of attributes are illustrated in Figures 7.13 and 7.14. Not enough samples were

Table 7.5: Elbow mouthpiece shapes

	Late Woodland I	Late Woodland II	Contact	Total
Rounded	1	66	32	**99**
Cut	2	36	31	**69**
Flange	0	13	0	**13**
Expanding Oval	0	11	0	**11**
Tapering Oval	0	8	0	**8**
Flared	0	5	1	**6**
Flattened Oval	0	2	0	**2**
Oval/Biconvex	0	5	4	**9**
Squared Cut	0	2	0	**2**
Square Flanged	0	1	0	**1**
Facet Flanged	0	1	0	**1**
Rectangular	0	1	0	**1**
Carved/Ground	0	0	1	**1**
UNID	5	132	110	**247**
FullTotal	8	283	179	**470**

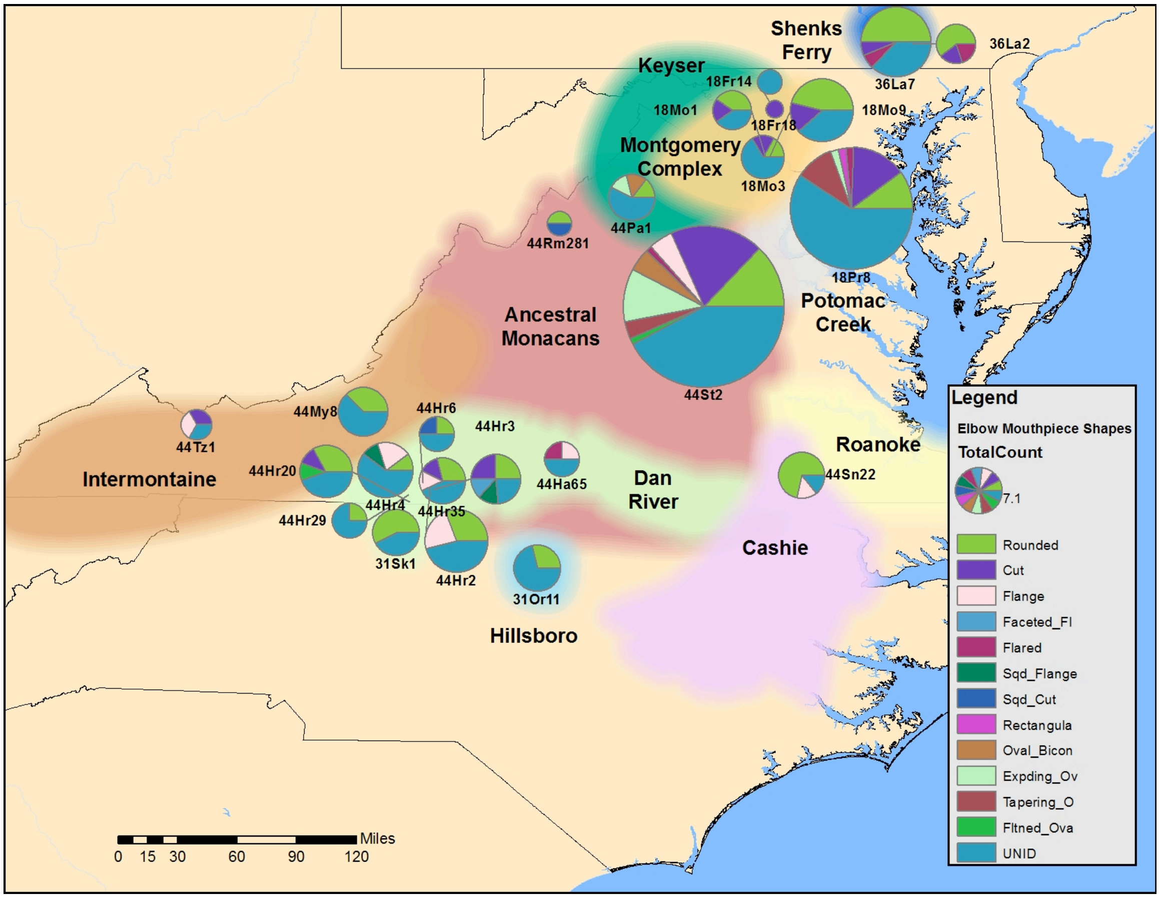


Figure 7.11a: Proportions of elbow mouthpiece shapes found on Late Woodland II period assemblages

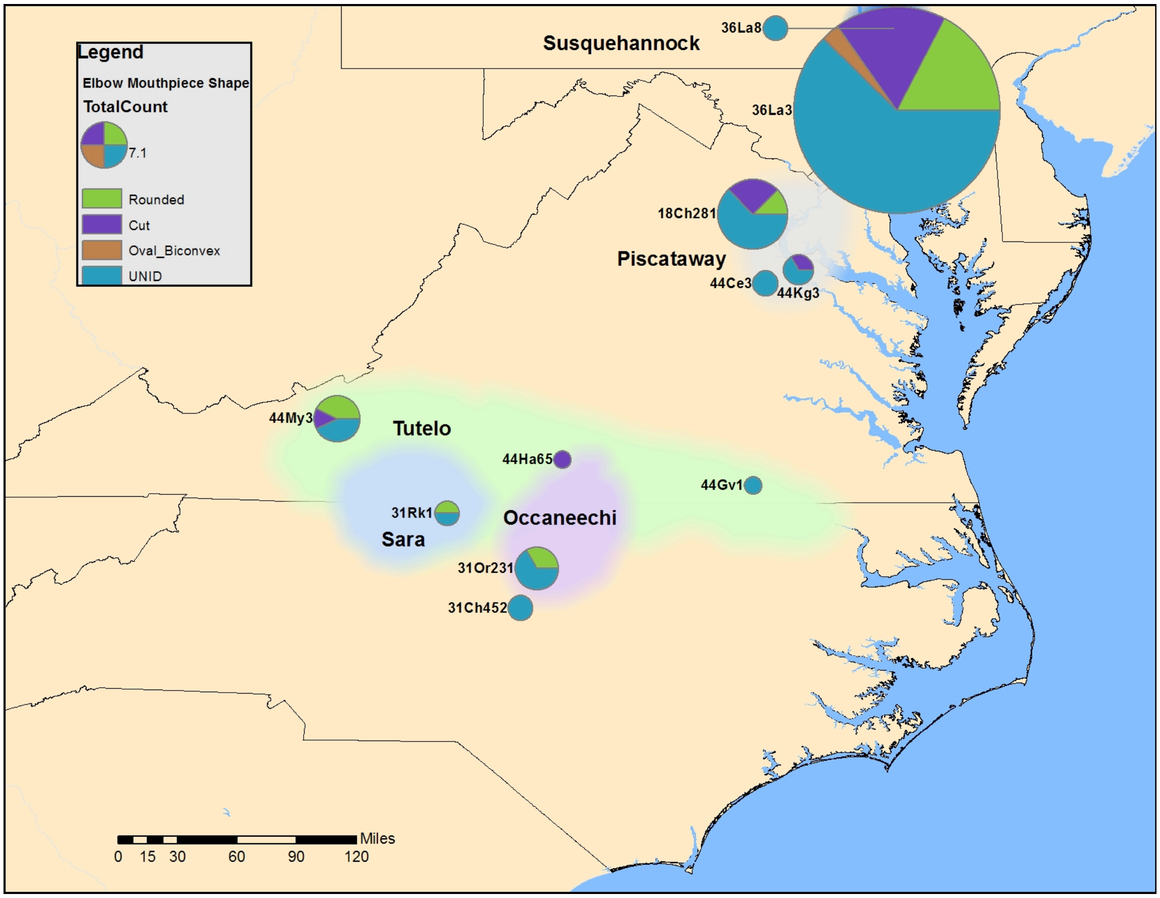


Figure 7.11b: Proportions of elbow mouthpiece shapes found on Contact period assemblages

Figure 7.12: Mouthpiece attributes a.) Expanding oval, b.) Round flange, c.) Expanding oval, d.) Rounded (Pictures courtesy of the Smithsonian Institution National Museum of Natural History, UNC Research Laboratories of Archaeology, and the Maryland Archaeological Conservation Lab)

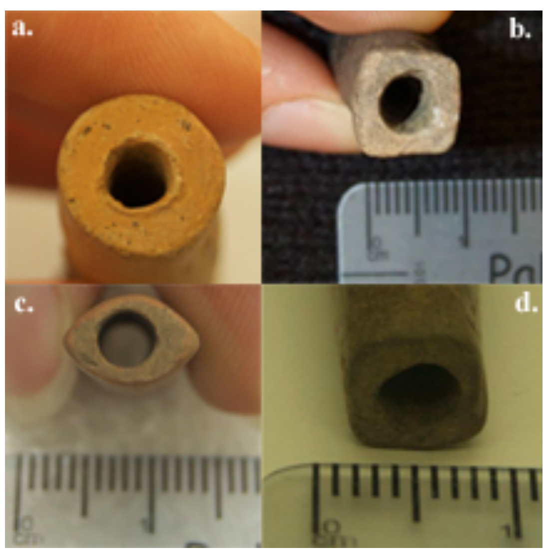


Figure 7.13: Mouthpiece attributes: a.) Cut, b.) Square flanged, c.) Oval/biconvex, d.) Square cut Pictures courtesy of the Smithsonian Institution National Museum of Natural History, UNC Research Laboratories of Archaeology, and the Maryland Archaeological Conservation Lab)

available from the Late Woodland I period sites to discern anything about their distributions so they were not mapped.

Two mouthpiece traits exhibited the most clustered distribution in the dataset. Both of these shapes have received attention from previous researchers. One trait was variously labeled as a broad bit (Stephenson et al. 1963:137), or as expanded or triangular bit (Blanton et al. 1999:69-72; Potter 1993:159). I retained the label expanded oval bits (see Figure 7.13a). These terms refer to the large width of these mouthpieces. The sides dramatically flare away from the stem and when viewed from above, these mouthpieces look like a triangle. A variant of this style, the tapering oval (see Figure 7.13c) was also present in the dataset. As illustrated in Figure 7.12a, the largest concentration of these bits is found at the Potomac Creek (44ST2) and Accokeek Creek sites (18PR8) although isolated examples are also found on the Keyser site (44PA1). I will examine the social implications of these patterns in more detail in Chapter 8 when I discuss the results of LA-ICP-MS testing of samples from these four sites.

Figure 7.12a illustrates that oval mouthpieces of other varieties were also found in the dataset. A small sample of the oval mouthpieces was biconvex in shape (Figure 7.14c). Most of these mouthpieces were associated with the Potomac Creek (44ST2) and Keyser sites (44PA1) but a few were also found on the Stickler (36LA3) site. One last oval shape present in the dataset was the flattened oval. The upper and lower sides of the oval on these mouthpieces were flattened, not convex like the other shapes. The two examples of this attribute were present on the Accokeek Creek site. Despite some differences in shape, in general the distribution of oval mouthbits seems to be restricted to the upper northeastern part of the study region.

The next largest category consisted of mouthpieces with a small thin flange encircling the tip of the stem (Figure 7.13b). As previously noted by Eastman (1999) and Davis et al. (1998) pipes used by Native groups on Dan River phases sites were primarily plain except for these kinds of embellishments. As illustrated in the figures below, like rim flanges, this shape is found on a number of Dan River sites but is also found on sites outside of this general area, including the Hand site (44SN22), the Abbyville site (44HA65), the Potomac Creek site (44ST2), and the Crab Orchard site (44TZ1). Additionally, like the flanged bowl rims that were discussed previously, two of the flanged mouthpieces present in the dataset were squared (Figure 7.14b). They were found on the Belmont (44HR3) and Philpott (44HR4) sites. Interestingly both of these square flanged mouthpieces co-occurred with squared flanged bowl rims. Moreover, both of these pipes were interred with elder adults, suggesting that pipes with these distinctive embellishments may have been important possessions for these individuals.

Like the other parts of the pipe, the greatest number of mouthpieces were unfinished or were cut to create a small flat surface. Rounded mouthpieces exhibit no finishing (Figure 7.13d). The rounded edges of clay mouthpieces were created when the reed or other implement was inserted into the stem to make the bore. For stone pipes, the rounded edges of a mouthpiece were created when the drill or other stone implement was used to make the bore. The other category that was most frequently found in the dataset was cut mouthpieces. The bits of these pipes had been finished to the degree that a flat, smooth surface was created when a knife or sharp implement was used to cut off the rounded tip of the bore. The resulting mouthpiece has a smooth, flat surface (Figure 7.14a).

Two mouthpiece attributes were present in very small proportions but exhibited widespread distributions. Six mouthpieces were flared but these mouthpieces were spread throughout four different sites. Two squared mouthpieces that were cut, rather than flanged, were found on two different sites (Figure 7.14d). Finally two attributes present in the dataset seem to be examples of unique bits. One rectangular mouthpiece was found on the Accokeek Creek site (18PR8). Additionally one facet flanged mouthbit was present on the Belmont site (44HR3).

Figure 7.14: Elbow pipe with alate stem from Bowman Mound (44RM281) (Photo courtesy of the Smithsonian Institution National Museum of Natural History)

Five specimens present in the dataset exhibited shapes that were found in extremely limited varieties in the dataset. Two triangular forms were associated with two different Late Woodland II period sites, Stockton (44HR35) and Philpott (44HR4). Both of these sites are located in the Dan River cultural area. Based on this small sample it would seem that Native communities located in the Dan River area were the primary producers of stems with this shape but it is difficult to draw any conclusions based on this sample size. Two rectangular stems and one hexagonal form were also present in the sample. The two rectangular stem forms were associated with the Accokeek Creek site (18PR8). The one hexagonal form was associated with the Strickler site (36LA3).

UNID Fragments

In this section, I discuss the characteristics of fragments that could not be identified with certainty to a form. Like the previous chapter, this chapter is divided into subsections that detail distributions of the different traits found amongst each part of the pipe, bowl rims, bowl bodies, junctures, stems and mouthpieces. In each subsection I first focus on the traits that were similar to those found on elbow pipes. I then discuss those characteristics that were unique to fragmented pieces and their distributions.

Bowl Rim Attributes

Many of the bowl rim traits identified among fragments reinforced the trends discussed in the elbow pipe section. For example, analogous to the pattern found amongst elbow pipes, rounded rims were by far the most popular rim shape amongst fragments. As illustrated in Figures 7.15a, 7.15b, and 7.15c, rounded rims were found on all sites and during all time periods. Clearly rounded rims cannot be associated with any one group but represent a convention that was widespread throughout the region.

Additional collared rim bowl fragments were also identified in the dataset. As illustrated in Figure 7.15a, more examples of this shape were found in the Kerns (44CK3) assemblage. The additional examples of this trait strengthen the alignment of its boundary with the boundary of the Montgomery Complex. Again, however, it is interesting that no examples of this technique were found amongst some of the larger Montgomery Complex assemblages included in the dataset. The Kerns assemblage contained by far the most examples of this technique (n = 8). An additional example of a collared rim was found on a stone pipe on the Woods site (44NE143) some hundred miles southwest of the Montgomery Complex territory. This specimen represented the only stone pipe fragment to exhibit this trait.

Another pattern initially identified amongst elbow fragments that was reinforced by my analysis of bowl rim fragments was the widespread distribution of round flanged rims. Sixteen additional examples of round flanged rims were identified amongst bowl fragments from five Late Woodland II period sites: Philpott (44HR4), Gravely (44HR20), Leatherwood Creek (44HR1), Box Plant (44HR2) Belmont (44HR3) sites. The addition of these samples demonstrates that the geographic distribution of the flange was even more extensive that the previously identified on elbow pipes as two additional sites, Philpott (44HR4) and Leatherwood Creek (44HR1) had fragments with this decorative technique. It should be noted that the two additional sites with this attribute are Dan River phase sites, which strengthens the association of this attribute with this phase. Nevertheless, my analysis of fragments uncovered additional round flanged specimens in the Trigg assemblage and other examples from the Abbyville (44HA65) and

Table 7.6: Bowl rim shapes among UNID fragments

Shape	Late Woodland I	Late Woodland II	Contact	Total
Rounded	13	113	126	252
Flanged	0	16	5	21
Inverted	0	5	9	14
Square Flanged	0	10	0	10
Flared	0	10	0	10
Collared	3	0	0	3
UNID	0	46	2	48
Total	16	200	142	358

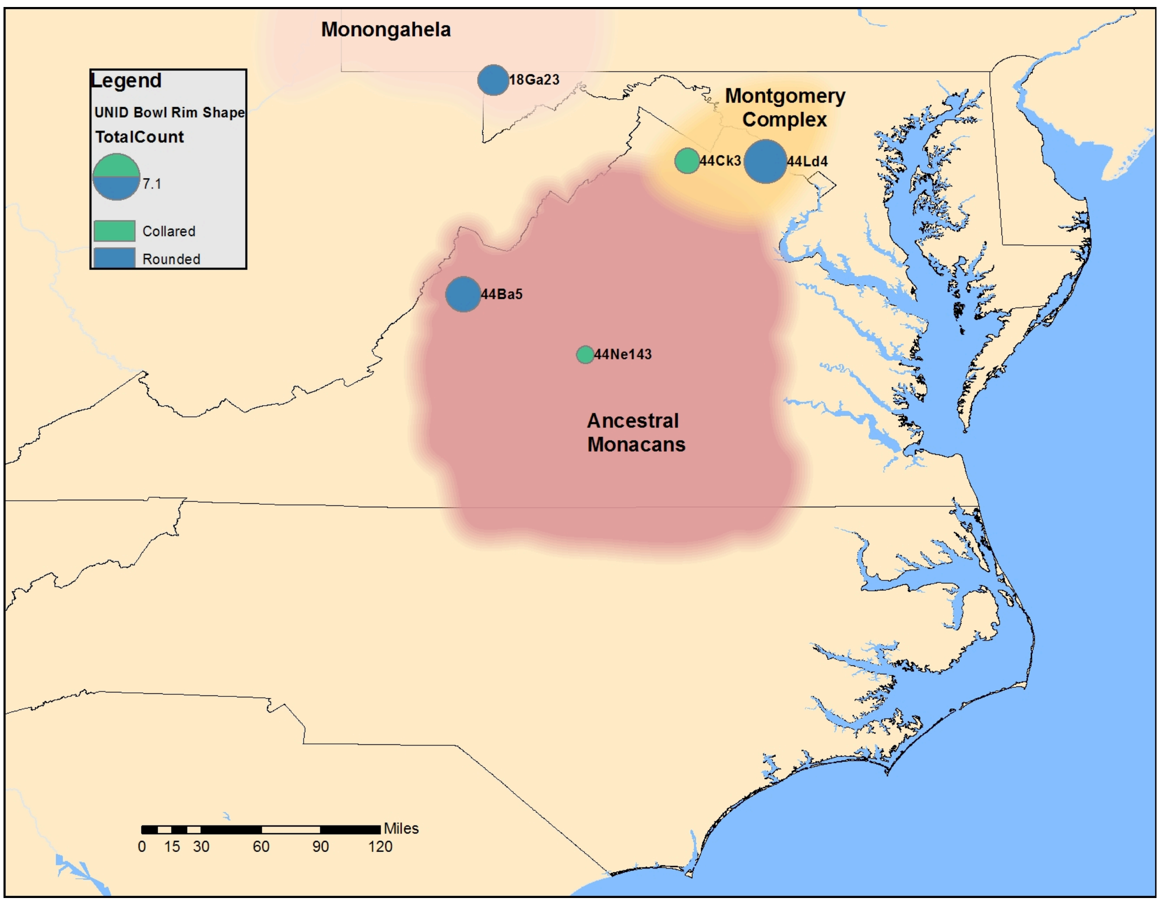


Figure 7.15a: Proportions of bowl rim shapes on fragments not identified to form on Late Woodland I sites

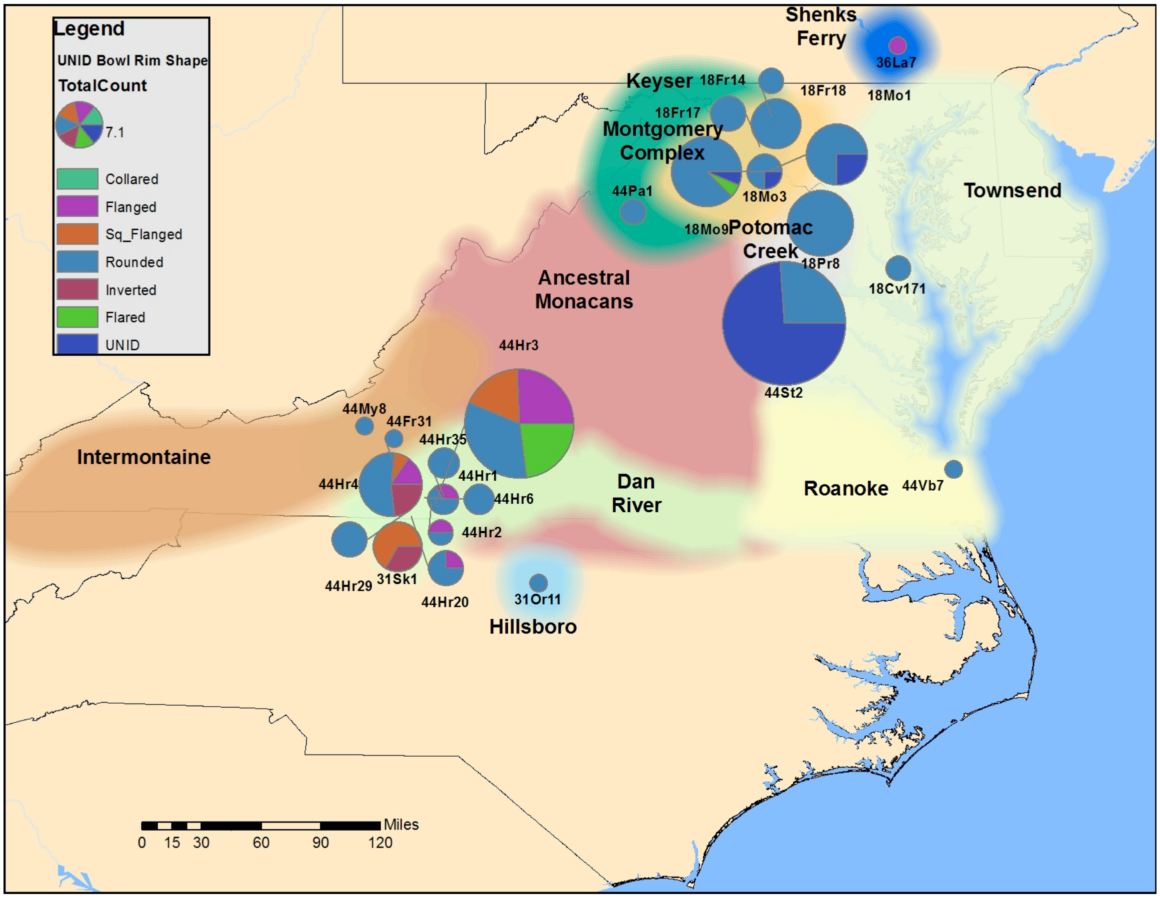


Figure 7.18b: Proportions of bowl rim shapes on fragments not identified to form on Late Woodland II sites

Jenrette (31OR231a) Contact period sites. These sites are outside both the temporal and geographic boundaries of the Dan River phase territory. The presence of flanged rims amongst these three sites demonstrates that Native groups living along the New, Roanoke, and Haw Rivers used pipes with this trait well into the seventeenth century. The presence of additional round flanged rim fragments on Contact period sites helps substantiate both the longer temporal range and wider geographic range of this attribute suggested by elbow pipes.

While the majority of sites listed above are located in the Dan River culture area, the presence of additional flanged fragments identified in the Washington Boro (36LA8)

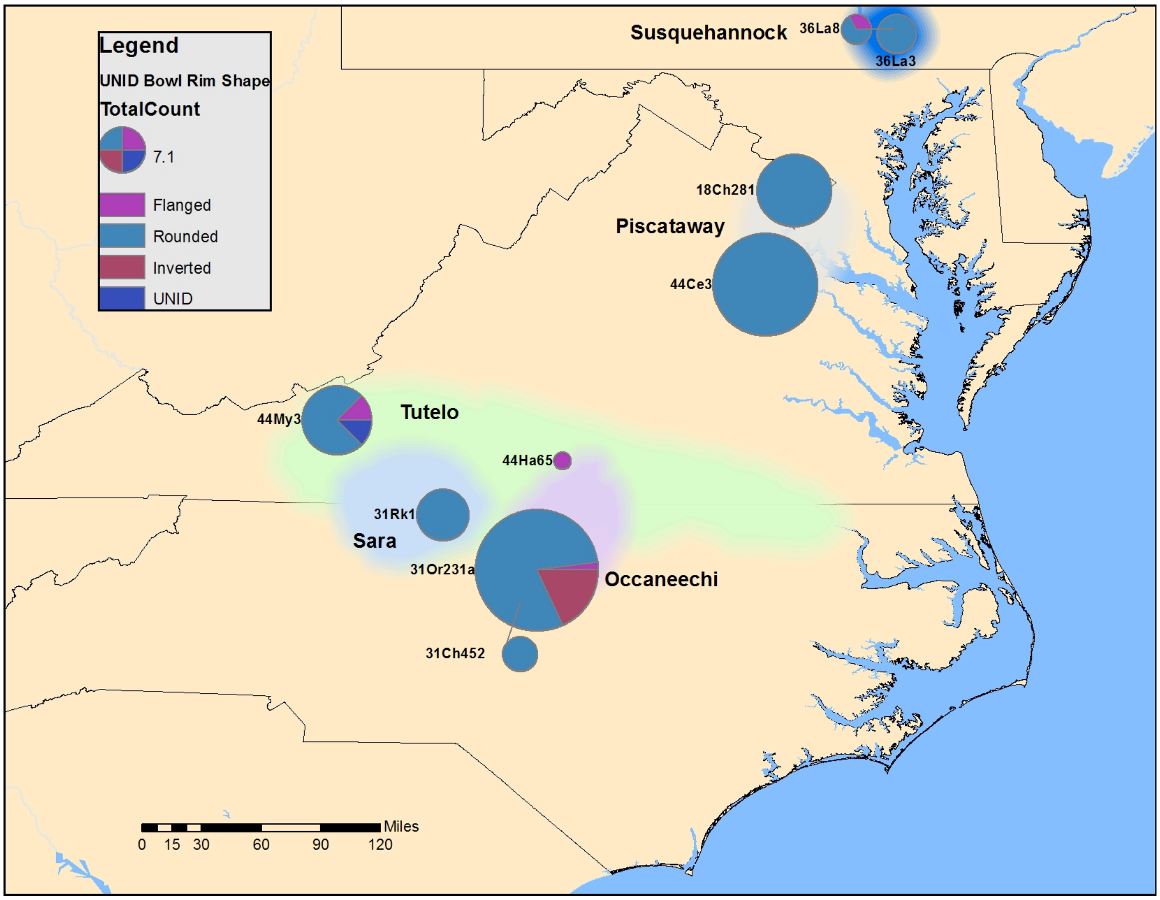


Figure 7.18c: Proportions of bowl rim shapes on fragments not identified to form on Contact Period sites

and Schultz Farm (36LA7) assemblages actually expand the geographic distribution of this characteristic well beyond Native groups occupying areas in south central Virginia. However, the flanges found on pipes from sites further north are not as prominent as those from southern sites. The flanges found on pipes from Dan River sites extended beyond the width of the bowl body. The flanges from sites farther north, however, were created when a horizontal incised line was carved around the circumference of the bowl.

These flanges look to be more of a continuation of the bowl rather than an additional embellishment. Consequently, while these examples technically fall into the same trait category, it is likely that their production was unrelated.

My examination of fragments also revealed additional examples of squared flanges in the dataset. Seven examples were identified on fragments in the Belmont (44HR3) site assemblage and one example was identified in the Philpott (44HR4) site assemblage. In addition, two of the fragments demonstrating this embellishment found on the Early Saratown site (31SK1) are particularly noteworthy as they were recovered from a storage pit context that was radiocarbon dated to A.D. 1300-1435 (2σ, Eastman 1999:65). While a radiocarbon date from daub or residue taken directly from the bowl of a pipe is preferable for absolute dating, the association of these fragments with a dated context provides a relative date for this particular embellishment. Although no other square flanged bowls were recovered from radiocarbon-dated contexts, occupation dates of five out of the six sites that had squared flanged bowls fall in-between the mid-thirteenth to fifteen centuries. These dates suggest that this embellishment could be used as a diagnostic marker of occupations that date to the later half of the Dan River period phase.

The pipe with a square flanged pipe that did not fall into this date range was the elbow specimen recovered from the Trigg (44MY3) site. MacCord (1977), Buchanan (1984), and Boyd (1993) have all placed the initial occupation dates of this site at sometime in the first quarter in the seventeenth century based on radiocarbon dates and glass beads. This seventeenth century date is almost 150 years later than the date ranges for the other five sites that have squared flange bowl rims. Nevertheless, the pipe from Trigg was produced from micaceous clay that is typical of Dan River pipes and pottery (Egloff personal communication 2009). This distinctive clay suggests that the pipe was produced in the Dan River area. The pipe from the Trigg site does not negate the relative date of this technique identified amongst Dan River sites but as previously noted does suggest that the production of pipes with this embellishment may have continued into the seventeenth century.

As previously noted, although a number of researchers (Davis et al. 1997a, b, c, d, 1998a, b; Eastman 1999) have noted that these squared embellishments are found on a number of Dan River phase sites, a bowl fragment with a squared flange was also recovered during excavations at the Abbyville site (44HA65). Unfortunately its intrasite provenience is unknown and multiple occupations have been identified at the site that date from A.D. 1000 to 1650. Thus although this squared embellishment suggests the occupants of the Abbyville site likely had connections with Native groups farther west, it cannot provide any further information about the time range of this technique.

The distribution of inverted rims in southern Virginia also expanded slightly from the distribution suggested by elbow pipes as three inverted rim fragments were identified in the Philpott (44HR4) assemblage and nine additional examples of fragments with this embellishment were identified in the Jenrette site assemblage (31OR231a). Two more fragments were identified in the Early Upper Saratown (31SK1) assemblage. Despite the fact that more examples of these fragments were found, their distribution remains associated with Native groups living in the Dan, Smith, and Haw River valleys although the presence of a few examples at the Jenrette site expands the temporal distribution of this technique.

Ten additional examples of flared rims were identified in two site assemblages; nine were present at Belmont (44HR3) and one at Winslow (18MO9). The additional examples present in the Belmont assemblage increase the number of examples present in the Dan River cultural area but does not expand the geographic boundary of this trait in any significant way. The presence of the one example from the Winslow site, however, is significant because it represents the only example of this trait amongst the sites of the Montgomery Complex.

Bowl Body Attributes

The vast majority of bowl fragments were too small to discern shape (n = 258/293). It should be noted that the proportions of Contact period bowl shapes were not mapped because 99 percent of them were unidentifiable (See Table 7.7). Interestingly, the attributes that exhibited clustering among elbow pipes, elongated/bulbous bowls and inverted bowls were not identified amid any of the fragments. Thus fragments could not provide any additional information about the distributions of these traits. Figures 7.16a, 7.16b illustrate that the distributions of elongated and bulbous bowls continued to be extensive both geographically and temporally. These forms were found on sites dating to all three time periods and were spread throughout the region. Additional examples of cylindrical bowls were also found on five Late Woodland II period sites. These sites were widely dispersed suggesting that the use of this particular bowl shape did not align with boundaries previously delineated by researchers.

Table 7.7: Bowl shapes of UNID fragments

Shapes	Late Woodland I	Late Woodland II	Contact	Total
Elongated	2	8	1	11
Cylindrical	0	10	0	10
Bulbous	1	8	1	10
Short Bulbous	0	1	0	1
Squared	0	1	0	1
Flared/Bulbous	0	1	0	1
UNID	14	92	143	249
Total	17	121	145	283

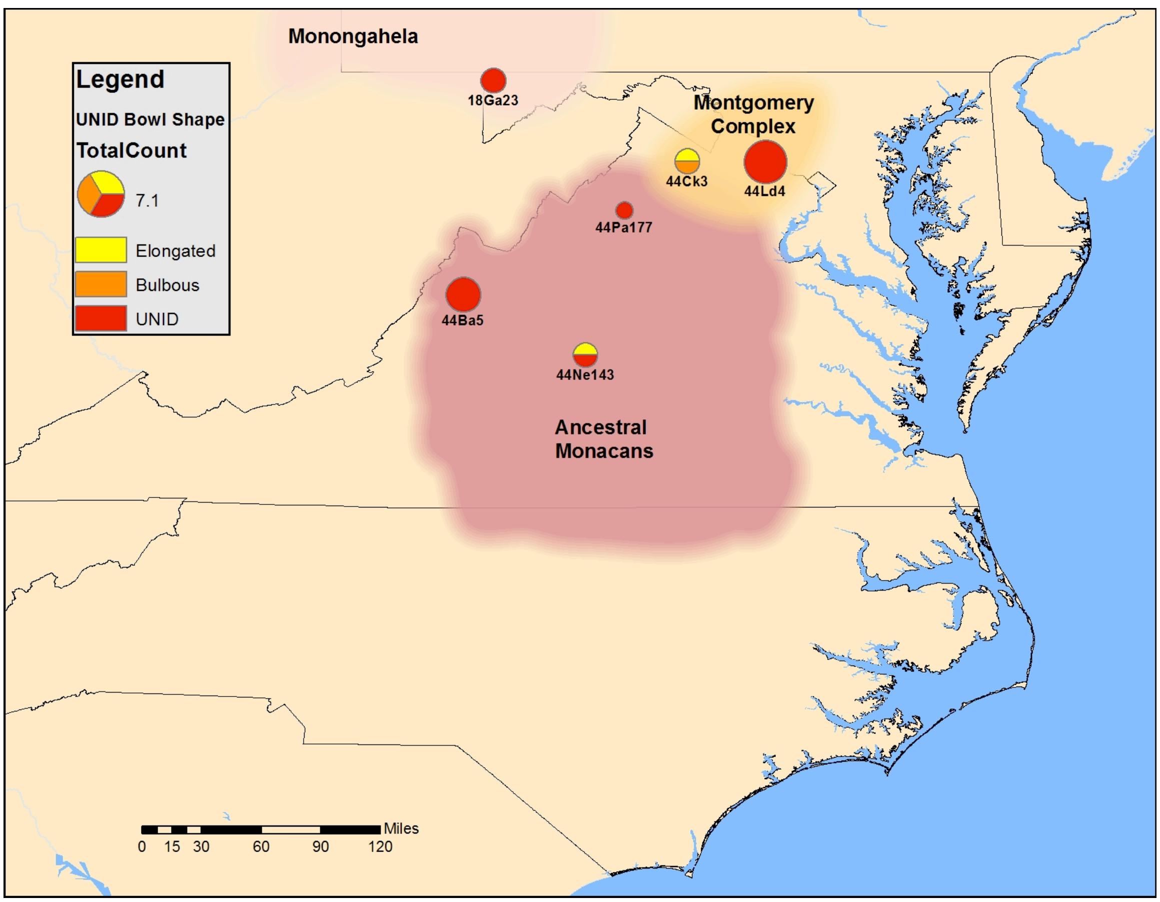


Figure 7.16a: Proportions of bowl shapes among Late Woodland I sites

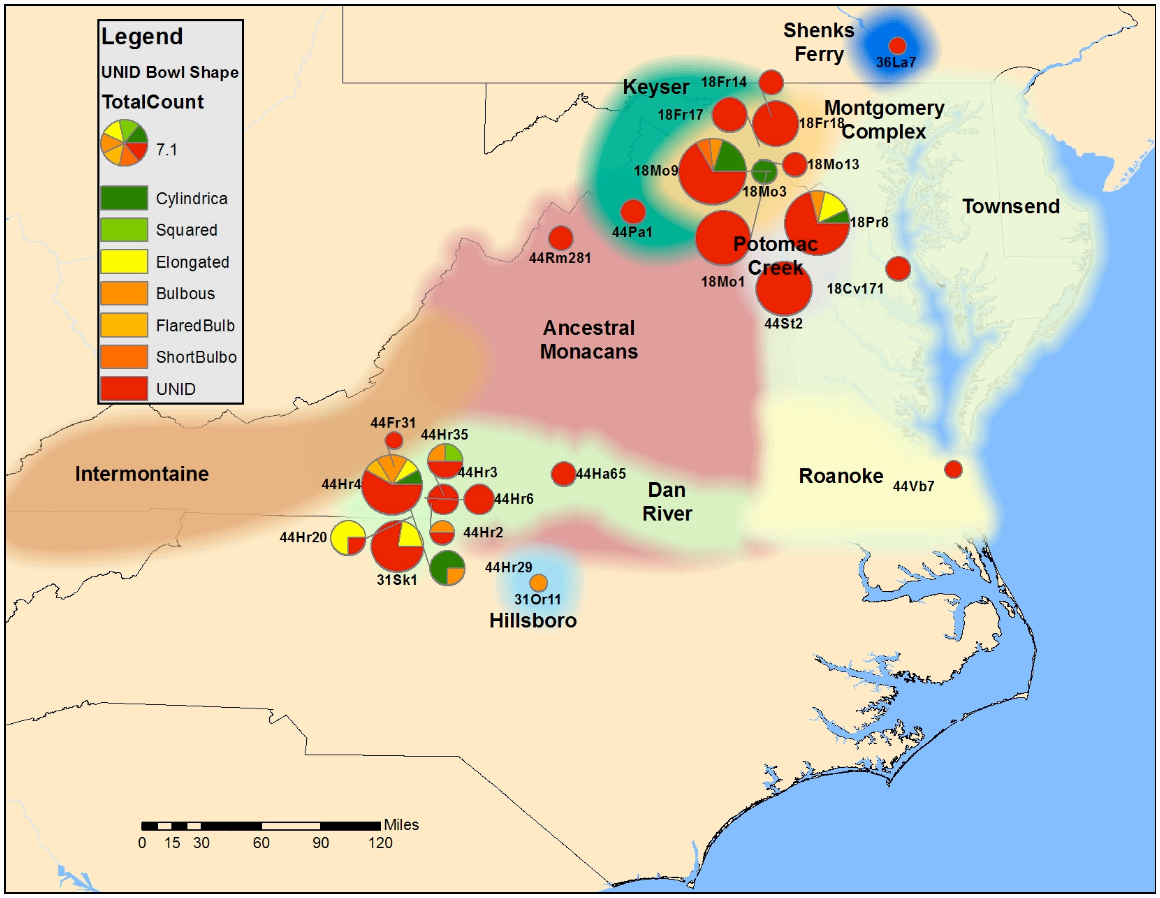


Figure 7.16b: Proportions of bowl shapes among Late Woodland II sites

One lone example of a squared bowl was identified in the Stockton (44HR35) site assemblage. This example, when combined with the three other specimens found on elbow pipes from the Belmont (44HR3) and Box Plant (44HR2) sites suggests that squared bowls could be another attribute that is associated with Native peoples who occupied Dan River phase site.

Interestingly, two additional forms were identified amongst fragments that were not present on elbow bowl specimens. Each of these forms was only represented by a single example respectively. These forms were labeled flared bulbous and short bulbous.

The term short bulbous was used to describe a bulbous bowl that did not exhibit a rim that was inverted. Bulbous bowls typically had sides that were convex but then gradually tapered inward as the body transitioned to the rim. The short bulbous bowl exhibited convex sides but the bowl did not taper inwards as it approached the rim. The flared bulbous bowl exhibited concave sites that flared outwards while approaching the rim.

Bowl/Stem Juncture Attributes

Similar to bowl fragments, I had difficulty assigning juncture fragments to different attribute categories. Consequently, the spatial distributions of juncture shapes were not mapped because too few examples could be categorized. A summary of the samples that could be identified is summarized in Table 7.8 below. Not surprisingly the shapes that were the most popular amongst elbow pipes, flattened junctures and slight heels comprised the majority of the identified specimens. Examples of heeled junctures and to a lesser extent spurs, were also present.

Table 7.8: UNID fragments stem/bowl juncture shapes

Shape	**Late Woodland I**	**Late Woodland II**	**Contact**	**Total**
Slight Heel	0	6	1	**7**
Flat	1	4	0	**5**
Heel	0	3	2	**5**
Spur	0	2	0	**2**
UNID	4	23	45	**72**
Total	**5**	**38**	**48**	**91**

Stem Shape

Mapping the proportions of stem fragments affirmed some of the results that were found by mapping elbow stem fragments but also revealed new insights. Overall, only one of the stem fragment shapes examined in the dataset adhered to the cultural or linguistic boundaries previously delineated by researchers. Although certain shapes were found in larger quantities than others, all of the different categories of stem shapes were widespread and exhibited no clustering.

The one trait among stem fragments that did exhibit clustering was oval/biconvex stems. Oval/biconvex stem fragments were found at two sites, Philpott (44HR4) and Wells (44HR9). Both of these sites are considered to be part of the Dan River culture (Davis et al. 1997; Davis et al. 1998) and although the occupation dates for Wells place it mostly within the

Table 7.9: UNID fragments stem shapes

Shape	Late Woodland I	Late Woodland II	Contact	Total
Circular	18	679	165	**862**
Squared	5	32	0	**37**
Alate	1	16	1	**18**
Rectangular	1	3	2	**6**
Oval/Biconvex	1	3	0	**4**
Triangular	0	1	1	**2**
Ovular	0	1	0	**1**
Total	26	735	169	**930**

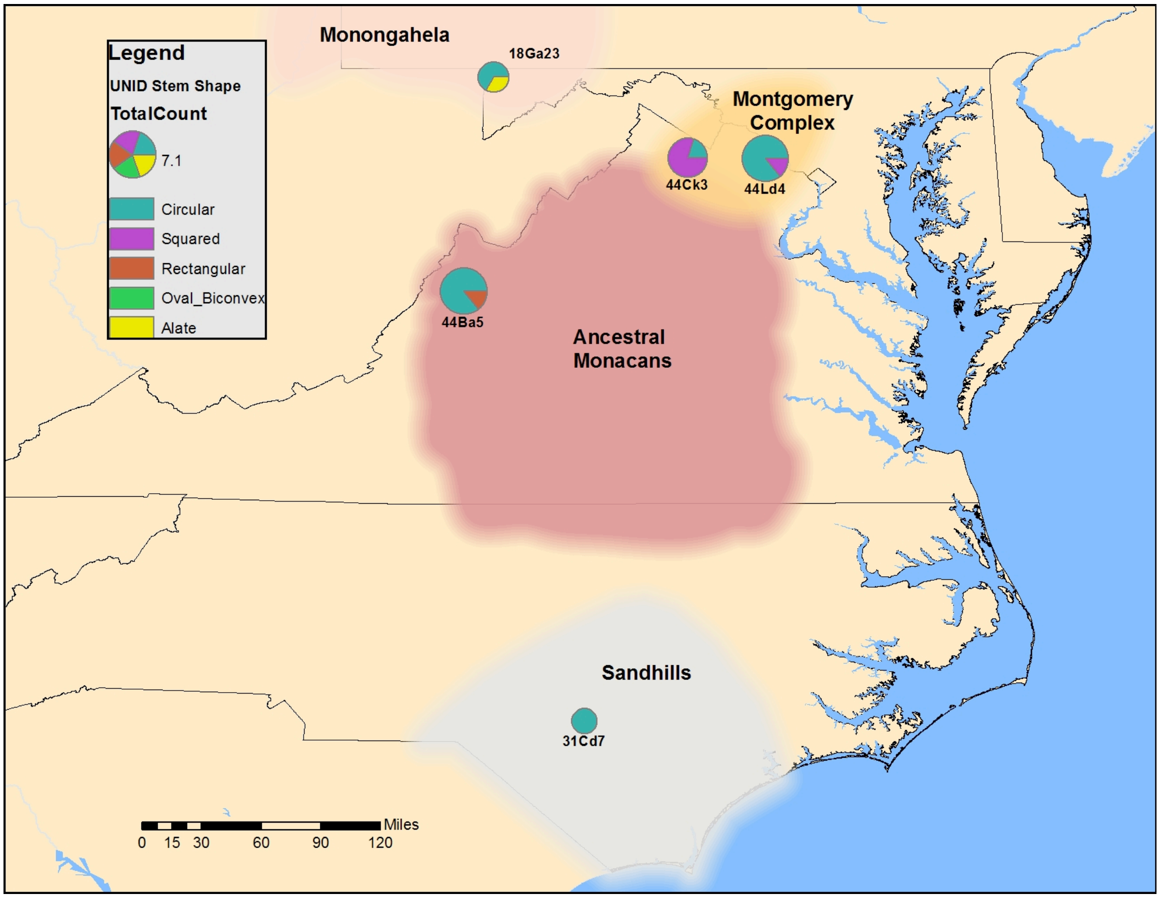


Figure 7.17a: Proportions of stem shapes on Late Woodland I sites

Late Woodland I period, the maximum range of the radiocarbon date overlaps with the earliest radiocarbon date range for the Philpott (44HR4). Interestingly, the other examples of this shape found amongst elbow pipes were present in the Gravely (44HR20) assemblage, which is also located in the Dan River culture territory and was occupied at the same time as the Philpott site. Based on current evidence oval/biconvex stems seem to be another characteristic that is only found on sites associated with the Dan River culture.

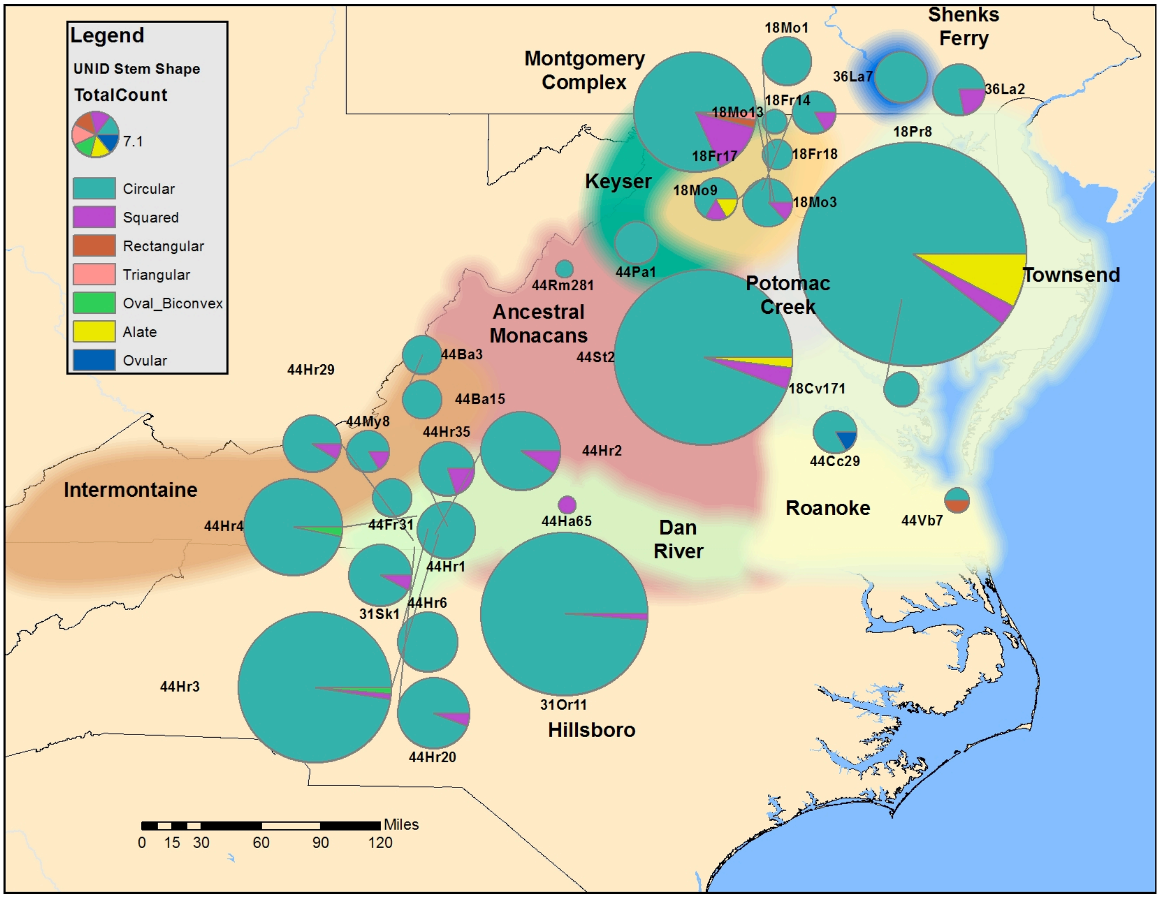


Figure 7.17b: Proportions of stem shapes on Late Woodland II period sites

Mapping the distributions of circular stem fragments confirmed that they were by far the most common in the region. Out of the 930 stem fragments that were included in this study 93 percent (n = 862/930) were circular. Circular stems were found in every assemblage and in all three time periods. Even without the 391 circular fragments identified amongst elbow pipes, this shape is clearly the dominant one used throughout the region. It can be considered the conventional shape that was produced and used by the majority of Native groups.

Perhaps the most drastic distribution change that was made apparent by mapping fragments was found amongst squared stems. While squared stems were widely dispersed amongst elbow pipes, they were only found on a few sites, making it difficult to draw any

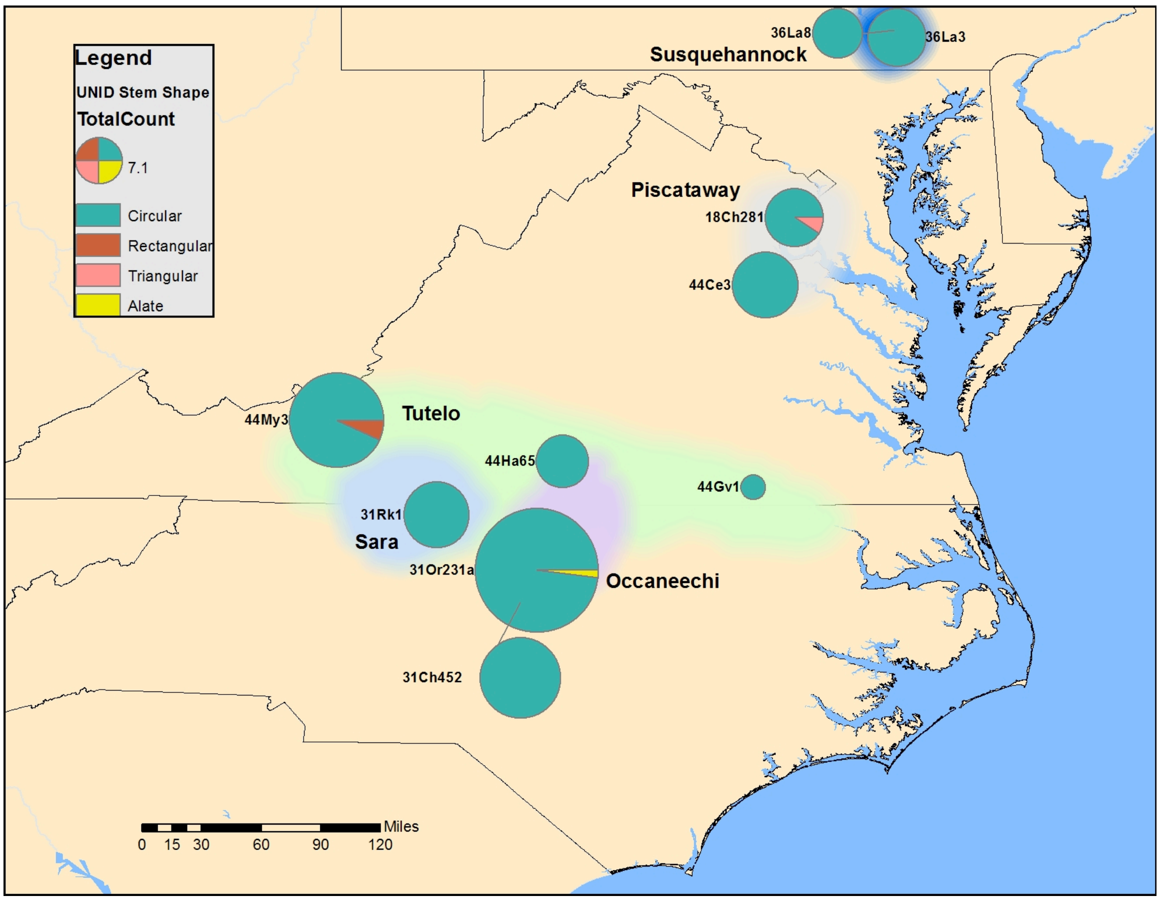


Figure 7.17c: Proportions of stem shapes present on Contact Period sites

concrete conclusions from their distributions. The examination of squared stem fragments, however, provides more information about this particular trait. Figures 7.17a and 7.17b demonstrate that at least one example of a squared stem was found on two Late Woodland I and sixteen Late Woodland II period sites. Although squared stems were not anywhere near as abundant as circular stems, they were certainly consistently found, albeit to a limited degree on sites throughout the study area.

After squared stems, alate stems were the next largest category present in the dataset. The majority of these fragments were from sites where elbow pipes with alate stems had already been identified, Accokeek Creek (18PR8) and Potomac Creek (44ST2). Two additional fragments were lone examples of this form on the Friendsville (18GA23) and Noland's Ferry (18FR17) sites. As previously noted, pipes with alate stems have long been circulating throughout the region, so it is not surprising that fragments of this shape would be found on sites spread throughout the study region.

The rest of the stem shapes were present in small quantities but were still widely distributed. Six rectangular stems were found on three sites dispersed over two time periods (Late Woodland I and II) and hundreds of miles. Two additional triangular stem fragments were identified amongst the fragments. When combined with the two examples identified amongst elbow pipes a total of four stems exhibiting this shape were found in the dataset. Interestingly, all four of these stems were found on four different sites. Although two of these sites were located in the Dan River culture area the other two, Winslow (18MO9) and Posey (18CH281) were well outside of this area. Moreover, the one from the Posey site is from a different period, the Contact period. Finally one ovular stem fragment was identified at the Edgehill (44CC29) site.

Mouthpiece Attributes

As previously noted mouthpieces were the area of the pipe that exhibited the largest amount of diversity when it came to embellishments. My examination of mouthpiece fragments

Table 7.10: UNID fragments mouthpiece shapes

Shape	Late Woodland I	Late Woodland II	Contact	Total
Rounded	5	238	33	**276**
Cut	0	68	23	**91**
Flared	0	17	12	**29**
Oval Biconvex	0	26	0	**26**
Flanged	0	24	0	**24**
Expanding Oval	0	12	0	**12**
Squared Flange	0	10	0	**10**
Squared Cut	0	7	2	**9**
Flattened	0	7	1	**8**
Tapering Oval	0	7	0	**7**
Rounded w/Collar	0	6	0	**6**
Rounded Oval	1	0	0	**1**
Carved	1	0	0	**1**
Oval Flanged	0	1	0	**1**
Flared Lip	0	1	0	**1**
Squared w/ Collar	0	1	0	**1**
Rectangular	0	1	0	**1**
UNID	8	32	97	**49**
Total	**15**	**458**	**80**	**553**

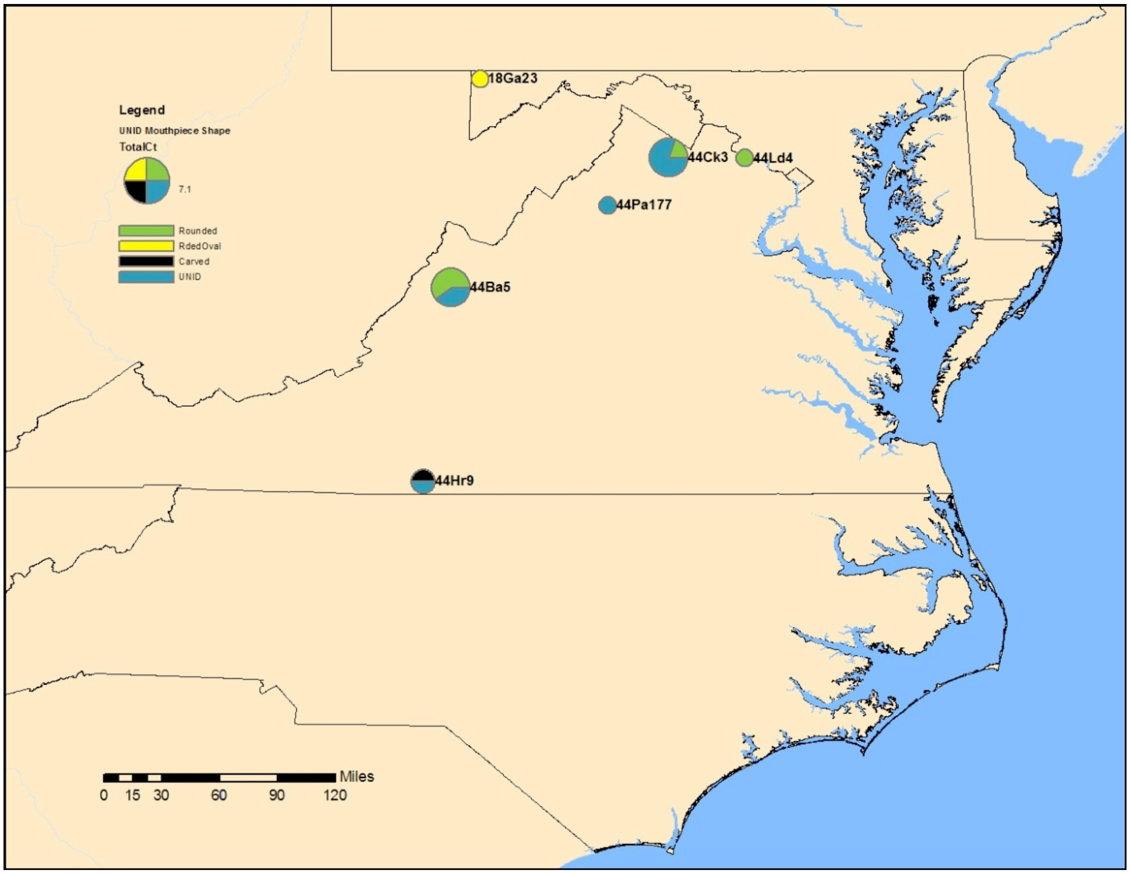


Figure 7.18a: Proportions of mouthpiece shapes on Late Woodland I period sites

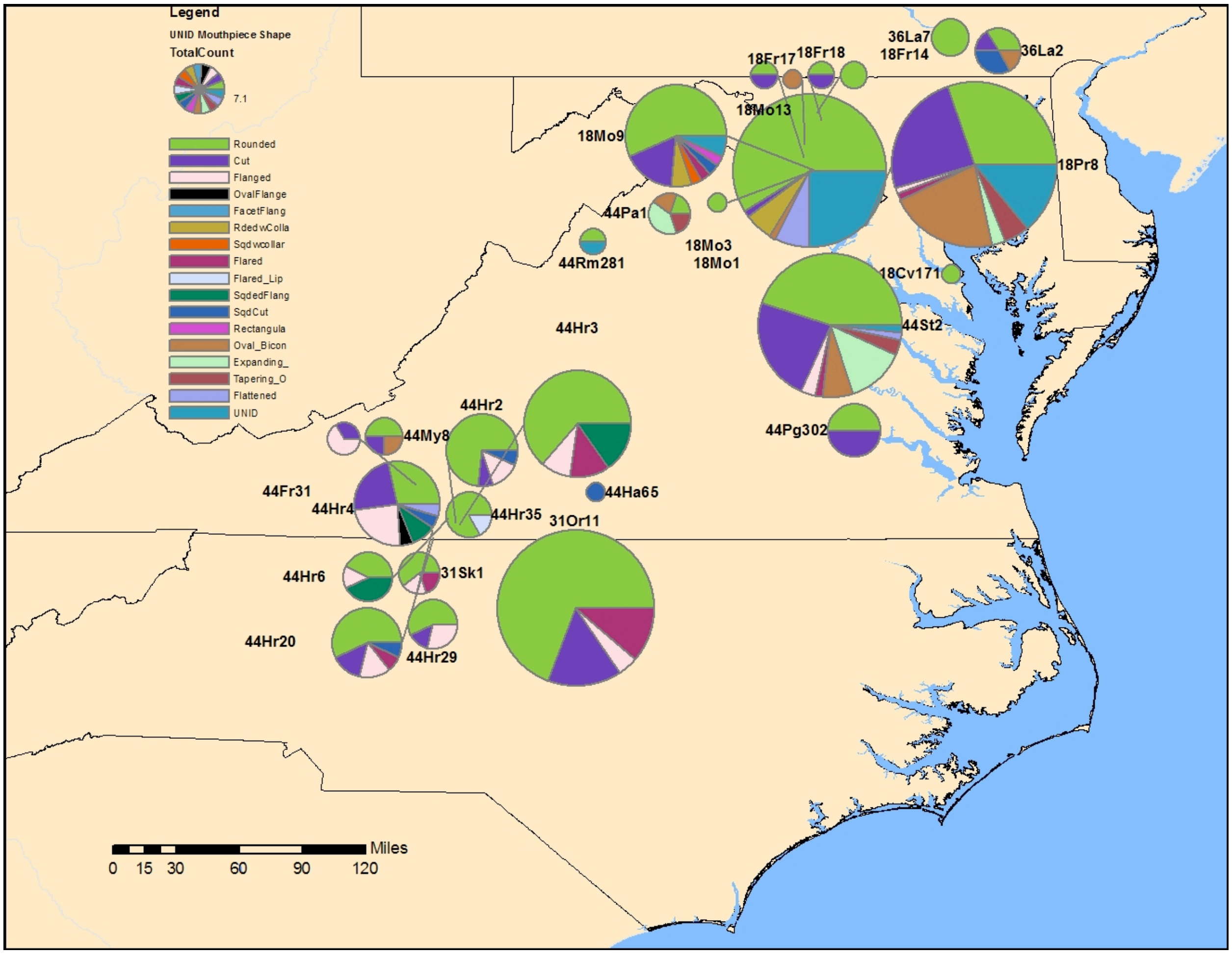


Figure 7.18b: Proportions of mouthpiece shapes on Late Woodland II sites

revealed that a number of different attributes continued to exhibit more restricted patterns even with the addition of fragments. Two such attributes were expanding oval and tapering oval fragments. Like elbow pipes with these traits, fragments exhibiting expanding and tapering oval mouthpieces were only found on three sites: Keyser (44PA1), Potomac Creek (44ST2), and Accokeek Creek (18PR8). Despite the more localized pattern, however, it is worth noting that these sites are considered to be part of different cultural complexes. This pattern will be investigated in more detail in Chapter 8, which outlines the results of chemical testing on fragments with this trait.

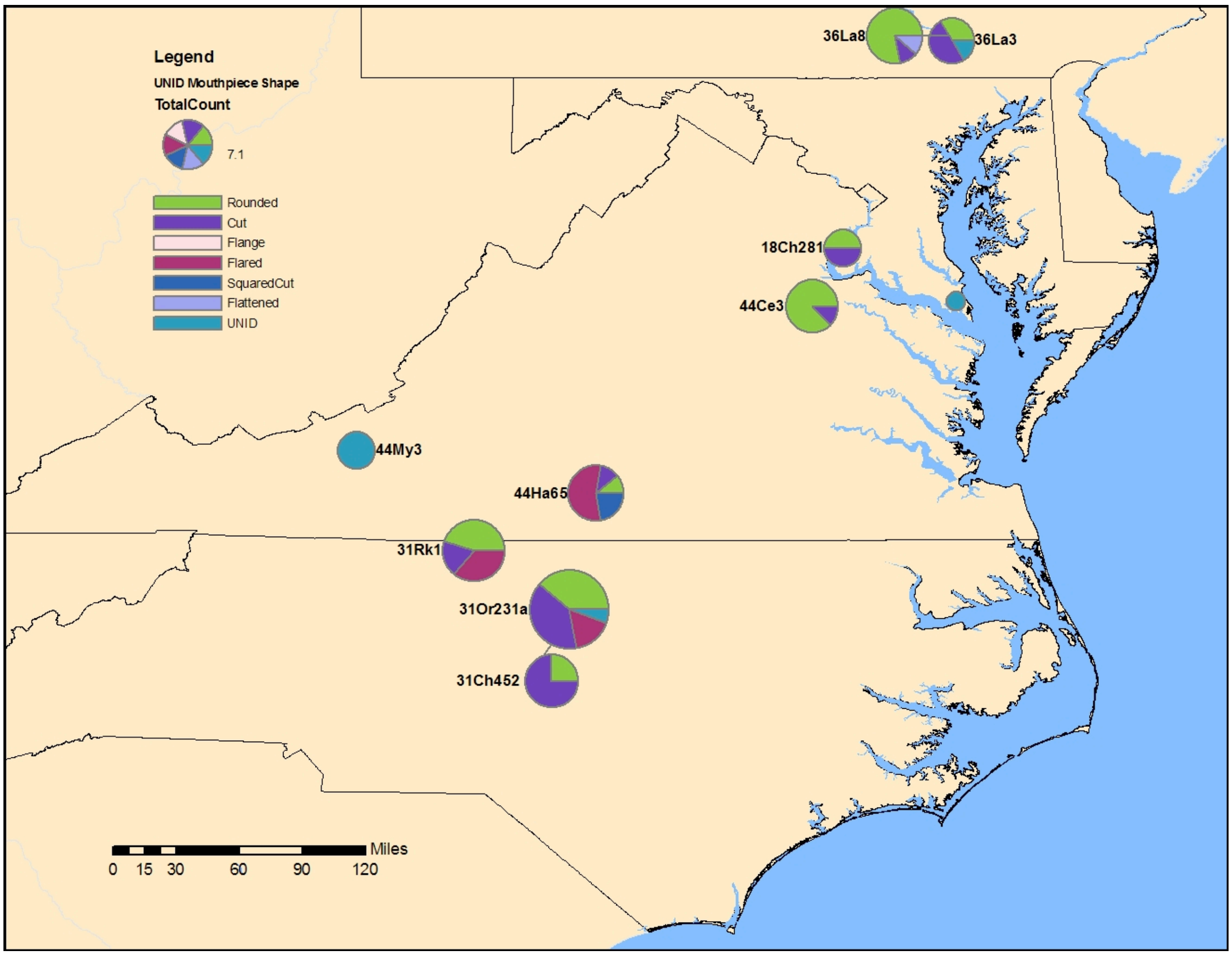


Figure 7.18c: Proportions of different mouthpiece shapes present among Contact Period sites

As was the case with elbow pipes, squared mouthpieces could be differentiated into different categories based on the presence or absence of certain traits in addition to general shape. Three different forms were identified, squared collar, squared cut, and squared flanged. The one example of a squared collar mouthpiece will be discussed below. Squared cut mouthpieces exhibited the most dispersed distribution as seven fragments were spread over five different sites located in different cultural complex territories. This is not surprising given the wide extent of squared stems throughout the study area.

The distributions of square flanged mouthpieces were more bounded. Like square flanged bowl rims and square flanged mouthpieces found on elbow pipes, fragments that exhibited square flanged mouthpieces were found only amongst sites located in the vicinity of the Smith and Dan Rivers in southern Virginia and northern North Carolina. The fact that additional examples of these embellishments adhere to the boundaries previously identified with elbow pipes reinforces the idea that pipes with this embellishment are strongly associated with Native groups who used Dan River ceramics. However, unlike square flanged bowl rims, no examples of this trait are found outside of the Dan River complex territory.

In contrast to square flanged mouthpieces, round flanged mouthpieces continued to exhibit a more dispersed spatial pattern. Flanged mouthpieces were found amongst sites associated with the Dan River phase but were also found amongst sites farther north associated with the Montgomery Complex and with the Potomac and Accokeek Creek sites associated with the Potomac Creek Complex. It is possible that taking certain measurements of this trait, for instance thickness, which was not recorded in this study, might help further distinguish whether other characteristics of this trait are present that allow further refinement of its boundaries. For now, however, it would seem that pipes with this embellishment trait were widely used by a number of Native groups both inside and outside the territory of the Dan River complex.

The distribution of oval/biconvex mouthpieces also expanded when fragments were taken into account. Figure 7.18b illustrates that oval/biconvex mouthpieces were found amongst three additional sites in the Montgomery complex territory, Noland's Ferry (18FR17), Shepard (18MO3), and Winslow (18MO9) that did not have elbow pipes with this bit shape. Thus the distribution of this trait expanded from Potomac Creek sites to both Montgomery and Potomac Creek complex sites.

Interestingly, the distribution of flared mouthpieces was also expanded when fragments were examined. Flared mouthpieces comprised significant components of assemblages on three Late Woodland II period Dan River sites. Flared bits were also found on the Wall (31OR11) and Jenrette sites (31OR231a) associated with the Hillsboro and Jenrette phases. Additionally, however, a few examples of this trait were found on the Trigg (44MY3) and Abbyville (44HA65) sites. The presence of flared bits at these sites mirrors the pattern of squared flanged bowl rims. Like square flanged bowl rims, flared bits were primarily associated with Dan River sites but were also found in limited quantities on sites immediately outside the boundaries of this territory.

Finally, as with bowl rims, rounded or unfinished mouthpieces and cut mouthpieces comprised the largest proportion of the dataset. Fragments with rounded bits were found on 32 out of the 56 sites included in the study. Cut mouthpieces were not as prevalent but were still found on 15 out of the 33 Late Woodland II sites included in the study.

One rectangular cut mouthpiece was also represented by a single fragment on the Winslow site (18MO9). Only one other rectangular mouthpiece was identified in the dataset at the Accokeek Creek site (18PR8). Given that there are only two examples of this attribute, it is difficult to say anything concrete about its distribution.

Four last attribute categories that were identified only among fragments were an oval flange mouthpiece a flared flange bit, and round and square collared mouthpieces. The oval flange and flared flange mouthpiece were represented by singular examples on the Philpot (44HR4) and Stockton site (44HR35) respectively. These attributes seem to be variants of the round and square flange characteristics that were predominant amongst Dan River sites.

Figure 7.19: Square collared mouthpiece (Photo courtesy of the Smithsonian Institution NMNH)

Discussion

Now that I have investigated how elbow pipes are distributed through time and space in the region I will evaluate how the patterning of the different attributes relates to my hypotheses about the relationships of pipes to social dynamics.

Tables 7.11 and 7.12 summarize the patterning of elbow pipe attributes and UNID fragment attributes respectively. I again divided the distributions into three categories: 1) attributes that exhibited more clustered distributions that aligned with cultural or physiographic boundaries, 2) those that displayed widespread distributions, and 3) attributes whose patterning could not be determined, either because of small sample sizes ($n < 5$) or due to limitations of the dataset.

Hypothesis 1:

Overall, more elbow attributes were grouped into the widespread patterning category than the number of attributes that displayed boundaries aligning with the previous borders outlined by researchers. Among both the elbow and UNID fragments the attributes that tended to exhibit the most widespread distributions were the least elaborate ones, such as rounded and cut bowl rims, circular stems, and rounded and cut mouthpieces. One exception to this was the patterning of squared stems, which could be considered a more elaborate attribute. The mapping of elbow and UNID squared stem fragments showed that squared stems were present in small quantities in a number of assemblages spread throughout the region.

Exceptions to the geographic dispersion of attributes were evident in the distributions of some bowl rim and mouthpiece attributes that were isomorphic with previous boundaries. Tulip bowls and curved stem/bowl junctures and stems were associated with Susquehannock sites. Square flanged bowl rims and mouthpieces aligned with the boundaries of the Dan River complex. Moreover, in a few cases these attributes were both found on the same pipe. Collared bowl rims aligned with the boundaries of

Table 7.11:Distributions of elbow attributes

Part	Isomorphic w/ Previous Boundaries	Widespread	Indeterminate
Bowl Rim	Square flanged Collared Inverted	Rounded Round flanged	Molded Point Four Corners Molded Flared
Bowl Body	Inverted Trumpet Tulip	Elongated Cylindrical Bulbous Elongated Flared Bulbous	Rounded Square Squared
Juncture	Curved Bulbous	Flat Heel Slight Heel Rounded Spur	Long Rounded Heel Slight Spur Double Spur Wing
Stem	Curved	Circular Squared Alate	Rectangular Triangular Alate Hexagon
Mouthpiece	-	Rounded Cut Round Flanged Expanding Oval Tapering Oval	Flared Flattened Oval Squared Cut Square Flanged Facet Flanged Rectangular Carved Ground

Table 7.12: Distributions of UNID Fragments

Part	Isomorphic with Previous Boundaries	Widespread	Indeterminate
Bowl Rim	Collared Square Flanged	Rounded Round Flanged Flared Inverted	-
Bowl Body	Elongated Cylindrical Bulbous	-	Short Bulbous Squared Flared/Bulbous
Juncture	-	-	Slight Heel Flat Heel Spur
Stem	Alate	Circular Squared	Rectangular Triangular Ovular Oval/Biconvex
Mouthpiece	Square Flanged Flared Collared	Rounded Cut Squared Cut Oval/Biconvex Round Flanged	Rectangular Cut Oval Flange Flared Flange

Montgomery Complex territory. Like the distribution of collared bowl rims, all six examples of collared mouthpieces were restricted to two sites associated with the Montgomery Complex, Winslow (18MO9) and Shepard (18MO3). The squared mouthpiece with a collar was also identified in the Winslow (18MO9) site assemblage.

It should be noted that a few attributes included widespread distribution category exhibited patterning that clustered within a particular area but were not completely restricted to such an area. Round flanged bowl rims also exhibited a widespread range that seemed to focus in the Dan River cultural area but also was found on a few other sites outside of this area, such as Crab Orchard (44VB7) and Shannon (44MY8), which are considered part of the Intermontaine cultural complex, the Hand (44SN22) site in the Cashie complex, and the Bowman Mound (44RM281) which is located in Ancestral Monacan territory. In a similar fashion, the majority of expanding and tapering oval mouthpieces were primarily clustered within the Potomac Creek complex territory but a few examples were also found on the Keyser (44PA1) site, which is in Keyser Complex territory. Round flanged bowl rims and mouthpieces were also primarily found on Dan River sites, but a few were also located outside of this territory and associated with sites that are considered part of the Intermontaine culture.

Finally a number of attributes were present in such small sizes that it was difficult to determine whether there was any patterning to their distribution. This could be due to the small sample size of pipes in general, or it could relate to individualized production of certain attributes.

In a manner similar to some of the forms discussed in the previous chapter, the majority of the attributes identified in the sample set were more simplistic forms that were found widespread throughout the region. I argue that these attributes, such as round stems, rounded and cut rims, and rounded and cut mouthpieces suggest that there were widespread conventions for elbow pipe production that did not align with cultural boundaries. Moreover, given that most of the more distinctive attributes still displayed more widespread distributions that extended outside of the previous boundaries, rather than restricted or clustered patterning, I accept the hypothesis that alternative models of social organization besides cultural and physiographic boundaries were impacting the distributions of pipes.

Hypothesis 2:

As previously noted, a number of different attributes did conform to the boundaries previously outlined by researchers. However, it is notable that the attributes that conformed to the boundaries were not those present in the largest quantities. Collared and square flanged bowl rims, and squared mouthpieces were minority forms while more conventional forms such as rounded or cut bowl rims, cylindrical or rounded bowls and rounded or cut mouthpieces dominated most assemblages. An exception to this, however, was the predominance of tulip shaped bowls and curved stems, in the Strickler (36LA3) assemblage.

Moreover, some attributes that aligned with cultural complex boundaries exhibited smaller, localized clustering, within those boundaries. For example, the sites with collared mouthpieces within Montgomery Complex territory were not the same sites that contained specimens of pipe bowls with collared rims and no whole pipes exhibited both these traits. While the fragmented nature of the rounded collar mouthpiece examples makes it difficult to determine whether collared rims and bowls may have co-occurred on pipes, evidence available to date suggests that these two traits may have had very different distributions. The two sites with round collared mouthpieces (18MO3 and

18MO9) were located east of the Monocacy river and the sites with collared bowl rims (44CK3, 18FR17, and 18FR14) were located on the western side of the river. The lack of co-occurrence of these traits is even more interesting when one considers the co-occurrence of round and square flanged bowl rims and mouthpieces on pipes from Dan River sites.

Given that all of these attributes that exhibited clustered distributions were built into the form of the pipe, one might interpret the clustered distributions as the result of isochrestic variation and localized learning networks. While these techniques may have been transmitted through such networks it is also worth noting that many of the attributes that exhibited clustered distributions were more elaborate, such as square flanged bowl rims, curved stems, and expanding and tapering oval mouthpieces. Arguably, this elaboration would have been visible and could be considered decorative. The collar and square flanged bowl rims and mouthpieces certainly would have been more visible or noteworthy than pipes that had rounded or cut rims, or plain mouthpieces. Thus I would suggest that these more elaborate attributes that exhibited clustered distributions may have been used to used to reflect or mark certain aspects of identity among users. Perhaps not gender, since males were likely smoking most of the pipes at these sites, but perhaps some form or status or other aspect of identity.

Thus although only a few attributes exhibit clustering that might align with efforts to mark certain identities, their presence in the dataset allows me to accept this hypothesis.

Hypothesis 3:

Given that most of the attributes that exhibited widespread distributions were more conventional forms and lack distinguishing characteristics, it is difficult to determine whether the similarities of these attributes are due to their roles in rituals of social interaction, or the similar production of attributes. The widespread patterns of some of the more elaborate attributes, such as expanding and tapering oval pipes and the rounded flange rims and mouthpieces, indicates that some pipes, or at least ideas about their production, were likely moving through social channels and exchange systems.

Squared pipe stems in particular exhibited an interesting pattern that may have something to do with their role in rituals. Squared pipe stems were the distinctive attribute most widely distributed throughout the region. This suggests that perhaps these particular pipes, or ideas about their production were circulating among different groups in the region. Yet despite the nearly continuous distribution, they were a minority form in all assemblages, which suggests they may have served to mark or reflect status on an intra-community level even though a number of different groups had access to them throughout the region. Nevertheless, none of these examples were found in ritual contexts such as burials, which indicates that again perhaps access to these particular pipes was more open than access to other distinctive pipes that exhibited widespread distributions, such as bent tube forms or trumpet tubular forms.

In contrast, the clustered distributions of some attributes, such as tulip bowl and curved stems, collared rims, square flanged rims and mouthpieces, suggests that perhaps that pipes with these attributes were not circulating through trade networks but were instead being used in community rituals.

Because at least some of the attributes demonstrated widespread distributions I can accept that these objects were likely part of rituals that facilitated social interaction and exchange. However, the level of access to these pipes is difficult to determine. Only one of the pipes with the square flanged bowl rim and mouthpiece was recovered from a burial context. The rest were recovered from pits, middens, or archaeological levels. When contrasted with the more restricted distributions of tubular or bent tube pipes in the previous chapter, it would seem that access to these pipes was more open. Thus I can accept the first part of the hypothesis that pipes were involved in rituals that facilitated social interaction and exchange but as it is difficult to assess the level of access certain individuals or groups may have had to these forms.

Hypothesis 4:

Overall elbow and UNID fragment attributes did exhibit temporal variation, although the use of many attributes persisted through multiple periods. Rather than shifting from widespread to clustered to widespread through time, however, the most common categories of attributes, such as rounded bowl rims, rounded bowl bodies, circular stems, and rounded mouthpieces, were widely distributed through space and persistently produced and used throughout all three time periods.

In contrast many of the most elaborate attributes displayed more restricted temporal spans and clustered distributions throughout multiple periods. For example, square flanged bowl rims and expanding and tapering oval mouthpieces, as well as tulip bowls and curved stem junctures did not appear until the Late Woodland II period and seem to have been restricted to certain territories. This pattern does align with part of the hypothesis that indicated that some distributions might become more focused during the Late Woodland II period. Given that this is the period where chiefdoms were becoming more prevalent the timing of the appearance of many of the more elaborate attributes may be material expressions of certain aspects of the identity of these leaders.

However, the widespread production and use of other elaborate forms such as squared stems during Late Woodland I persisted into the Late Woodland II period. Additionally, the use of collared rims also persisted from the Late Woodland I to Late Woodland II period but displayed a more clustered distribution that aligned with Montgomery Complex boundaries. Although there was variation in temporal patterning of pipe attributes it did not align with the models set out in my hypothesis. Thus, I am forced to reject this hypothesis.

Chapter 8 :Decorative Motifs and Native Social Networks

Introduction

In this chapter, I shift from a discussion of attributes built into the surface or form of a pipe to focus on decorative motifs that were carved or stamped into a pipe's surface. I begin the chapter by briefly synthesizing some of the previous research that has been conducted on pipe decorative attributes to place my study into context. Next, I outline my criteria for categorizing the variety of decorative units and structures that are found on pipes. Finally, I examine how the distributions of different design units relate to temporal and cultural boundaries in the study area. It should be noted that although my analysis of attributes built into the form of pipes differentiated between pipe forms, in this chapter, I am primarily concerned with design units and thus will be comparing units found on all forms of pipes.

Previous Research of Decorative Attributes

As previously noted I separated my analysis of decorative attributes that were carved or stamped into pipes from attributes such as the pipe form or shape of the bowl because decorative motifs are generally categorized as iconological (Sackett 1990) or expressive (Weissner 1983) aspects of stylistic variation. As noted in Chapter 1 iconological or expressive style is often contrasted with isochrestic or technological style, which focuses on attributes such as marks left by the manufacturing process and the tools used to create a particular decoration, rather than its content or form (Hegmon 1992; Sackett 1983; Stark 1999:29). Iconological style tends to be more visible on an object and researchers have noted that it is often used to express or communicate information about the individuals or communities who produce or use items (Weissner 1983; Wobst 1978). Archaeologists also have noted that groups and individuals are more likely to consciously manipulate iconographic or decorative style to convey social information about the maker or user of an object or a class of objects (Hodder 1982; Stark 1999; Weisser 1985, 1990; Wobst 1977).

The propensity of decorative attributes to be more visible and to have been consciously manipulated also often means these types of attributes demonstrate more of a tendency to be readily imitated by different makers. In many cases the tendency for decorative attributes to be copied manifests in more widespread spatial distributions than attributes that are built into an object such as the shape of a vessel rim or the application of different surface treatments (Agbe-Davies 2010; Stark 1999). Consequently, researchers have noted that it can be more difficult to align decorative features with certain types of social groups such as ethnic groups (Hodder 1982; Sackett 1990; Shennan 1989).

In the case of tobacco pipes, the hypothesis that decorative motifs would be widespread (Hypothesis 3, see Chapter 4) is based on ethnohistoric evidence of their role in Native societies and results from previous archaeological investigations. As noted in Chapter 4, a number of historic accounts report that pipes were often used in the social context of rituals where information and goods were exchanged (Percy 1969a[1607]; Smith 1986). Pipes with distinctive motifs may have been exchanged during these ceremonies and transported to different locales. Additionally if pipes with different motifs were brought home with those who traveled abroad, decorative techniques or methods could be copied and integrated into local production networks. Examples of such practices have already been identified in previous chapters. For example, in Chapter 6, I argued that the presence of distinctive reed stem pipes on southwestern Virginia sites indicate that Native groups in this area were interacting with and being influenced by Fort Ancient peoples from farther west. Additionally the widespread distribution of squared stems identified in Chapter 7 suggests that perhaps ideas about pipe production were circulating over a wide geographic expanse in the Middle Atlantic.

Previous analyses of Native pipe decorations support the hypothesis that decorative elements will have widespread distributions. Dentate stamp decorations found on pipes from Potomac Creek (44ST2), Keyser (44PA1), and Shepard (18MO9) have been linked to pipes from the Owasco Aspect of New York state (Stewart 1992:60). Decorations on pipes from the Townsend site (7-S-G2) in Delaware and the Shenks Ferry (36LA2) site were also noted as being similar to those found at Potomac Creek (Blaker 1963; Cadzow 1936; Kent 1984:147-148). Finally, Irwin (2004) acknowledged that geometric units that were incised into early Late Woodland period stone pipes were widely distributed from southern North Carolina to northwestern Virginia. These studies suggest a general pattern that similar decorative attributes are found at different sites spread out through the northern part of the study area. The distribution of decorative units over the entire region, however, remains unclear. Additionally, none of these studies have considered how or whether patterns of distribution were changing over time.

As noted in Chapter 4, decorative motifs on historic pipes have primarily been used to investigate the ethnic identity of their producers, seen alternatively as African American slaves (Emerson 1994, 1998; Monroe 2002) Native Americans (Magoon 1999; Mouer 1969; Mouer et al. 1999) and European settlers (Harrington 1951; Kelso and Straube 2004; Luckenbach 2004; Luckenbach and Kiser 2006). While debates regarding the ethnicity of producers have lasted for almost have a century, ultimately, most researchers have acknowledged that these pipes cannot be considered linked to any one group given the complexities of Virginia's social landscape during the seventeenth century (Agbe-Davies 2010; Mouer 1993). More recent studies have looked at variations in decorative motifs to explore the presence of other social networks such as workshops (Agbe-Davies 2004b) and the geographic expanse of pipes produced by particular artisans (Luckenbach and Kiser 2006).

Despite the fact that previous studies noted general similarities between the pipes from some sites, there has been a general lack of systematic categorization of analytical units such as design elements, especially in the case of prehistoric pipes. Moreover, there has been limited recognition of the multidimensional nature of style, i.e. that design elements can have multiple attributes and levels of organization. For example, triangles found on pipes in the region exhibit differences in attributes that allow them to be differentiated. While some were infilled with lines, others were left hollow. Additionally, while some triangles were isolated units, other forms were linked together to create bands or lines that covered a pipe's surface. Researchers (Irwin 2004; Stewart 1992:58) have noted differences in some triangle motifs but have not considered whether the distributions of infilled or combined units were any different than those without infilling or those that were found in isolation. While such a distinction may seem trivial, a number of researchers have noted that variation in specific aspects, levels, or characteristics of style may be explained by different factors (for a more detailed discussion see Plog 1983:138). In some cases variations between attributes such as infilling were related to different social processes than variations between geometric units. Therefore, an analysis of the frequencies of decorative motifs that takes into account the multilayered nature of decoration could potentially provide information about different types of production or exchange networks in the region.

As discussed in Chapter 1 the question of how to analyze and interpret the large amount of variation that can be present in decorative elements has been a long running debate among archaeologists. The way we define or compare decorative motifs can affect our analysis and results. Previous research has demonstrated that there is a need to be cautious when using design frequencies to define social boundaries as the results could be more reflective of differences in definitions of design motifs than a result of real differences in design frequencies (Plog 1980).

A number of researchers have suggested that the best way to create systematic and replicable results is to be very explicit about the criteria used to isolate the analytical units that serve as the basis for comparison (Conkey 1980; Conkey and Hastorf (ed.)1990; Hegmon 1992, Stark (ed.) 1998; Plog 1980). These studies have suggested that creating a design classification system that differentiates design units that stand alone from those appended to or infilling a design provide a more holistic sense of variation and covariation of different attributes. Additionally, such studies indicate that examining the co-occurrence of designs can also provide insights into social processes such as the interaction and aggregation of different groups (Braun and Plog 1982; Conkey 1980; Hantman and Plog 1982).

The decorative classification system used in this study draws from these models and focuses on two general categories of attributes. The first is the design element or unit, which consists of the general shape or configuration of a design. The second category is the design structure or composition. This category pertains to the structure of the design element, i.e. whether it occurs in isolation or combination with other units. I will briefly explain the criteria and organizational structure for design elements or units and examine the spatial distributions of individual units. I will then explain how different classes of design structures were defined and examine the spatial patterning of units that occur in combination with each other.

Design Classification System

Plog's (1980) design classification system served as the primary model for this study. Some aspects were adapted to fit the particulars of the designs found on Middle Atlantic pipes. The classification system divides design units into two different but related categories. Plog (1980:49) defines primary designs as "those that occurred on vessels either in isolation from or in combination with other forms." In this dataset, primary units consisted of a number of different subcategories or classes, which are illustrated in Figure 8.1. The first class consisted of geometric design units such as triangles, rectangles, squares, diamonds, ladders, and chevrons. The second class consisted of lines running in different directions across fragments. As illustrated in Figure 8.1, these lines were oriented horizontally, vertically, or diagonally, and they could also be zigzagged. Another class consisted of parallel lines of notches that ran down the tops of stems of some pipes. The next class consisted of pipes with zoomorphic design units. Finally, a few pipes also exhibited designs that were classified as botanical design units.

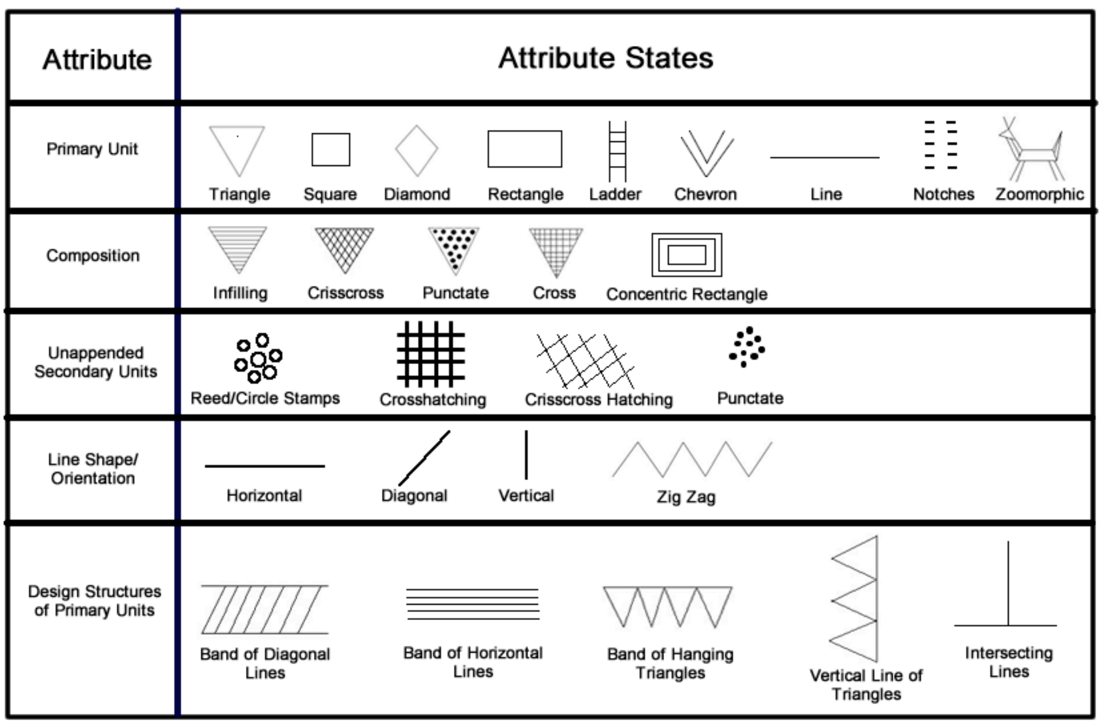


Figure 8.1: Design Attribute Units Recorded for Pipes (Adapted from Plog 1980:Figure 4.3)

In addition to primary design units, secondary units were also present. Filler or secondary motifs "are those units which are either included within the boundaries or appended to the borders of a primary motif, or are used to fill an area within the field of decoration which is not covered by primary motifs" (Carlson 1970:85 in Plog 1980:48).

If a design did not appear in isolation, i.e. if it only appeared in conjunction with other forms, then it was designated as a secondary unit. Some examples of these units are illustrated in Figure 8.1. A typical example of a secondary unit is the horizontal, vertical, or diagonal lines that were used to infill triangle motifs. Additionally, some motifs were infilled with smaller versions of the same shape, for example, the concentric rectangle. A few other units were also represented, such as crosshatched or checkerboard lines, punctuates, and reed stamps, which are circular, hollow stamps made by pressing the edges of reeds or shells into the pipe's surface.

In some instances, certain secondary units were used in different ways. Checkerboard and crosshatching designs were repeatedly used to infill geometric units. However, there were also a few pipes where these units were used to infill areas of the bowl or stem that lay in-between primary units. Occasionally reed stamps were also used in this way. Given that these units were still used to infill the portion of the pipe they were found on, but were not contained within primary units and were not found in isolation, I designated them as unappended secondary units.

In the sections below I examine the distributions of individual primary design units, suspending questions of co-occurrence. Then I examine the distributions of secondary design units. I compare these distributions with cultural complex, linguistic, physiographic, and temporal boundaries previously delineated by archaeologists to determine whether the null hypotheses posed above can be rejected.

It should be noted that in addition to looking at the frequencies of design units, I will mention instances where pipes from sites that could not be included in the analysis because of lack of temporal control exhibited certain units. The purpose of mentioning this is that in some cases, the presence of units on certain sites expands the known geographic distribution of the unit. Despite the lack of temporal control, knowing the full extent of the unit impacts the evaluation of the hypotheses, thus it was deemed important to include the sites in this discussion.

Primary Designs

Triangles

Triangles were one of the most the most frequent primary design units present on pipes from the region. A total of 62 pipes exhibited one or more triangle units as part of their decorative structure. Triangles were found on pipes from 26 different sites that were widely dispersed throughout both space and time (see Figures 8.2a-c). In addition to the sites shown on the map below, a pipe with a triangle was recovered on the surface of the Overpeck (36BU5) site. Although it is unclear whether this pipe dates to the Late Woodland II or Contact period, its presence extends the geographic boundaries of this unit further north into central Pennsylvania.

As shown in Figures 8.2a-8.2c pipes with triangle designs did not cluster in any particular time period. Moreover, even within each time period, pipes with triangle units were widely dispersed from north to south throughout the region and were found on pipes in multiple cultural complexes. In the Late Woodland II and Contact periods, pipes with triangles were also widely dispersed from east to west throughout the study area. One notable exception to this pattern however, is the absence of pipes with these units among the four sites in southwestern Virginia.

One possible explanation of this pattern could be that pipes with this unit were primarily produced in Piedmont and Coastal areas but knowledge of these decorations never reached Native groups living in the Ridge and Valley physiographic province. As previously noted, during certain periods, the Blue Ridge Mountains (see Figure 8.2b) served as a both a geophysical and social boundary between groups living in the Piedmont and Ridge and Valley areas. Nevertheless, previous research has shown that materials such as chert, jasper, and shell beads were traveling between the Ridge and Valley and Piedmont provinces during the Late Woodland and Contact periods (Barber 2008; Gallivan 2003; Lapham 2005). Moreover, Gallivan (2003:458-464) has argued that increased amounts of chert at Late Woodland II Piedmont sites indicates exchange relations between groups in the Ridge and Valley and Piedmont of Virginia intensified during the Late Woodland II period. Additionally, pipes from Keyser (44PA1) and the Cabin Run site (44WR300), which are located west of the Blue Ridge, had pipes with triangle units. The presence of pipes with triangle units on these sites indicates that pipes with triangles or ideas about their production were part of the exchange networks linking northern Ridge and Valley and Piedmont Native groups. While the lack of triangular units on southwestern Virginia pipes could be interpreted as an indication that southern Ridge and Valley and Piedmont Native groups were not engaging in the exchange networks with their eastern neighbors, results from earlier analyses described in Chapter 6 indicate that is not the case. The similarities between pipes recovered from the

Shannon (44MY8) and the Trigg (44MY3) sites indicate that groups living west of the Blue Ridge used the same distinctive thin round and squared flanges on bowl and mouthpiece rims as Native groups living in the Piedmont. The wide east to west distribution of these distinctive techniques indicates that ideas were moving over the mountains in the southern part of the study region as well as the northern portion.

Rather than being an indication of the nature of east-west exchange, the lack of pipes with triangles amongst southwestern Virginia sites could provide an indication of exchange relations between Native groups in the northern and southern parts of the study area. Figure 8.2b illustrates that triangular units are found in larger frequencies on northern sites during the Late Woodland II period than ones located in the south of the study area. Out of the 62 pipes that exhibited this unit, 58 were found amongst sites in the northern part of the study area. The lack of pipes with these units in the southern part

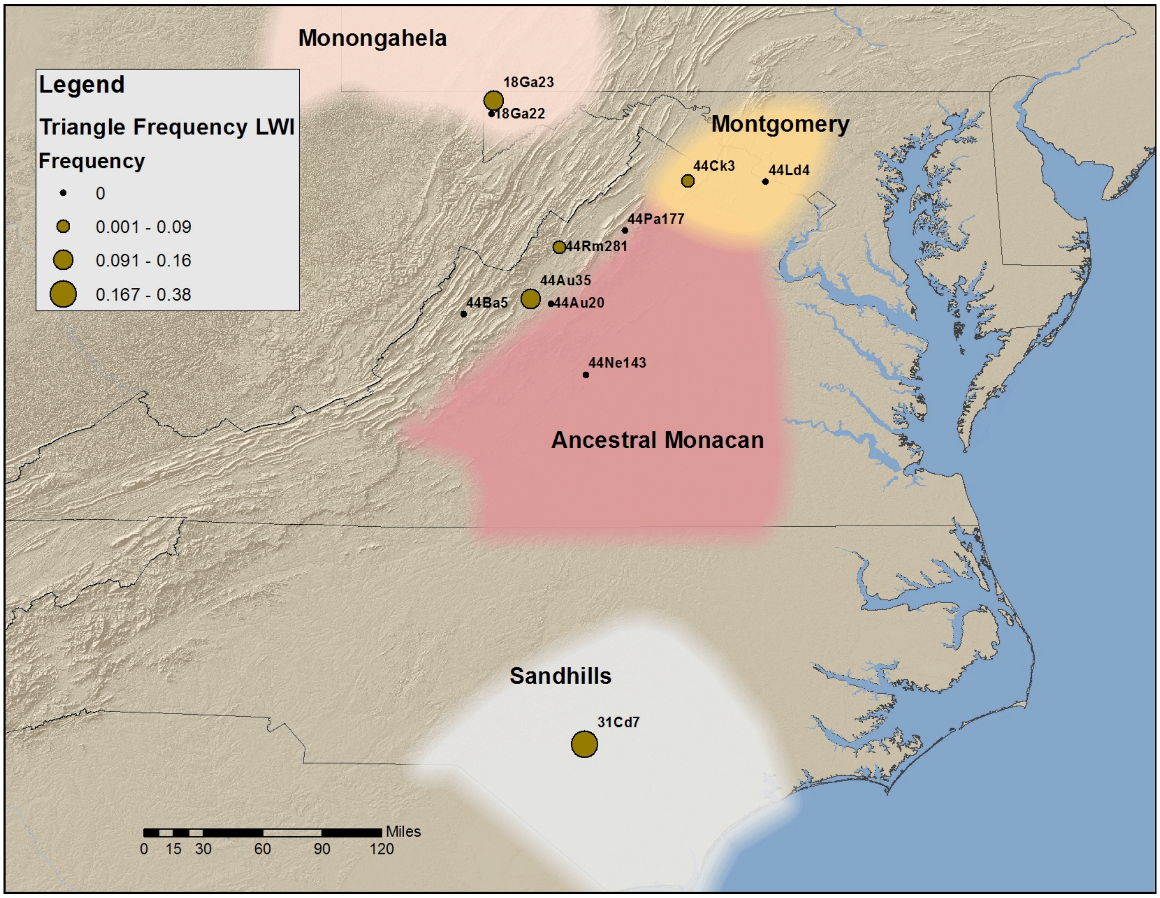


Figure 8.2a: Distribution of triangle design units on Late Woodland I Sites

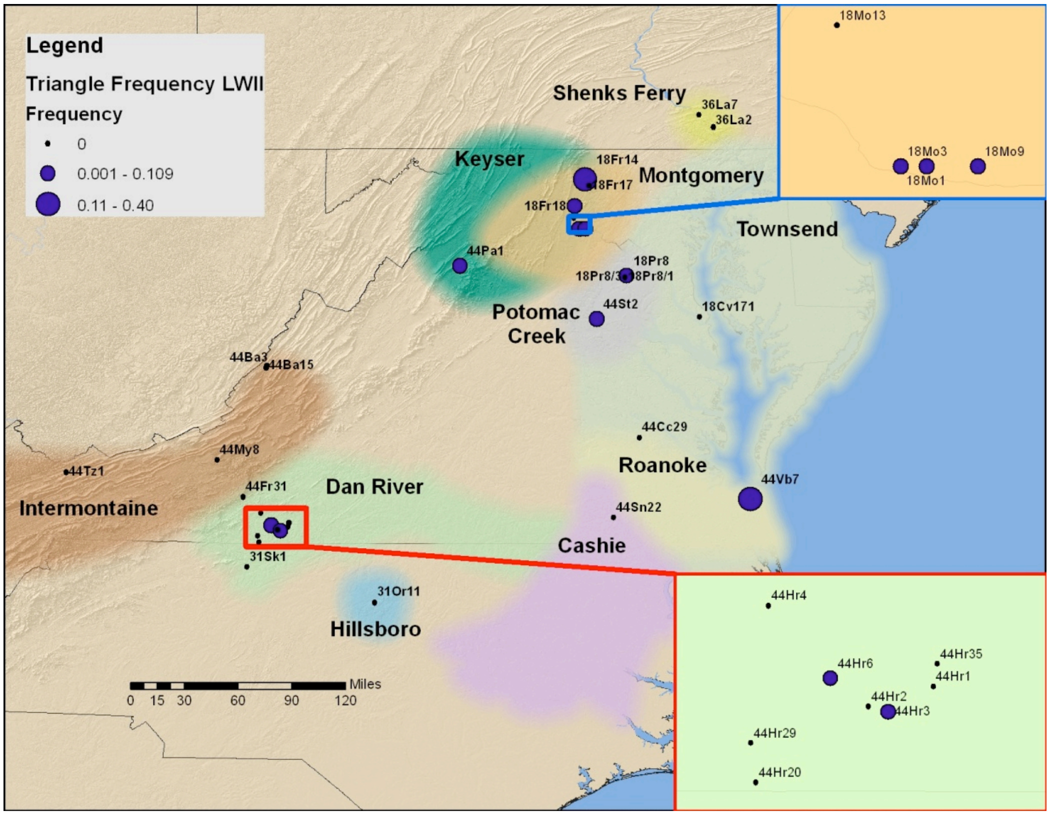


Figure 8.2b:Distribution of triangle design units on Late Woodland II sites

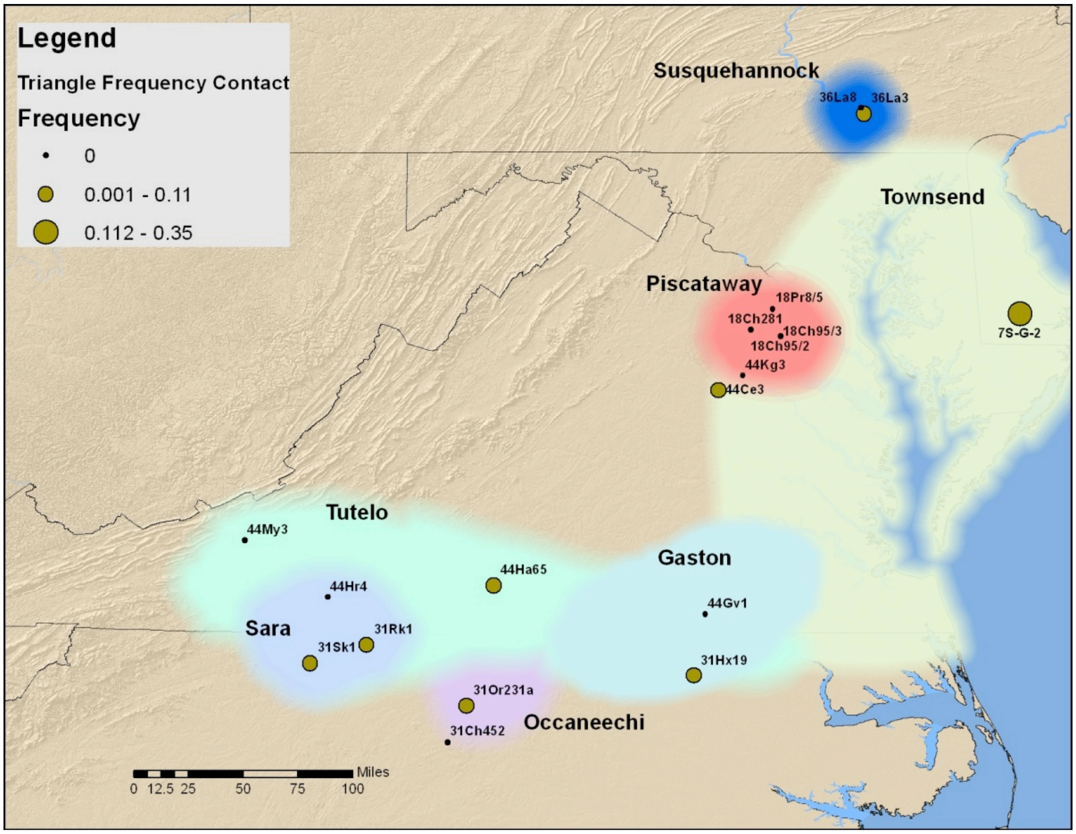


Figure 8.2c: Distribution of triangle design units on Contact Period sites

of the study area could be a result of north to south exchange networks were becoming more bounded and spatially-constricted during the Late Woodland II period in the region.

To test whether the distribution suggested by the maps was significant, a 2x2 contingency table of the presence and absence of triangle units on the different sites was created (see Table 8.1). Because one of the cells had a count of less than 5, a Fisher's test was used to evaluate the relationship between site location and the presence or absence of the triangle design unit. The Fisher's test returned a *p* value of 0.051. Although a p value of .051 is technically just outside of the .05 range, given all the possible errors in archaeological data I argue this is still statistically significant. This indicates that the pattern suggested by the maps was significant and that there is a difference between the distribution of triangle units on north and south sites in the study area.

In contrast to the Late Woodland II period distribution, the majority of pipes with triangular units from Contact period sites were found in the southern part of the study area (see Figure 8.2c). Unfortunately the lack of available assemblages from the northern part of the study area makes it difficult to determine how widespread the distribution of this unit is but its presence on pipes from the Camden site (44CE3) suggests that triangles were still being used by Native groups in the north to decorate pipes. The presence of pipes with triangles in the southern part of the study area is likely a result of another shift in exchange networks in the region. This could be further evidence of a pattern already identified by Eastman (1999). Eastman has argued that variations in ceramics on the Early Upper Saratown site (31SK1a) and the Lower Saratown (31RK1) site were material evidence that the Sara shifted their trading routes after 1650. Prior to 1650 the Sara were trading with groups in southwest Virginia. After 1650 the Sara shifted focus to trade with groups in the northeast Piedmont, along the Occaneechi trail from southeast Virginia. The presence of pipes with geometric units at the Abbyville (44HA65) and Jenrette (31OR231a) sites suggests groups living to the east and southeast of the Sara were participating in the same trade route. Ward and Davis (1993:204–205, 365–368) have also noted that pipes with motifs similar to those found on Chesapeake pipes are present on eighteenth-century Fredericks site.

Table 8.1: Presence/absence of triangle design units among northern and southern sites

	Triangle Present		
Site	Absent	Present	Total
North	6	7	13
South	15	3	18
Total	21	10	31

Overall the distribution of triangle decorative units provides some insight into possible shifts taking place in exchange networks in the Middle Atlantic through time. Although the distributions of triangles are widespread in all three time periods the geographic extent of the dispersion shifts through time. In the Late Woodland I period, pipes with triangles are found on sites ranging from southeast North Carolina to northwestern Virginia suggesting the social interaction and exchange networks functioned on a long distance scale. In contrast, in the Late Woodland II period, the distribution of triangles becomes more constricted as the majority of pipes with this unit are found among northern sites. Finally in the Contact period the majority of pipes with this decorative unit are found in the southern part of the study area. Their presence on pipes from the Camden site located further north indicates the distribution became more widespread again and could be related to the long distance exchange networks that were part of the fur trade.

Squares and Rectangles

Another distinctive motif identified in the dataset was the presence of four-sided shapes on the surfaces of some pipes. In some cases, such shapes have been identified as squares (Curry and Kavanaugh 2004; Slattery and Woodward 1992). In other instances, four-sided shapes have been labeled rectangles (Irwin 2004). It should be noted that this distinction was not necessarily the result of a conscious effort by researchers to differentiate between shapes that were vastly different in execution. Rather, the researchers who have used these different terms were not necessarily cognizant of other terms used to describe similar motifs from different parts of the study area. My own comparison of the pipes whose units had been designated as squares with pipes labeled rectangles indicated that the shapes labeled rectangles do exhibit two sides that are longer than the other two sides. In contrast the shapes with four sides found in the northern part of the study area exhibit sides that are fairly uniform in length. Consequently, to capture as much variation as possible, I differentiated squares from rectangles based on the length of the sides. Squares had roughly even sides while rectangles had two longer and two shorter sides. Nevertheless, it is difficult to say whether the Natives producing pipes necessarily differentiated between these different shapes or whether these could have been considered variations of a single unit. Although I discuss the distributions of these two shapes separately, this could be a differentiation that was imposed by the author and not necessarily one that captures how such shapes were viewed in Native cultures.

Square units were present in lower frequencies than triangles. Seven total pipes exhibited square units. As illustrated by Figures 8.3a and 8.3b, during the Late Woodland I and II periods, the distribution of this motif was solely associated with Montgomery Complex sites. Yet, the distribution of this unit expands during the Contact period as examples were identified in the Early Upper Saratown (31SK1a) and Jenrette (31OR231a) assemblages. A pipe with a square unit was also found farther north on the

Overpeck site (36BU5) in Pennsylvania that dates to either the Late Woodland II or Contact period. Given the extremely small sample size it is difficult to tell whether the production of pipes with square motifs from the southern part of the study area is in any way related to the production of pipes with this unit amongst Montgomery Complex sites. However, it seems unlikely given that the pipes from the southern sites date to a later period. The association between pipes with this unit and Montgomery Complex sites suggests that squares might have served a particular social role amongst Natives living at these sites.

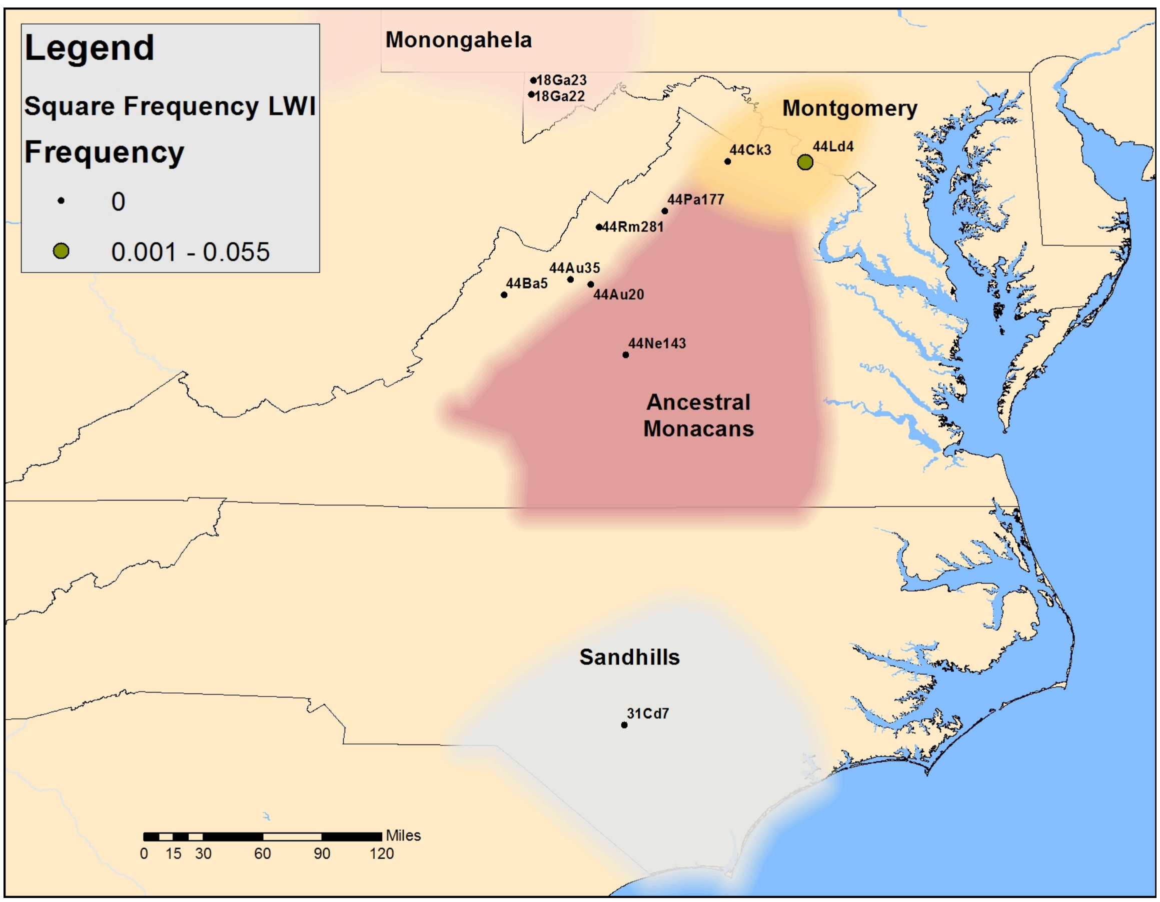


Figure 8.3a: Distribution of square primary units on Late Woodland I sites

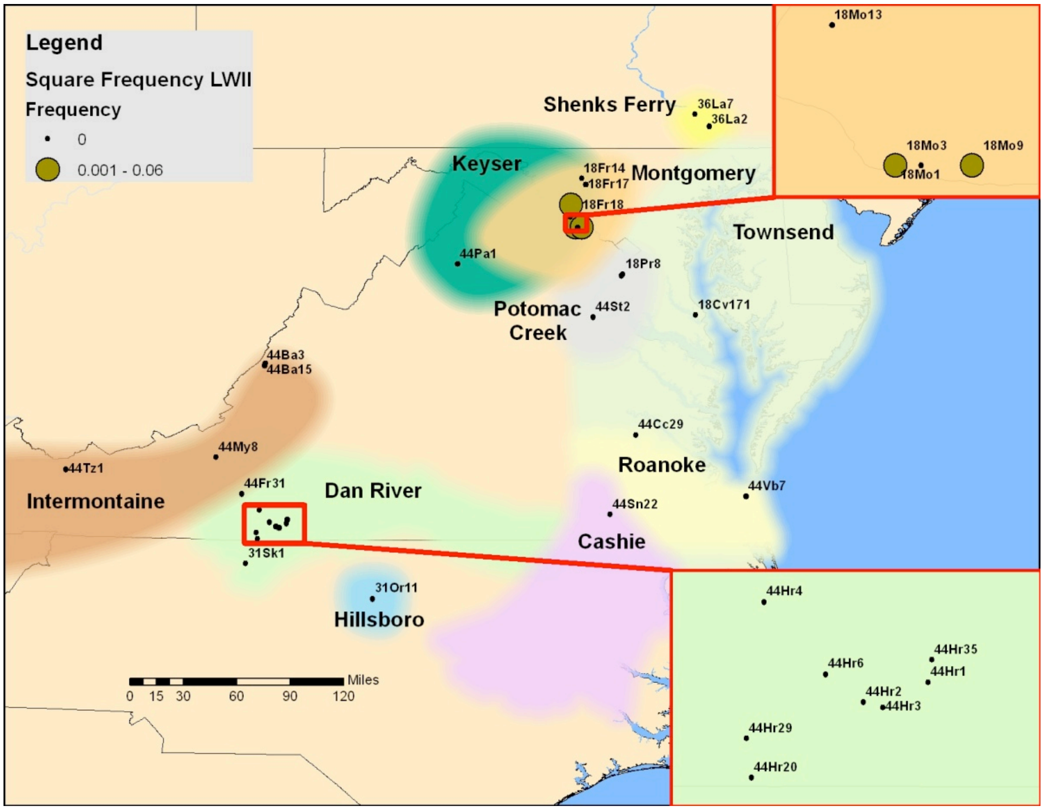


Figure 8.3b: Distribution of square primary design units on Late Woodland II sites

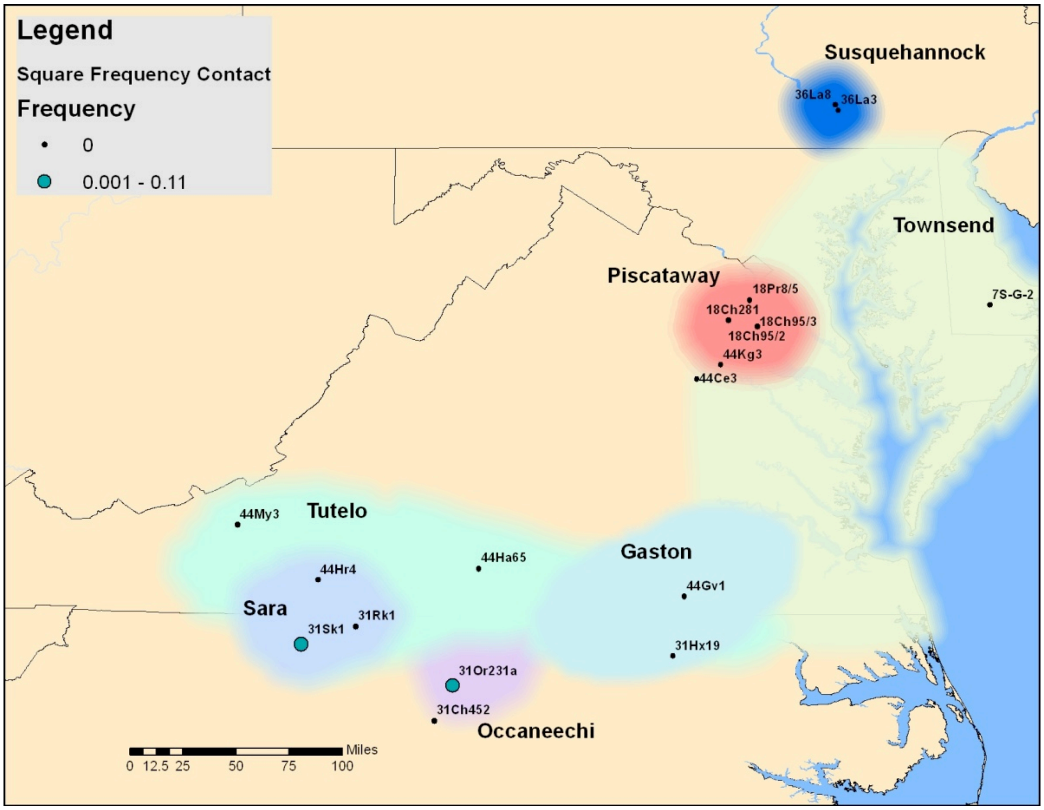


Figure 8.3c: Distribution of square design units on Contact period sites

Rectangles

The number of rectangle units identified in the sample was also small. Eight pipes total had this decorative unit. Rectangle units were only present in assemblages dating to the Late Woodland I and II period; no rectangles were found in any of the Contact period pipe assemblages. Pipes with rectangles on Late Woodland I sites were associated with the two different mound complexes in the region which are separated by hundreds of miles. The McLean Mound (31CD7) assemblage contained by far the most pipes with this unit (n = 5). One additional pipe with a rectangle was excavated from the John East Mound (44AU35).

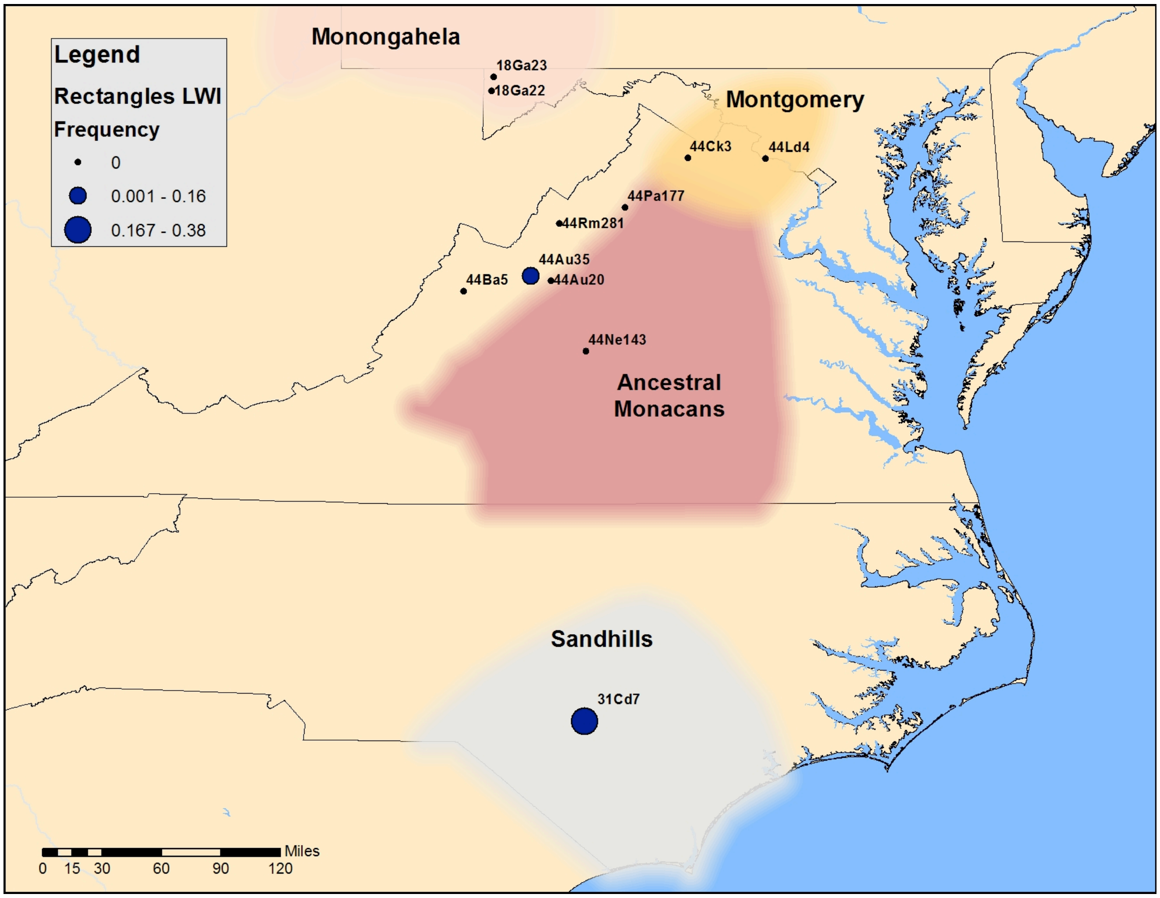


Figure 8.4a: Distribution of Rectangles on Late Woodland I sites

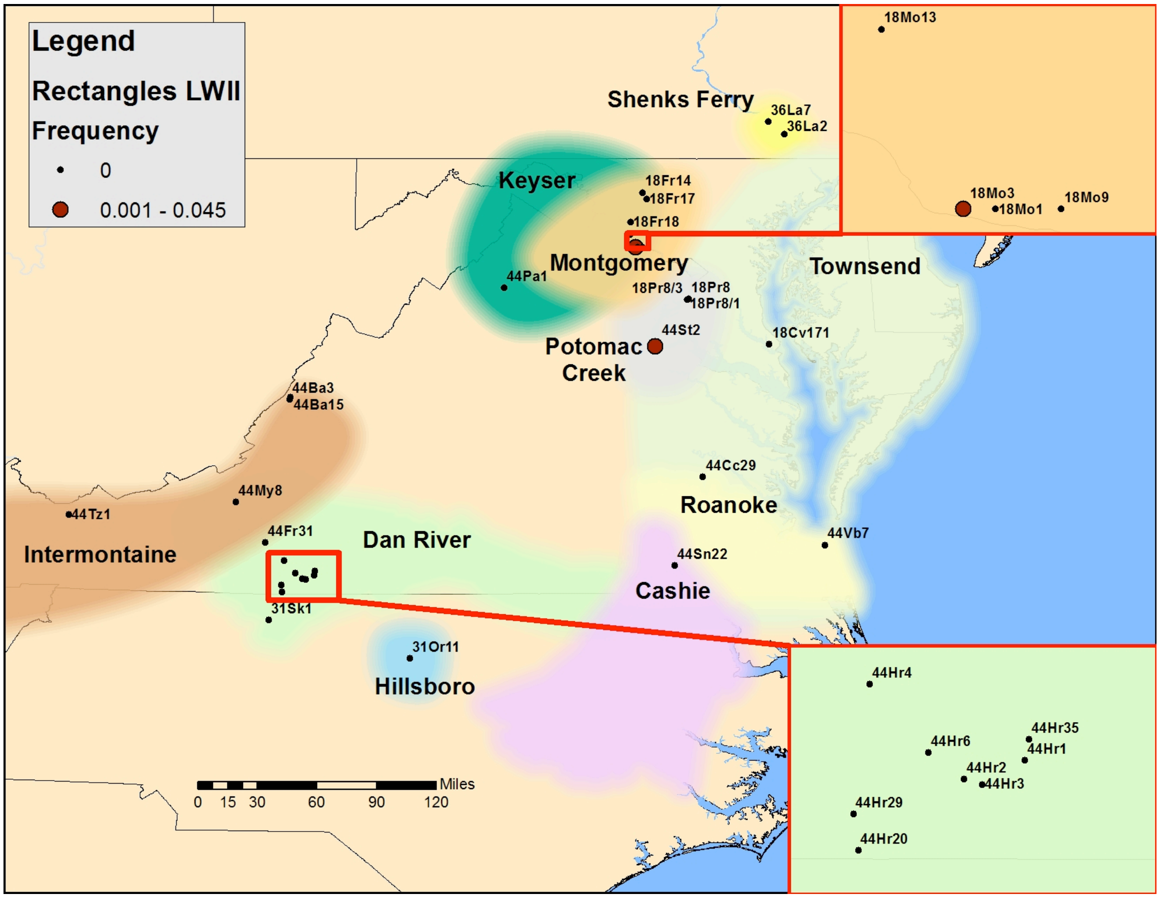


Figure 8.4b: Distribution of rectangles on Late Woodland II sites

The distribution became more clustered on Late Woodland II sites but the two pipes with these units were from sites considered to be part of two different cultural complexes, Montgomery and Potomac Creek.

Diamonds

Diamonds were another decorative unit found on pipes. Eleven total pipes were identified with this unit. No pipes with diamond units were present on Late Woodland I period sites. The majority of Late Woodland II period pipes with diamonds were present on sites belonging to the Montgomery and Potomac Creek cultural complexes. The two

Contact period assemblages exhibiting pipes with diamond motifs were widely dispersed, one in southern Pennsylvania and the other in northern North Carolina. Given the distance between these two sites it seems unlikely that the presence of this design unit indicates any connection between their inhabitants.

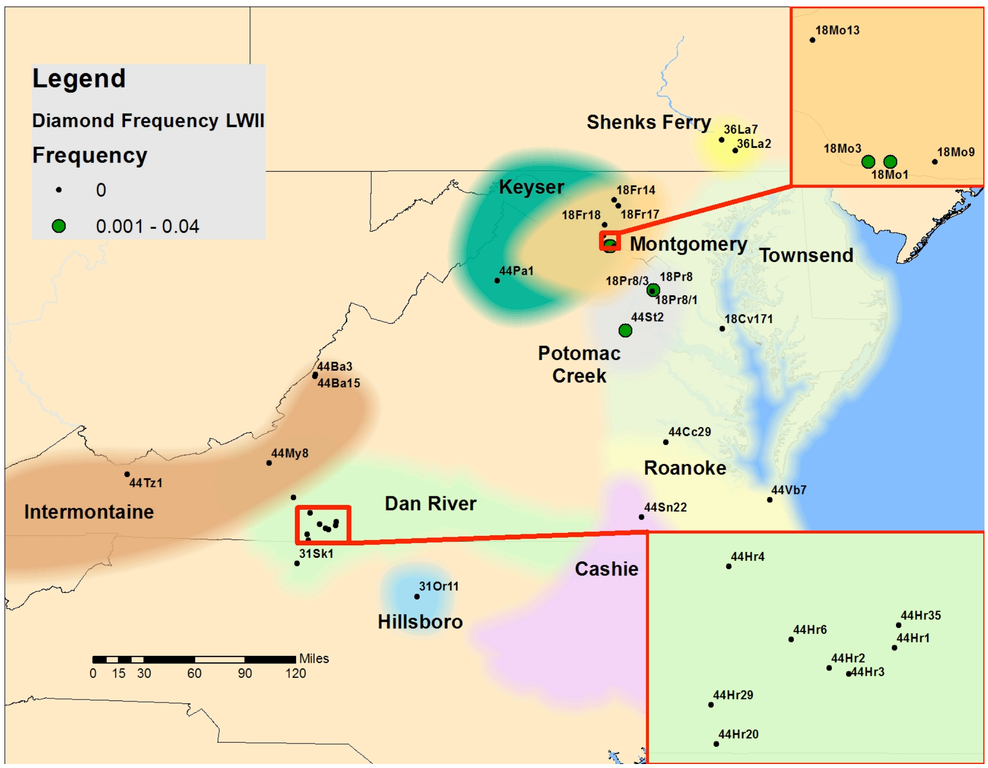


Figure 8.5a: Distribution of pipes with diamond primary units on Late Woodland II sites

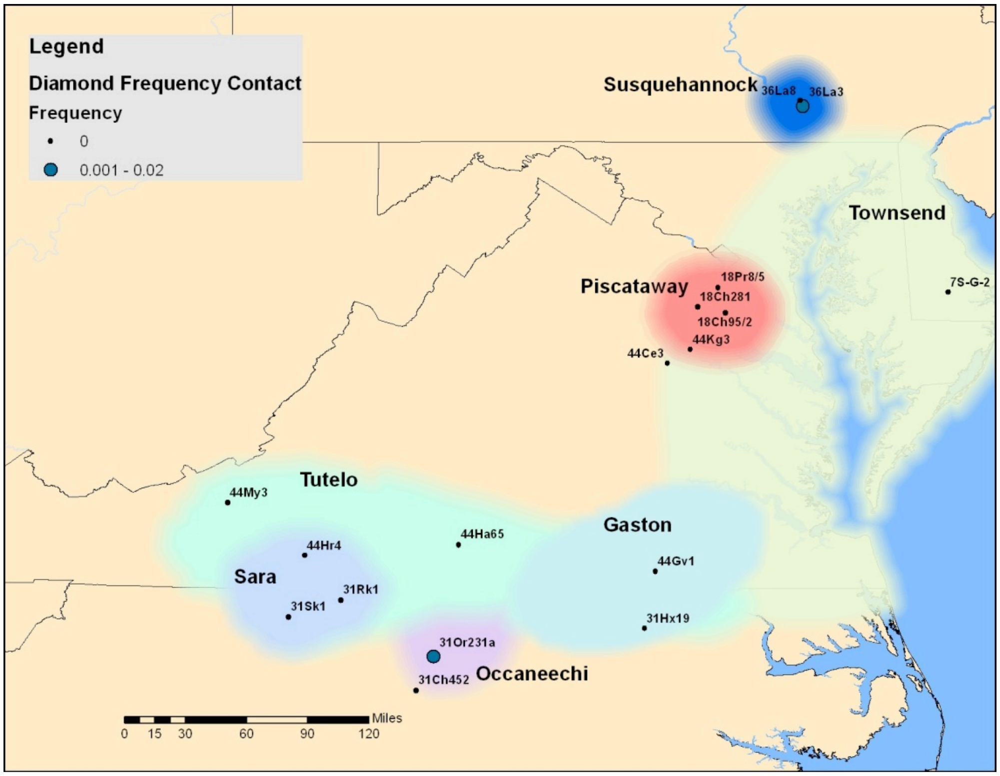


Figure 8.5b: Distribution of pipes with diamond primary units on Contact period sites

Ladders

The term "ladder" describes the shape made by two vertical lines filled with horizontal hatching (see Figure 8.1). Like rectangles and diamonds the use of this unit was scattered and infrequent. Seven pipes had this unit. Five of these pipes were found on two Late Woodland I mound sites, McLean (31CD7) and John East (44AU35). The two sites with pipes exhibiting this trait are separated by hundreds of miles (Figures 7.6a and b).

In addition to pipes from mound sites, two pipes with similar units were found on the Contact period Strickler (36LA3) site. However, these units exhibited hatching lines that were diagonal instead of horizontal and wrapped diagonally around the bowl rather than running vertically up and down the stem. Given these differences, and the fact that the Strickler site was occupied at least three centuries after the use of mound sites, it seems unlikely that the use of a similar unit is related to any connection Strickler residents may have had with Native groups using the mound sites.

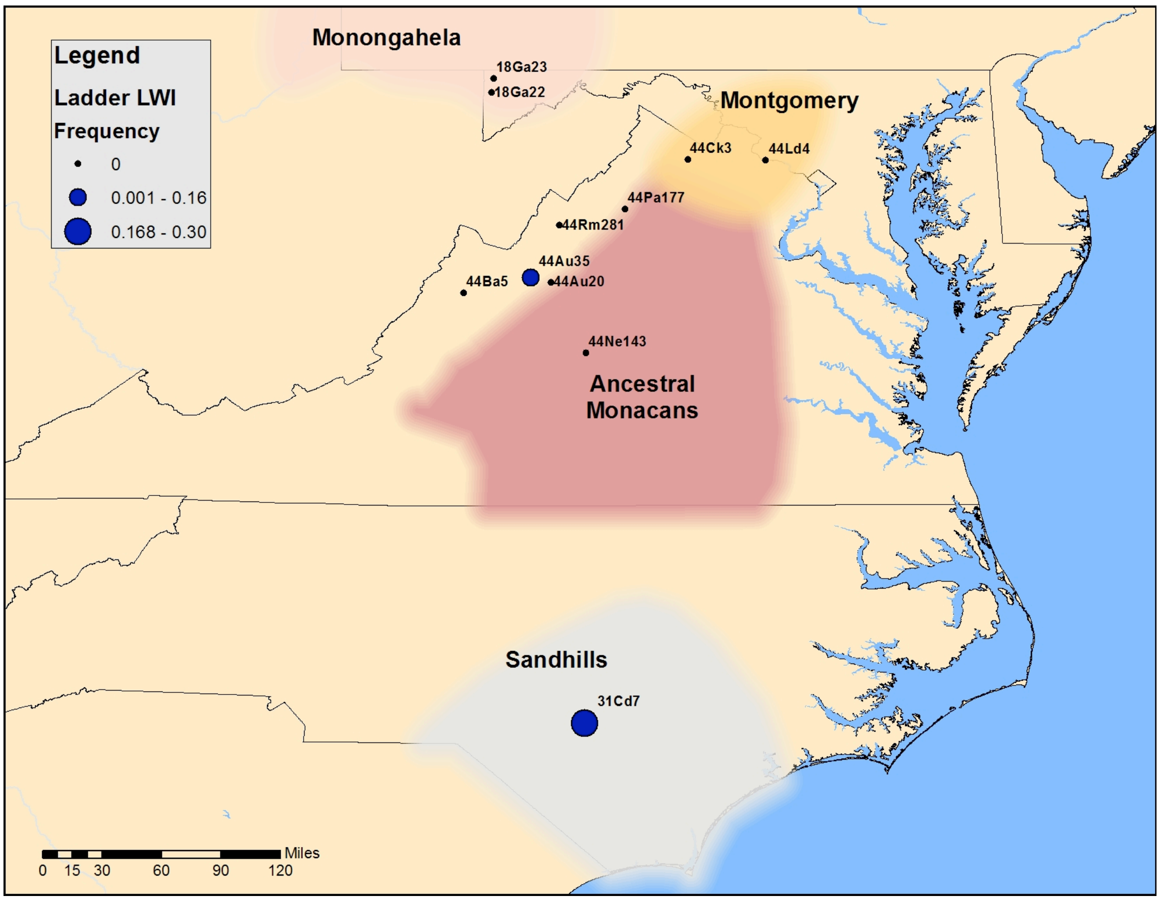


Figure 8.6a: Distribution of ladder primary units on Late Woodland I sites

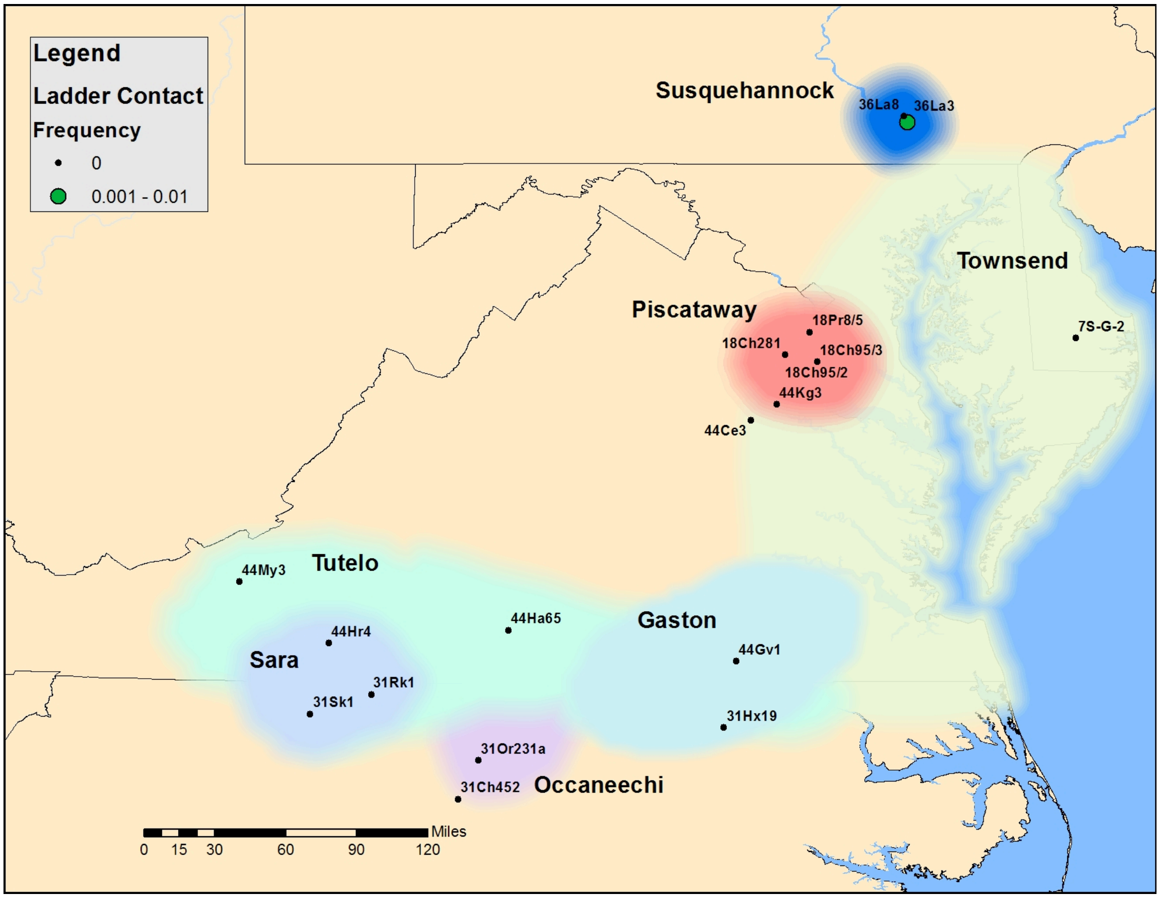


Figure 8.6b: Distribution of ladder units on Contact period sites

Chevrons

Chevrons were another geometric primary unit found on a small percentage of pipes (Figures 8.7a-c). A total of eight pipes with chevrons were found on five sites that were widely dispersed through both space and time. Given the low frequency of use and the dispersion of the unit, it seems unlikely that the use of this design unit by different groups is related to any particular social or exchange network. Rather it could be an independent innovation used by a number of different groups.

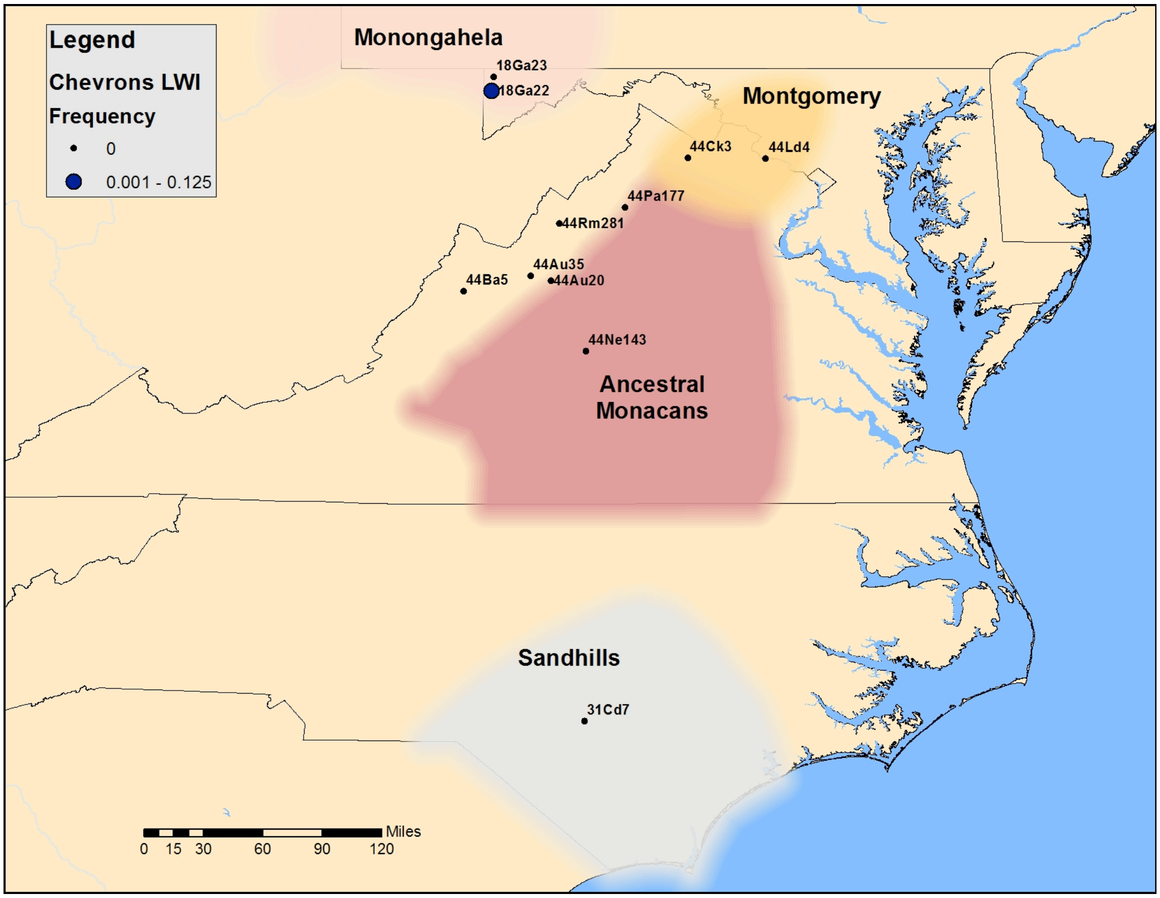


Figure 8.7a: Distribution of chevrons on Late Woodland I period sites

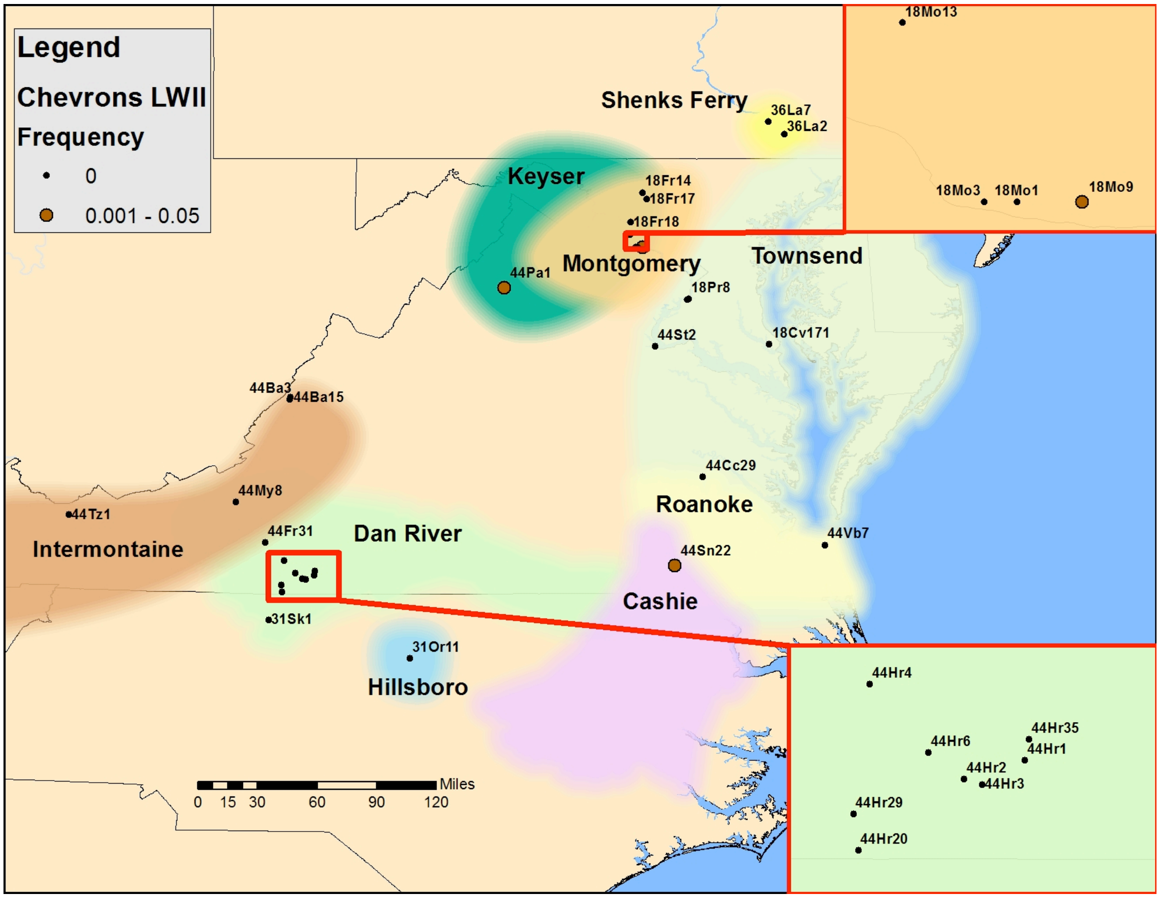


Figure 8.7b: Distribution of chevrons on Late Woodland II period sites

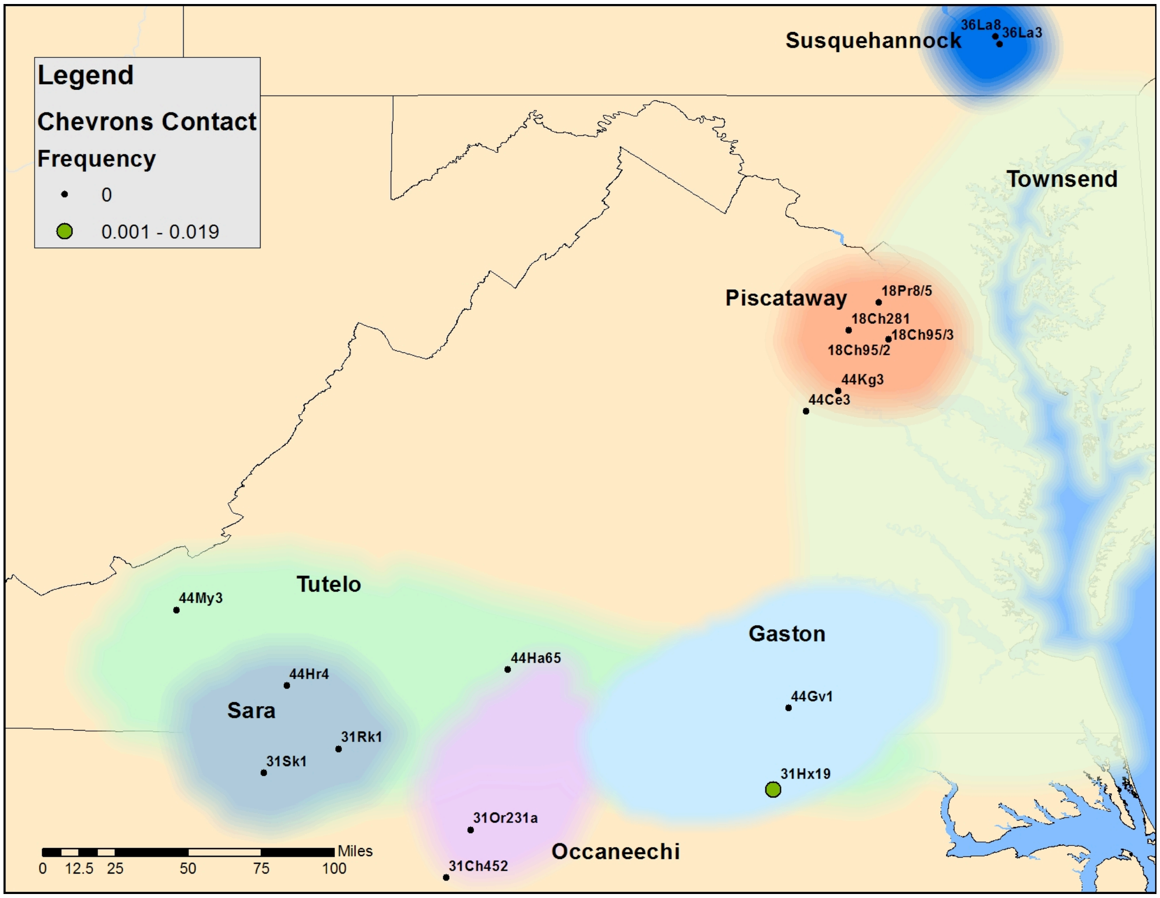


Figure 8.7c: Distribution of chevrons on Contact period sites

Lines

Another class of primary units consisted of lines oriented in different directions on the bowls and stems of pipes. To reiterate briefly, lines ran either horizontally, vertically, diagonally, or followed a zigzag pattern across the surface of the pipe (see Figure 8.1). In some cases lines of one orientation occurred more frequently than others. Horizontal lines were the most frequent of the four different types of lines found on pipes. Examples of this unit were found on a total of 437 pipes. As illustrated in Figures 8.8a-c, pipes with one or multiple horizontal lines were found on the vast majority of sites in the region throughout all three time periods. Overall pipes with horizontal lines were widely dispersed throughout the study area. In fact, horizontal lines were one of the only design units found within the boundaries of all but two of the cultural complexes in the study. The exception was that no pipes with horizontal lines were identified amongst assemblages from southwestern Virginia.

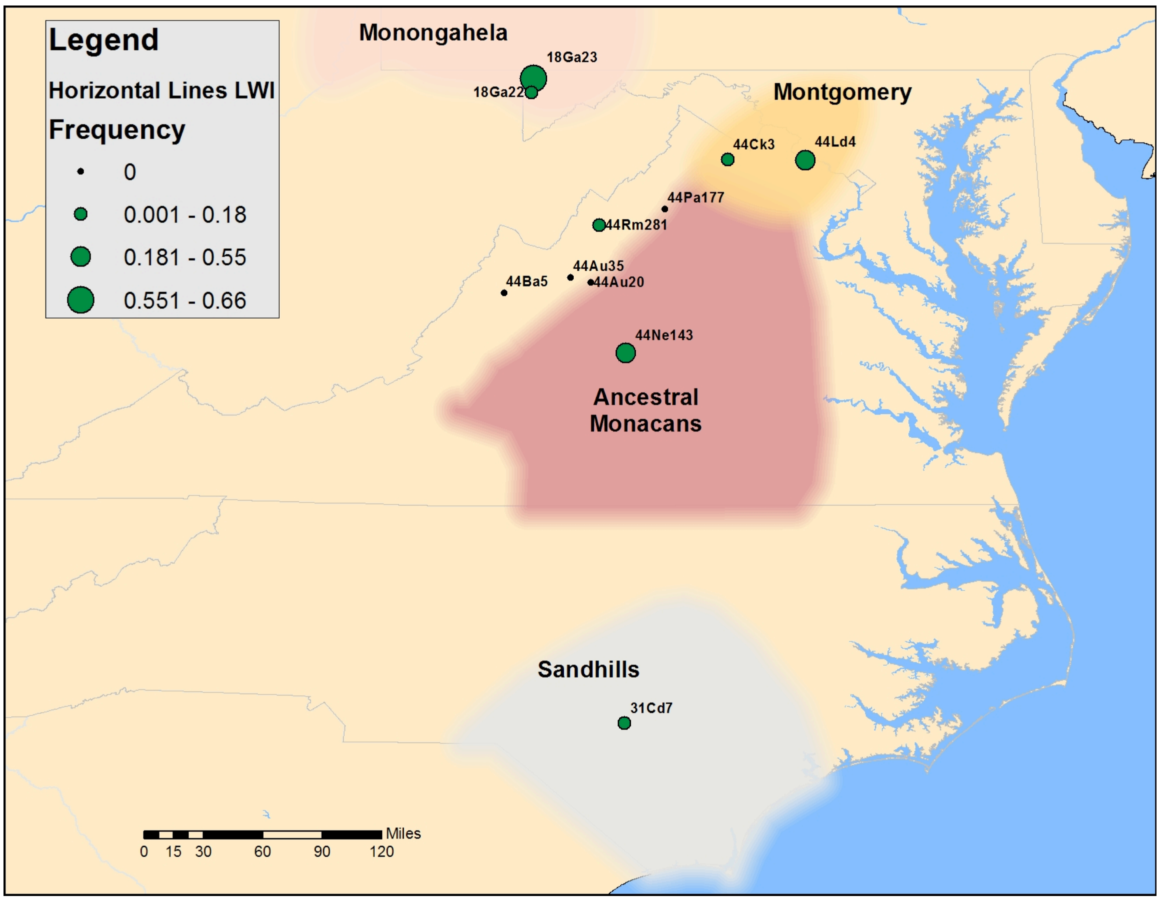


Figure 8.8a: Distribution of horizontal lines of Late Woodland I period sites

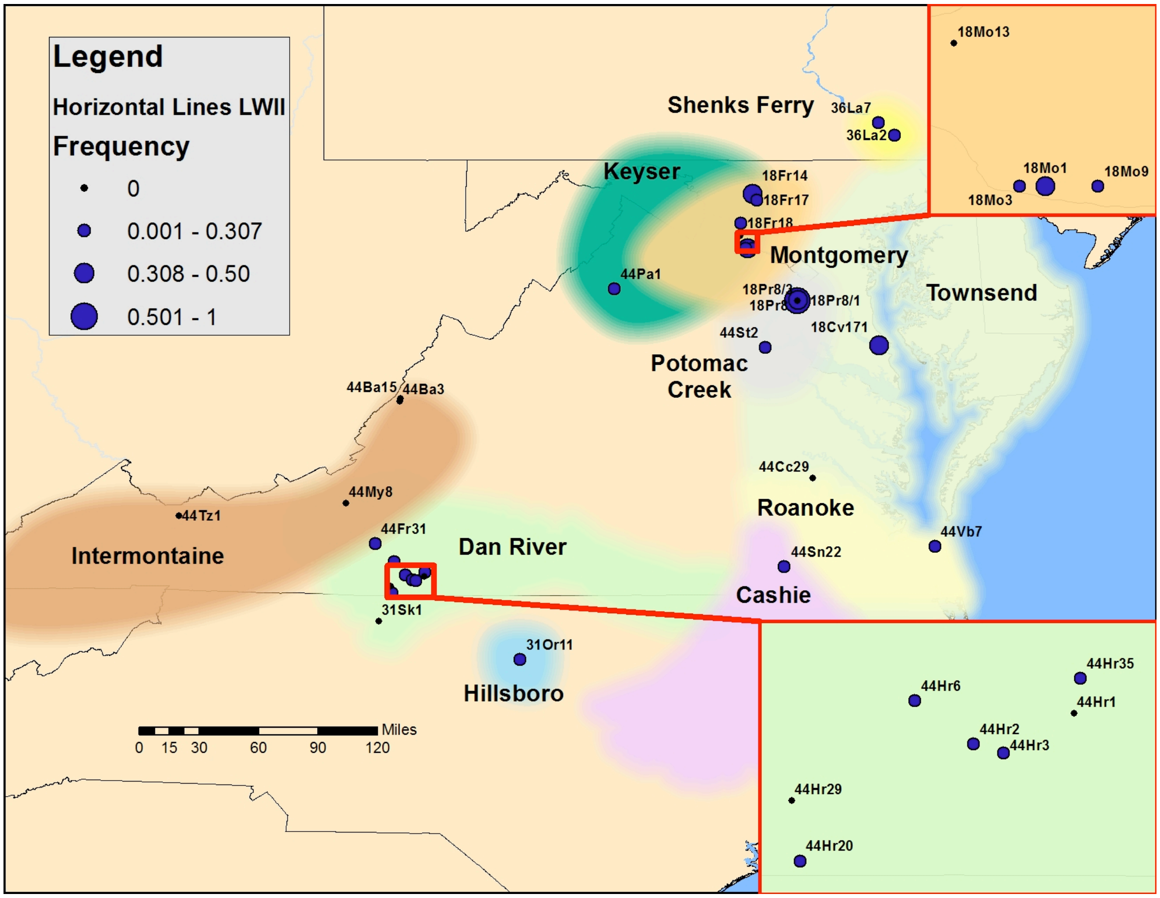


Figure 8.8b: Distribution of horizontal lines on Late Woodland II period sites

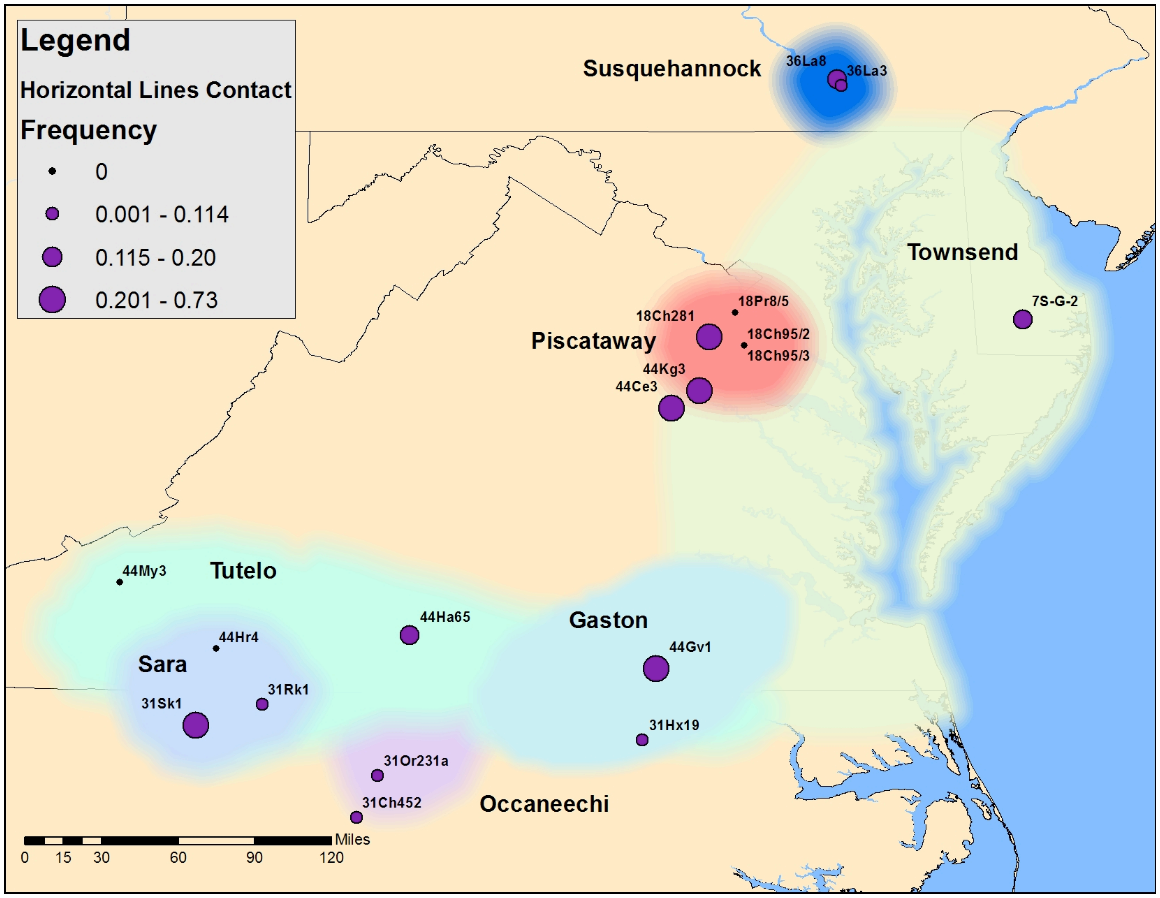


Figure 8.8c: Distribution of horizontal lines on Contact Period sites

Decorative lines that were oriented vertically were also widely dispersed throughout space and time but were not as prevalent as horizontal lines. Overall the frequency of vertical lines on Late Woodland II period sites was much lower than that of horizontal lines in all three time periods (Figures 8.9a-c). A total of 89 pipes exhibited vertical lines. Nevertheless, like horizontal lines, the use of vertical lines traversed cultural complex boundaries during all three time periods. While some of the assemblages exhibited higher frequencies of vertical lines, they tended to be the smaller assemblages such as Early Upper Saratown (31SK1a) and DeShazo (44KG3).

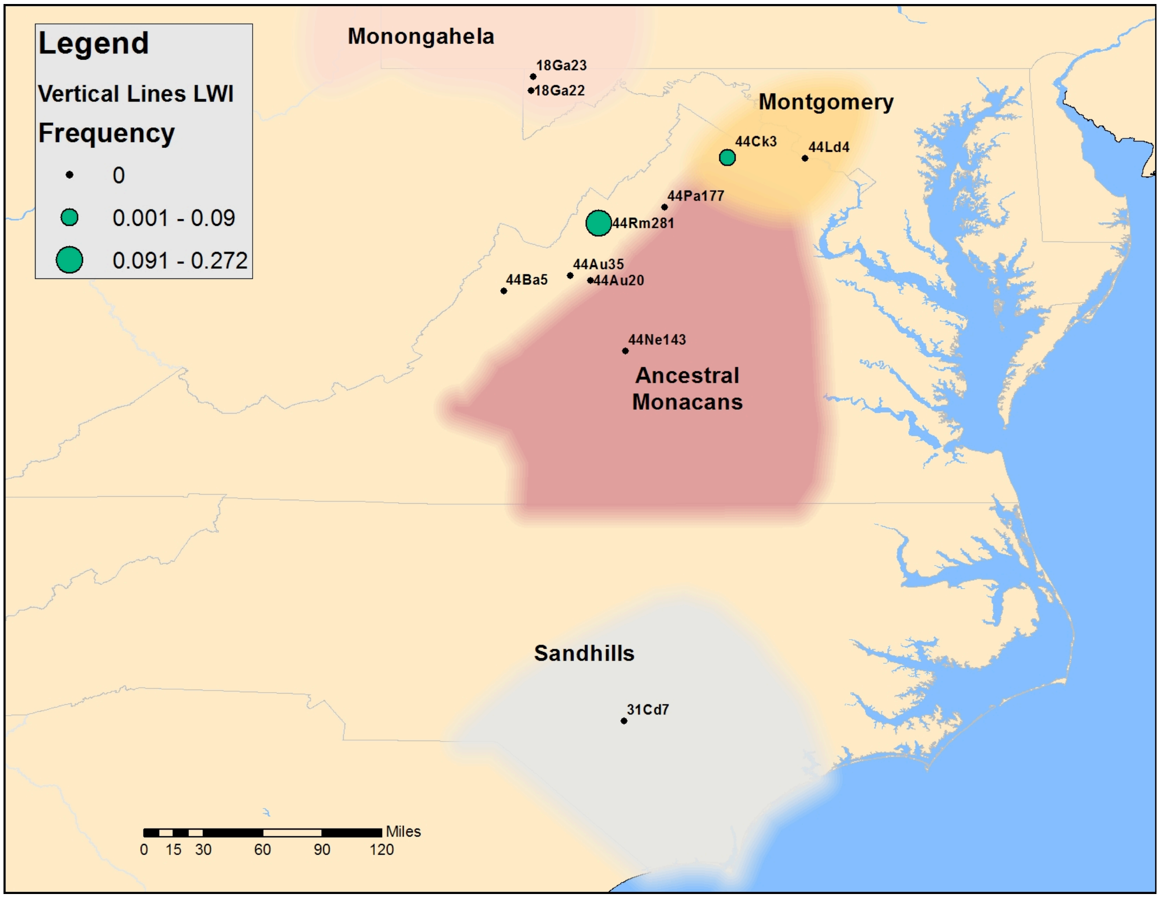


Figure 8.9a: Distribution of vertical lines on Late Woodland I period sites

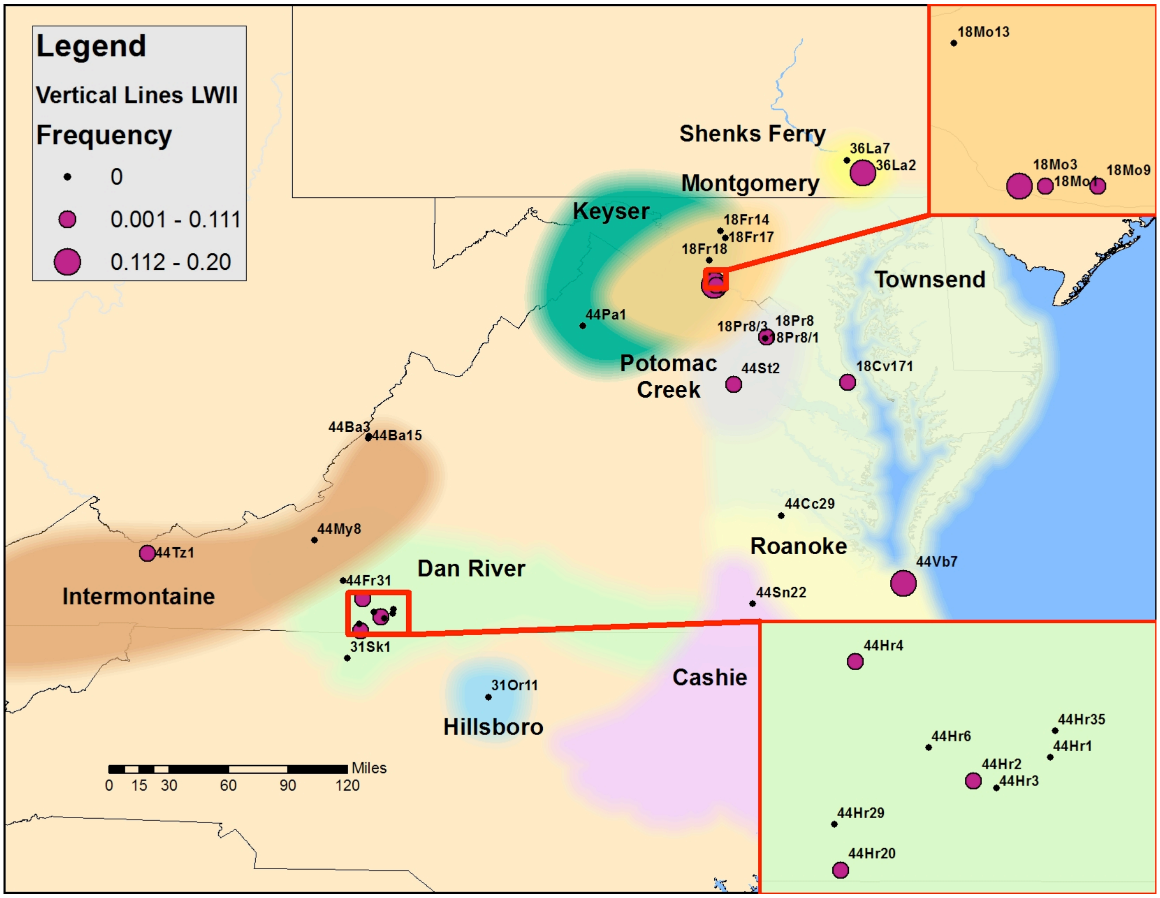


Figure 8.9b: Distribution of vertical lines on Late Woodland II period sites

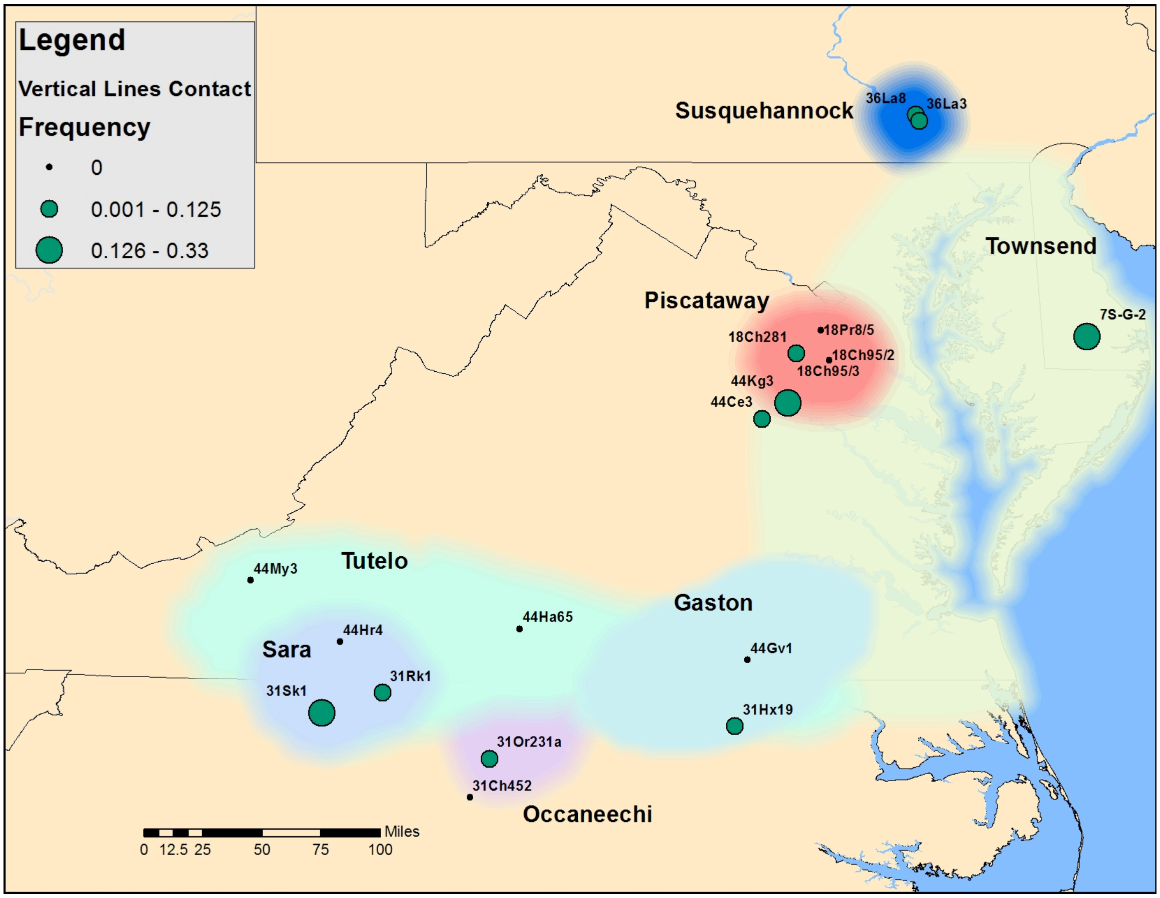


Figure 8.9c: Distribution of vertical lines on Contact period sites

Line units on pipes were also oriented diagonally on the pipe's surface. Diagonal lines exhibited a distribution similar to that of horizontal lines, widespread and found fairly frequently on pipes from all three time periods. Two hundred and five pipes exhibited diagonal line units. Like horizontal and vertical lines, the use of diagonal lines was also widespread throughout the region and was not restricted to any cultural complex boundaries (Figures 8.10a-c).

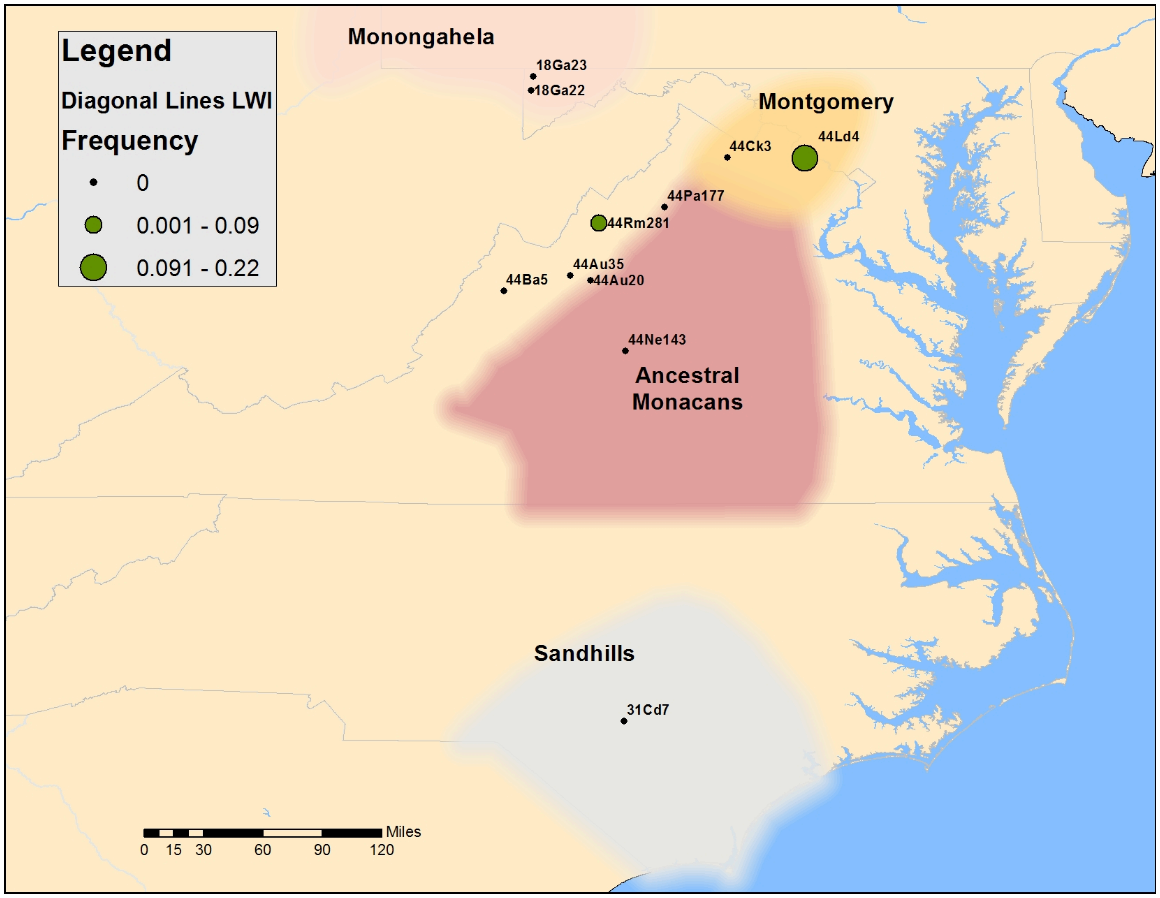


Figure 8.10a: Distribution of diagonal lines on Late Woodland I period sites

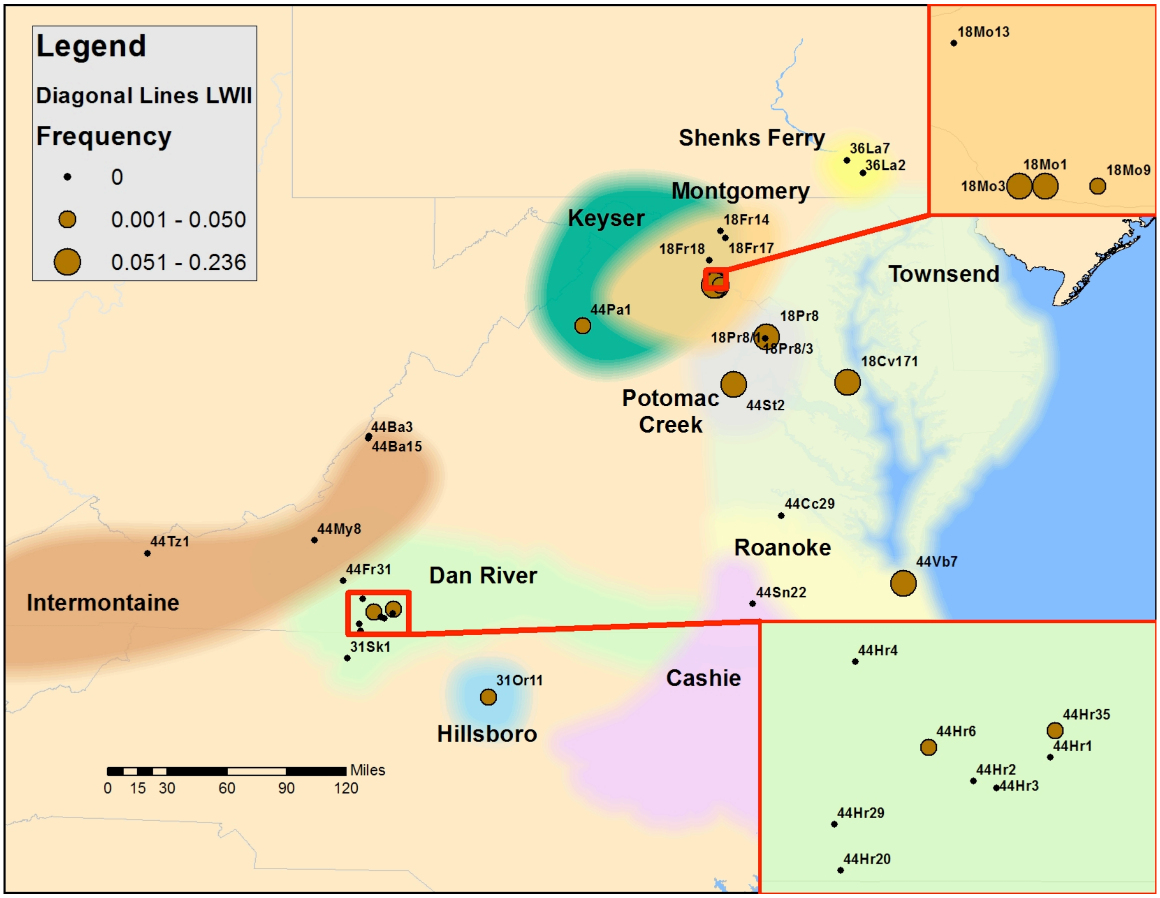


Figure 8.10b: Distribution of diagonal lines on Late Woodland II period sites

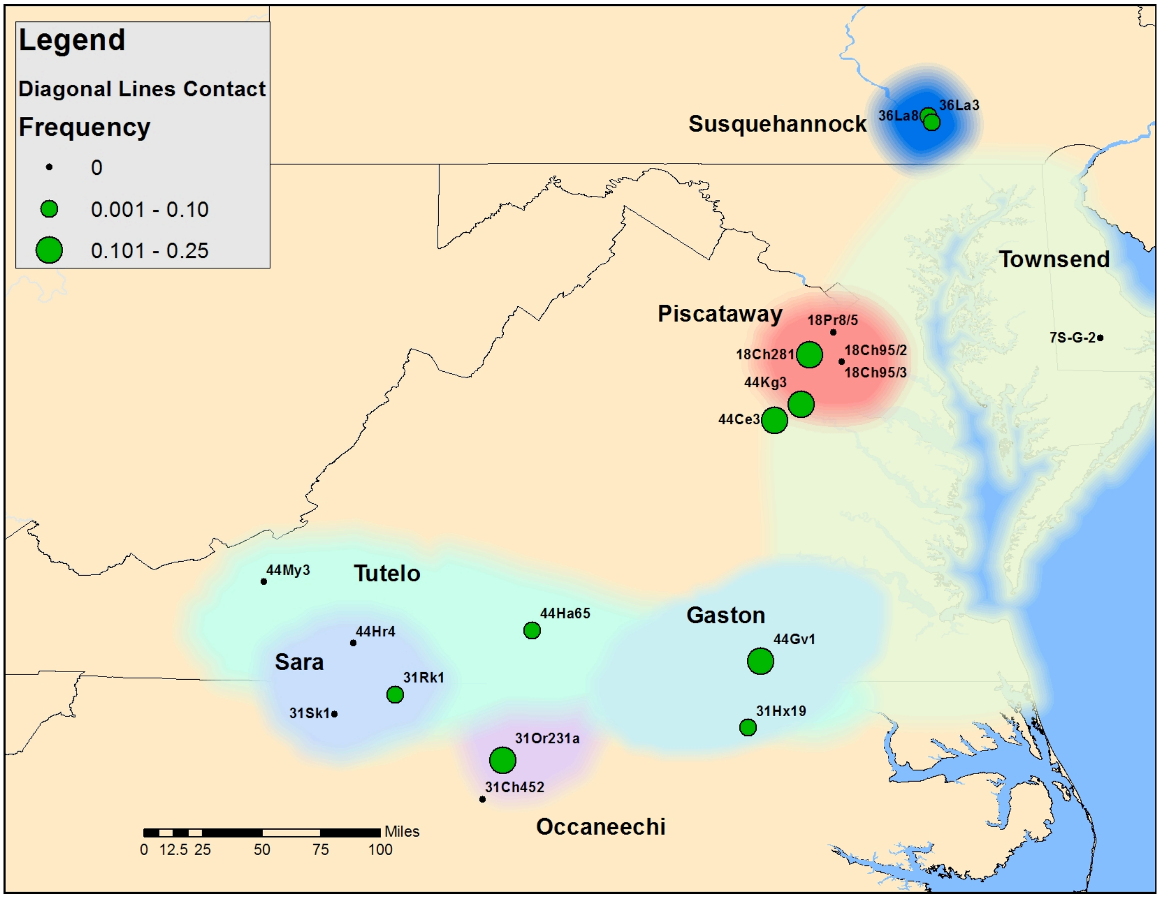


Figure 8.10c: Distribution of diagonal lines on Contact period sites

Zigzag lines were another category of line unit. Zigzag lines are only found on pipes from mounds during the Late Woodland I period but the distribution expands in the Late Woodland II period (Figures 8.11a-c). Nevertheless, zigzag lines tend to be associated with northern sites located within the Montgomery and Potomac Creek cultural complexes. The one exception was the presence of a few pipes with zigzag lines at the Wall site (31OR11). The lack of zigzag lines on pipes from sites associated with Late Woodland II sites in the Dan River and Townsend cultural areas is interesting given that zigzag lines are a decorative unit found somewhat frequently on Dan River and Townsend ceramics.

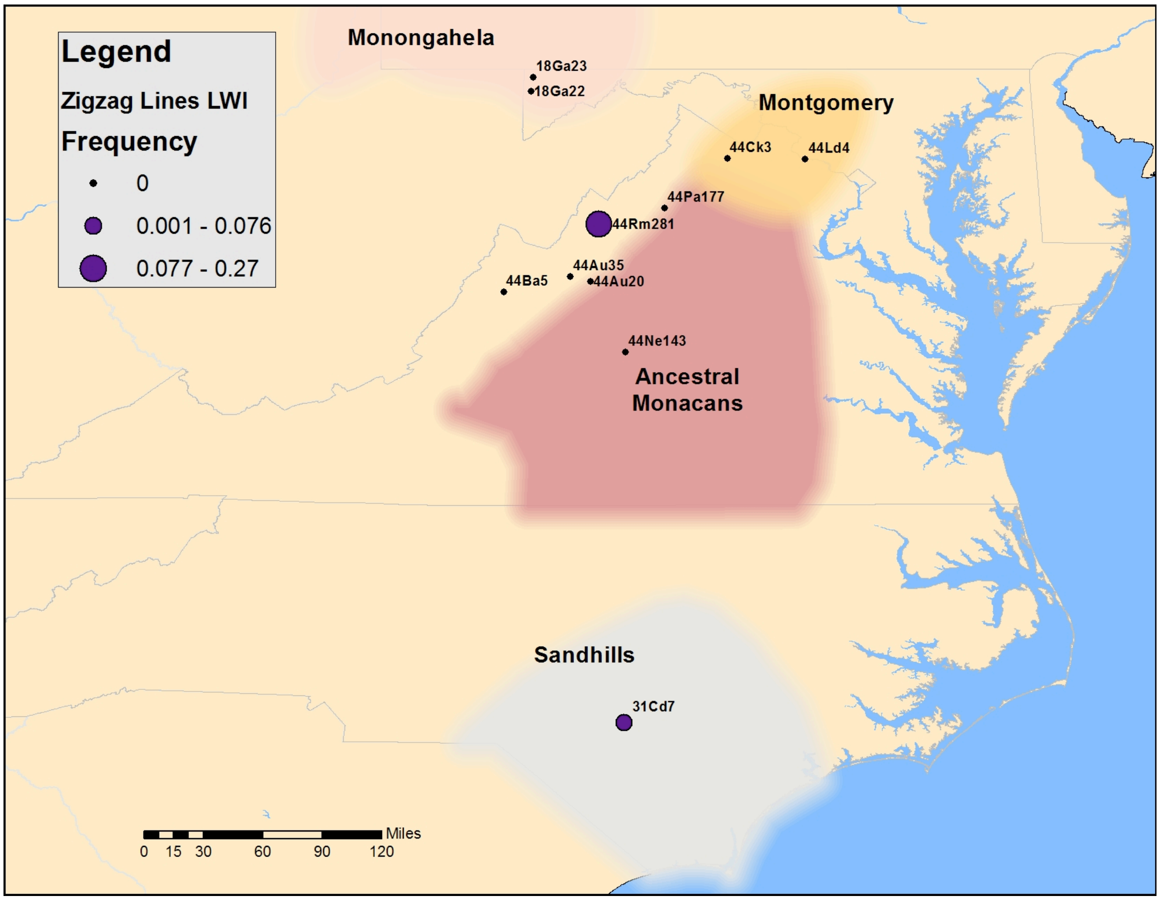


Figure 8.11a: Distribution of zigzag lines on Late Woodland I period sites

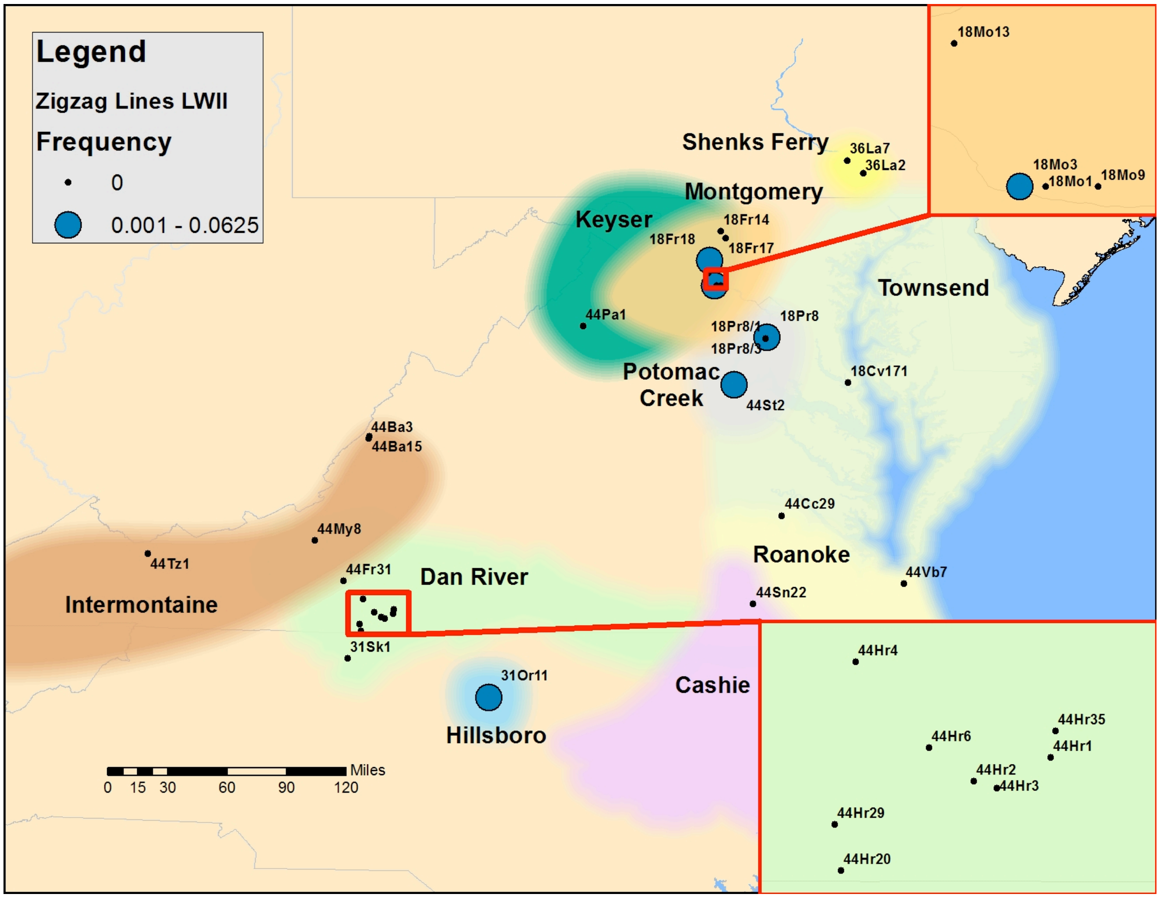


Figure 8.11b: Distribution of zigzag lines on Late Woodland II period sites

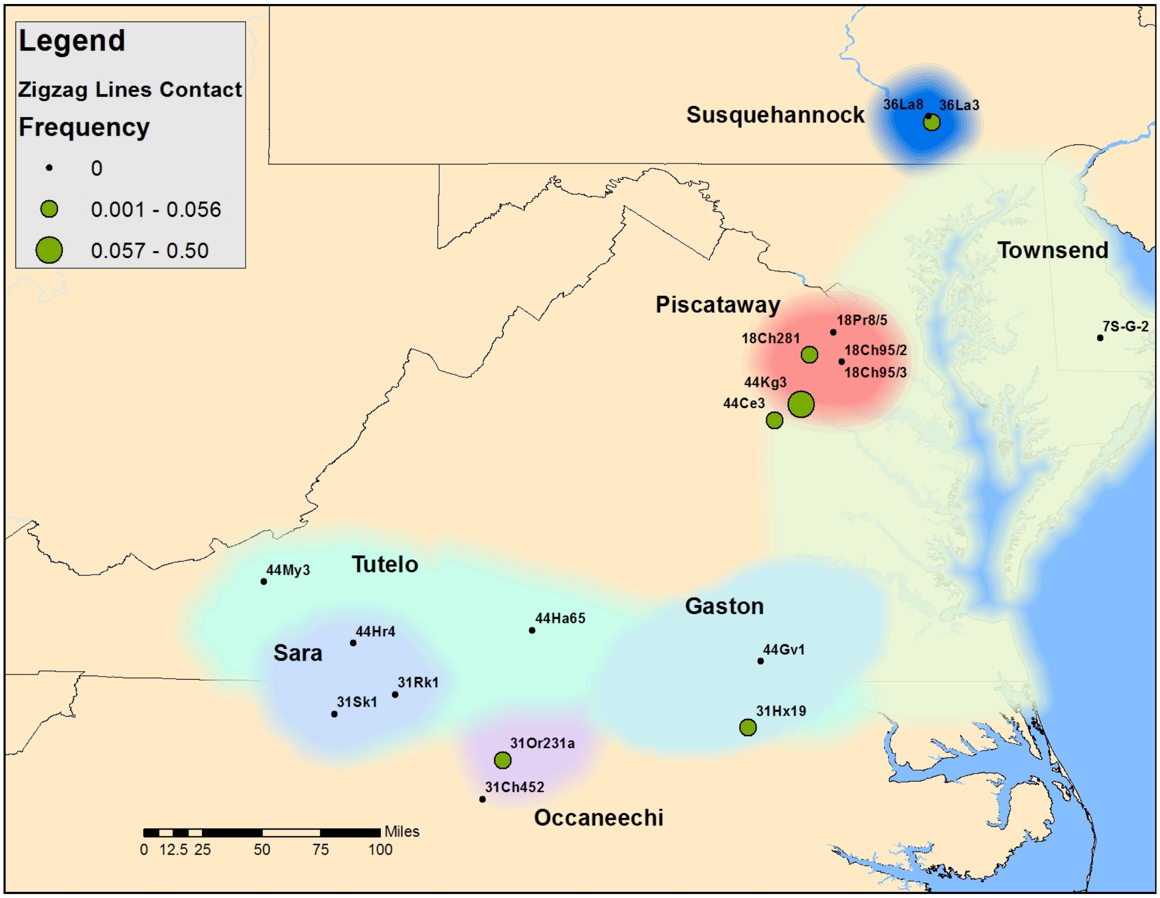


Figure 8.11c: Distribution of zigzag lines on Contact Period sites

The distribution of zigzag lines becomes slightly more dispersed among Contact period sites (Figure 8.11c). Zigzag lines were found on pipes ranging from the Strickler site (36LA3) in southeastern Pennsylvania to the Jenrette site (31OR231a) associated with the Occaneechi in north central North Carolina. Despite the change in geographic distribution the frequency of pipes with this unit remained small. Although fifty percent of the pipes from the DeShazo site exhibited this unit the assemblage from this site only consisted of four pipes total. For the rest of the sites pipes with zigzag lines only comprised five percent of the assemblage.

Overall, lines running different directions were widely dispersed throughout the region although different subclasses of lines were found in varying frequencies and distributions. Horizontal lines were used the most frequently among different assemblages. These units were also found to be the most widely dispersed throughout the region. The use of diagonal lines was also frequent and widespread although this unit tended to be found in larger frequencies in the northern part of the study area and was used less frequently in the southern part of the study area during the Late Woodland II period. Vertical and zigzag lines were used in more limited frequencies but their distributions were dispersed.

Lines were used far more frequently and widely than geometric units throughout the region. Nevertheless, like most of the geometric units the use of lines oriented in different directions to decorate pipes did not cluster in any particular cultural complex territory. Additionally, the frequency of the use of certain forms of lines such as diagonal lines, does differ between northern and southern sites in the study area in a manner similar to the distribution of triangles.

Yet one interesting pattern of note is that with the exception of one pipe, no lines were found on pipes from any of the five sites located in southwestern Virginia during any of the three time periods. The one exception was a single pipe from the Crab Orchard (44TZ1) site that displayed vertical lines. The lack of the use of lines as decorative units becomes even clearer when the frequencies of all pipes with lines are combined and mapped (see Figure 8.12a-c). I will discuss this pattern more in discussion section of the chapter.

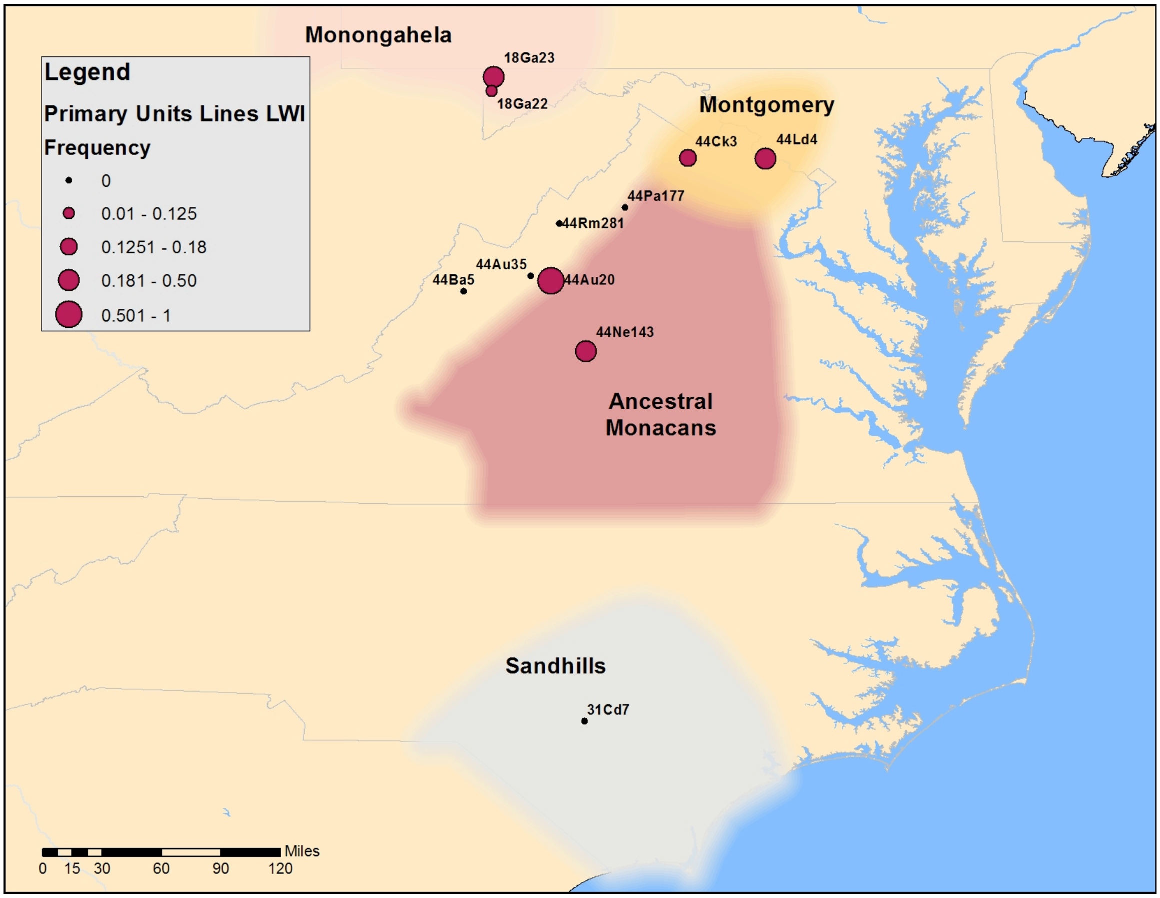


Figure 8.12a: Distribution of frequencies of different primary lines units on Late Woodland I period sites

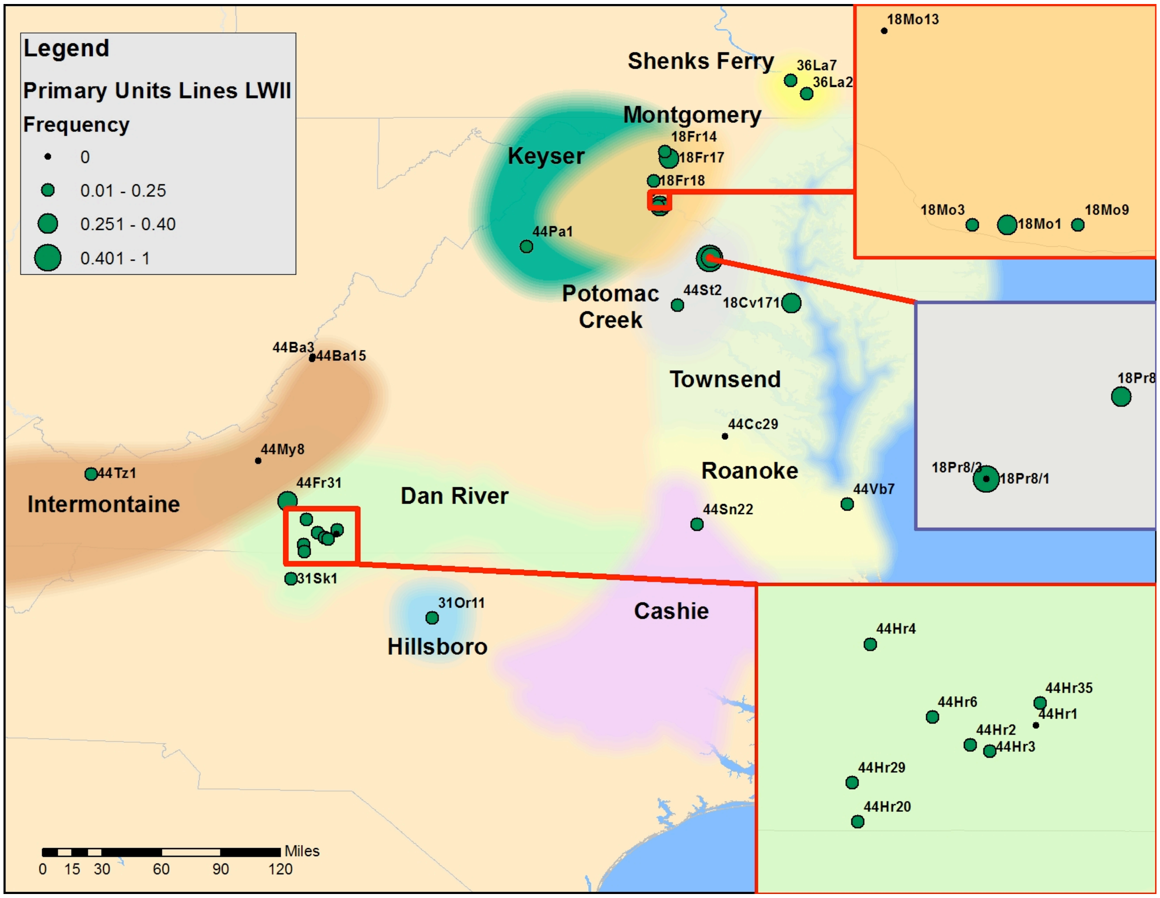


Figure 8.12b: Frequencies of all primary line units on Late Woodland II period sites

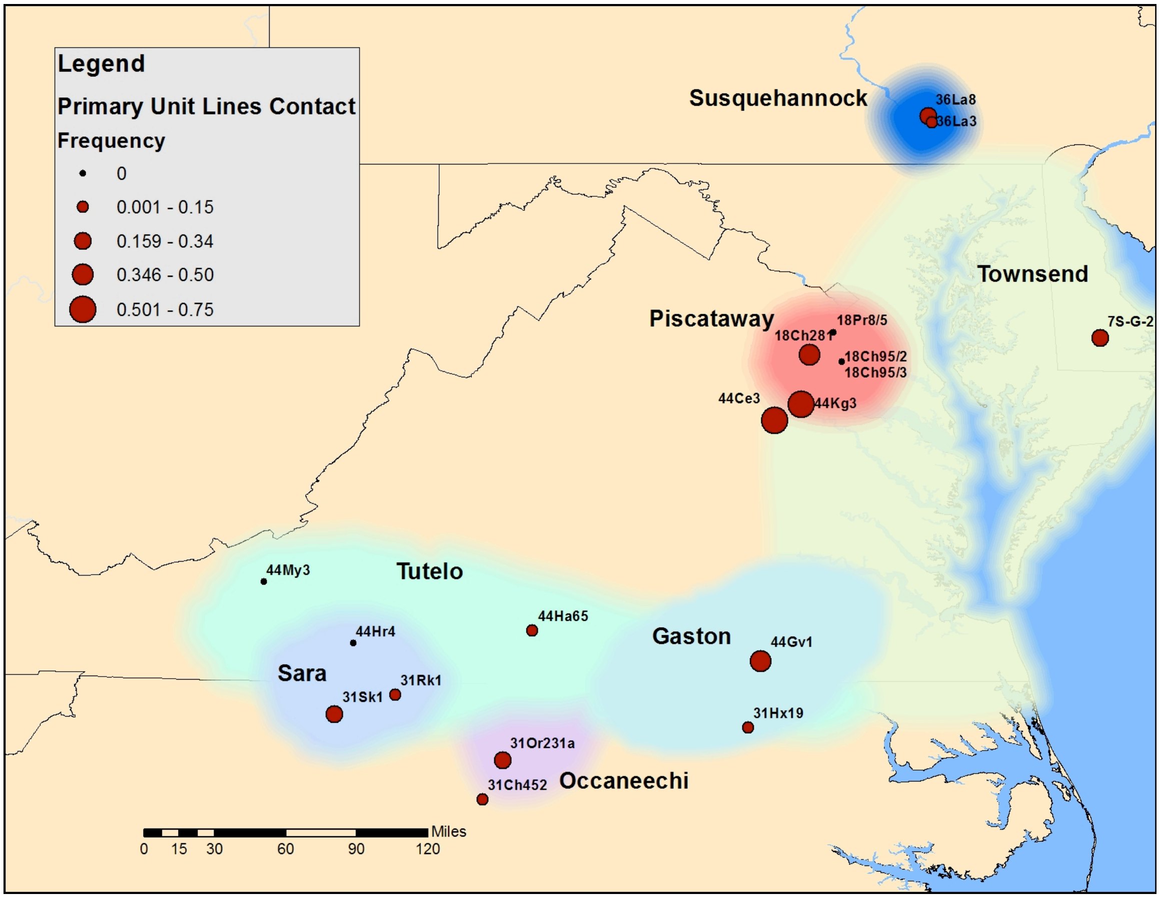


Figure 8.12c: Distribution of frequencies of all primary line units on Contact period sites

Notches

Another class of primary unit consisted of a parallel set of vertical lines created by fine diagonal or horizontal notches running down the length of a stem. This particular design of two parallel rows of notches running down the stem was found to be independent of any other decorative motifs incised or stamped into a pipe's surface. However, these notches were usually found in combination with another alteration to a pipe's stem. In many cases the notches ran along the edges of a small raised platform. In some instances the raised platform was simply a flat, thin rectangle that ran down part of the stem (Figure 8.13a). In other examples, notches were found running along the corners of squared pipe stems (Figure 8.13b). Finally in other cases, notches ran along angled lines as they came to a point (Figure 8.13c).

Although the distribution of the parallel lines of notches was more widespread, the covariation of notches with different types of stem alterations showed more clustered distributions. Pipes with this design unit were also found on the Jordan's Landing site (31BR7) located in the Coastal Plain of North Carolina (Magoon 1999) although their frequency is unknown because the collection was not available for study.

The site with the highest frequency of pipes with triangular and rectangular platforms with notches by far was the Halifax (31HX19) site (see Figure 8.14b). Given that the Halifax site is associated with the Gaston phase, the highest frequency of this design unit was associated with Contact period sites. In addition to being found on Native sites, it is also worth noting that an example of a pipe with this distinctive motif was also found at Jamestown (Ligman personal communication 2010), which provides further evidence of use of this unit into the Contact period.

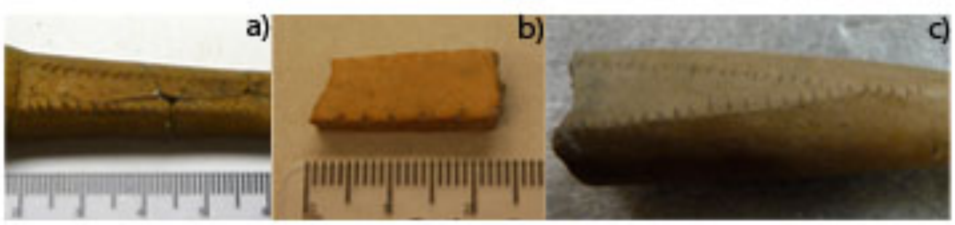


Figure 8.13a-c: Different types of stem alterations and notches: a)Rectangular platform with Notches from 44SN22, b) Squared pipe with notches from 18MO13, c) Rectangular platform with notches from 31HX19. (Images courtesy of the Virginia Department of Historic Resources, Maryland Archaeology Conservation Lab, and North Carolina State Office of Archaeology).

On the other hand, the four pipes with the parallel rows of notches running down the corners of squared stems were found on both northern and southern sites. The co-occurring units of squared stems and notches were found on the Biggs Ford (18FR14), Mason Island (18MO13), Strickler (36LA3) and Wall (31OR11) sites. However, because only one pipe was associated with each site it is difficult to say with certainty whether the similarities are related to a shared social network or are independent innovations.

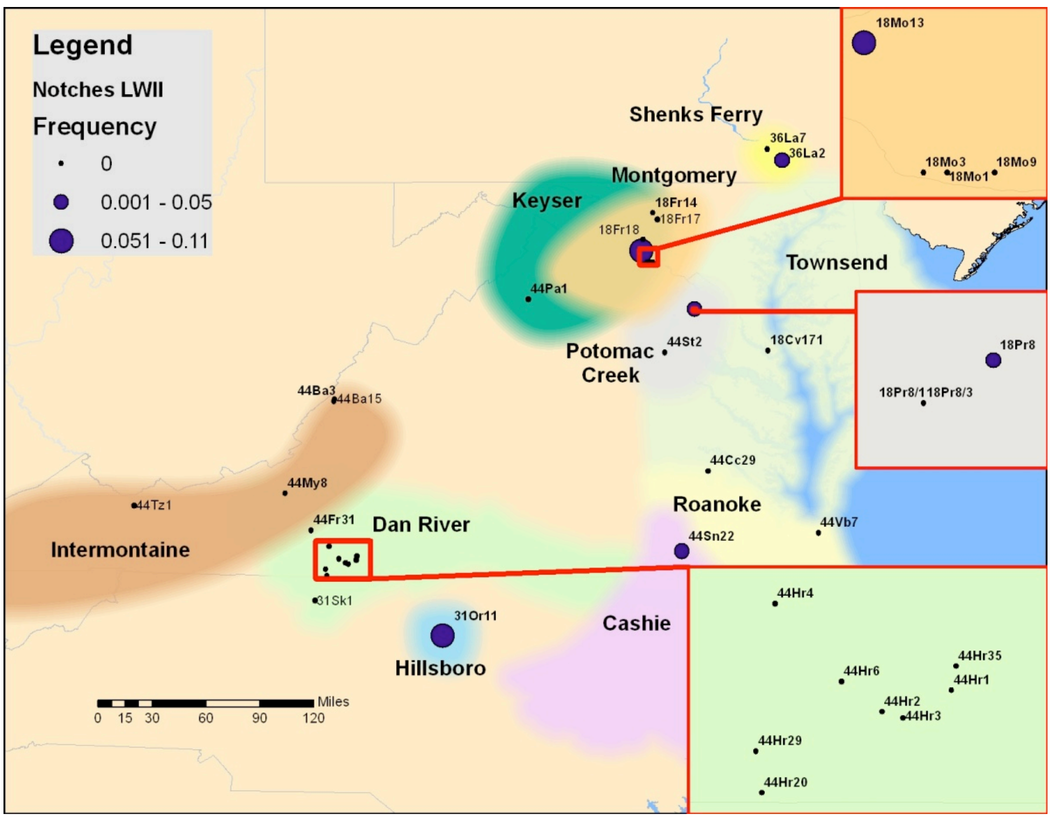


Figure 8.14a: Distribution of notches on Late Woodland II period sites

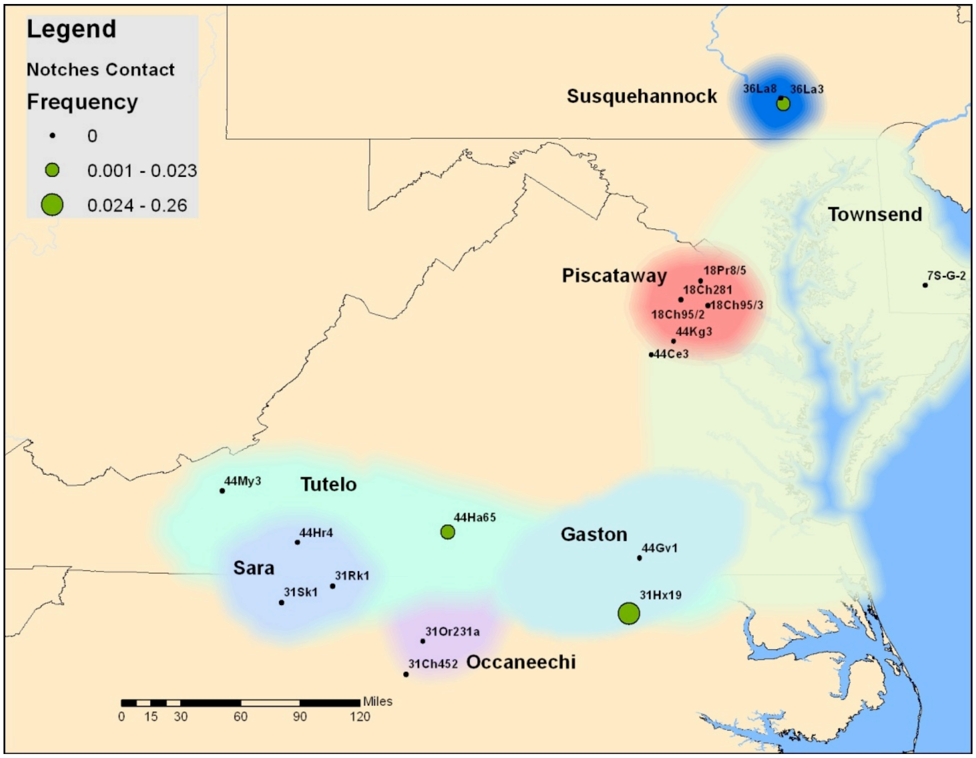


Figure 8.14b: Distribution of notches on Contact period sites

Zoomorphic

The next class of primary units was comprised of zoomorphic units. These units are discussed separately from effigy pipes because they are not carved into the bowl or stem of the pipe like more traditional effigy figures but are instead stamped or incised into the pipe's surface. Only a small percentage (n = 7, .003 percent) of pipes exhibited zoomorphic units. No Late Woodland I period pipes exhibited these forms. The only example of a zoomorphic figure from a southern site in the study area is from the Dallas Hylton site (44HR20) (Figure 8.15a). On both sides of the pipe is an incised representation of an animal. One side exhibits bird-like features, while the other seems to be a representation of a lizard (Davis et al. 1998a:55). This is the only example in the dataset to exhibit what may be two different zoomorphic figures on a single pipe. The rest of the examples only have one animal carved or stamped into their surfaces.

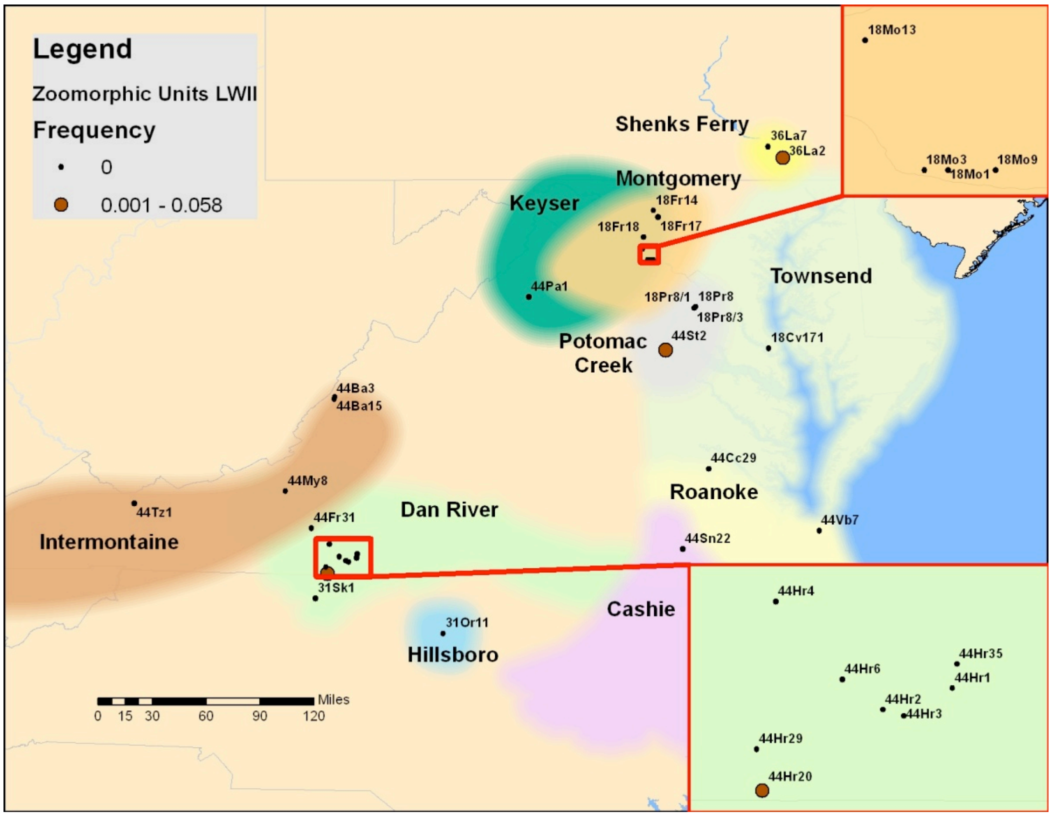


Figure 8.15a: Frequencies of zoomorphic units on Late Woodland II period sites

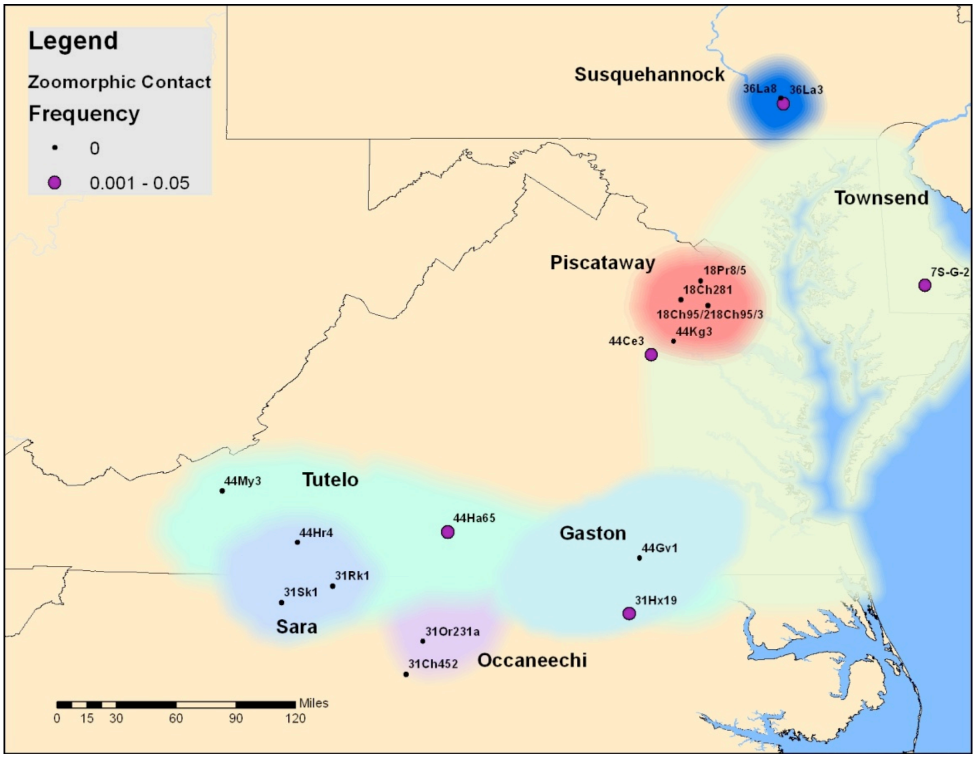


Figure 8.15b: Distribution of zoomorphic units on Contact period sites

Another example of a pipe with a zoomorphic unit was from the Townsend site (7S-G-2). This pipe, which was thin and highly burnished, had a whale or shark form filled with rouletted lines that encircled the bowl (Figure 8.16). As previously noted, the Townsend site includes deposits that exhibit a wide temporal range extending from the latter part of the Late Woodland period to the seventeenth century. This pipe exhibits two characteristics that suggest it was likely produced during the Contact period. Some of the dentate stamps on the pipe exhibit white inlay, a decorating technique that is generally associated with Chesapeake or terra cotta pipes that were popular in first half of the seventeenth century. Additionally, the dentate stamp marks are very uniform rectangles, a shape that is usually associated with a watchwheel. Regardless of whether this form is from the Late Woodland or Contact periods, however, it is a unique example of an aquatic effigy. The only other aquatic effigy located by the author was from the Jordan's Landing (31BR7) site hundreds of miles south of the Townsend site. The zoomorphic unit was a dentate-stamped catfish (Magoon 1999:111). The catfish motif also encircled the bowl of the pipe and was enclosed by two bands of diagonal lines.

Figure 8.16: Rouletted shark effigy from the Townsend site (7S-G-2) (Front and Back) (Picture courtesy of the Delaware State Archaeological Repository)

Two additional dentate-stamped effigy units are present in the Potomac Creek (44ST2) assemblage. Both of these examples are pictured in Figure 8.17a and 8.17b. Stewart (1992:57) noted that the effigy in 8.17a likely represents a salamander or lizard, while the one in 8.17b is a snake.

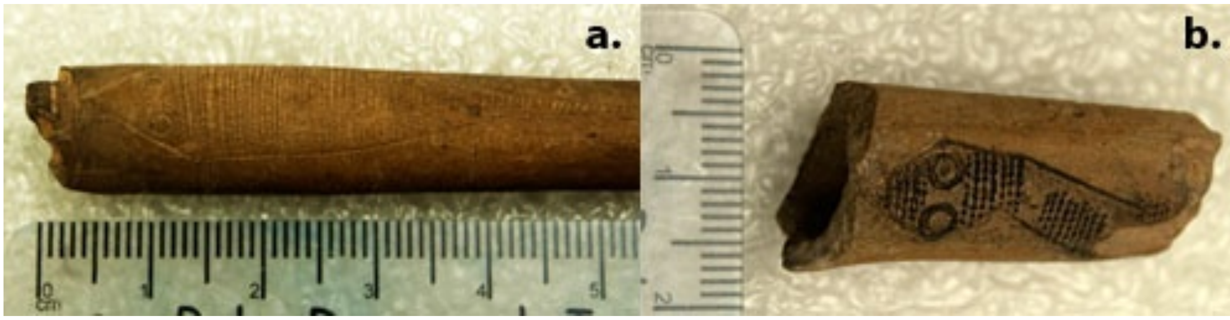


Figure 8.17a and b: Rouletted and incised zoomorphic effigies from Potomac Creek, a) Lizard, b) Snake (Images courtesy of Smithsonian Institution's National Museum of Natural History)

One last dentate-stamped zoomorphic form present in the sample has previously been identified as a "running deer" and has been a source of great debate. This motif takes the form of a four-legged animal, which many researchers have argued represents a deer (Mouer et al. 1999). More conservative interpretations note that it is simply a four-legged animal, or quadruped and not necessarily a deer (Emerson 1999). The appearance of this motif is thought to date to the Contact period but isolated examples have been found on earlier sites, such as Shenk's Ferry (36LA2) (Kent 1984:147). This form has alternatively been attributed to Native (Luckenback and Kiser 2006; Mouer et al. 1999) and African (Emerson 1999) producers. Within this sample, one four-legged animal was found in the Shenk's Ferry (36LA2) assemblage, which does suggest it was used prior to the arrival of Europeans but the rest of the examples were from the Contact period Strickler (36LA3) and Camden (44CE3) sites.

The use of zoomorphic forms in general did not adhere to any cultural complex boundaries. The geographic distributions of particular types of animals also seemed to vary. With the exception of the running deer motif, most of the animals found on pipes were singular examples. For instance, reptile and aquatic animals were found in assemblages on sites that were both close to the coast and some distance from the coast. Again it is worth noting the small proportion of pipes with animal figures contrasts greatly with the high frequency of the use of zoomorphic figures amongst the Iroquois farther north and Mississippian groups farther south. The execution of these designs, as figures stamped or incised into the surface of the bowl as opposed to carving the pipe into the shape of an animal form also differs quite a bit from zoomorphic and anthropomorphic designs found on pipes from neighboring areas.

Secondary Units

In addition to looking at the distributions of primary decorative motifs, the geographic and temporal patterning of secondary units was also considered. Secondary units consisted of different ways of infilling primary units or the areas of the pipe's surface that were in-between primary units (see Figure 8.1). A total of 133 pipes had secondary units. Figures 8.18a-c compare the frequencies of different secondary units within assemblages from Late Woodland and Contact period sites. It should be noted that the frequencies of secondary units within each assemblage were calculated from the total number of pipes that were decorated within each assemblage, rather than the total number of fragments.

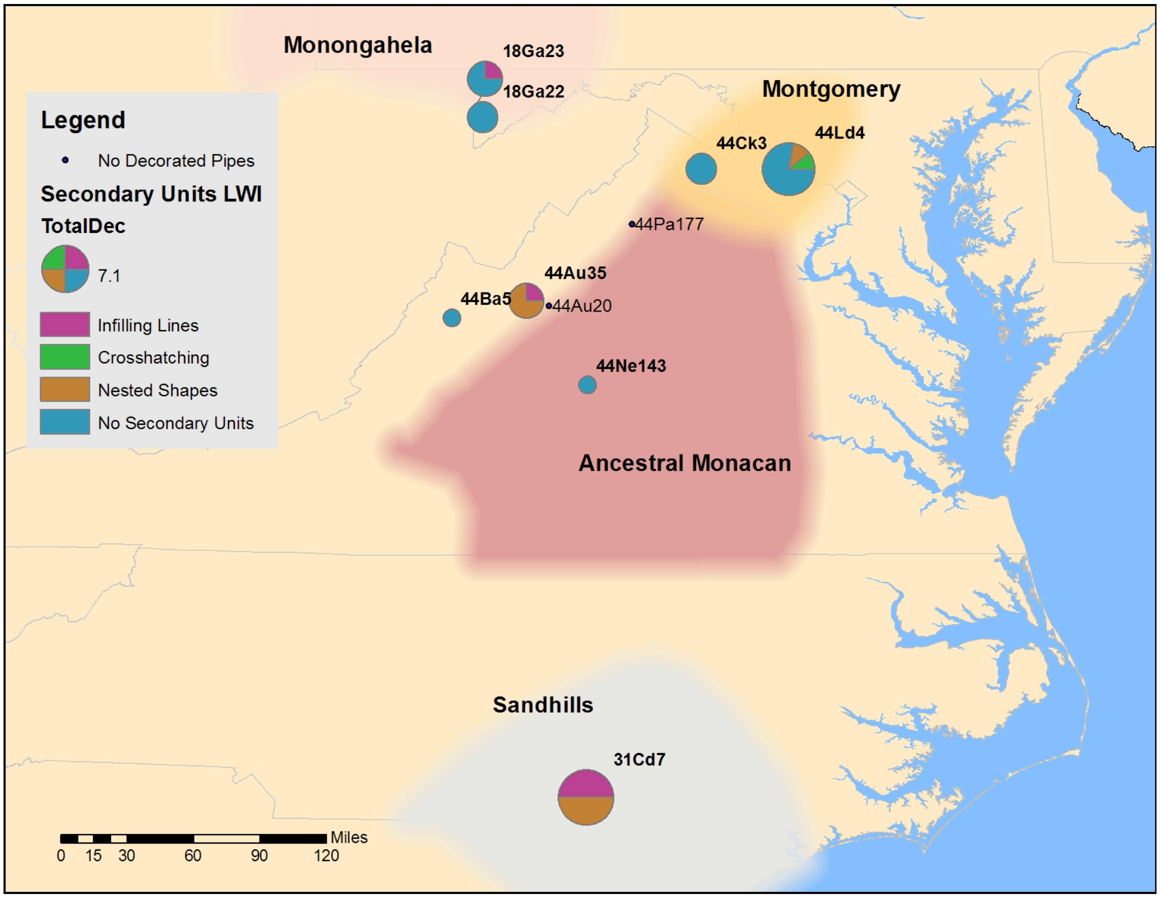


Figure 8.18a: Distribution of secondary units on Late Woodland I period sites

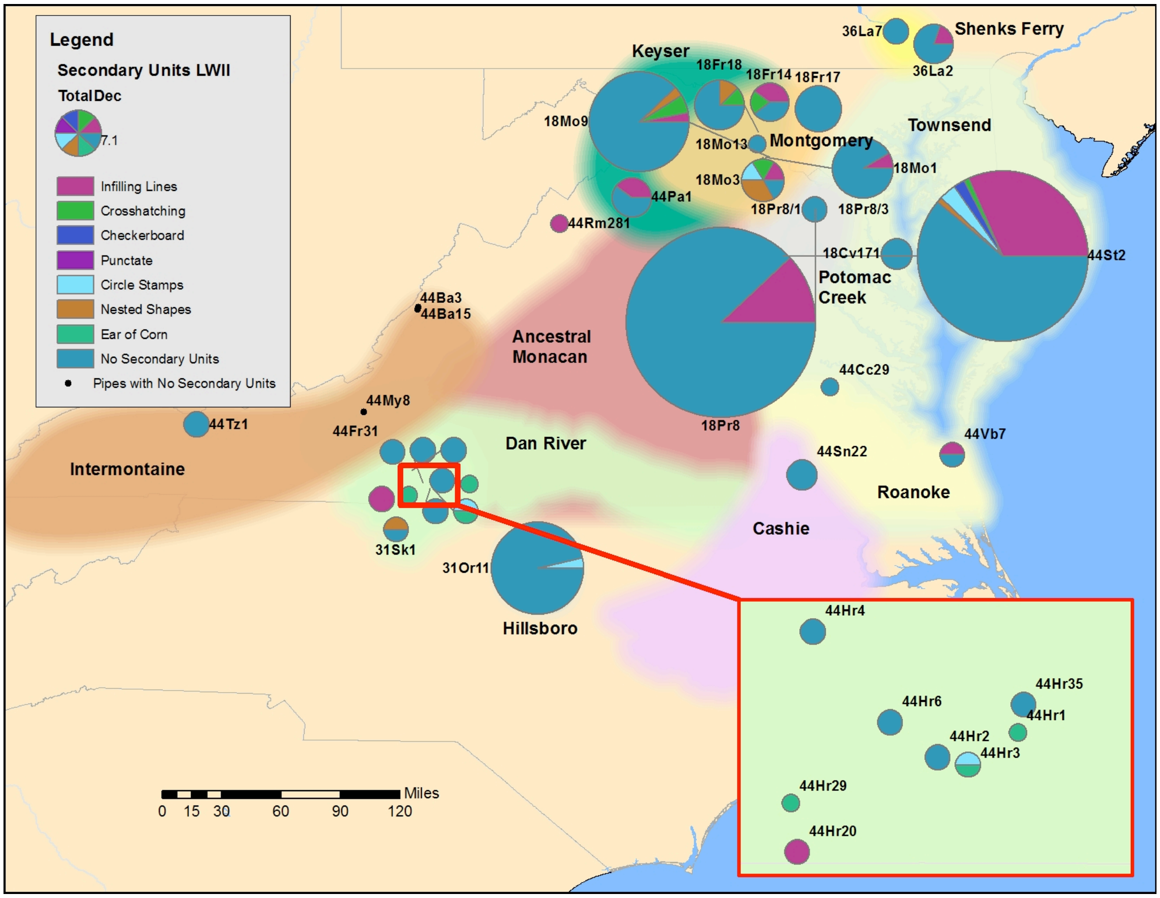


Figure 8.18b: Distribution of secondary units on Late Woodland II period sites

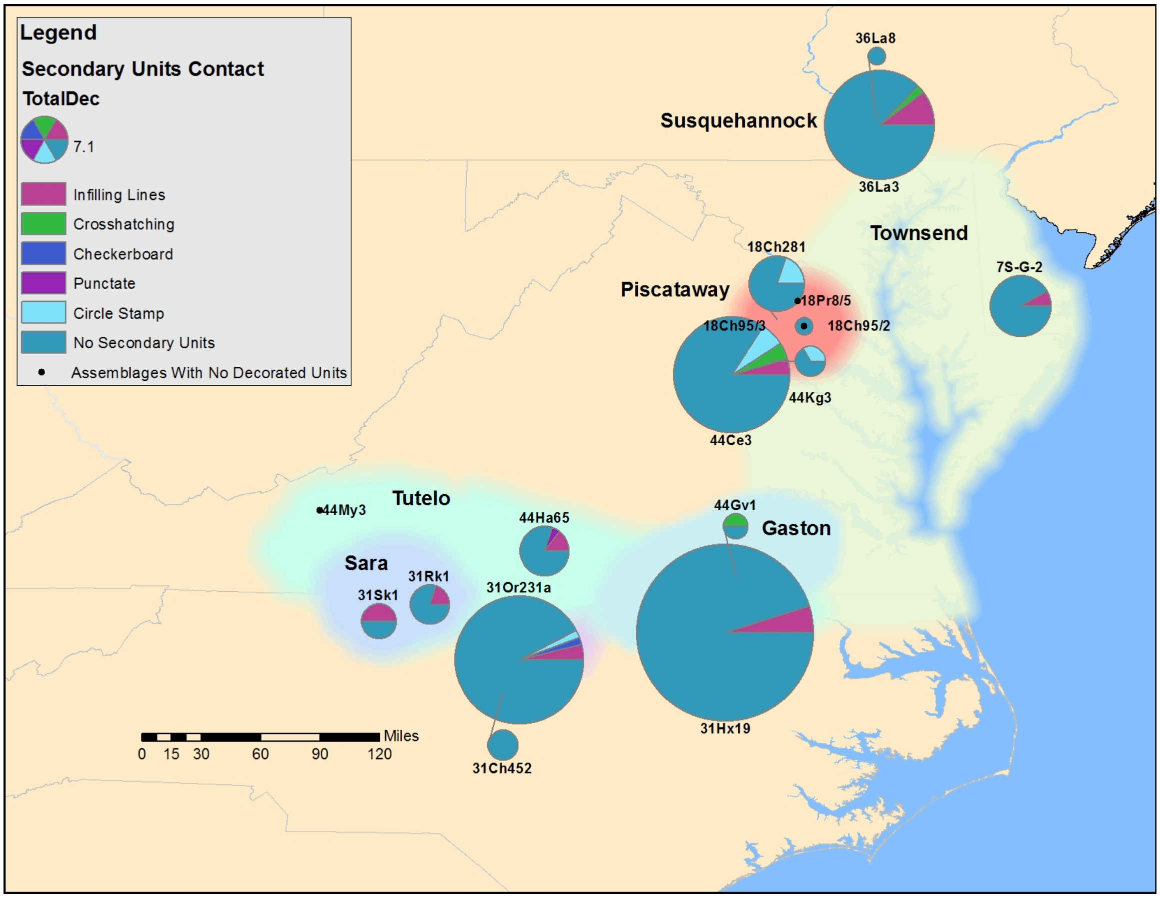


Figure 8.18c: Distribution of secondary units on Contact period sites

The most widely used secondary techniques were infilled lines and crosshatching. Eighty-three pipes had primary units that were infilled with lines. It should be noted that over half of the sample (n = 44) came from the Potomac Creek and Accokeek Creek sites. Nevertheless, this secondary unit was found on pipes spread throughout the region and was used on pipes dating to all three time periods.

The next largest category of secondary units was nested shapes, which were found on 17 pipes. The distribution of nested shapes was more limited than infilled lines. Pipes with nested shapes tended to cluster in the northern part of the study area, mostly with sites associated with the Montgomery Complex (see Figures 8.18a and b). The one exception to this was a pipe with a nested square found in a context dating to the Protohistoric period from the Early Saratown (31SK1a) site. This singular instance of a nested square is interesting given that it points to possible contacts with groups further north, but unfortunately the small sample size makes it difficult to draw any conclusions. This secondary motif was not found on pipes from Contact period sites. The clustering of the nested units at Montgomery Complex sites aligns with the clustering of square primary units as all the examples from these sites are nested squares.

Hollow circular stamps, also known as reed stamps, were the next largest category of secondary units. Fifteen pipes exhibited circular stamps as infilling units. No circular stamps were found on Late Woodland I period sites but this unit was on a number of Late Woodland II and Contact period sites that were spread throughout the region.

Crosshatching was another technique that had a long temporal span as it was found on pipes dating to all three time periods. Eleven pipes exhibited this secondary unit. However, with the exception of a pipe found at the John Green site (44GV1) the majority of the pipes that exhibited this technique were found in the northern part of the study area.

Checkerboard and Ear of Corn units were found in equal but extremely limited amounts. A total of three pipes exhibited checkerboard units and the sample number exhibited Ear of Corn units. Ear of Corn is a term that describes a unit similar to that of checkerboard that is found only amongst three Dan River sites in the sample. For pipes with the Ear of Corn unit, the lines used to make the unit are deeply incised into the clay making the squared off areas in-between the lines raised which resemble an ear of corn (Davis et al. 1998a:Figure 38b). Other checkerboard units in the sample have a similar design but the lines are not as deep and thus give pipes with this unit a different appearance. Consequently these two units were mapped separately. While the Ear of Corn unit does cluster amongst Late Woodland II Dan River sites, pipes with checkerboard do not cluster in any particular area or time period. The last secondary unit, which was found on two pipes, was punctuates. The two different assemblages where this unit was found dated to different periods. The Hand site (44SN22) dates to the Late Woodland II period and Abbyville (44HA65) dates to the Contact period. The pipe at Abbyville was unique as it was the only example in the entire sample where punctuates were used to infill a triangle.

Design Structures

Besides looking at the distribution of individual units a second attribute category recorded for primary and secondary units was the manner in which they were combined or arranged with other units of the same or different forms. Previous researchers have called the principles of arrangement that structure the use of design elements *structural principles* (Conkey 1980:616). A number of studies have demonstrated that analyses of the structure or grammar of designs can provide insight into production traditions (Longacre 1964; Plog 1980) and exchange or interaction of ideas and objects (Conkey 1980).

Five classes of structural principles were identified among pipes in the sample. These are illustrated in Figure 8.19. The first structural principle (Class 1) consisted of designs that included multiple forms of singular primary units. This structural principle was called a *combined structure* of design units. For example, a single horizontal or vertical line could be combined with a single geometric form, or multiple singular instances of geometric forms, such as triangles and concentric rectangles, could be combined on a pipe.

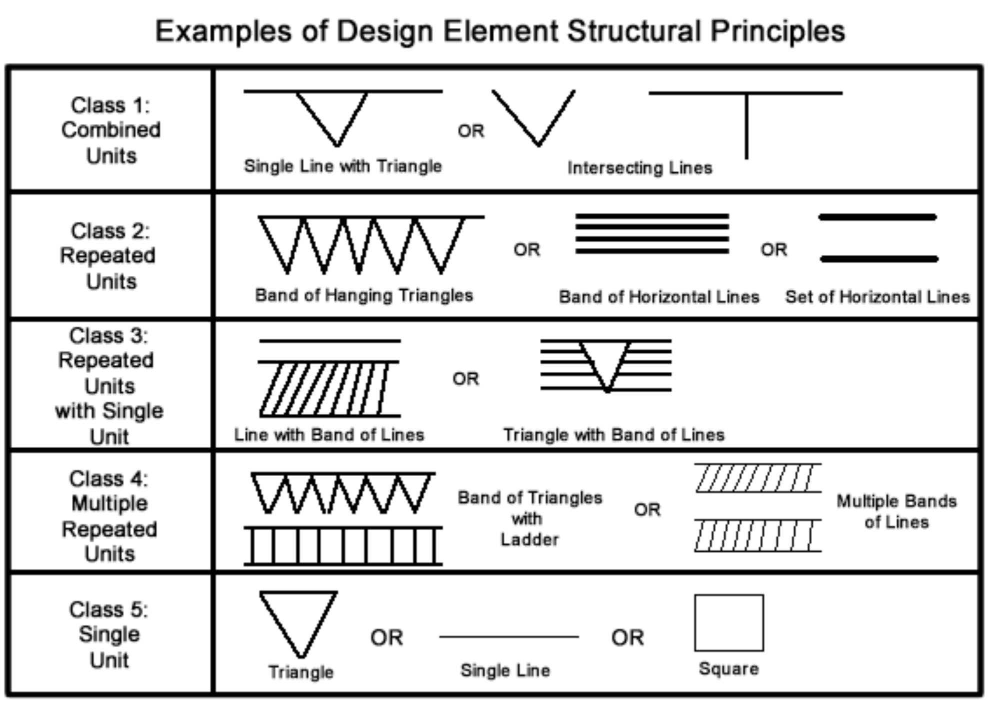


Figure 8.19: Examples of design structures

The second structural principle (Class 2) consisted of one primary design, such as a triangle or diagonal line, repeatedly incised or stamped in bands or lines over the surface of the pipe.[4] This decorative structure was classified as a *repeated structure* of design units. These repeated structures could consist solely of primary units, but in some instances primary elements were combined with secondary elements, such as bands of infilled triangles.

The third structural principle was a combination of a repeated design with a single design unit (Class 3). These designs consisted of a band or set of horizontal or vertical lines found with a single geometric unit or a single line. This structural principle was called a *repeated structure with single unit*. The fourth structural principle (Class 4) consisted of multiple instances of repeated structures on a pipe, such as multiple sets or bands of lines or multiple bands or sets of repeated geometric units. This principle was called *multiple repeated units*.

Finally, the fifth principle (Class 5) identified consisted of instances of single, isolated primary units such a horizontal line or single geometric shape that did not co-occur with any other design units on a pipe. This was called a *single occurrence* design structure. The frequencies of these five structural principles were calculated for each assemblage and then were mapped to compare their distributions for the Late Woodland and Contact periods.

[4] For repeated geometric shapes, the term "band" was used to designate repeating shapes that ran horizontally across a pipe's surface. The term "line" designated lines of shapes that ran vertically down the surface of a pipe. For designs that consisted of repeated lines, the term "band" was used to designate when there were three or more closely spaced lines present running down the surface of the pipe. It was also used to describe instances where diagonal or vertical lines ran across the surface and where enclosed on both edges by horizontal lines. The term "set" was used when only two closely spaced lines were present. See Figure 7.18 for examples.

The frequencies and distributions of the five principles showed a good deal of variation among Late Woodland I sites. A total of twenty-five pipes from Late Woodland I contexts exhibited one of the five decorative structures. Twelve pipes (48 percent) were decorated with Class 4 structures (8.20c). Five pipes from the Kerns (44CK3) and Fisher (44LD4) sites had designs that consisted of multiple bands or sets of lines. Seven of the pipes from the John East Mound (44AU35) and the McLean Mound (31CD7) exhibited repeating units that consisted of multiple instances of repeating geometric units. In addition to the seven pipes that exhibited this structural principle, two bent tube pipes from the Keyauwee (31RD1) and Gaston (31HX7) sites exhibited combinations of different repeated geometric design forms. Although these pipes could not be included in the frequency analysis because information was not available about the assemblage as a whole, their presence is noted because it expands the geographic distribution of this decorative structure. As illustrated in Figure 8.20c, the distribution of pipes with the geometric decorative structure was widespread ranging from southeastern North Carolina to northwestern Virginia.

The nine pipes with multiple repeated instances of geometric designs also exhibited similarities of other attribute states. They were carved from either steatite or chlorite and were either platform or bent tube forms. While pipes from the Late Woodland II and Contact periods exhibit the same primary units, such as triangles and rectangles, pipes from the Late Woodland I period are the only ones to have multiple repeated instances of geometric designs incised into their surfaces. The highly distinctive nature of their form and decorative structure suggests that these pipes played an important social function. Moreover, the widespread distribution of pipes with this structure were physically circulating through exchange or interaction networks during this period.

Eleven pipes (44 percent) with instances of Class 2 structures were identified with a unique combination of elements indicates that these objects or ideas about their production were widespread (Figure 8.20a). Unlike the pipes that exhibited combinations of repeated structures, the singular repeated units present were variations of bands or sets of lines. No single repeated units of geometric units were identified. The distribution of these pipes was also widespread as at least a few examples of pipes with this principle were found on sites in every cultural complex.

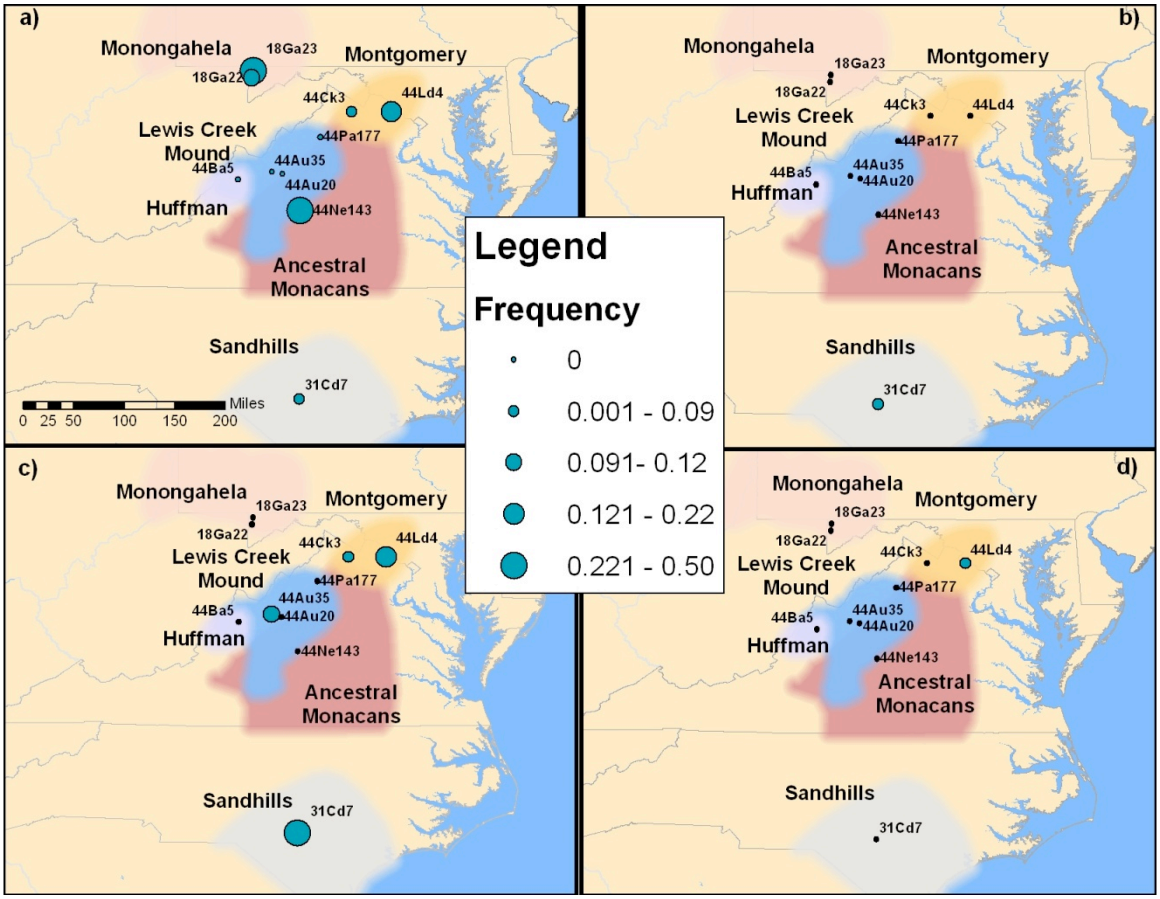


Figure 8.20a-d: Distributions of decorative structures among Late Woodland I Period sites: a) Class 2, b) Class 3, c) Class 4, d) Class 5

The frequencies of pipes with a combination of a repeated unit and a singular unit (Class 3) were much lower than the previous two classes of structural principles (Figure 8.20b). The frequency of pipes with singular instances of primary units (Class 5) was equally low (Figure 8.20d). Only one pipe (four percent) displayed a combination of a repeated and singular unit and one pipe (four percent) exhibited a single primary unit. The distribution of pipes with these two structural principles was limited to the northern part of the study area. However this is only because no pipes displaying these structures were found in the McLean Mound assemblage (31CD7). Nevertheless, the pipes displaying these structures were still found on sites in different cultural complexes although small sample sizes prevent any concrete conclusions regarding how they were related to social dynamics. No Late Woodland I pipes had decorative structures comprised of combinations of different singular design units (Class 1).

Moving into the Late Woodland II period, a total of 378 pipes exhibited one of the five classes of design structures. The most distinctive pattern that emerges from a comparison of structural design distributions is the higher frequency of pipes with repeated units from Late Woodland I period sites. One hundred and forty-two pipes (37.5 percent) exhibited Class 2 design structures, or a single repeated unit (Figure 8.21b). Additionally, one hundred and eighty-four pipes (48.6 percent) exhibited Class 4 structures, or multiple repeated units (Figure 8.21d). Overall three hundred and twenty-six pipes (86 percent) exhibited one or more instances of repeated units making the use of these structural principles by far the most prominent one found among Late Woodland II pipes. The single instances of repeated primary units found on Late Woodland II pipes were bands or sets of lines or repeated units of different geometric shapes. Triangles were the most prevalent geometric unit used. All instances of multiple repeating units consisted of multiple bands or sets of lines or a combination of repeating lines and repeating geometric units. In contrast to the pipes with multiple repeating structures on Late Woodland I pipes, no instances of multiple repeating geometric units were identified on Late Woodland II period pipes.

As illustrated in Figures 8.22b and 8.22d, pipes with repeated units were widely dispersed as examples were found within the boundaries of every cultural complex. Yet as illustrated in Figure 8.23a and 8.23b a comparison of the distributions of the two different types of repeated design units, geometric units and bands or sets of lines, reveals a significant difference. The presence of repeated geometric units is limited to sites in the northern portion of the study area. In contrast, bands and sets of lines are found on sites throughout the study area. The more clustered distribution of repeated geometric units is somewhat similar to the distribution of pipes with triangle units discussed in the analysis of primary units above. While the Chi Square comparison of the presence and absence of triangles on pipes from the northern and southern parts of the study area did not reveal a significant relationship between the location of a site and the presence of triangular decorative units the analysis of structural principles suggests a more definitive difference in the ways geometric units were used on pipes from northern and southern parts of the study area. Even though groups in the south occasionally incorporated geometric units into their decorative traditions, they did not use them in the repeating structures like northern groups. The one exception to this is the pipe found with a band of triangles from the Great Neck site (44VB7).

The widespread use of bands and sets of lines as decorative units throughout the region is not limited to pipes. Bands and sets of lines are also prevalent decorative units on a number of different ceramic types throughout the region, including Potomac Creek (Schmitt 1952; Stewart 1992), Dan River (Davis et al. 1997a, b, c, d, 1998a, b), Shepard (Slattery and Woodward 1992), and Townsend (Blaker 1963; Griffith 1982) wares. The widely dispersed use of bands and sets of lines on ceramics suggests that different combinations of these units were a popular design motif on multiple material types throughout the region.

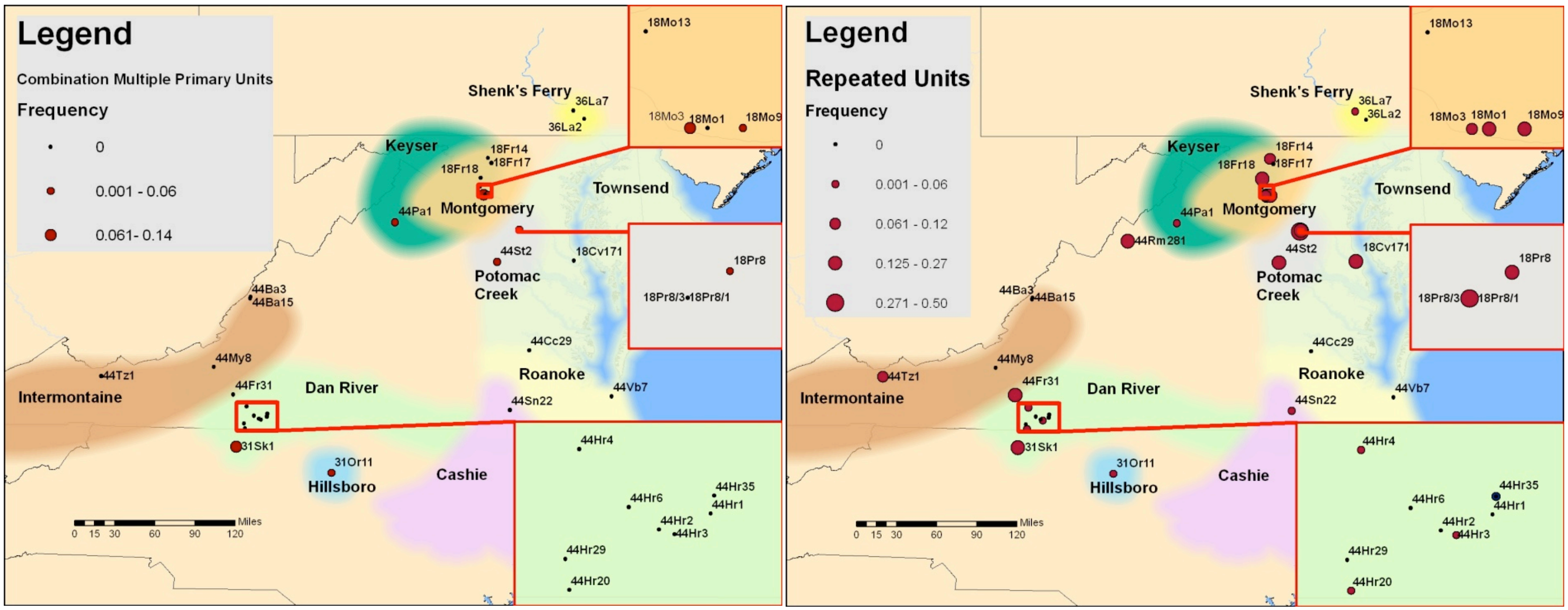
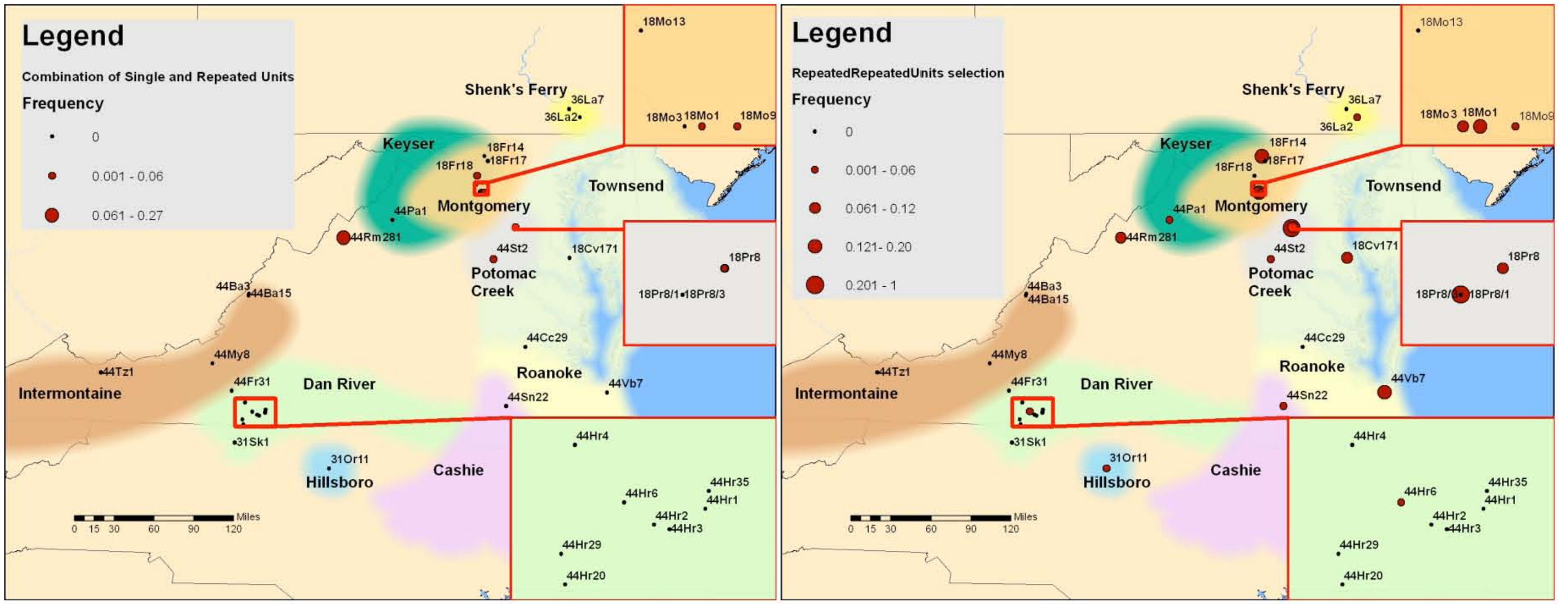


Figure 8.21a-b: Distribution of decorative structures on Late Woodland II period sites: a) Class 1, b) Class 2


Legend
Combination of Single and Repeated Units
Frequency
0
0.001 - 0.06
0.061 - 0.27
Legend
RepeatedRepeatedUnits selection
Frequency
0
0.001 - 0.06
0.061 - 0.12
0.121- 0.20
0.201 - 1
Shenk's Ferry
Keyser
Montgomery
Townsend
Potomac Creek
Roanoke
Dan River
Intermontaine
Hillsboro
Cashie
Miles
0 15 30 60 90 120

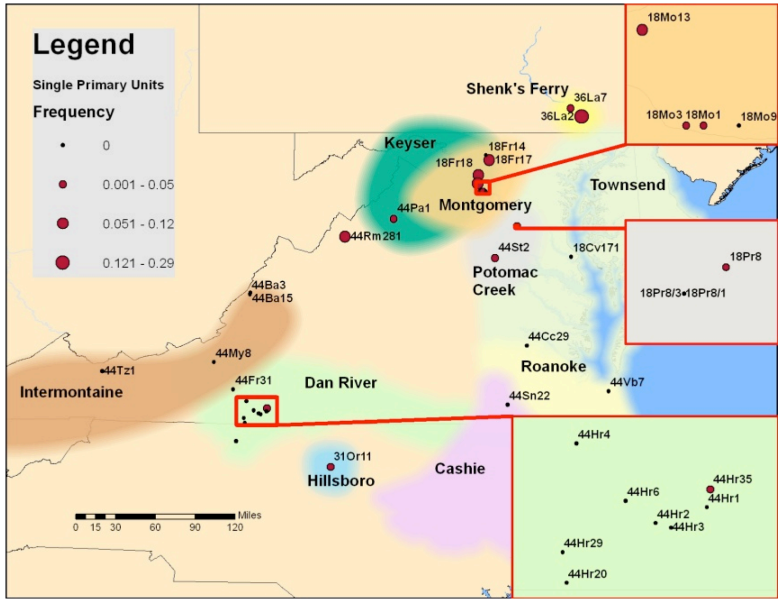


Figure 8.22c-e: Distributions of decorative structures on Late Woodland II period sites: c) Class 3, d) Class 4, e) Class 5

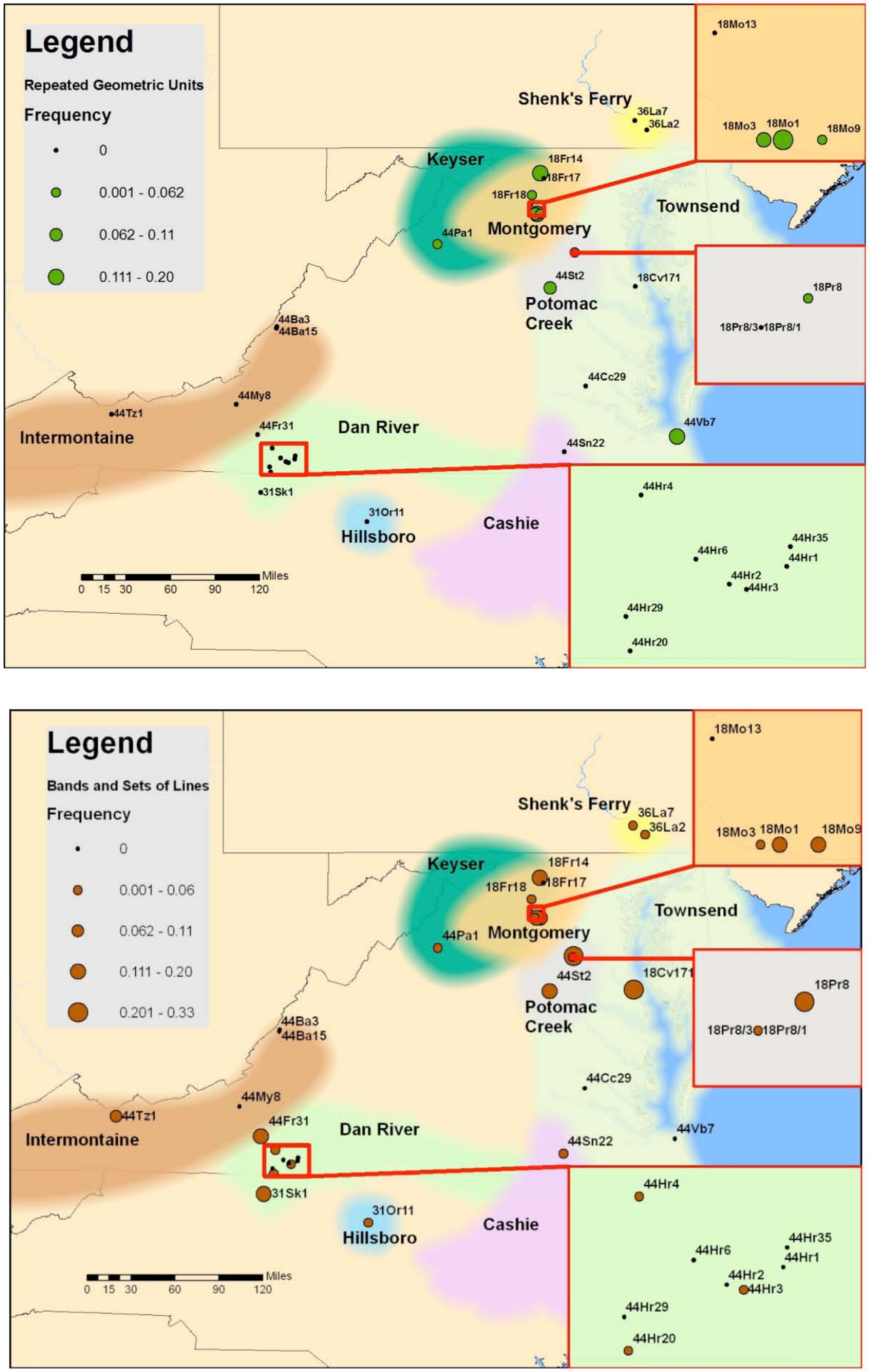


Figure 8.23a-b: Frequencies of repeated geometric units, b) Frequencies of bands and sets of lines on Late Woodland II sites

Pipes exhibiting the other three structural principles were found in more limited quantities on Late Woodland II period sites. Twenty-seven pipes (seven percent) exhibited Class 3 structural principles (Figure 8.22c). Out of the 27 pipes with this combination, 24 consisted of a band or set of lines combined with a single geometric unit. A few different geometric units, including triangles and squares, were part of these combinations. The other three pipes had a band or set of lines along with a separate single line running across the surface of the pipe. Additionally, 26 pipes (six percent) were decorated with Class 5 structures (Figure 8.22e). The majority of single units consisted of singular lines running across the surface of the pipe although a few isolated geometric units were also present. Finally, 15 pipes (four percent) had Class 1 structural units (Figure 8.22a). Only one pipe from the Accokeek Creek site (18PR8) exhibited a combination of different geometric units. The rest of the pipes exhibited combinations of single intersecting lines, or a single line intersecting with a single geometric shape.

While not found in every cultural complex, Figure 8.22 illustrates that pipes with the three other structural principles were also widespread, dispersed from the northern to the southern parts of the study area as well as east to west from the Coastal to Ridge and Valley provinces. Pipes with these structural principles did not exhibit any clustering that might be indicative of their use by particular groups.

A total of 224 pipes from Contact period sites exhibited designs with structural principles. During this period there continued to be a high frequency of Class 2 design structures (Figure 8.24b). Seventy pipes (31 percent) exhibited single instances of repeated primary units. Pipes with this decorative structure were found on nearly every site from this period. Additionally, among the Contact period assemblages a few new repeated units were identified that were not present in Late Woodland period assemblages. Pipes in Contact period assemblages exhibited repeated stars and zoomorphic units in addition to the bands and sets of different lines and bands and geometric units. Unfortunately the sample sizes of the stars and zoomorphic primary units were too small to gather much information from their distributions but they demonstrate that Native groups in the region continued to innovate their decorative structures through time.

In a shift from previous periods, the second most prevalent design structure found on Contact period pipes were Class 5 structural designs. Seventy-four pipes (33 percent) exhibited this structure (Figure 8.24e). Single lines oriented in different directions were fairly prevalent, but the majority of pipes with single primary units were from the Halifax assemblage. All of these pipes exhibited two parallel rows of notches (n = 44). The next highest sample of pipes with singular units from one site was eight pipes with single horizontal lines from the Posey site (18CH281). The rest of the examples generally consist of one or two pipes exhibiting a single line from each site. Although the raw count of pipes with this structure was higher than other classes, the fact that the majority of examples came from one site makes it difficult to draw many conclusions about the use of this structure in the Contact period other than the fact that notches were a very popular decorative unit at the Halifax site.

Fifty-two pipes (23 percent) displayed Class 1 structural principles (Figure 8.24a). Fourteen examples included various geometric units combined with lines of different orientations. The other type of combination that was prevalent was intersecting lines (n = 17). Additionally, seven pipes from the Camden (44CE3) and three pipes from the Posey

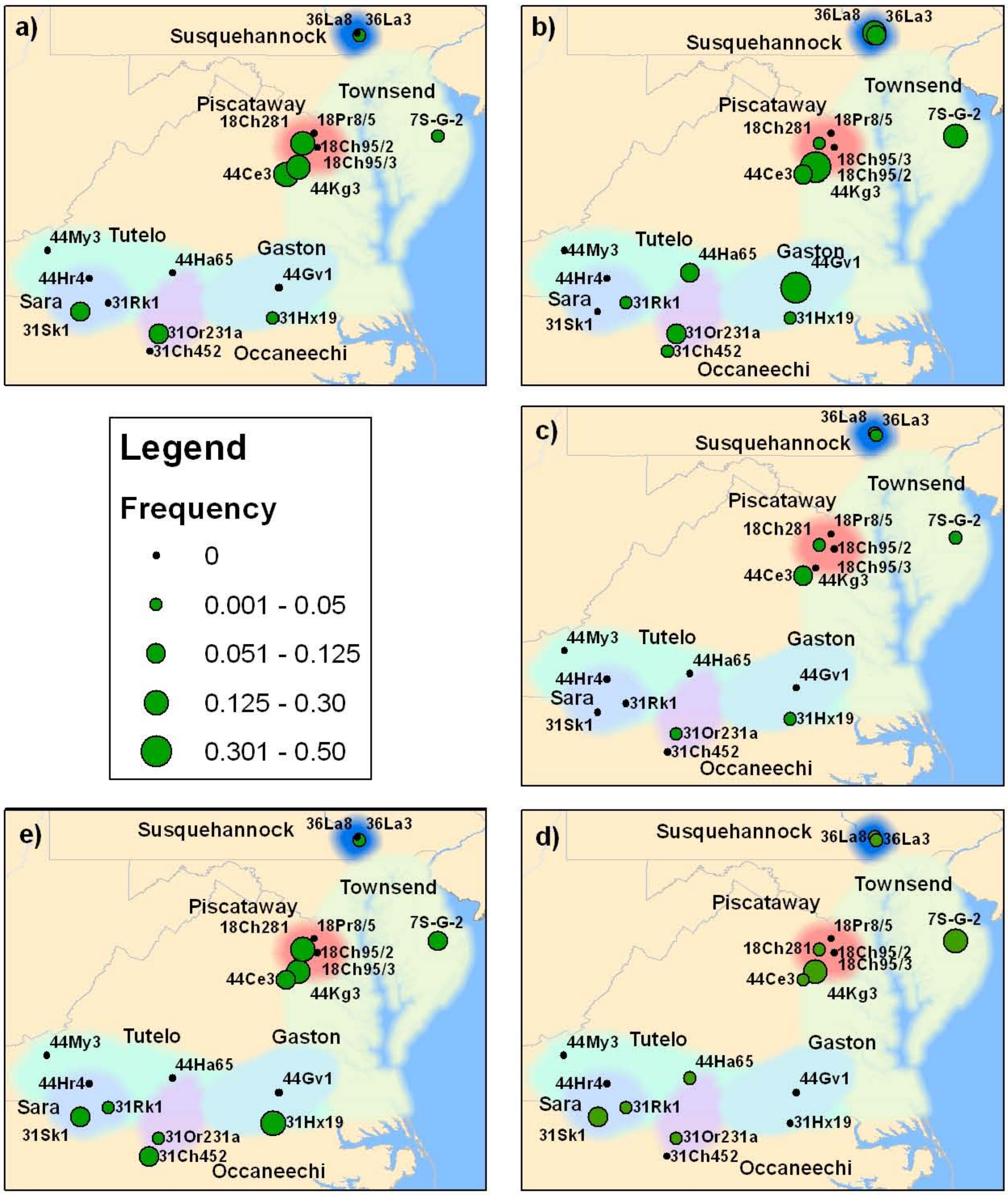


Figure 8.24: Distribution of design structures on Contact period sites: a) Class 1, b) Class 2, c) Class 3, d) Class 4, e) Class 5

site (18CH281) exhibited designs consisting of diagonal lines intersecting to form a v-shape which hung off a horizontal line that was running near the rim of the pipe. These were the only two sites that had pipes with this pattern in the sample. Other assemblages such as Stricker (36LA3) and the Fredericks site (31OR231a) exhibited intersecting lines but these did not have the same configuration.

Twenty-one pipes (nine percent) exhibited a combination of Class 3 structural principles (Figure 8.24c). Twenty of the pipes with this structure consisted of a single line combined with a band or set of lines. Only one pipe from the Camden site exhibited a band of lines with a geometric motif. Overall the use of this decorative structure was more limited than its use during the Late Woodland II period.

Finally, twenty pipes (nine percent) exhibited Class 4 design structures (Figure 8.24d). The majority of these repeated designs were multiple bands or sets of lines (n = 13) while the rest of the pipes with this structure consisted of a band or set of lines and a repeated geometric unit. Four sites in the southern part of the study area, Abbyville (44HA65), Early Upper Saratown (31SK1), Lower Saratown (31RK1), and Jenrette (31OR231a) had a total of eight pipes with a band or line of repeating geometric units, indicating that the distribution of this structural principle became more widespread during the Contact period. No pipes were found with multiple repeating geometric units, indicating that this particular decorative combination was limited to Late Woodland I pipes.

Discussion

Now that I have investigated how decorative units and structures are distributed through time and space in the region I will evaluate how the patterning of the different attributes relates to my hypotheses about the relationships of pipes to social dynamics.

Tables 8.2, 8.3, and 8.4 summarize the patterning of primary decorative units, secondary decorative units and decorative structures respectively. Like the last two chapters, these tables are divided into three categories: 1) attributes that exhibited more clustered distributions that aligned with cultural or linguistic boundaries, 2) those that displayed widespread distributions and 3) attributes that displayed indeterminate patterning generally due to small sample sizes or limitations in the spatial distribution of the dataset.

Hypothesis 1:

Overall the distributions of the different primary element classes did not align with historically defined boundaries although there was a fair amount of variation between the distributions of each the five classes and even within the five classes. For example, within the class of geometric primary elements, the use of triangles as a decorative element was much more widespread than the use of squares or diamonds. Additionally, lines demonstrated more widespread distributions than any of the geometric classes. Horizontal lines were an especially popular decorative motif as they were present on pipes from nearly every site included in this study. Vertical and diagonal lines were not found in as large quantities but were also widespread throughout the region. In general, secondary units were also widely distributed throughout the study area and did not align with cultural complex boundaries.

Table 8.2: Distributions of Primary Decorative Element Classes

Element Class	Isomorphic with Previous Boundaries	Widespread	Indeterminate
Geometric	Squares Diamonds	Triangles	Rectangles Ladder Chevron
Lines		Horizontal Vertical Diagonal	Zigzag
Notches	Triangular platform & notches Rectangular platform & notches	-	Squared platform and notches Heel Spur
Zoomorphic	-	-	Animals

Table 8.3: Distributions of Secondary Decorative Element Classes

	Isomorphic with Previous Boundaries	Widespread	Indeterminate
Elements	Crosshatching Nested Shapes Ear of Corn	Infilling Lines Circle Stamps	Checkerboard Punctate

Table 8.4: Distributions of Design Element Structures

	Isomorphic with Previous Boundaries	Widespread	Indeterminate
Late Woodland I	-	Class 2 Class 4	Class 3 Class 5
Late Woodland II	-	Class 2 Class 4 Class 5	Class 1 Class 3
Contact	-	Class 1 Class 2 Class 4 Class 5	Class 3

Elements that were variations of the shape of a square were the exception to this pattern. Squares and diamonds were two of the only primary units that actually were isomorphic with cultural complex boundaries. Squares and diamonds were primarily used within Montgomery Complex territory and were not found anywhere outside of this area. Additionally, the five sites in southwestern Virginia that did not display primary units also lacked secondary units.

Triangle platforms with notches and rectangular platforms with notches were another type of primary design that exhibited a more clustered distribution. Yet even though they were only found on sites located in southeastern Virginia and northeastern North Carolina that dated to the Late Woodland II and Contact periods, these sites have still be considered to be part of multiple cultural complexes, including Gaston, Cashie, Hillsboro, and Tutelo. The distributions of design element structures were also widespread throughout the region and did not align with any cultural complex boundaries.

Finally, rectangles, ladders, chevrons, zigzag lines, squared platforms with notches, heel and spur notches, zoomorphic elements, checkerboard and punctate secondary units were not found in large enough frequencies to be able to make any concrete conclusions about their patterning. Additionally as shown in Table 8.4, the quantities of a number of design element structure classes were too small in different periods to be able to interpret their patterning.

One of the most interesting patterns in regard to boundaries, however, did not actually pertain to where design elements were found but where they were not found. Almost none of the primary, secondary, or design structure elements discussed here were used as decorative units on any of the five sites located in southwestern Virginia associated with the Intermontaine cultural complex during any of the three time periods. The one exception was a single pipe from the Crab Orchard (44TZ1) site that displayed vertical lines. One possibility is that the lack of primary units could be related to the small samples of pipes from sites in this area. The Huffman (44BA5), Noah's Ark (44BA15), and Perkins Point (44BA3) assemblages are small (n = 13, n = 6, n =5). The Trigg (44MY3) and Shannon (44MY8) assemblages are more sizeable however (n = 51, n=21, respectively). Consequently, the fact that primary elements are not included in these larger assemblages suggests other factors may have played a role in the distribution of this unit.

The lack of decorative units in this area could also be an indication of the orientation of exchange networks between certain areas of the region. Again it would seem that materials and ideas were moving east to west between northern sites in the region as a number of sites located west of the Blue Ridge, including Sang Run (18GA22), Friendsville (18GA23), Bowman Mound (44RM281), and Keyser (44PA1) were decorated with line units. Additionally, lines were found in higher frequencies as decorative units than geometric units among sites directly to the east in the Dan River cultural area. Although the presence of the square and round flanged bowl rims indicate that the inhabitants of the Trigg (44MY3) and Shannon (44MY8) were interacting with the Native occupants of sites along the Smith, Dan, and Mayo, southwestern groups apparently did not adopt the practice of using lines as decorative motifs.

The lack of decorative units among these sites could be an indicator of influences on southwestern Virginia natives from areas outside of the region. As previously noted in Chapter 6, the forms of pipes from sites in southwestern Virginia, such as reed stem pipes, are similar to those found on sites located farther west and south occupied by Fort Ancient and Mississippian peoples. The decorative units used by Fort Ancient and Mississippian peoples were often quite different than those used in the Middle Atlantic and lines or geometric symbols were not a prevalent decorative motif. Consequently, the lack of primary units could serve as further material evidence that Native groups in southwestern Virginia were more interested in incorporating both pipe forms and decorative styles from groups to the west.

Despite the exceptions discussed here, the majority of design elements and structures exhibited widespread distributions, allowing me to reject this hypothesis and accept the premise that alternative models of regional social organization are impacting the type of decorative elements found on pipes.

Hypothesis 2

Only a few design elements showed any clustering. As previously noted squares and diamonds and rectangular and triangular platforms with notches were the only elements to show any clustering, although the lack of these units on sites in southwestern Virginia could also be interpreted as a clustered distribution of a lack of elements.

Only squares and diamonds aligned with previously defined boundaries, those of the Montgomery Complex. Although this could be interpreted as evidence supporting the argument that cultural influences are impacting pipe decorations, I suggest that the low frequency of these forms suggests that they were more likely used to mark or reflect aspects of the users' identity to others within the community. If they were found on a larger contingent of the pipes one could argue that they were being used to signal some kind of communal identity but I contend it is more likely they were used for intra-community signaling.

The lack of design units on the southwestern sites in Virginia, however, could be an indication of both intra-community signaling but also of a larger effort on the part of the inhabitants of these sites to align themselves with Native groups farther west and south. As I mentioned in Chapter 6, the use of reed stem pipes could have been part of efforts of high status males to signal some aspect of their identity and lack of decoration supports the idea that they were attempting to differentiate themselves both within their communities and from neighboring eastern Native groups.

The clustering of triangular and rectangular platforms with notches is also interesting because although it is limited to groups living in southeastern Virginia and Northeastern North Carolina, the distribution still crosses a number of cultural and linguistic boundaries. This could be evidence of that the pipes were actually used in rituals that promoted interaction between different groups. I will address the possibility below.

While these patterns are interesting, it must be acknowledged that the vast majority of decorative units and structures actually displayed widespread patterning, not localized clustering. Thus despite the notable exceptions examined above, I am forced to reject the premise that decorative attributes were primarily being used for intra-community signaling.

Hypothesis 3:

The widespread distribution of the majority of the primary and secondary elements, as well as most of the design structures allows me to accept the hypothesis that pipes were an integral part of rituals that facilitated social interaction and exchange throughout the region. Overall it would seem that many of the attributes are widely distributed suggesting that there was relatively open access to symbols of importance.

Two exceptions to this pattern are the rectangular and triangular platforms with notches and the pipes with multiple repeated units. As noted in the previous section, the notched platforms are clustered but still traverse two or three cultural boundaries and linguistic boundaries that have been identified by previous researchers. Thus I argue that despite their clustered patterning they are still examples of pipes moving through social and exchange networks that linked the different villages in this area. However, access to pipes with this design unit does not seem to have been as open as others, such as triangles.

In contrast to the notched platforms, the distribution of pipes with similar design structures such as multiple repeated units (Class 4) was widespread. However, these pipes shared other attributes, which suggest access to these particular forms was not as open as other kinds in the sample set. Pipes with this design structure were the stone bent tube and platform pipes discussed in Chapter 6. These pipes were all made of stone, which is important given that their widespread distribution also crossed physiographic boundaries. Finally, all of the pipes with this structure were recovered from burial contexts such as mounds or individual burials. The highly distinctive nature of their form, raw material, and decorative structure and their restricted depositional context suggests that these pipes played an important social function. Moreover, the widespread distribution of pipes with this structure suggests they were physically circulating through long distance exchange or interaction networks during this period despite the fact that their use may have been more restricted.

Hypothesis 4:

Temporal variation was identified among the distributions of decorative units and structures in the dataset although again it did not neatly follow either of the possibilities anticipated in my hypothesis. For primary units, the patterning of triangles exhibited a distinct variation between the Late Woodland II and Contact periods but did not necessarily shift from clustering to widespread patterning. Triangle units were widespread in a sense but also clustered as they were found throughout the northern part of the region and were not present along sites in the southern part during the Late Woodland II period. During the Contact period this distribution changed, as triangles were present on pipes on both northern and southern sites, likely due to the connections created by the burgeoning fur trade.

However, another primary element whose use persisted throughout multiple time periods, the square, remained clustered in all three time periods. In the Late Woodland I and II periods, squares were located within the Montgomery complex territory and during the Contact period, squares were located in the Sara and Occaneechi areas. Rectangular and triangular notched platforms also exhibited clustered distributions from the Late Woodland II to Contact period.

Additionally, secondary elements whose use persisted throughout all three periods displayed both similarities in their distributions throughout time but also some variation. Infilling lines for example, were widespread through all three periods. Nested shapes, on the other hand were widespread during the Late Woodland I period but became more clustered in the Late Woodland II period as its distribution aligned more with the Montgomery Cultural complex territory. The use of crosshatching also remained fairly clustered within Montgomery Complex territory during the Late Woodland I and Late Woodland II periods but then became more widespread during the Contact period.

A few important temporal patterns were identified amongst the distributions of decorative structures in the region. The first was the widespread combination of repeated geometric units found on a small sample of pipes from the Late Woodland I period. Although Irwin (2004) and others (MacCord 1966) have noted the unique and distinctive nature of these decorations and their widespread distribution, this is the first study to demonstrate that this particular design structure is limited to pipes from the Late Woodland I period. The unique nature of this structure along with the fact that these pipes are some of the few stone pipes in the sample and exhibit distinctive forms suggests that they served an important social function. The disappearance of these forms in later periods could be an indication of a shift in the use of pipes from the Late Woodland I to Late Woodland II period. The lack of pipes with these decorative structures could also point to the breakdown of the particular exchange or interaction networks that facilitated their production. Finally, although the particular decorative structure was no longer used, the individual geometric units, such as triangles, squares, etc. and singular repeated structures of these forms continued to be used as decorative units in later periods but in different configurations.

Additionally Class 5 Decorative structures (singular units) seemed to show the opposite distribution than the one anticipated by this study. During the Late Woodland I period, this structure was only found on one site. During the Late Woodland II period, however, rather than become more focused or restricted, it became more widespread and continued to be widespread in the Contact period.

More generally, the distributions of geometric units and design structures that incorporated these units seem to have been more sensitive to the changing geographic extents of exchange networks than decorative units that used lines. While the distributions of geometric units such as triangles and repeated geometric designs fluctuated throughout the three time periods from more clustered to more dispersed, the use of bands and sets of lines as decorative units was more consistent through space and time throughout the region. The change in this distribution could be due to the fact that geometric motifs were associated more strongly with the more northern groups and only reached the southern part of the study area through fluorescence of long distance exchange networks that researchers have argued were an integral part of the burgeoning deer trade during the seventeenth century (Eastman 1999; Lapham 1999; Potter 1993; Ward and Davis 1993). On the other hand, lines were used by a number of groups and did not experience the same movement.

Overall, although there is a great deal of significant temporal variation in the dataset, it was not reflected in either of the ways anticipated in this hypothesis. Thus I am forced to reject this hypothesis.

Although mapping the distributions of pipe decorative units provides further insights into the social dynamics that are behind their variation, the fact remains that a variety of social processes could be causing these patterns. Many anthropological and archaeological studies have shown that the circulation of ideas and social institutions is also an integral part of exchange networks (Appadurai 1982; Bauer and Agbe Davies (ed.) 2010; Hodder 1982; Mauss 1990[1950]; Schortman 1989) in addition to the movement of materials. Thus the widespread distributions of decorative units and structures could be a result of materials, people, ideas, or a combination of these moving through exchange networks. In the next chapter chemical testing will be used to shed more light on the social processes that could be behind the circulation of a particular subset of pipes from the dataset.

Chapter 9 : Made to Move?: A Chemical Analysis of Pipe Circulation Spheres and Their Social Contexts

Introduction

In this chapter, I narrow my focus from the exploration of stylistic variation throughout the region as a whole to concentrate on the possible social connections suggested by the similarity of pipe attributes between four Native settlements: Hughes (18MO1), Potomac Creek (44ST2), Accokeek Creek (18PR8), and Keyser farm (44PA1). Radiocarbon dates and artifact analyses demonstrate that these sites were occupied from the fourteenth through sixteenth centuries (Table 9.1). Although these settlements are spread across approximately 80 miles, three physiographic provinces[5] (Figure 9.1), and have at times been considered part of two different culture areas (Figure 9.2), stylistic similarities between pipes found on all four sites suggest that their inhabitants were engaged in exchange networks or were to some degree influencing each other's production of the styles and decorative techniques used to embellish pipes. Yet, as I will explain in more detail below, the social practices that could have caused these similarities are still a matter of debate amongst researchers.

This chapter evaluates whether a Laser Ablation Inductively Coupled Plasma Mass Spectrometry (hereafter referred to as LA-ICP-MS) analysis of 182 clay smoking pipe fragments from the archaeological assemblages excavated from these four sites can

[5] To reiterate from Chapter 3, a physiographic province is a geographic region defined by an overall similarity of landforms that has been shaped by a common geological history. In Virginia and Maryland each province is characterized overall by similarities in bedrock, topography, soil, vegetation, elevation, or some combination of such features (Hunt 1967). The three physiographic provinces included in this study are the Coastal Plain, Piedmont, and Ridge and Valley.

provide new insights into the social processes that may have been causing the circulation of pipes or ideas about their production between these four settlements. The primary goal of this investigation was to evaluate whether the clays used to produce the pipes from the four different settlements exhibited variations in their elemental concentrations that would allow them to be grouped into distinct compositional groups. Compositional groups are comprised of samples that exhibit similar concentration levels of certain elements. These different compositional groups may be presumed to represent geographically-restricted clay sources or source zones. For example, if the majority of the pipes from the Keyser site exhibited distinctive elemental concentrations that allowed them to be grouped together in one compositional group, this would represent pipes produced at the Keyser site from a local clay source. If homogeneous chemical groups could be distinguished,

Table 9.1: Summary of sites included in analysis

Site	Physiographic Province	Site Dates	Source
Potomac Creek	Coastal Plain	1260-1655*	Stewart 1992; Blanton et al. 1999
Accokeek Creek	Coastal Plain	1300-1600	Stephenson et al. 1963
Hughes	Piedmont	1320-1442*	Dent and Jirikowic 1990; Jirikowic 1995; Wall 2001
Keyser Farm	Ridge and Valley	1400-1450. 1570-1600*	Manson et al. 1944; Barber 1995

*=two sigma radiocarbon date

further analysis could then be conducted to examine whether each site assemblage contained pipes produced from more than one source. If each site assemblage contained pipes from different compositional groups, this would indicate pipes produced from different clay sources were being circulated between different sites. Finally, the distributions of pipes with similar attributes could also be compared among the different compositional groups to identify whether these pipes were physically circulating between sites or if pipes with these attributes were being locally produced at all four sites. Being able to determine whether the pipes with stylistic similarities were being exchanged or locally produced enhances our understanding of the nature of the social networks that were connecting these four sites.

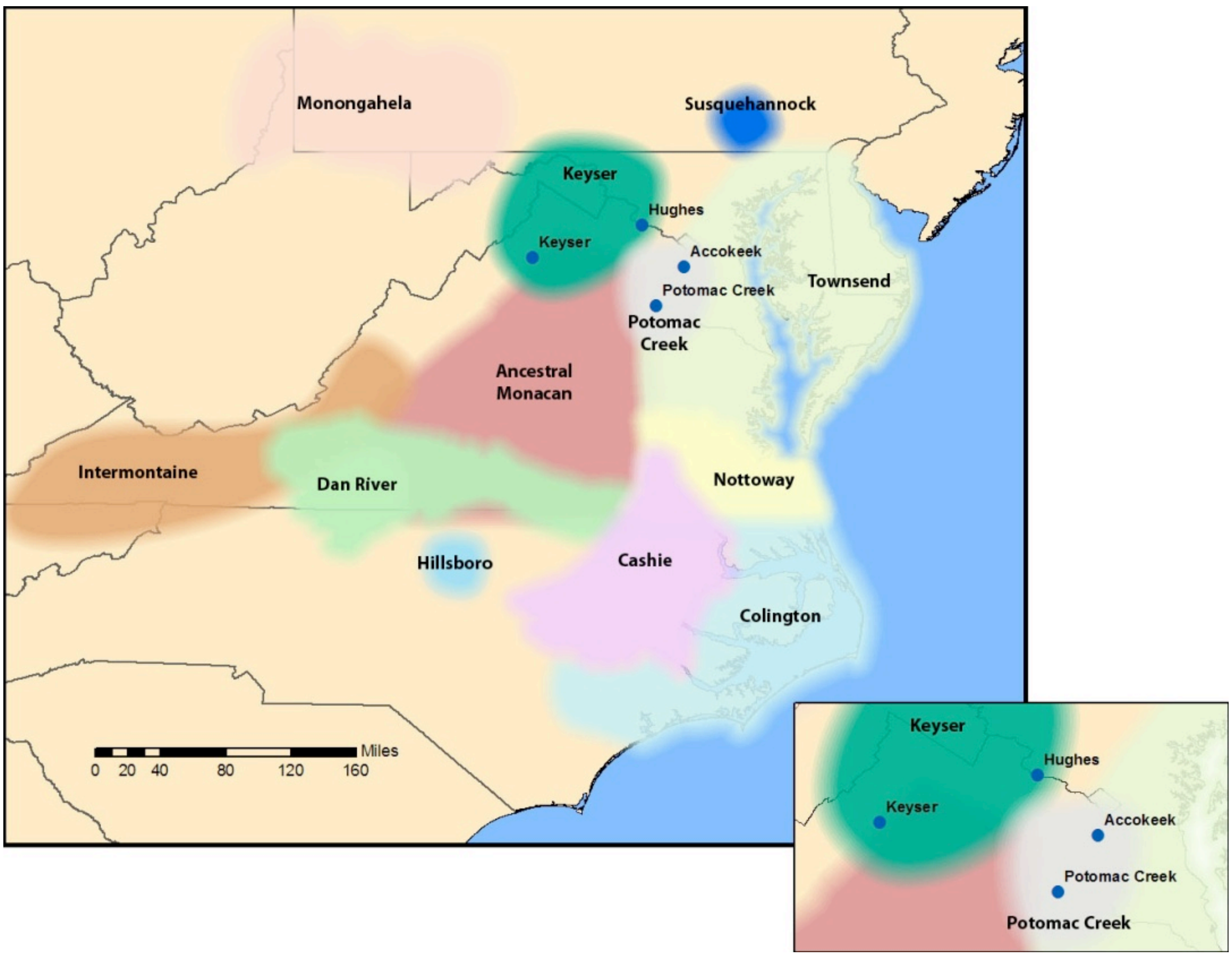


Figure 9.1:Map of the Middle Atlantic study area with approximate boundaries of Native cultural areas identified by previous researchers. Inset shows distribution of sites from which specimens were selected for LA-ICP-MS analysis.

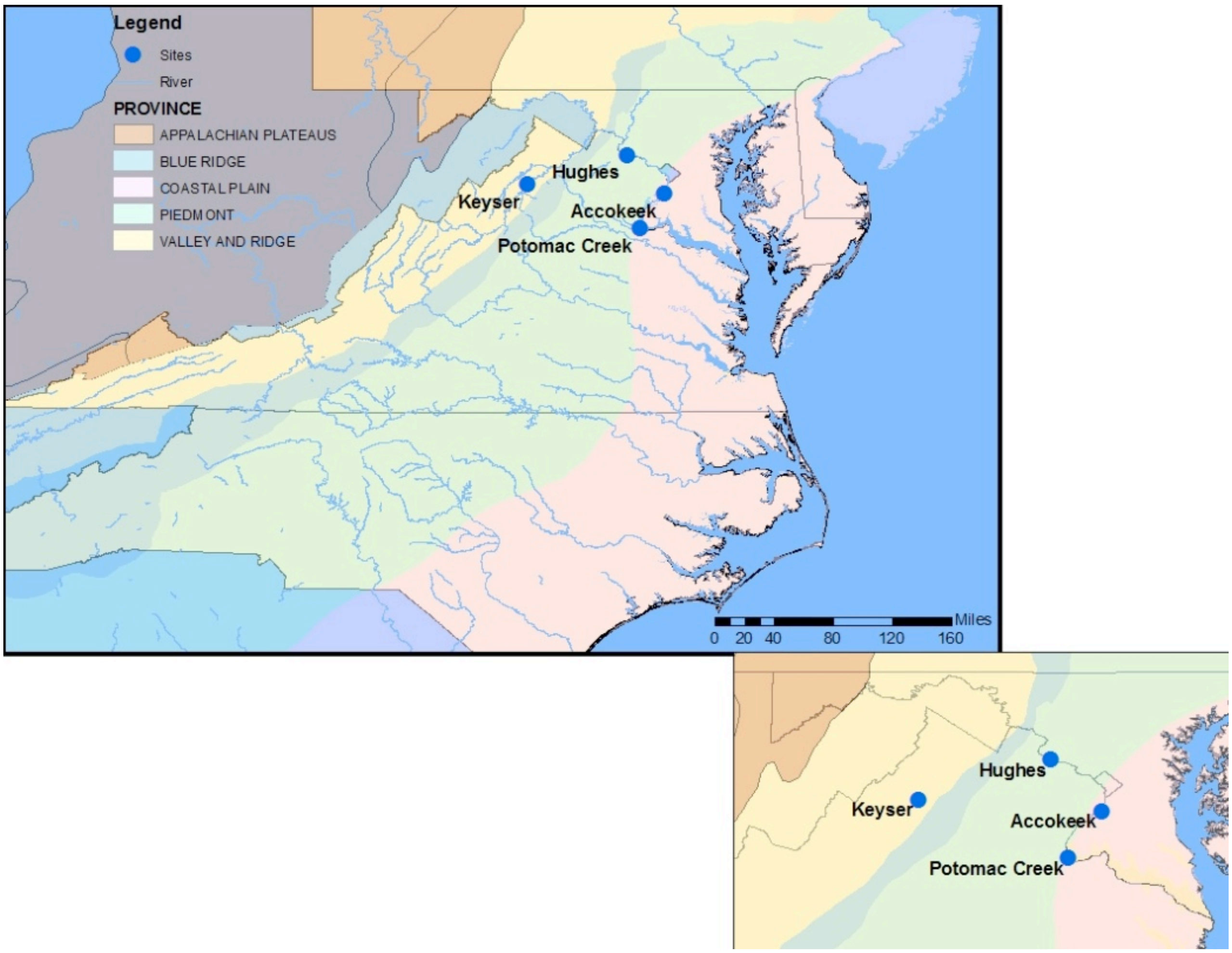


Figure 9.2: Map of the Middle Atlantic showing study area divided into physiographic provinces. Inset shows distribution of sites from which specimens were selected from LA-IC-MS analysis.

In addition to evaluating whether elemental differences can be identified between pipes that would help provide insight into the exchange networks between four settlements, this chapter draws on recent efforts by archaeologists (Bauer and Agbe-Davies (ed.) 2010) to contextualize the results within a theoretical framework that considers the social contexts and consequences of exchange. Instead of looking at the production and circulation of pipes merely as an economic enterprise, I argue it is important to remember that the act of smoking and the exchange of pipes created socio-economic relationships that could initiate and cultivate long-standing reciprocal connections between different individuals or communities (Drooker 2004; Mann 2004; Springer 1981) or even stronger social bonds that some have likened to kinship (Hall 1997).

In the sections that follow I first detail the stylistic similarities shared by the pipes from the four settlements and briefly summarize previous research that has suggested possible scenarios to explain their distribution. Next, I provide a brief synthesis of the previous archaeometric[6] analyses conducted in the region to provide an interpretative framework for my results. Third, I describe the analytical procedure of LA-ICP-MS testing and detail the statistical analysis of the chemical characterization data. Fourth, I discuss the implications of the analysis. I conclude by briefly discussing how a more holistic consideration of exchange, as both a social and economic phenomenon, provides insights into the social dynamics of Native groups in the region.

Circulation Spheres and their Social Contexts

My decision to use pipe assemblages from the four previously mentioned sites, Accokeek Creek (18PR8), Potomac Creek (44ST2), Keyser (44PA1), and Hughes (18MO1) was based on the presence of stylistically similar attributes on pipes excavated from all of these sites. One example of these shared attributes takes the form of geometric rouletted patterns that are found on pipes from all four sites. These motifs are

[6] Archaeometry is a term used to describe research that consists of the application of natural or physical scientific techniques to the analysis of archaeology materials

fairly distinct and consist of a number of different designs. Some of the most frequently occurring motifs are different configurations of triangles filled with rouletted or cord-impressed lines running horizontally, diagonally, or vertically, infilling the shape (Figure 9.3). In addition to rouletted decorations certain parts of clay pipe forms are also embellished. One of the embellishments noted by a number of researchers (Blanton et al. 1999; Potter 1993; Schmitt 1952; Stewart 1992) is a triangular bit form (Figure 9.4a). A variation of this form is what Stewart (1992) called the rectangular bit (Figure 9.4b). These forms are primarily found on the Potomac Creek and Accokeek Creek sites but examples are also present in the Keyser and Hughes assemblages.

The distributions of both of these types of stylistic elements extend across different cultural areas (Barber 2003; Jirikowic 1999; Mason et al. 1944; Schmitt 1952; Stewart 1992),

Figure 9.3: Example of hanging triangle motif on a pipe bowl fragment from the Accokeek Creek site

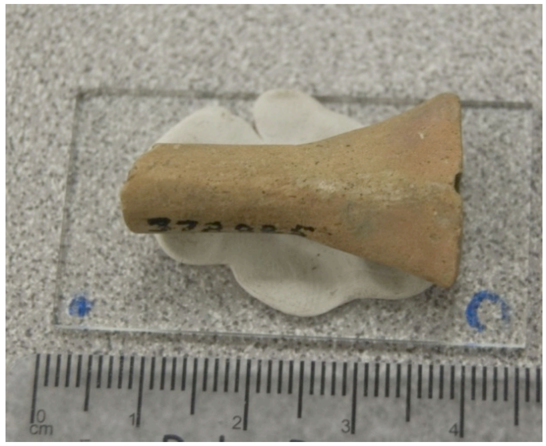


Figure 9.4a: Example of a triangular mouthpiece from the Potomac Creek site

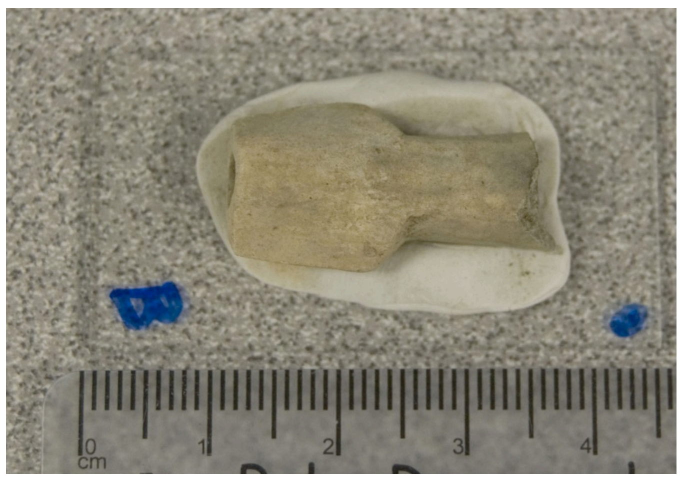


Figure 9.4b: Example of a rectangular mouthpiece from the Accokeek Site

and physiographic provinces (Figures 9.1 and 9.2) yet it has been difficult to pinpoint what kind of social relationships created this distribution. A number of different possible scenarios have been proposed. One of the more popular explanations is based on a combination of documentary and material evidence. Historic documents and archaeological research indicate that during the fifteenth and sixteenth centuries the inhabitants of the Potomac Creek and Accokeek Creek sites played a central role in

Native exchange systems that were present in the areas now known as northern Virginia and Maryland. Clark and Rountree (1993) and Potter (1993) have noted that that the term "Patawomeke", the Algonquian name for the Potomac Creek, means trading center. Additionally, archaeological analyses have revealed that the geographic expanse of Potomac Creek ceramic wares spans hundreds of miles. Ceramics exhibiting distinctive rim decorations that are considered typical of Potomac Creek wares are found on sites along the Potomac and Rappahannock rivers (Egloff and Potter 1982:112), the Virginia Piedmont (Hantman 1993:105), the northern Shenandoah valley (Gardner 1986; Manson et al. 1944) and in the James River Piedmont (Gallivan 2003). The widespread distribution of this ware suggests that the inhabitants of these sites likely had contact with Native villages that were in some cases a hundred miles away or more.

While the distribution of Potomac Creek ceramics indicates that the inhabitants of these sites were part of a long distance exchange network, the extent to which this network was multi-directional and the degree of participation of other groups has been a matter of debate. For example, R.L. Stephenson, who analyzed the entire artifact assemblage from Accokeek Creek, concluded that the higher frequency of Potomac Creek ceramics at the Keyser Farm site and the low frequency of Keyser ceramics at Accokeek Creek signified that "in the presumed contact between the two peoples, a one-way ceramic trade is indicated" (1963:194-195). Additionally, in his analysis of the Potomac Creek ceramic assemblage, Stewart (1992:50) suggested that all of the minority wares, including Keyser wares, "were not associated with the Potomac Creek occupation but seem to be items lost or discarded by previous occupations of the site". Their interpretations helped to foster the idea that the Potomac Creek and Accokeek Creek sites served as production and trade centers but that their inhabitants did not incorporate ideas or materials from other groups into their production networks.

As discussed in Chapter 8, pipes exhibiting the same distinct geographic motifs as those found on the pipes from the Potomac Creek and Accokeek Creek sites demonstrate a distribution similar to Potomac Creek ceramics. Pipes with these motifs are not only found on the Keyser and Hughes sites but as far north as the Shenks Ferry site (36LA2) in Pennsylvania (Kent 1984:385) and as far south as the Jenrette site (31OR231) in North Carolina (Ward and Davis 1993). Moreover, the large quantities of pipes found in the Potomac Creek and Accokeek assemblages (280 and 303 fragments respectively), indicates that these sites were large production centers of pipes. If pipes with geometric motifs and embellished bits originated from the Potomac Creek and Accokeek Creek sites and were exchanged with Natives in other areas, including the inhabitants of Keyser and Hughes, then LA-ICP-MS testing should reveal that all the pipes with these motifs, no matter what site they were excavated from, exhibit the same chemical compositions.

Yet other researchers have offered a contrasting viewpoint of the Potomac Creek exchange network that argues the Native communities who were part of this network were not passively incorporating Potomac Creek pipes and ceramics into their daily activities. For example, Moore (1993) and Gallivan (2003) persuasively argued that Potomac Creek wares represent something more than a marker of a single political, ethnic, or linguistic group. Rather, the widespread use of the distinctive rim decorations or geometric motifs by a number of groups may represent a popular stylistic motif that was incorporated into local ceramic making traditions. Additionally, Barber (2003) has contended that the prominent role Potomac Creek may have played as a trading center does not negate other Native groups' active roles in the exchange relationships that existed during this period. As part of his argument, Barber (2003) presented an alternative hypothesis for the exchange network that connected the Potomac Creek and Keyser residents. He interpreted the large quantity of bone awls recovered from the Keyser site as material evidence of an increase of deer hide processing. The prepared deer hides likely traveled east in exchange for objects from the coast such as ceramics and shell beads. I suggest that pipes should also be added to this list of possible nonlocal exchange items.

Besides arguing that Keyser inhabitants had a more dynamic role in their exchange relationship with Potomac Creek, Barber (2008) has identified evidence that the Keyser inhabitants were actively learning new production skills that incorporated knowledge they gained from the objects they received from the coast. Large quantities of marine shell beads from the coast indicate that Keyser inhabitants were procuring some decorative items through exchanges with other groups. However, fragments of freshwater shells were also found at Keyser that show evidence of experimental bead production. These shells were procured from lakes located in the general vicinity of the site. Barber noted that perhaps experimental bead production using local resources was part of an effort to become less dependent on the marine shell beads that had to be transported from the coast. Regardless of what sparked this initiative, these shell beads serve as material evidence of the Keyser inhabitants' efforts to integrate new ideas into modes of production at the site and introduce the possibility that perhaps they also could have been incorporating external ideas into their local pipe production. If this was the case, then pipes from the Keyser site that were stylistically similar to those from Potomac Creek and Accokeek Creek might exhibit the same chemical signatures as other pipes produced at the Keyser site.

In contrast to the central role in regional exchange networks ascribed to the Potomac and Accokeek Creek occupants, and the possible integral role in the fur trade suggested for the inhabitants of Keyser Farm, Jirikowic (1995:326) argued that the Hughes site residents were economically “self-sufficient”. She noted that although the assemblage from the Hughes site contained ceramics that shared traits with Potomac Creek wares, their number was so limited in the sample “as to be relatively insignificant.” Moreover, she noted that the site’s assemblage indicates overall that the ceramic and subsistence data provide little evidence of sustained or frequent economic exchange with other groups. According to Jirikowic the ceramic wares associated with the site were notable for their homogeneity, as were the lithic tools. Jirikowic interpreted the lack of diversity in the assemblage as material evidence of efforts by the site’s inhabitants to keep their social distance from contemporary Native groups. Given her interpretation, it is somewhat surprising to find any pipes in the Hughes site assemblage that are stylistically similar to those from Potomac Creek and Accokeek Creek. On the other hand, it is possible that the pipes were part of infrequent exchanges and interactions between inhabitants that may not have been part of a sustained exchange network. If this was the case, then pipes from Hughes with geometric motifs would likely exhibit the same chemical signatures as pipes from Potomac or Accokeek Creek.

Previous research has offered a few different scenarios that will be tested through this study. Some researchers have suggested that Potomac Creek and Accokeek Creek represent the central area of production for all objects with distinct geometric motifs or embellished rims, or in the case of pipes, mouthpieces. These objects were then circulated and exchanged with other groups outside of their territory. This model suggests that the Hughes and Keyser assemblages will contain pipes produced from Accokeek Creek and Potomac Creek but not vice versa. Furthermore, all the pipes with geometric motifs and embellished bits would exhibit the same chemical signatures as other pipes produced at the Potomac Creek or Accokeek Creek sites. However, if the inhabitants of Keyser and Hughes were actively integrating ideas from nonlocal sources into their own production networks then the pipes with geometric motifs and embellished bits would likely exhibit the same chemical composition as other pipes locally produced at each site. The variety of possible scenarios suggests that different patterns of circulation and production may be causing the stylistic similarities between the different sites. In the next section, I will discuss how previous archaeometric studies have used chemical analyses to examine the circulation, or lack of circulation, of objects.

Archaeometric Examinations of the Provenience and Circulation of Ceramic Objects

As demonstrated by the multiple theories regarding the social processes behind the similarities of materials found at the Potomac Creek, Accokeek Creek, Keyser, and Hughes inhabitants, determining which social practices were the source of material variation or innovation in an archaeological assemblage can be extremely difficult. In many cases, new or innovative stylistic trends or elements are initially introduced through the physical exchange of objects from nonlocal sources or the integration of new people into the community. However, the presence of such objects also introduces new techniques of production into local learning networks whose members can then actively incorporate such innovations into their own operational sequences, effectively making local copies of the foreign style.

Within the last few decades, archaeologists have increasingly turned to archaeometric techniques to bring new insights to questions regarding the circulation and production of objects in prehistoric and historic societies. Such analyses include energy dispersive X-ray florescence (XRAF), Instrumental Neutron Activation Analysis (INAA), petrographic analysis, and more recently, Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS). These techniques allow researchers to characterize and compare the various elemental and mineral components that comprise the raw material matrix of ceramic and lithic objects. Researchers use the results of these analyses to determine whether artifacts from the archaeological sites in question may have been 1) produced using raw materials that exhibit the same elemental composition and 2) whether artifacts that display stylistic similarities exhibit similar chemical signatures. The comparison of stylistic elements with the underlying chemical composition of an artifact allows archaeologists to examine whether stylistically similar elements at different sites are a product of the physical circulation of objects or the incorporation of nonlocal ideas into local production networks, or if both social processes are taking place.

Previous Archaeometric Research of Pipes and Their Implications for this Study

Recently, researchers have attempted to address questions regarding the social contexts of the circulation and exchange of pipes through chemical analysis. Three previous investigations (Capone and Downs 2004; Kuhn 1986; Kuhn and Sempowski 2001) that have used chemical analysis to explore pipe circulation suggest archaeometric techniques can provide insight into the movement, or lack of movement, of these objects through exchange or trade networks. Kuhn (1986) used X-ray florescence (XRAF) to identify differences in trace element compositions in pipes from multiple sites that indicated different Iroquoian Mohawk groups were exchanging ceramic pipes. Kuhn and Sempowski's (2001) study used X-ray florescence (XRF) and particle-induced X-ray emission (PIXE) spectrometry to demonstrate that two of the most geographically separate league members of the Iroquoian Confederacy, the Seneca and Mohawks, were exchanging pipes.

The researchers in both of these studies first created a control for determining which objects were produced from local clays by examining the chemical composition of ceramics produced at different Mohawk and Seneca sites. Pottery samples in each of these studies were hypothesized to represent the local clay resources being exploited by potters who inhabited nearby sites. Once control groups were established through chemical testing, the researchers then tested pipes and assigned them to the different clay groups using a discriminant-function analysis. The discriminant function analysis was first used to determine which elements played the largest role in separating the different Seneca and Mohawk clay groups. The researchers then used the functions to allocate the unknown pipe samples to one of the two groups. Once group memberships were established Kuhn and Kuhn and Sempowski then compared the provenience information of each specimen with its clay group membership to determine which pipes represented "nonlocal" manufacture. Both studies were able to successfully identify evidence of pipes in archaeological assemblages that were produced from nonlocal clays and therefore were exchange items.

Capone and Downs (2004) used a different technique, petrographic analysis, to examine the circulation paths of red clay pipes found on seventeenth and eighteenth century sites in Virginia, New York, and Massachusetts. Their examination of the ceramic matrix and mineral inclusions of the 26 samples determined that pipes exhibited enough diversity in ceramic paste and density of size and type of inclusions to allow them to conclude that the pipes from the three different areas were made from distinct clay sources and that no centralized production system existed. Capone and Downs research suggested that looking at inter and intra-assemblage variation of clay matrix and inclusion types could serve as a useful means of distinguishing pipes produced in different areas.

Although these studies provide an important baseline for the chemical investigation of pipes, the particular methods employed in their analyses were not suitable in the context of my project. I could not utilize petrographic analysis because this technique requires that an object be cut to make a thin section to subject the sample to high-power magnification. As discussed in Chapter 4, prehistoric pipes occur in much smaller quantities than historic period pipes. Given the smaller sample sizes and the destructive nature of petrographic analysis most institutions are understandably reluctant to loan samples for this type of examination. Additionally, whereas the techniques employed in Kuhn (1986) and Kuhn and Sempowski's (2001) studies were non-destructive, no previous research in my immediate study area had employed X-ray florescence or particle-induced X-ray emission. Due to the fact that no other chemical studies of pipes have been conducted in my study area, it was necessary to draw from previous archaeometric studies of other ceramic objects conducted in my study region to create an interpretative framework to analyze my data.[7] Because I wanted to choose a technique that would produce results that might be compatible with previous studies already conducted in the region, I decided not to use X-ray florescence or particle-induced X-ray emission.

The majority of archaeometry studies conducted on Native ceramic objects from the East Coast of the United States have attempted to investigate the social contexts behind the circulation of objects through Neutron Activation Analysis (NAA). NAA has

[7] Unfortunately, unlike Kuhn and Sempowski, I was not able to directly test ceramics in my study to create a comparative sample, although I hope to do so in future analyses.

gained popularity as a technique that provides data on the elemental composition of a specimen with remarkable precision (Glascock and Neff 2003). NAA "involves the irradiation of a sample by neutrons to make the sample radioactive. After irradiation, the gamma rays emitted from the radioactive sample are measured to determine the amounts of different elements present in the sample" (Glascock and Neff 2003:1516). The information obtained is then used by archaeologists to create compositional profiles of artifacts and source materials to determine the geographic provenience of production and identify patterns of circulation.

While NAA studies have provided insight into compositional differentiations between ceramics from areas ranging from New England to Florida, one problem with NAA analysis in the context of my study is that it is destructive. Samples must be ground up into a fine powder to be irradiated and analyzed. For reasons already discussed, destructive analyses were not a viable option for my investigation. Yet, when deciding what technique to use to analyze the pipes in this study, it was necessary to employ one that would allow the results to be compatible to those previously found through ceramic studies. Ideally, the best way to ensure congruence of results would be to utilize another technique that created results comparable to those produced by NAA analyses.

Although NAA uses a different experimental procedure, multiple studies, including Speakman et al. (2002), Neff (2003), Larson et al. (2005), and James at al. (2004) have demonstrated that NAA results are often in reasonably good agreement with those produced by LA-ICP-MS analysis. However, it should be noted that NAA was considered to be slightly more precise in terms with respect to accuracy of measurements.

Nevertheless, James et al. (2004:697) concluded, based on the direct comparison of the two techniques on the same archaeological samples, that "the multivariate statistical analysis of data resulting from the two methods demonstrates a high degree of comparability". The previous examples of the congruence of the results from these different procedures afforded the possibility of using the conclusions drawn from NAA investigations to guide analysis of LA-ICP-MS data. LA-ICP-MS analysis was feasible for my project because it is a minimally destructive technique. Additionally, one other study (Steadman 2008) successfully employed LA-ICP-MS to investigate the circulation of ceramics from Virginia, which suggested this technique could produce significant results when used to test ceramic objects from my study area. Consequently, I chose this technique for my analysis. Before describing the details of my analysis, I will first briefly synthesize what previous LA-ICP-MS and NAA studies of ceramics have revealed about ceramics and clay sources in my study area and the areas immediately surrounding it to provide an interpretative framework for my analysis.

Material Studies of Late Woodland and Contact Period Ceramics in the Eastern United States

Previous chemical studies of Native ceramic objects in the Eastern U.S. have revealed a number of important results and issues that have implications for this study. One methodological issue that has emerged concerns the utility of using raw clay samples to source archaeological samples. While some chemical studies include raw clay samples from known geographic sources as a comparative measure for archaeological materials, others draw conclusions solely based on the chemical characteristics of archaeological materials. When raw samples are included in the testing, they are separated into compositional groups and then serve as markers of the geographic source of that particular compositional group. These markers are then compared to artifacts of unknown provenience to investigate how the artifacts fit into the range of variation established by the known source groups (Glascock and Neff 2003:1521).

Results from previous studies that have included raw clays suggest this method returns mixed results. Lizee, Neff, and Glascock (1995), Ashley (2003), and Pevarnik, Boulanger, and Glascock (2008) were able to successfully identify compositional groups that linked raw materials to archaeological samples. However, Boulanger and Glascock (2008) and Herbert and McReynold's (2004) studies revealed that the clay compositions of raw clay samples do not always group with archaeological samples, making it difficult to link ceramics to geographic sources. This lack of consistency suggests that chemical differences likely exist amongst clay resources in their study area. Because of the variable success of previous studies, and the fact that no raw clay samples were immediately available from the sites in my study, I chose to use draw conclusions based solely on the chemical characteristics of archaeological materials. The other LA-ICP-MS study conducted in the region (Steadman 2008) followed the same procedure.

Regardless of the inclusion or exclusion of raw clay samples, the majority of ceramic studies conducted in the region have successfully differentiated archaeological materials produced from clays originating in different physiographic provinces. Furthermore, such differentiations can be made even when sites are less than a hundred miles apart (Boulanger and Glascock 2008; Herbert and McReynolds 2004; Pevarnik, Lizee, Neff, and Glascock 1995; Steadman 2008; Steponaitis, Blackman, and Neff 1996). Additionally, Steadman's (2008) study indicated that clays from different geographic sources in the same physiographic province can be distinguished, especially when the sources or sites are separated by long distances.

Ceramics produced from clay alluvial deposits from different river valleys have also been found to exhibit distinct chemical signatures (Herbert and McReynolds 2004; Lizee, Neff, and Glacock 1995; Steponaitis, Black, and Neff 1996). Herbert and McReynold's (2004) investigation of ceramics from North Carolina revealed a particularly interesting pattern regarding alluvial clay deposits in river valleys. Their research noted that certain Coastal Plain clay deposits associated with rivers that originated in the Piedmont province exhibited similar chemical and mineral composition to Piedmont clays. The researchers concluded that this was due to the rivers redepositing alluvial sediment from the Piedmont into the Coastal Plain. As I will explain below, this process may explain similarities identified between pipes from the Hughes and Accokeek Creek sites.

In addition to identifying heterogeneity between clays from the same physiographic province, chemical studies have also identified homogeneity in clay sources from the same physiographic provinces over broad geographic expanses that can make it difficult to differentiate clay sources (Ashley 2003; Speakman personal communication 2010; Steponaitis, Blackman and Neff 1996). In the Middle Atlantic specifically, NAA studies have demonstrated that clays of the Coastal Plain geological province are strikingly homogeneous over broad geographic expanses due to the fact that they are all comprised of alluvial sediments. For example, Speakman and Glascock's (2006) analysis of ceramics from southeastern North Carolina suggested that Coastal Plain clays are homogenous in composition and show a great deal of similarity starting in Maryland and running as far south as North Carolina. Studies of sites farther south, such as Ashley's (2003) analysis of ceramics from a variety of sites in northeastern Florida, demonstrated that some compositional groups can be distinguished amongst different Coastal Plain sites, but the results also suggested a good deal of overlap between certain groups. Steadman's (2008) LA-ICP-MS study was able to differentiate between ceramics from different sites in the Coastal Plain but the sites were separated by hundreds of miles. The widespread similarity of clay composition has very real implications for studies attempting to discriminate between artifacts produced on different sites located in close proximity to each other in the Coastal Plain, such as Potomac Creek and Accokeek Creek.

Based on previous studies and the particulars of my sample, I determined three major questions that I attempted to answer through my analysis. Given that this was the first LA-ICP-MS analysis to examine pipes from this area of Maryland and Virginia, the initial question was whether different compositional groups could be discerned among the assemblages from different geophysical provinces. Part of the reason I chose to test pipes from these four assemblages was that in addition to the stylistic similarities exhibited by the pipes, these four sites were distributed over three different physiographic provinces. I anticipated that the underlying geological differences between these territories would generate elemental differences that might help distinguish compositional groups.

The second question was whether pipes from Accokeek and Potomac Creek could be differentiated, as both sites were located in the Coastal Plain. One problem identified with previous studies that had failed to differentiate clay types from different sites in the Coastal Plain province was that they utilized fairly small sample sizes from each site. To maximize the probability of identifying chemical differences, I selected large sample sizes from both Accokeek and Potomac Creek.

Finally, if distinctive compositional groups could be determined, further investigations needed to be conducted to examine whether or not, and to what degree, pipe fragments from different compositional groups were found in the same pipe assemblage. Additional investigations would also determine how stylistically similar pipes were distributed amongst different compositional groups. As previously noted, if pipes with similar attributes were grouped into one compositional group, this would indicate they were all likely made from similar clays, and therefore were produced at one site and were physically transported to the other sites. On the other hand, if stylistically similar pipes were distributed throughout multiple compositional groups this would suggest Native individuals at different sites were locally producing pipes with similar stylistic elements rather than exchanging them between different sites.

Research Methods

Sampling Strategy

The strategy used in identifying samples for this study was based primarily on the questions outlined above. However in addition to the questions posed above, a few other factors also impacted sample choice. The primary determining factor was size of the pipe fragments. The dimensions for the chamber that encloses the samples while they are ablated is 5cm x 2cm. Consequently these dimensions also served as the maximum size for samples that could be included in the study. Fortunately, this did not heavily impact the sample pool. Nearly all of the samples from the Hughes and Keyser assemblages fit this requirement. Only eight pipe fragments, four from Hughes and four from Keyser had to be excluded due to the size restrictions. Unfortunately, however, it should be noted that two of these samples excluded from Hughes did exhibit the hanging triangle motif that was of interest. Nevertheless, the possibility remains that these samples could be tested using other methods, such as X-ray florescence (XRAF), at a future point in time. In all 182 samples were chosen from the four sites. Table 9.2 summarizes the breakdown of the number of samples from each site and how many samples exhibited the decorative motifs discussed above.

Only a portion of the Potomac Creek and Accokeek Creek assemblages, which contained 280 and 303 fragments respectively, could be tested. Given that this was the first analysis of its kind conducted on these collections, my first priority was to include a representative sample of the assemblage. However, knowing the context of the sample was also important in case certain variations might be related to the spatial or temporal distribution of the pipes. The pipe fragments for which the best provenience information was available were from the most recent excavation of the site, conducted in 1996 (Blanton et al. 1999). While the spatial extent of this excavation was small (629 m^2), the pipes from this context had best contextual information. The rest of the samples were chosen from the Smithsonian's collections. Samples with provenience were given priority and then within each provenience, samples with the decorative motifs discussed above were chosen.

Table 9.2: Summary of samples

Site	No. of samples	Decorated Samples	Embellished Bits
Potomac Creek	58	18	0
Accokeek Creek	79	29	5
Hughes	26	9	10
Keyser Farm	19	8	2

Unfortunately the Accokeek assemblage largely lacks stratigraphic provenience. Rather, the pipe assemblage was divided into groups based on stylistic differences assigned by Stephenson (1963). I attempted to create a representative sample from this collection by including samples from all of the different type categories. The number of samples chosen from each category was scaled to its size. So for example, one category, Moyaone/Potomac Creek Plain consisted of 83 examples. I drew 19 samples from this category. On the other hand the Moyaone category only had 25 examples. Thus, I chose fewer samples, eight, from this category. Within the larger categories of Potomac Creek Cord Impressed and Accokeek Impressed, I also targeted samples that exhibited the triangular and rectangular mouthpieces and geometric roulette motifs.

Experimental Procedure

LA-ICP-MS is a procedure in which a laser is used to ablate or burn a very small portion of a sample (generally a few hundred microns in length). Once the portion has been vaporized it is then introduced into a vacuum, which carries it into the mass spectrometer. After it enters the mass spectrometer, the mass to charge ratios are measured for each sample. The elemental concentrations of multiple samples can then be compared using multivariate statistics to identify distinct, homogeneous compositional groups. As previously noted this method of analysis is considered particularly beneficial because it is minimally destructive, leaving only a small mark on the artifact's surface that often cannot be seen with the naked eye.

The 182 samples in the study were tested and analyzed over a four week period at the Smithsonian's Museum Conservation Institute under the direction of Jeff Speakman and Nicole Little. Prior to conducting the analysis, it was determined that 1) it would be beneficial to ablate the samples in lines rather than dots to cover more surface area on each sample and 2) that testing three ablation lines on each sample, instead of just one, would provide a more comprehensive picture of the composition of the clay for each sample. These decisions were based on results from initial tests that suggested the clay used to produce the pipes might be somewhat heterogeneous. Moreover, the third set of numbers could be used as a check against the two other passes in case one pass hit an inclusion or was on a less than flat surface, which could skew the counts.

No initial preparation of the samples was necessary to conduct LA-ICP-MS. The use of laser ablation allowed the solid fragment to be directly sampled without having to be brought into solution or ground up into powder prior to analysis. Samples were mounted either individually or in sets of two on a microscope slide and then placed in the sample cell or chamber. Once in the chamber, three ablation lines were drawn on each sample. All ablation lines were limited to between 600 and 800 μm in length. When drawing each ablation line I endeavored to only test the clay matrix. This meant avoiding any large inclusions in the clay and any decoration that could be visually identified to ensure that the surface being tested was as flat and homogeneous as possible. I also attempted to separate the lines on each sample to acquire data on as much of the clay composition as possible. However, at times decorative attributes or high densities of inclusions covered the majority of the fragment which meant lines had to be drawn in close proximity to each other.

A pre-ablation pass was run first to clean dirt or other possible contaminants off of the surface before the analysis began. Samples were ablated using a New Wave 213 nm Nd:YAG Laser system (Figure 9.5a). For the pre-ablation passes the laser was set to a scan speed of 60 μm/s at 10 Hz with a spot size of 300 μm. Once the pre-ablation pass was complete, the clay matrix of the sample was ablated. For the ablation passes the laser was set to a scan speed of 30 μm/s at 4 Hz with a spot size of 300 μm. The lines were of such a size that only three to four passes were needed to generate elemental abundance data.

After the ablation pass, the sample was introduced to the Perkin Elmer Elan 6000 ICP-MS. The ICP-MS recorded mass to charge ratios for a suite of elements including: Al, Ba, Ca, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Hf, Ho, K, La, Lu, Mg, Na, Nb, Nd, Pb, Pr, Rb, Sc, Si, Sm, Sr2, Ta, Tb, Th, Ti, Tm, U, V, Y, Yb, Zn, and Zr. Measurement precision during ablation passes was monitored by a continuously calculated relative standard deviation for each of the 42 analyzed elements. Screen shots were taken to record the impact of the ablation on the artifact's surface. Figure 9.5b is one such screenshot. While the line in the shot looks deep under a high-powered microscope when the sample is viewed with the naked eye, it is barely discernable. After every five pipe samples, a series of standard reference material (SRM) glasses, 610 and 612, and Ohio Red Pipe Clay were scanned following the same protocol used to analyze the archaeological samples. The purpose of running the standards was to generate a calibration that could be used as a comparison for pipe samples. Blanks, or scans where no samples were introduced into the vacuum, were also run after the standard materials were tested. Running standards and blanks after every five unknowns corrects for instrument drift over the course of the analysis when calculating final element abundances (Speakman and Neff 2006). The elemental concentration data from the three measurements was tabulated into parts per million using the Microsoft EXCEL spreadsheet program. The descriptive data on stylistic attributes was kept separate from the chemical information so that previous knowledge of stylistic similarities would not bias the creation of compositional groups. The spreadsheet with stylistic information was appended to the sample information only after the samples had been grouped.

Results

The analyses performed at MCI produced elemental concentration values for 42 elements in most of the analyzed samples. Data for the elements Cr, Cu, Er, Ga, Gd, Ho, Ni, Pb, Pr, Ti, Tm, Y was below detection limits in many samples and was removed from consideration. The analysis of the data was carried out on log base-10 values of the remaining 30 elements. The logarithmic transformation compensates for the differences in magnitude between major

Figure 9.5a: New Wave 213 nm Nd:YAG Laser system

Figure 9.5b: Ablation scar on one of the samples as viewed through a high-powered microscope. Image also captures ceramic matrix and size of inclusions.

elements, such as calcium, and trace elements, such as rare earth or lanthanide elements (REEs). Transformation to base-10 logarithms also yields a more normal distribution for many trace elements (Speakman and Glascock 2006:3).

The next step consisted of evaluating working hypotheses regarding the number and size of groups present in the compositional data. According to Speakman and Glascock (2006:4): "Compositional groups can be viewed as "centers of mass" in compositional hyperspace denoted by the measured elemental data. Groups are characterized by the locations of their centroids and the unique relationships (i.e. correlations) between the elements. Decisions about whether to assign a specimen to a particular compositional group are based on the overall probability that the measured concentrations for that specimen could have been obtained from that group."

Given the large amount of variability present in chemical datasets (in this case measurements for 30 variables for each of the 182 samples), it is often useful to transform the original correlated variables into a smaller set of uncorrelated variables to simplify data interpretation. This transformation involves the application of pattern recognition techniques, such as Principal Components Analysis (PCA), which can be used to identify subgroups in datasets. PCA is a technique that groups highly correlated variables into factors beginning with those factors, or components, that summarize as much of the joint variation of the data as possible. These components are then plotted as reference axes. Data can then be plotted in relation to these axes to analyze the presence of possible subgroups.

One advantage of PCA is that it can be employed as a simultaneous R- and Q-mode technique, in which both objects (individual specimens) and variables (chemical elements) can be depicted on the same set of PCA reference axes. As Speakman (2002:4) explains:

> "The two-dimensional plot of element coordinates on the first two principle components is the best possible two-dimensional representation of the correlation or variance-covariance structure of the data. Small angles between vectors from the origin to variable coordinates indicate strong positive correlation; angles at 90 degrees indicate no correlation, and angles close to 180 degrees indicate strong negative correlation. Likewise, the plot of object coordinates is the best two-dimensional representation of the distances among the objects in standardized log concentrations space."

Displaying the objects and variables on the same plot allows the researcher to compare which elements are contributing to the differentiation of certain subgroups. These plots are called "biplots" in reference to the simultaneous plotting of objects and variables. The biplot of the first two principle components identified from the dataset in this study is pictured in Figure 9.6 below. This plot is based on a PCA of the 30 element variance-covariance (correlation) matrix of all the 182 archaeological samples. The plot suggested that the first Principal Component axis was positively loaded with rare earth elements in comparison to the rest of the samples. This could indicate the presence of a subgroup comprised of samples with higher concentrations of rare earth elements. Additionally, the second Principal Component axis was negatively loaded by transition metals, (Zn, Co, and Fe) and alkaline metals (Na, K, Rb, Cs). This pattern indicated the presence of another subgroup with low concentrations of these elements.

Once the provisional groupings of elements were identified through PCA these groups were further refined and modified by creating bivariate plots of the elements that reflected the greatest variation in PC space. The analysis produced a total of four compositional groups, two well-defined compositional groups and two groups whose separation is marginal at best. The four compositional groups are illustrated in a series of bivariate plots (Figures 9.7-9.10) below. It should be noted that there were 15 specimens that could not be assigned to groups and were not compositionally similar to each other. In addition eight specimens could not be included in the analysis because their parts per million values were considered too low compared with the rest of the samples. In total, out of the 182 specimens, 159 were successfully assigned to one of the four compositional groups.

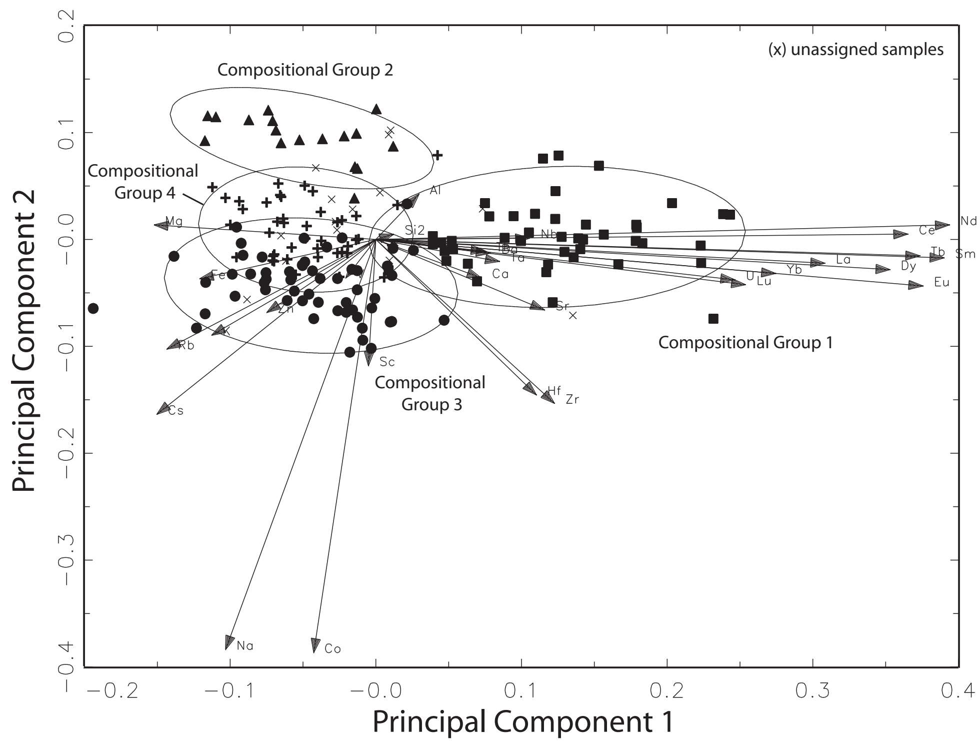


Figure 9.6: Biplot of Principal Components (PC) scores of variables along PC1 and PC2. Variables (elements) are represented by gray arrows. Objects (samples) from the different sites are represnted by symbols. Squares = Compositional Group 1, Triangles = Compositional Group 1, Triangles = Compositional Group 2, Circles = Compositional Group 3, Crosses = Compositional Group 4. This plot explains more than 55 percent of variation in the dataset. PC1 is strongly positively loaded on Rare Earth Elements (REEs) while PC2 is negatively loaded with Alkali metals (Cs, Rb, K, and Na) and Transition metals (Co, Zn, Fe).

The first compositional group identified in the dataset is well-defined. Compositional Group 1 contains 44 members and comprises 24 percent of the total sample. As illustrated in the bivariate plot of Europium and Samarium (Figure 9.7), the specimens in this group exhibit higher concentrations of Rare Earth Elements (REEs) than samples belonging to other groups. Although the majority of samples (eighty-six percent) are from the Accokeek Creek site assemblage (n = 38), fragments from the Hughes and Potomac Creek sites are also represented by four members and two members respectively.

Compositional Group #2 is the smallest but also well-defined. This group is comprised of 17 members and represents nine percent of the total sample set. The majority of this group (70.5 percent) is comprised of twelve members from the Keyser site. Samples from the Potomac Creek and Accokeek Creek assemblages are also represented in this group by two and three members respectively. As shown in Figure 9.8, the samples in the second compositional group are characterized by lower concentrations of transitional metals, in this case Zinc and Cobalt, in comparison to samples from other groups.

The third compositional group contained 43 specimens or 23.6 percent of the sample (Figure 9.9). This group is split relatively evenly between 20 members from the Accokeek Creek site and 21 members from the Hughes site. In addition, the Potomac Creek and Keyser sites are represented by one member each. This group is not as well defined as Compositional Groups 1 and 2 because there is some overlap with Compositional Group 4 (see Figure 9.9).

The final and largest group, labeled Compositional Group 4, is comprised of 60 members or 33 percent of the sample. Fifty-five members or 91.6 percent of the group are samples from the Potomac Creek site. The Accokeek Creek site and the Keyser site are also represented by one member and four members respectively. As illustrated in Figure 9.9, however, the

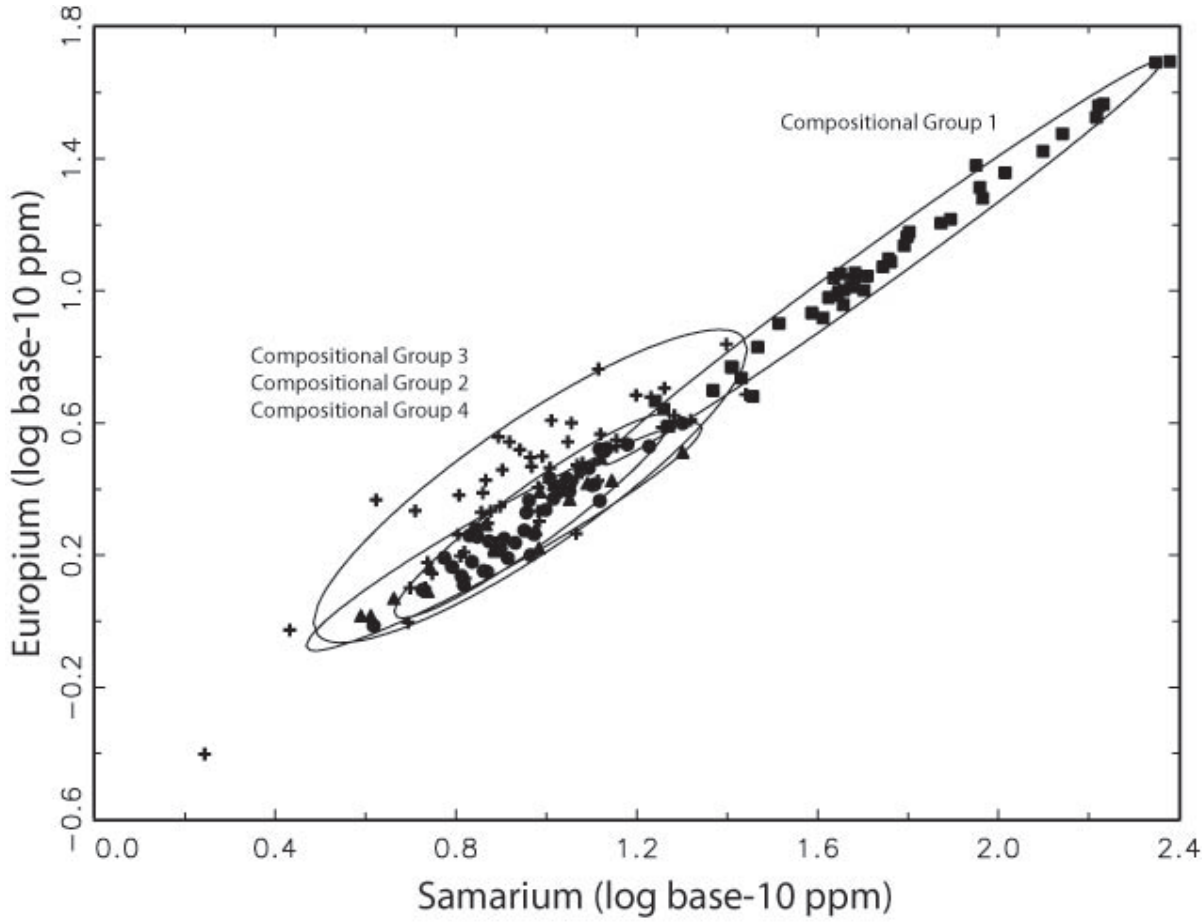


Figure 9.7: Bivariate of Europium and Samarium base-10 log concentrations in data set. Ellipses represent 90 percent confidence level for membership in the two groups. Symbols differentiate compositional groups.

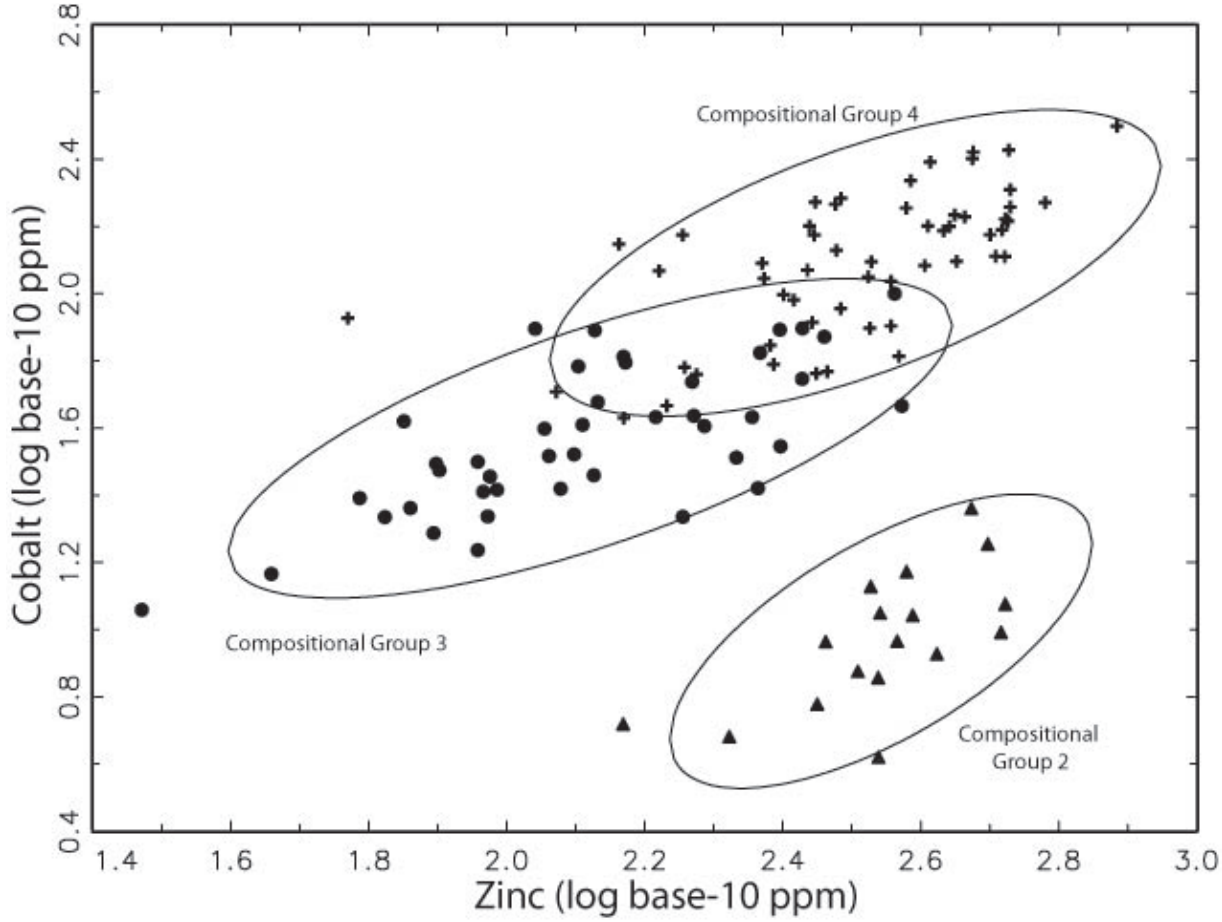


Figure 9.8: Bivariate plot of Cobalt and Zinc base 10 log concentrations in dataset. Ellipses represent 90 percent confidence level for membership in three groups. Symbols differentiate compositional groups.

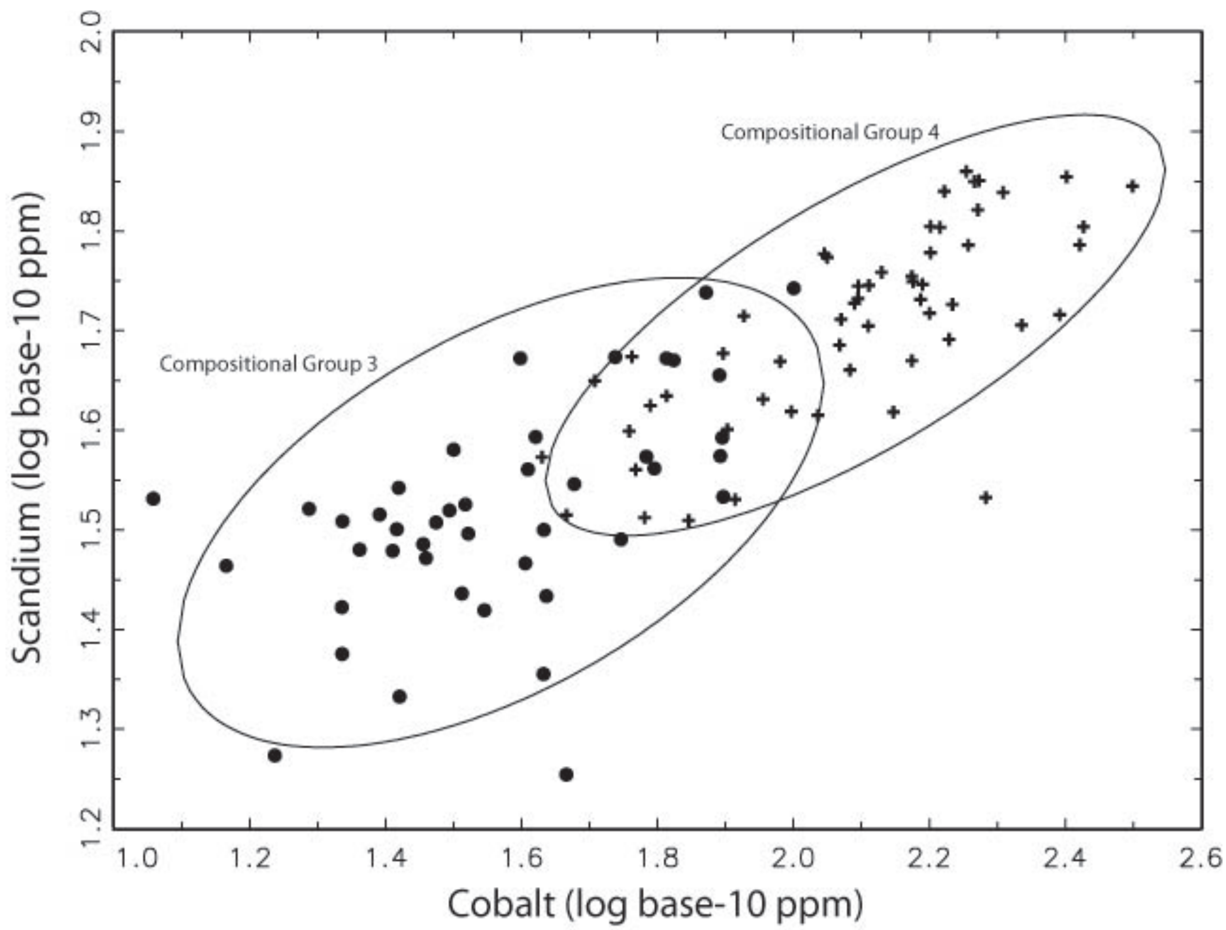


Figure 9.9: Bivariate of Scandium and Cobalt base 10 log concentrations in dataset. Ellipses represent 90 percent confidence level for membership in the two groups. Symbols differentiate compositional groups.

separation between Compositional Groups 3 and 4 is marginal. These two compositional groups are mostly comprised by samples from Potomac Creek, Accokeek Creek, and Hughes. Consequently, the overlap of these compositional groups suggests that the inhabitants of these three sites were likely using clays with similar compositions to produce pipes. This is not surprising given their close geographic proximity to each other (see Figures 9.1 and 9.2).

Figures 9.10a and 9.10b illustrate the differences between the four groups in multivariate space. The large separations of Compositional Groups 1 and 2 from the other two groups suggest variations in the raw material differences are contributing to the

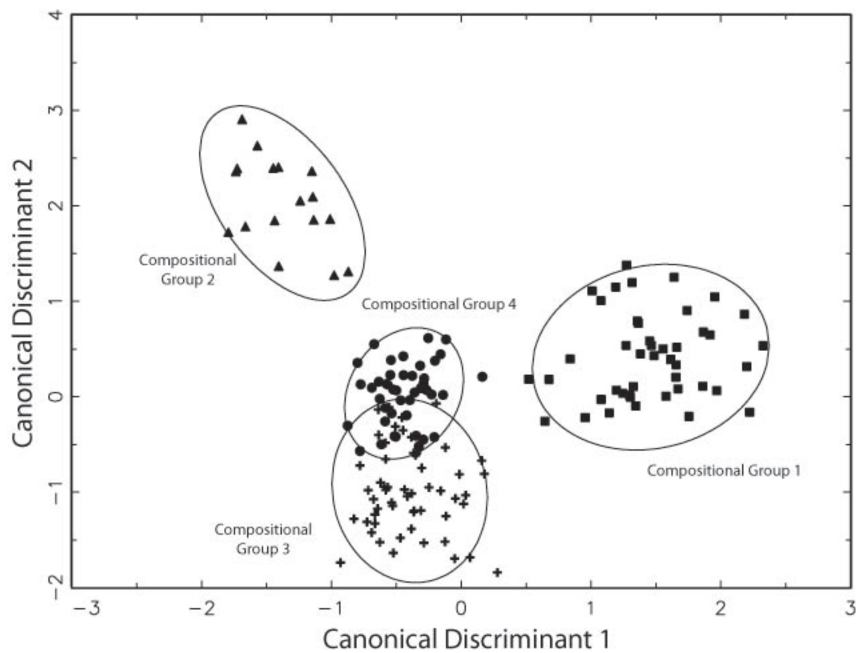


Figure 9.10a: Plot of compositional groups identified in the 182 specimen dataset in canonical space. Ellipses represent 90 percent confidence levels for membership in the four groups. Symbols differentiate compositional groups.

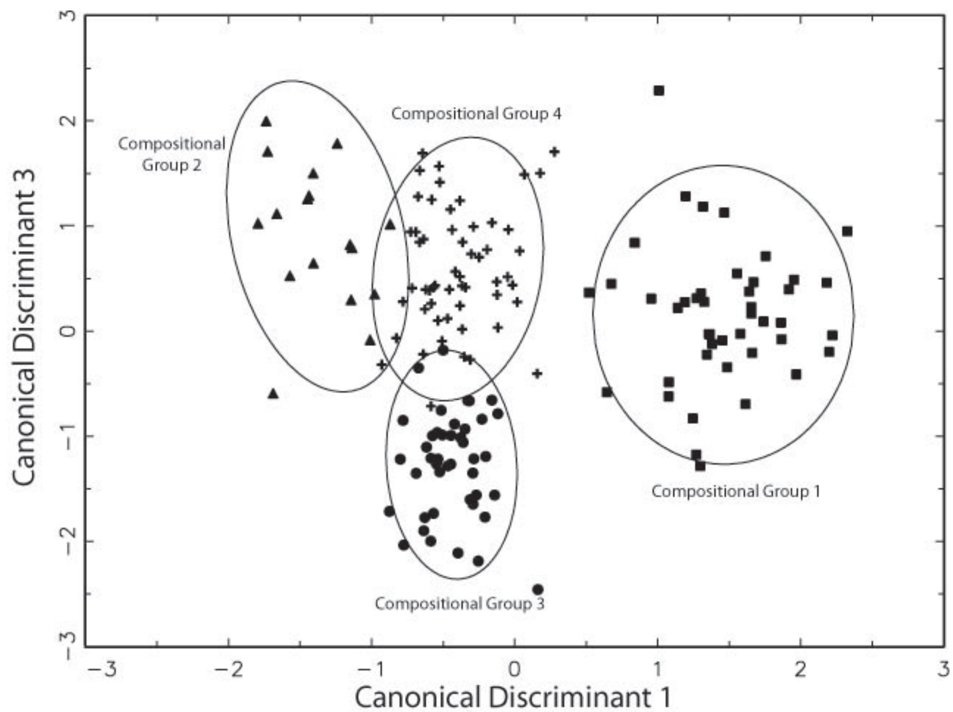


Figure 9.10b: Plot of compositional groups identified in the 182 specimen dataset in canonical space. Ellipes represent 90 percent confidence levels for membership in the four groups. Symbols differentiate compositional groups.

separation. On the other hand, the marginal separation of Groups 3 and 4 suggests the differentiations in compositional variation from a similar clay source may be causing the variation. The distinct areas of point densities demonstrate that the compositional differences between most of the specimens were larger for specimens in different groups than for specimens in the same group. Appendix IV (included at the end of the chapter) summarizes how all the samples were distributed among the four compositional groups, along with site provenience, physiographic province information, and decorative information.

Discussion

The results from this study provide a number of avenues for considering circulation of pipes and people amongst these four settlement sites. The initial question posed by this investigation has been answered by the results outlined above. Four compositional groups were identified from the dataset, two that were distinct, and two that overlap. Based on the fact that the majority of pipe samples from each archaeological assemblage tended to group with other pipes from the same assemblage, I argue that each compositional group likely represents the local clay production source for pipes from each of the four sites. Figure 9.11 illustrates the proportions of each site assemblage that were assigned to different compositional groups. Compositional Group 1 is mostly comprised of pipes from the Accokeek Creek site, and therefore represents the pipes locally produced there. Compositional Group 2 is mostly comprised of pipes from the Keyser assemblage and is assumed to indicate pipes produced at that site. Compositional Group 3 is the exception as it is nearly evenly split between pipes from the Hughes and Accokeek Creek sites. I will discuss this group more below. Finally the majority of samples in Group 4 are from Potomac Creek and this group is thought to represent samples produced at this site. Additionally, Figure 9.11 illustrates that a few samples from each site were assigned to a compositional group that was mostly comprised of samples from another site. Presumably these

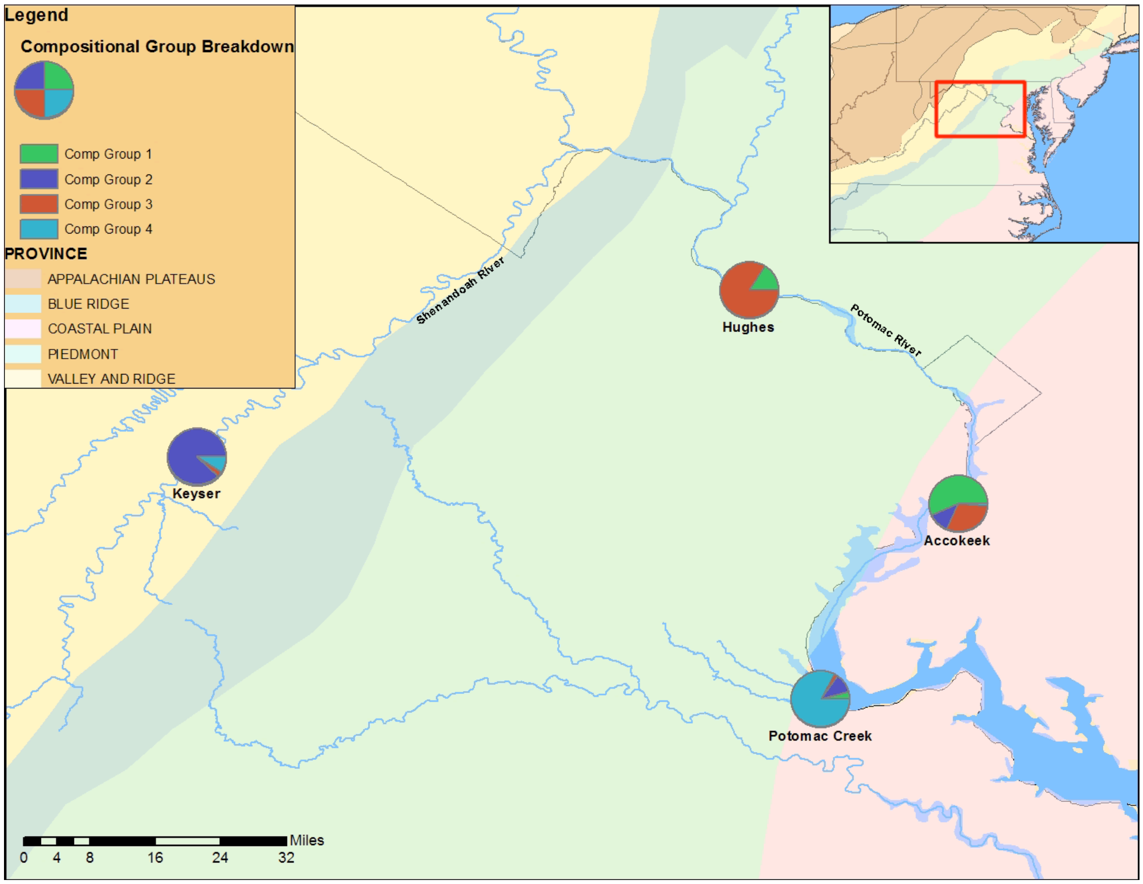


Figure 9.11: Proportions of archaeological assemblages assigned to different compositional groups

are the “imported” pipes. The fact that all of the assemblages contained pipes from more than one compositional group suggests that at least a small percentage of pipes were being circulated through exchange networks that linked the four sites.

However, there were significant exceptions to this pattern. Perhaps the most unexpected result is that the Accokeek site assemblage was split between two compositional groups, 1 and 3. Additionally the overlap between Compositional Groups 3 and 4, which are comprised of specimens from the Potomac Creek, Accokeek Creek, and Hughes sites, is also intriguing.

Finally, the fact that no pipes from Compositional Group 2 were found in the Hughes assemblage is also surprising given that the Keyer and Hughes sites are considered to be part of the same "culture area". In the sections below, I consider the geophysical and social processes that may have caused these outcomes.

The Accokeek Split

The split of the Accokeek samples between Compositional Groups 1 and 3 could be the result of a number of possible scenarios. One working hypothesis is that the samples in Compositional Group 1 may have been produced using clays from a source in the Coastal Plain while the samples from Compositional Group 3 may have been produced using clays from the Piedmont. Because the majority of the samples from the Hughes site were also assigned to Compositional Group 3, it is more likely that the pipes in this Compositional Group were produced from Piedmont sources than those in Compositional Group 1. The chemical similarities between the Hughes pipes and the pipes from the Accokeek Creek site indicates some inhabitants of the Accokeek Creek site may also have been using Piedmont clays to produce their pipes.

Unfortunately, it is difficult to say with certainty whether the differences in these compositional groups are due to the geographic locations of their sources. Previous researchers have been able to differentiate clays from the Coastal Plain and Piedmont provinces based on variations in Sodium (Na) and Calcium (Ca) concentrations (Boulanger and Glascock 2008; Herbert and McReynolds 2004; Steponaitis, Blackmen, and Neff 1996). The differentiation in sodium levels between clays from these two provinces is believed to be caused by the enrichment of Coastal Plain clays with the clay mineral smectite (Herbert and McReynolds 2004:9; Steponaitis et al. 1996:Table 4; Klein 1994:67). Smectite is distinctive among clay minerals because it contains substantial amounts of sodium. On the other hand, Calcium levels tend to be lower in Coastal Plain clays in relation to Piedmont sources. Herbert and McReynold's (2004) study demonstrated that Piedmont clays were characterized by high Calcium concentrations in relation to the Coastal Plain samples.

To evaluate whether variations in Sodium and Calcium concentrations could be used to differentiation between the presumed Piedmont and Coastal Plain clays identified in this study, the concentrations of Sodium and Calcium in the samples belonging to Compositional Groups 1 and 3 were compared. Yet, as shown in the bivariate plot illustrated in Figure 9.12, while the samples from Compositional Group 1 exhibited a wide range of Sodium values, they did were not significantly higher or lower than the Sodium values from Compositional Group 3. Moreover, the comparison showed that samples belonging to Compositional Group 3, the compositional group thought to be from the Piedmont, had, on the whole, *lower* Ca values than the samples from the Compositional Group 1. This is the converse of the pattern Herbert and McReynolds identified.

These results suggest a few possibilities. McReynolds and Herbert noted that the high Calcium values of their Piedmont samples might be related to igneous rock inclusions, some of which could be temper (2004:17). Pipes lack tempering agents, which could explain why Calcium concentrations don't vary as much between Piedmont and Coastal Plain pipes. An additional possibility is that the chemical composition of the clays comprising the Piedmont and Coastal Plain physiographic provinces exhibit enough heterogeneity that results from North Carolina cannot be used to evaluate differences between compositional groups created using Virginia and Maryland clays. Another possibility is that the NAA results are not congruent with the results from LA-ICP-MS. Future testing will hopefully provide further insights into the

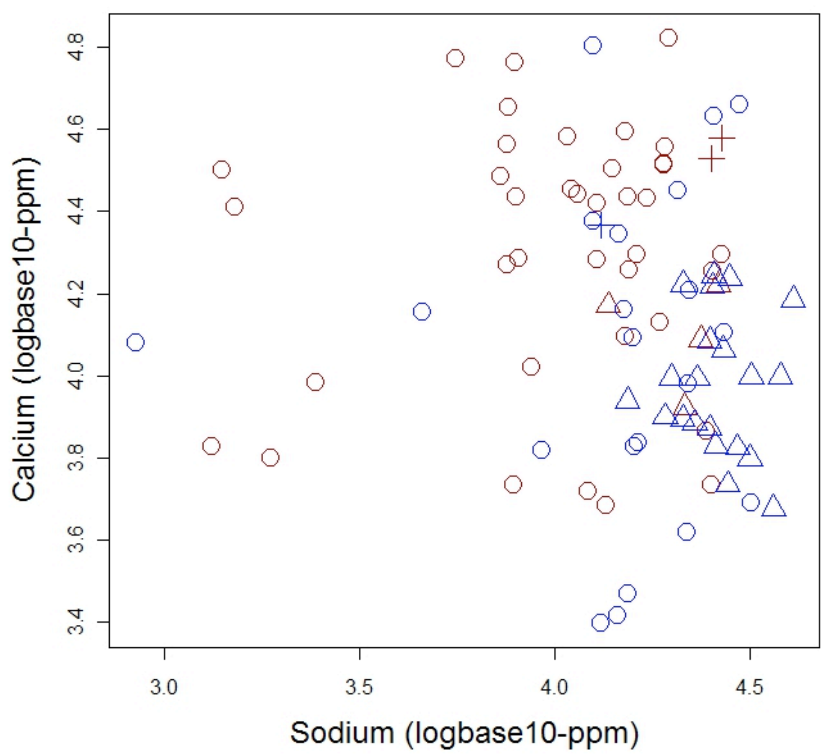


Figure 9.12: Bivariate plot of Calcium and Sodium base 10 log concentrations of samples in Compositional Groups 1 and 3. Different colors illustrate samples in the two compositional groups. Red = Compositional Group 1, Blue = Compositional Group 2. Symbols represent site provenience of samples, circles = Accokeek Creek, triangles = Hughes, crosses = Potomac Creek.

degree to which clays from different areas of the same physiographic province are relatively homogeneous or heterogeneous.

Another potential scenario introduced by Herbert and McReynold's (2004) study is that Compositional Group 3 represents one or more clay sources associated with the Potomac River basin. As illustrated in Figure 9.11, both the Hughes and Accokeek Creek sites are located along the banks of the Potomac River which crosses the border from the Piedmont into the Coastal Plain before emptying out into the Chesapeake Bay. The Accokeek Creek site is situated approximately 11 miles from where the Potomac River crosses from the Piedmont into Coastal Plain province. Therefore, it is possible that Compositional Group 3 represents pipes produced from alluvial clay deposits from the Piedmont. The pipes from Accokeek Creek could have been produced from Piedmont clays that the Potomac River redeposited in the Coastal Plain. Conversely, the clays that comprise Compositional Group 1 could come from a different source located farther east in the outer Coastal Plain, away from any alluvial deposits from the river. Given that the site is thought to have been occupied over a three hundred year time span, it is certainly feasible that the inhabitants utilized different clay sources during different periods.

Besides considering the possible geophysical differences that might be producing the chemical differentiation between the pipes from the Accokeek Creek site, another avenue of inquiry focused on investigating possible anthropological causes that could have created this pattern. As previously noted, inclusion densities, paste color, and stylistic attribute information was appended to the spreadsheet of samples after they had been assigned to compositional groups. This allowed me to directly compare stylistic information about each fragment with the elemental concentration results (see Appendix IV). One immediate difference between these two groups is that more of the specimens from Compositional Group 1 are decorated with rouletted motifs than those from Compositional Group 3. Moreover, a few specimens from Compositional Group 1 exhibit rectangular mouthpieces, while only expanded mouthpieces are found on specimens from Compositional Group 3. Additionally, the specimens in Compositional Group 3 exhibit decorative elements, such as punctuates and a squared stem, that are not present amongst samples in Compositional Group 1.

The counts of decorated and undecorated specimens from each compositional group were entered into a contingency table (Table 9.3) to evaluate the differences in decoration between fragments from the different compositional groups. To assess the statistical significance of a 2x2 contingency table, such as Table 9.3, Thomas (1986:298) recommends using the chi-square test. The Chi Square statistic compares the tallies or counts of categorical variables between two or more independent groups. In this case, the Chi Square statistic was used to compare the distribution of decorative elements between the two compositional groups. The results of the chi-square test ($\chi^2 = 11.513$, $p = .001$) indicate that the distribution of decorated specimens in Compositional Group 1 is significantly different from the distribution of decorated specimens in Compositional Group 3. The significantly higher number of decorated specimens in Compositional Group 1 and differences between the decorative motifs on samples between these two groups suggests that the variation in raw materials between these two groups could be related to different pipe making traditions that used different clay sources. Whether these two traditions were in operation simultaneously or at different points in time, however, is unclear and can only be evaluated in future studies.

One final tantalizing possibility is that the similarities in the chemical characteristics of the Hughes and Accokeek Creek pipes in Compositional Group 3 are evidence of an intensive exchange network between the inhabitants of these two sites.

Table 9.3: Decorated fragments in Compositional groups 1 and 3

Compositional Group		Decoration		Total
		Present	Absent	
CG1	Count	26	18	44
	Expected	18.2	25.8	44.0
CG3	Count	10	33	43
	Expected	17.8	25.2	43.0
Total	Count	36	51	87
	Expected	36.0	51.0	87.0

Such evidence is particularly interesting when considered in light of Jirikowic's (1995) argument that the Hughes inhabitants were "self-sufficient" based on the stylistic homogeneity of ceramics and lithics excavated from the site. This possibility will hopefully be further investigated in future studies that can directly compare the elemental compositions of ceramics produced at these sites to pipe data.

Overlap of Compositional Groups 3 and 4

In addition to the split of the Accokeek Creek specimens, the overlap of Compositional Group 4 (comprised of mostly Potomac Creek samples) and Compositional Group 3 (see Figures 9.9 and 9.10a and b), suggests the Potomac Creek inhabitants may have engaged in similar patterns of clay procurement or pipe exchange. Given the proximity of the Accokeek and Potomac Creek sites, and the fact that they are considered to be part of the same cultural group, such overlap is not necessarily surprising. The chemical similarities between these two compositional groups could also be a result of Potomac Creek inhabitants using Piedmont clay sources, or clays from alluvial deposits from the Piedmont that were deposited in the Coastal Plain by the Potomac River. However, the chemical similarities introduce the possibility that the Potomac Creek inhabitants were also engaging in an exchange network with the Hughes inhabitants. Again more testing is necessary to evaluate this prospect.

Lack of Compositional Group 2 Pipes in the Hughes Assemblage

In contrast to the linkages between Accokeek Creek, Potomac Creek, and Hughes, suggested by the overlap between Compositional Groups 3 and 4, the lack of Compositional Group 2 pipes in the Hughes assemblage suggests the possibility of a different kind of exchange network linking the Keyser and Hughes sites. The lack of Compositional Groups 2 pipes in the Hughes assemblage indicates that no pipes produced at the Keyser site made their way to the Hughes site. Yet pipes excavated from the Accokeek and Potomac Creek sites were assigned to Compositional Group 2, which indicates pipes made at the Keyser site were transported to the Potomac and Accokeek Creek sites. This result suggests the possibility of two different exchange networks, one circulating between Keyser, Accokeek, and Potomac Creek and another circulating between Hughes, Accokeek, and Potomac Creek.

This pattern is somewhat surprising especially given that the Hughes' site, situated roughly between Keyser and the Potomac Creek and Accokeek Creek sites (see Figure 9.11) is arguably well-situated for participation in an exchange route that linked

Keyser, Accokeek, and Potomac Creek. The absence of Keyser pipes in the Hughes assemblage could be an indication of chronological variability in the dataset. Radiocarbon dates indicate Hughes was abandoned by the mid-fifteenth century, making it the only site in this study without a sixteenth century occupation. Thus the lack of Keyser pipes at Hughes may indicate the long distance circulation of pipes between the Potomac, Accokeek, and Keyser sites did not begin until the sixteenth century.

Alternatively, the lack of Keyser pipes at Hughes couple with the exchange of goods among the Keyser, Hughes, Potomac Creek and Accokeek Creek sites suggests the inhabitants of Keyser and Hughes primarily used pipes to create and maintain social ties with communities who were socially and geographically distant. Alternatively, perhaps social activities such as the communal act of smoking may have helped maintain social connections and facilitated the exchange of other objects that reinforced social ties between these two sites. A way of testing this proposition would be to examine whether the ceramics from these two sites exhibit similarities in chemical composition that suggest they were being exchanged. The circulation of other types of material culture between the site would support the idea that pipes were being used differently.

The possible differentiation in pipe circulation routes is particularly interesting in light of the fact that all four sites were using pipes with similar stylistic motifs. In the next section, I shift my focus to examine what the distribution of stylistic motifs amongst the four compositional groups reveals about the social processes behind their production and exchange.

The Circulation of Stylistic Motifs

When stylistic information from each fragment was compared with their compositional group membership, it was found that pipes with similar stylistic motifs were found in all four compositional groups. Figure 9.13 illustrates how pipe samples with a particular stylistic motif, an infilled triangle (see Figure 9.3), were dispersed among the four compositional groups. Moreover, within each compositional group the samples with this motif were from the same archaeological provenience as the majority of members found in each group, and were not among the small percentage associated with other sites. This indicates that pipes with this motif were being locally produced at different sites rather than inhabitants at one site producing all of the pipes with this symbol and exchanging them with individuals from other sites.

This result has interesting implications for our understanding of how the Native communities were using pipes to create intersocietal connections. While some pipes were circulating, pipes with geometric motifs were not necessarily part of the exchange network. Although the Native inhabitants of Keyser and Hughes were using pipes with geometric motifs, they were not necessarily dependent on the inhabitants of Accokeek Creek and Potomac Creek for pipes with these attributes. This does not negate the possibility, however, that the use of pipes with these motifs was meant to signal a social affiliation with Native groups from other areas. In many cases, the use of a common set of symbols is generally thought to have been used to reinforce social solidarity or create social affiliations between communities (Hodder 1982; Schortman 1989). The fact that pipes with geometric motifs may have been locally produced at different sites suggests that the actual exchange of pipes with these motifs may not have been important to the maintenance of social ties.

Interestingly, the group assignments of the embellished bits (see Figures 9.4 and 9.5) suggested a different pattern of circulation for these attributes (Figure 9.14). A total of 17 out of 18 samples were assigned to Compositional Groups 1, 3, and 4. One expanded oval bit was assigned to Compositional Group 2. Although the sample of embellished bits is small (n=18), the overwhelming attribution to Potomac and Accokeek Creek sites (17/18) suggests the production areas for pipes with these types of bits were centered at these two sites. Although it is extremely difficult to draw conclusions from such a small sample, the grouping of a pipe with an expanded bit to Compositional Group 2 suggests that perhaps the inhabitants of the Keyser site were not just importing pipes with this embellishment but also incorporating ideas about their production into their local learning networks. A visual comparison of the bit fragment from the Keyser site with a typical example produced from the Potomac and Accokeek sites indicates that the paste color of these two samples is very different (Figure 9.15). In addition the sample from Keyser exhibited a higher density of quartz inclusions whereas the samples from Potomac Creek and Accokeek Creek had high densities of very fine sand inclusions but no quartz.

The results of the stylistic analysis, although based on small samples, suggest an interesting difference in the ways the different attributes were distributed amongst the four sites. The geometric motifs, which are more visible and distinctive, seem to have been integrated into the localized learning networks of all four sites. While it is impossible to know whether the inhabitants of these four sites ascribed the same meaning to the these motifs, the distribution

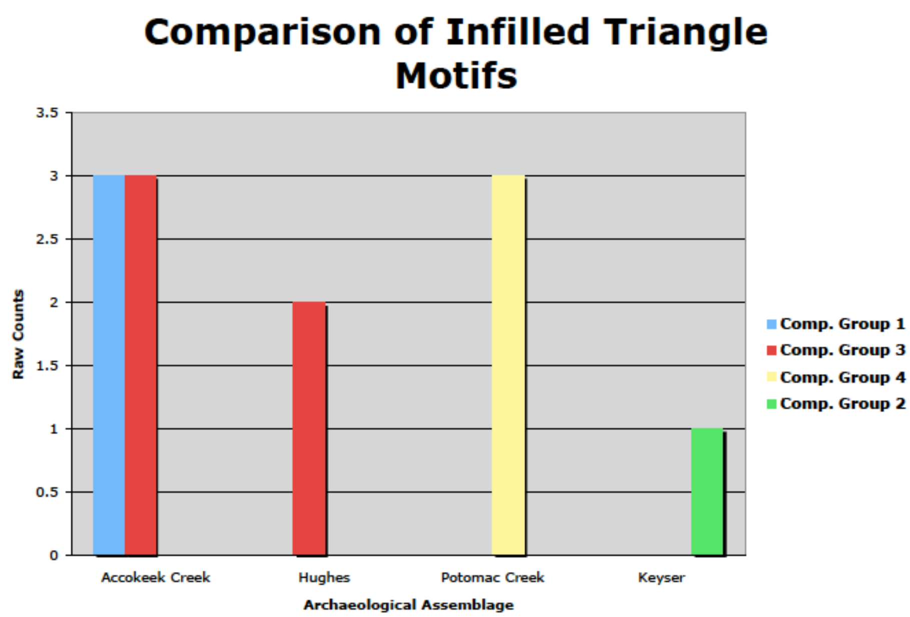


Figure 9.13: Comparison of hanging triangle motifs from different assemblages

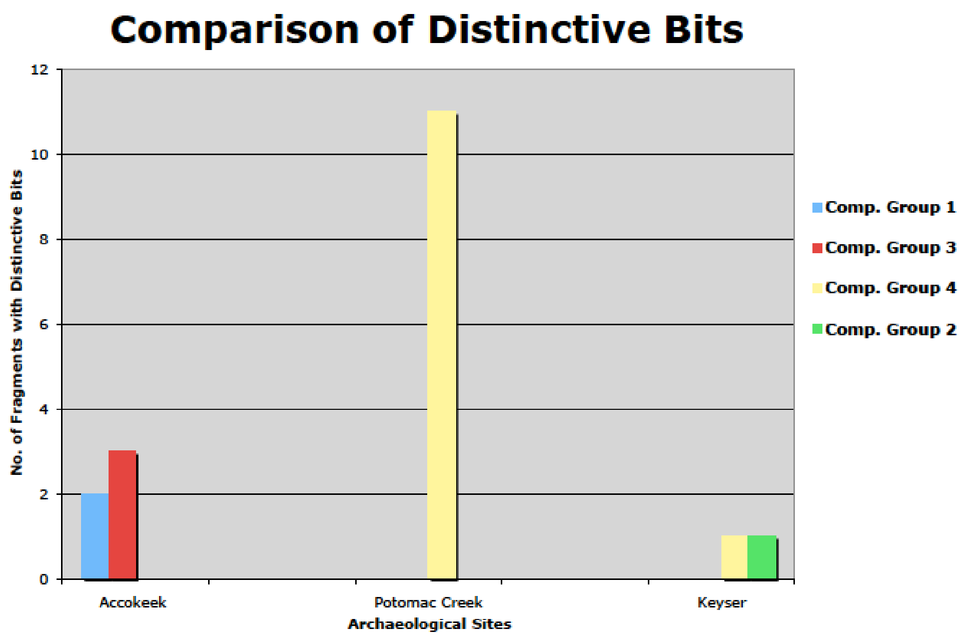


Figure 9.14: Comparison of bit forms from different sites

Figure 9.15: Expanded triangular bits from (Left) Keyser and (Right) Potomac Creek

of these decorations suggests that they were part of an important shared symbolic set that may have played an important role in diplomatic or social interactions between different village communities that were separated by 80 to 100 miles. In contrast, the locus of production of the embellished mouthpieces found on a number of specimens seems to center on the Potomac and Accokeek Creek sites. These bits provide an interesting comparison because arguably they would not have been as visible during smoking activities or ceremonies given that the mouthpiece would generally be covered by a person's lips. Holmes (1903) suggested that the purpose of these wide bits may have been practical, giving the smoker a more substantial portion to hold in his teeth. Regardless of whether the purpose was practical or meant to provide noticeable adornment to these pipes, it does seem that despite their centralized production they were physically circulating between the sites in this study. Moreover, the lone fragment from Keyser that is made from local clay suggests the inhabitants of that site may also have started experimenting with that production technique as well.

Conclusion

Although the conclusions drawn here are necessarily tentative and may change as additional samples are analyzed, the integration of stylistic and chemical data provides insights into the complex social processes behind the production and circulation of pipes. As I have done in the other three chapters, I will evaluate my hypotheses with the information revealed from this analysis.

Hypothesis 1:

The results examined here demonstrate that the compositional groups of pipes do not neatly align with cultural complex or physiographic boundaries. They suggest that pipe production was a localized practice even among different sites in the same cultural complex. Additionally, the fact that the Hughes assemblage was split between Compositional Group 1 and 3 suggests that Hughes residents may have been traveling across the physiographic boundary between the Piedmont and Coastal Plain to procure raw material for pipe production. Accokeek Creek inhabitants may also have been traveling between different physiographic provinces to collect raw materials, possibly for different localized production groups even within that one site. These results allow me to reject this hypothesis and accept that alternative models of regional social organization were impacting pipe production and exchange.

Hypothesis 2:

The chemical results revealed a few localized clusters that occurred within cultural complex boundaries. However, these clusters may be tied to production networks rather than efforts at intra-community signaling. For example, the lack of Keyser pipes in the Hughes assemblage suggests that pipe production was localized at the village level. Additionally the splitting of the Accokeek assemblage between two different compositional groups could be the result of different production networks, although more data is necessary to determine whether these groups were contemporary or separated in time. Based on the evidence presented here, I accept this hypothesis.

Hypothesis 3:

The analyses described in this chapter provided some interesting results that were particularly pertinent to Hypothesis 3. The inclusion of pipes from multiple sites in each of the four compositional groups supports the pattern indicated by the stylistic data. This result suggests that both pipes and ideas about their production were circulating between the Native inhabitants of these different sites. Drawing from the available ethnohistoric evidence, I suggest it is likely that these pipes were being exchanged during rituals of social interaction and exchange. However, the fact that pipe exchange does not seem to have been an integral part of interactions between the inhabitants of the Keyser and Hughes sites suggests that different types of exchange networks may have existed between these four sites, with pipes primarily figuring into longer distance exchange rather than interactions with nearby communities.

Besides providing an opportunity to consider the social contexts of exchange and interaction, the results from this study also point to another interesting aspect of pipe use among Middle Atlantic Native groups. Although there is evidence of circulation, the possibility that pipes with similar stylistic elements may have been locally produced at different sites suggests that the interaction of individuals and the circulation of information may be the source behind these stylistic similarities, rather than the direct physical exchange of pipes. The possibility that the sharing of information may be behind these similarities is further supported by the fact that the majority of the compositional groups were comprised of pipes from the same site. This distribution suggests the majority of pipes from these four sites were produced from local sources, used, and discarded within the immediate vicinity of their point of origin.

Although the exchange of pipes served as mechanisms for intercommunication between communities and outsiders, the degree to which pipes were locally produced and used also suggests they played an important role as objects that were made and smoked by members of the same community. This material evidence is supported by historical accounts that suggest tobacco pipes were smoked by individuals during council meetings to offer personal intercessions to guardian spirits or while individuals were contemplating or reflecting upon important decisions (Arber 1612; Percy 1606). Additionally, as I argued in Chapter 7, stylistic differentiations between pipes recovered from the same site suggest individuals who owned and smoked pipes could have used them as material symbols to mark their own status to community members in addition to creating connections with other individuals or spiritual advisors. Overall, the evidence uncovered here suggests that local production and use may have been more important than the circulation and exchange of pipes, at least during certain periods in certain areas of the region.

Because the majority of pipes seemed to have been locally produced and used it would seem that their primary function may have been within the community rather than as objects of interaction. Nevertheless, the fact that some of the pipes were circulated, especially between sites that were located longer distances from each other, does suggest they played some role in interaction. This result should not be ignored because even infrequent exchange could have played an important role in facilitating and maintaining connections. Given that the chemical testing suggested both social processes were likely behind the circulation of pipes I feel it is necessary to conduct more testing before I can accept or reject this hypothesis.

Hypothesis 4:

The results of this analysis, like others conducted in previous chapters, did suggest indications of temporal variation in the dataset. The first piece of evidence is the splitting of the Accokeek Creek assemblage into two Compositional Groups. The differing chemical signatures of the pipes are likely a result of raw material differences. Such differences introduce the possibility that two groups inhabiting the Accokeek Creek site were using different raw material sources for pipe production. However, the contemporaneity of these networks is questionable and more testing needs to be conducted before this possibility can be accepted.

Additionally, the absence of Keyser pipes in the Hughes assemblage could be an indication of chronological variability of the circulation networks between the four sites included in this study. The lack of Keyser pipes at Hughes may indicate the long distance circulation of pipes between the Potomac, Accokeek, and Keyser sites did not begin until the sixteenth century. This is particularly interesting given that this is period during which circulation routes were supposed to become more focused. However, as Barber (2008) has noted these three sites may have been linked by the fur trade that was beginning in earnest during this time. Again more data is needed to fully evaluate this hypothesis, but the results described here introduce interesting possibilities of temporal variability even among assemblages considered to be contemporary.

Overall, the results of the LA-ICP-MS testing seemed to have introduced more questions than answers but have provided some intriguing insights into pipe production and exchange amongst Middle Atlantic groups. In the concluding chapter of this dissertation, I will consider how these results relate to my interpretations from the other three chapters. I will also discuss how this study has informed our understanding of pipe use among Middle Atlantic groups and how it introduces possibilities for future studies.

Chapter 10 Conclusion: The Role of Pipes in Native Social Dynamics of the Middle Atlantic Region

Introduction

This study began by considering the meaning of Chief Powhatan's pipe and how this object was related to the social interactions and processes of the Powhatan and neighboring Native groups in the Middle Atlantic. I suggested that despite the lack of historical documentation the fact that a pipe was one of the few objects illustrated with Powhatan indicated pipes were important objects in Powhatan society and by extension, other Native societies in the region. I contended that their important roles in Native rituals of exchange and interaction meant they could potentially provide insight into Native social dynamics and networks. The rest of this dissertation provided historical and more importantly, material, evidence for this supposition by looking at the spatial distributions of pipe forms and stylistic attributes.

To assess how pipes figured into Native social dynamics in the Middle Atlantic, I first considered previous models used to illustrate or depict Native social organization in the region. Drawing from recent studies I questioned whether some of the more popular models use to explain material variation, such as cultural complexes, linguistic boundaries and physiographic provinces, would explain the distributions that one might expect to see from pipes. Based on ethnohistoric evidence of Native pipes users, I suggested that the distribution of pipe attributes might be linked to other models of social dynamics or networks, such as status, gender, or trade and exchange networks also identified by recent research. I outlined four hypotheses that could be used to evaluate this premise and then evaluated each of them using data collected from 72 Late Woodland and Contact period sites distributed throughout the Middle Atlantic.

In this chapter I will briefly synthesize the results of this study. I will also consider some of the questions brought up by this study that suggest interesting avenues for future research of pipes specifically and Middle Atlantic Native social dynamics. Finally, I will discuss the broader significance of this study for Middle Atlantic archaeology and for past and contemporary Native groups.

Synthesis of Results

Table 10.1 summaries the results of this study. Overall, Hypothesis 1 was strongly refuted based on the results of my analysis. The widespread distributions of different forms, stylistic attributes, decorative units, and the results of the chemical testing, showed that cultural, linguistic, or physiographic boundaries were not the primary social structures that were impacting the distributions of pipes. The distributions of forms and stylistic attributes, including attributes carved into forms and decorative units and structures, rarely conformed to Cultural Complex boundaries. Additionally, the distributions of certain forms, raw materials, and decorative units were not confined to physiographic provinces. Finally, the chemical research provided further evidence that pipes were circulating between sites in different cultural complexes and physiographic provinces and that production was localized at the village level even when two villages were part of the same cultural complex. Overall, the data strongly supported the alternative hypothesis that pipe forms, styles, and decorative elements were tied to other aspects of Native social dynamics and networks.

Table 10.1: Summary of Results

Hypothesis	Different Forms	Attributes of Elbow and UNID Fragments	Decorative Units	LA-ICP-MS
1	Refuted	Refuted	Refuted	Refuted
2	Supported	Supported	Tentatively Refuted	Supported
3	Supported	Tentatively Supported	Supported	Tentatively Supported
4	Refuted	Refuted	Refuted	Indeterminate

Given that other social aspects of Native societies seemed to be impacting the distributions of pipe forms and pipes attributes, Hypothesis 2 and 3 allowed me to evaluate more fully what kinds of social dynamics may have been playing a role. Hypothesis 2 considered whether there were clustered distributions within cultural or physiographic provinces that could provide insights into other social groups that were controlling pipe use. Three out of the four categories of evidence: the distributions of different forms, carved attributes of elbow and UNID fragments, and the results of LA-ICP-MS testing revealed that pipe forms or attributes showed clustering within previous boundaries that I argued could be indicative of the use of the objects to either signal information at an intra-community level or their ties to other social processes.

For example, in Chapter 6, I noted that the clustering of ovoid reed-stemmed pipes in adult male burials in southwestern Virginia could indicate that these pipes were used for intra-community signaling. However, integrating this information with the results from Chapters 7, 8, and 9 indicates that the use of these pipes could be material evidence of these groups choosing to interact with Mississippian groups rather than Native groups farther east. The choice of southwestern Virginia groups using this form and their refusal to use pipes with decorative attributes similar to those found farther east, could be an indication that individuals living in the southwestern tip rejected the styles and interactions with groups to the east in favor of facilitating and maintaining interactions and connections with Mississippian and Fort Ancient groups to the west.

I argued that the clustered distribution of tubular pipes on Late Woodland II sites in the southeastern area of Virginia could be indicative of its use by community members to signal some aspect of their identity. The limited number of these pipes in assemblages, and the fact that one was excavated from a high status burial at the Great Neck site (44VB7) indicate that perhaps these distinctive forms may have served a purpose similar to reed stem forms in the southwestern area of Virginia.

Besides forms some attributes exhibited clustering among different sites within cultural complex boundaries. For example, although collared rims and mouthpieces clustered within the Montgomery Complex cultural territory, these two attributes were found on pipes from different sites located on different sides of the Monocacy River. Incised squares were another form of decorative attribute correlated with Montgomery Complex boundaries. Squared bowl rims and mouthpieces found among Dan River sites also exhibited localized clustering.

I argued that although these clusters could be considered to be reflection of cultural boundaries, the small number of pipes with these attributes suggested that they could have been used for intra-community signaling of some aspect of identity rather than signaling cultural identity to groups outside of this area. This was supported by the fact that the majority of widespread attributes that comprised the majority of most assemblages were less visible or ornate styles that were arguably more conventional given their widespread use such as rounded or cut bowl rims, circular bowls and stems and rounded and cut mouthpieces. Thus the use of distinctive attributes, such as particular forms like reed stem or restricted rim and trumpet tubular pipes, or elbow pipes with visibly distinctive bowl rim, bowl, stem, or mouthpiece attributes could be indicative of efforts by individuals to signal information about aspects of their identity to their local community but also to visitors or other outsiders.

The only part of my data that did not support this hypothesis, was, in fact that portion of the data most might expect would be linked to intra-community information exchange: decorative units and elements. The spatial distributions of many primary and secondary units and decorative structures did not form small, localized clusters within cultural boundaries but were actually widespread. However, it should be noted that a number of primary units were found in such small quantities that it was difficult to determine their distributions. Consequently, future research may provide more information as to how some of these attributes, such as chevrons, ladders, etc. were used. Nevertheless, the widespread use of many decorative units and their structures suggests that many of the decorative attributes on pipes may have served different roles than intra-community signaling.

To return for a moment to the Powhatan pipe problem, it is notable that in the picture on the John Smith map Powhatan's pipe is plain, completely lacking decoration and elaboration of bowl rim, bowl shape, stem shape, or the mouthpiece. Although this simply might be due to the limitations of the level of detail available in the casting process, it adds some evidence to the fact that perhaps decorative symbols on pipes were not necessarily a primary form of information exchange, at least among Powhatan communities. This is a stark contrast to the stylistic patterning of pipes in other regions such as the Northeast or South Appalachian Mississippian region, which were very stylized with elaborate symbols and effigies (Blanton 2012; Mathews 1992; Paper 1992; Wonderley 2005). However it is possible that a more detailed look at combinations of specific elements within the design structures identified in Chapter 8 might reveal more localized patterning that could be indicative of intra-community signaling.

Hypothesis 3 provided an opportunity to consider how the integral role of pipe smoking in social and exchange networks may have figured into the distributions of different forms and stylistic attributes. Overall, all four forms of data at least tentatively supported the supposition that pipes or ideas about their production were circulating through social and exchange networks in many portions of the region. The widespread distribution of stone bent tube pipes with unique decorative structures during the Late Woodland I period demonstrates the circulation of these forms through social networks. Additionally, the widespread distribution of certain geometric decorative units across various cultural complex boundaries suggests that they were part of social exchange networks.

Despite the widespread dispersion of many of the decorative attributes, it was unclear whether the physical circulation of pipes through exchange networks or the circulation of information, which is an equally important part of the interaction process (Appadurai 1982; Bauer and Agbe Davies (ed.) 2010; Hodder 1982; Mauss 1990[1950]; Schortman 1989), caused this patterning. LA-ICP-MS testing tentatively suggested that pipes with similar stylistic attributes were likely produced locally at different sites. The localized production of stylistically similar attributes indicates that the information about how to produce such stylistic forms was being exchanged and circulated rather than actual pipes. More testing is needed to confirm these patterns but they provide interesting potential insights into the social processes that were behind the patterns identified through the stylistic analysis.

Although the results of my analyses provided some insight into the movement of pipes and ideas about their production, the level of access to these ritual paraphernalia was difficult to fully assess based on available data. In many cases the more stylized and visible pipes, such as stone bent tube pipes or ovoid stone reed stem pipes were found with individual burials of elder males or in restricted communal burials such as mounds suggesting that there was relatively limited access within communities to these objects. However, the widespread distributions of many decorative elements and structures, when combined with the fact that the majority of attributes seem to have been plainer and conventional and the fact that most of these pipes were not found in burial contexts, suggests that the issue of accessibility may have varied through time and between different communities. I will consider how future analyses may consider this question in the second to last section of this chapter.

Hypothesis 4 provided the opportunity to evaluate how temporal, as well as social variation, impacted the dataset. Given that it seemed fairly certain that there would be variation in pipes over the seven-century period covered in this study, I posed some scenarios I thought might be impacting the distributions of pipes based on historical and archaeological evidence of social and political changes taking place in the Middle Atlantic during this time. While there was a great deal of temporal variation in the dataset, the patterns I anticipated did not appear in the data. The distributions of pipes certainly differed between the Late Woodland I, Late Woodland II, and Contact periods. However, the distributions of forms and attributes did not vary between being more widespread or focused in the ways necessarily followed the changes taking place in the social or political systems of the region. Rather, certain patterns of clustering or widespread distributions persisted through multiple periods. When there was variation it did not adhere to the focused networks expected in the Late Woodland II period. On the other hand chemical testing suggests that there might be finer temporal variation in exchange networks than is immediately apparently through stylistic analyses. Thus while temporal variation is present, the social processes causing it need more analyses before definite conclusions can be drawn about the degree to which political and social changes were impacting pipe use and circulation.

Future Avenues for Research

This dissertation has considered how pipes were used as ritual and high status objects. However, some of the analyses conducted here have introduced new questions about other possible uses of pipes.

A Better Understanding of the Ways Natives Viewed and Used Pipes

I have primarily highlighted the use of pipes as objects of power and interaction to try and consider some of the social dynamics in the Middle Atlantic region that are only beginning to be acknowledged. This meant that I highlighted when pipes were excavated from burial contexts, such as individual burials, mounds, and ossuaries, because they provide some insight into the possible significance and associations of their use. Yet as I showed in Chapter 4, material evidence indicates that the association between pipes and males was not absolute as pipes were also associated with a small percentage of female burials, suggesting that females were also associated with pipes in limited circumstances. However, given the small sample size and the fact that there seemed to be no patterning to the age of females buried with pipes it is difficult to draw any conclusions about the types of females who were using pipes in the region. Hopefully additional data uncovered in future analyses will provide insight.

Besides burials pipes were recovered from a variety of other contexts, including surface areas, the plowzone level, and from features such as hearths, storage pits, and burials. Out of the 2,543 pipe specimens analyzed in this study, 1,994 pipe specimens (78 percent) were recovered from plowzone or general excavation contexts (midden, plowzone, arbitrary and natural stratigraphic levels). One hundred fourteen specimens or four percent came from burial contexts. Sixty-eight of these pipes were found in Late Woodland burials, while 44 were associated with historic period burials.

Interestingly, nineteen percent of specimens (n = 504) were recovered from feature contexts in sites throughout the region. By features I mean pits that were identified either as storage pits, refuse pits, ditch features or pits whose function was unidentified. Also of note is the fact that 317 of the pipe specimens were recovered from Late Woodland I and Late Woodland II period sites. Now I should note here that these are tallies of Native made pipe fragments and do not include European white clay pipes. So this is not a study of all pipes from historic period sites, just Native made ones.

What I argue is interesting about these results is that a significant percentage of the Late Woodland pipes were found in areas that were also used for what could be considered the disposal of domestic trash such as storage pits or refuse pits. Moreover, the vast majority of my dataset was found in areas, that although they cannot be directly tied to trash disposal, are not burials or restricted areas.

I should note that once I began to notice this pattern I did go back to site reports to see whether the pit contexts pipes were found in could be areas of ceremonial refuse as specialized features associated with ritual behavior, such as feasting, have been identified in the region. While some pits were not specifically identified as storage pits or refuse pits, none seemed to fall into the category of a special use pit. Special use pits have been identified in the Middle Atlantic, and mostly take the form of what are considered to be communal roasting pits. These pits have typically been identified through the presence of burned refuse and large quantities of faunal material. None of the pits that pipes were found in seem to fit this description.

This pattern is made even more interesting by the fact that it diverges from patterns in other parts of the Eastern Woodlands. For example, recent analyses of pipes from the deeper southeast suggest that the majority of these objects were associated with male burials and were not found in more secularized contexts (Blanton 2012).

The fact that pipes were found both in areas associated with domestic refuse and in more restricted contexts such as burials suggests that they been might have been valued differently depending on which context they were being used in. While there is still much research to be done before any definitive conclusions can be drawn, I would like to suggest one idea based on some conversations I have had about Native objects with a colleague of mine, Karenne Wood, a well-known member of the Monacan tribal nation, the descendants of the Ancestral Monacans who occupied the Virginia Piedmont during the Late Woodland period. Karenne has emphasized to me many times that to Native people objects have a function and a value that is simultaneously practical and spiritual. Objects aren't necessarily categorized as sacred or secular. A number of Native scholars, including Nancy Shoemaker, and others have suggested that the categories used to investigate Native lifeways and behavior don't capture the duality that was an integral part of Native worldviews.

Future research could help determine if there is spatial patterning to the types of pipes that are found in what could be considered more secular contexts. Are the majority of pipes associated with these contexts ones that have the more conventional stylistic attributes or are the visually distinctive ones found in pits as well? Such research could provide insights into the dualistic nature of ritual objects in prehistory.

Drawing from these ideas I suggest that the disposal patterning of pipes may serve as a future avenue for investigating the dual functionality of ritual objects. Although the sacred nature of pipes was emphasized when they were used in ceremonies to communicate with ancestors or outsides, it would also seem that their practical function was important as well. However, once their functionality had ceased, i.e. once they became cracked or broken and could no longer be used to smoke tobacco, they were disposed of in the same manner as any other object that had outlived its usefulness. Thus even ritual objects were only valued for their spiritual functions so long as they could fulfill their practical function. Moreover acknowledging the fact that Native groups endowed pipes with both a practical and spiritual function, suggests that the introduction of new types of pipes, which also had a practical use may not have represented such a drastic shift in Native conceptions of pipe smoking as previously thought.

Pipe Production

The results revealed in this study tentatively suggest that chemical testing, when combined with information from stylistic analyses can provide more insights into pipes production processes and networks. This information is particularly useful because it provides insight into one area where very little information is available: pipe production. While the ethnohistoric record at least provides some indication of the users of pipes, it provides no information about producers. Although ceramics are typically considered to fall within the female realm, the production of ceramic pipes may have been an exception given that these were primarily male objects. Stone pipes may have been a different story as stone working was usually a male project in the Middle Atlantic.

While chemical testing may not be able to provide insights into the gender of pipe producers, the fact that the majority of pipes that I tested were produced, used, and discarded within the boundaries of the original village site suggests production was a localized process. A future line of research to investigate this patterning more fully would be to directly compare the chemical signatures of ceramics and pipes from the same site for a number of sites and see if they exhibit similar compositions. Kuhn and Sempowski (2001) have already shown that this can be useful comparative lens for pipes in the Northeast. Testing the chemical composition of ceramics and pipes will help to show whether these objects were being produced using similar clays, or whether pipe assemblages were producing using multiple clay sources. Additionally, statistical testing of metric measurements of certain aspects of pipes when combined with chemical data might provide more information about the types of production networks that were functioning in the Middle Atlantic.

Pipe Circulation and Community Use

Additional archaeometric studies will also likely provide a better window into pipe circulation and the social processes that are behind stylistic variation. For instance, if the majority of pipes produced and used during the Late Woodland II period were produced, used, and discarded within the community, they were not circulating through exchange networks. This brings attention to their important roles within community rituals. While this has been discussed for groups farther north, such as the Iroquois, it has not been considered for the Middle Atlantic.

Implications for Middle Atlantic Archaeology

The Complexity of the Native Social Landscape

What I hope to have demonstrated in this study, drawing from and following in the footsteps of many other researchers before me, is that Middle Atlantics archaeologists (and researchers in the discipline as a whole) must be particularly cognizant and careful of how analytical units are chosen, labeled, and conceptualized in our research. The depictions of Native culture identified and shared by archaeologists have an impact on the general public and on contemporary Native communities. Cultural complexes, while useful and in many ways necessary analytical units for differentiating the spatial and temporal variation of objects, must be explicitly stated to be just that: analytical units and not actual representations of Native cultures and communities. More and more researchers in the Middle Atlantic are addressing this problem and in the next decade or so it is likely that these complex boundaries will still be considered useful but will be put in their rightful place.

Besides giving more scrutiny to the units used in research, I also hope I have contributed to the growing amount of literature that argues for the use of different kinds of classification systems to investigate different research questions. In this case, an attribute-based analysis was used to provide information about stylistic variation at different levels. In the Middle Atlantic in particular, attribute analyses are beginning to become more popular and are contributing to our understanding of the complex nature of prehistoric and historic Native social networks and dynamics. While creating typologies to group artifacts together can be useful for answering certain questions, it is necessary to consider analytical units at different scales because such scales can provide insights into aspects of social dynamics that may not be captured by typologies (Plog 1983; Hegmon 1992).

Additionally, I hope that my results will help prove that the methodological approach applied in this project can be utilized to investigate the distributions of other types of artifacts, such as ceramics and lithics. Collections-based research, while providing its own challenges in relation to excavation, is increasingly becoming a crucial component of archaeological investigation. This project strives to serve as a model for collections-based research in the Middle Atlantic by demonstrating that by harnessing new technological tools such as ArcGIS software and chemical testing, these types of analyses can explore and address relevant questions and thus play an important role in advancing our knowledge of relationship between material patterning and conceptualization of identity. While excavation will always remain a crucial component of research it is necessary to utilize previous collections that also contain important information and do our best to make them comparable with contemporary results. Although assemblages from the late nineteenth and earlier twentieth century were often collected or excavated with less precision than we would like, I hope this study has demonstrated that they can still provide insight into important questions about the past and that with new technology we can find out more.

Chemical testing in particular is a technique that has not been utilized in the Middle Atlantic to degree it could be but it has the potential to provide insights into many questions that interest archaeologists. Our sense of boundaries or relationships created through stylistic data may be challenged by chemical data, as demonstrated by the locally produced pipes that had similar stylistic features discussed in Chapter 8. Although stylistic similarities can be an indication of shared views or ideas it can also mask differences that are informative as well. As archaeometric techniques continue to become more popular in archaeology they will undoubtedly provide information about many past social processes that will improve our understanding of the complexity of the Native social landscape.

This study has also strived to make available information about pipes so that their attributes can be compared with other types of material culture in future studies. A direct comparison of the distributions of stylistic elements found on pipes and other objects, such as ceramics and lithics will likely reveal further complexities of Native social systems that are not accessible when we only focus on the distributions of one class of artifacts.

My investigation has revealed material evidence of past Native communities using pipes to maintain and perpetuate certain aspects of communal identity while simultaneously facilitating the exchange of ideas and materials with outside groups. I contend that this dissertation serves as a case study that provides a more comprehensive picture of Native social geography and demonstrates the dynamic nature of past Native communities.

Bibliography

Abbot, Lawrence E., Jr.

2003 Quarry Studies in North Carolina: What Have We Learned in the Past 30 years? *Journal of Middle Atlantic Archaeology* 19: 93-112.

Agbe-Davies, Anna

2004a The Production and Consumption of Smoking Pipes along the Tobacco Coast. In *Smoking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Ed. Sean M Rafferty and Rob Mann. Knoxville: University of Tennessee Press.

2004b *Up in Smoke: Pipe-Making, Smoking, and Bacon's Rebellion*. Ph.D. Dissertation, Department of Anthropology, University of Pennsylvania. University Microfilms, Ann Arbor, MI.

2010 Social Aspects of the Tobacco Pipe Trade in Early Colonial Virginia. In *Social Archaeologies of Trade and Exchange: Exploring Relationships Among People, Places, and Things.* Ed. Alexander A. Bauer and Anna S. Agbe-Davies. Walnut Creek: Left Coast Press.

Alexander A. Bauer and Anna S. Agbe-Davies (Eds.)

2010 S*ocial Archaeologies of Trade and Exchange: Exploring Relationships among People, Places, and Things.* Walnut Creek: Left Coast Press.

Anderson, David G.

1994 *The Savannah River Chiefdoms: Political Change in the Late Prehistoric Southeast.* Tuscaloosa: University of Alabama Press.

Andrefsky, William

2005 *Lithics: Macroscopic Approaches to Analysis.* Second ed. Cambridge: Cambridge University Press.

Appadurai, Arjun

1986 Introduction: Commodities and the politics of value. In *The Social Life of Things.* Ed. Arjun Appadurai. Cambridge: Cambridge University Press.

Arber, Edward and John Smith

1612 A Map of Virginia with a Description of its Commodities, People, Government, and Religion, 1612. In *Travels and Works of Captain John Smith.* Edinburgh: John Grant.

Archer, Gabriel
1969[1607] Relatyon of the Discovery of Our River. In *Jamestown Voyages Under the First Charter.* Ed. P.L. Barbour. Cambridge: Hakluyt Society.

Asch, D.L. and N.B. Asch
1985 Prehistoric Plant Cultivation in West-Central Illinois. In *Prehistoric Food Production in North America.* Ed. R.I. Ford.

Ashley, Keith H.
2003 *Interaction, Population Movement, and Political Economy: The Changing Social Landscape of Northeastern Florida (A.D. 900-1500)*. Ph.D. Dissertation, Department of Anthropology, University of Florida. University Microfilms, Ann Arbor, MI.

Atkinson, David L. and Adrian Oswald
1969 London Clay Tobacco Pipes. *Journal of the British Archaeological Association* 32.

Barber, Michael B.
2003 The Late Woodland Dan River People: A Social Reconstruction Based on a Study of Bone Tools at a Regional Scale. Ph.D. Dissertation, Department of Anthropology, University of Virginia. University Microfilms, Ann Arbor, MI.
2008 *The Keyser Farm Site (44PA1), Page County, Virginia: Evidence of An Interior Bead Industry.* Paper Given at the 28th Annual Middle Atlantic Archaeology Conference.

Barth, Fredrik
1969 *Ethnic Groups and Boundaries: The Social Organization of Cultural Difference.* Boston: Little, Brown and Company.

Bense, Judith A.
1994 *Archaeology of the Southeast United States.* San Diego: Academic Press.

Benthall, Joseph L.
1969 *Archaeological Investigation of the Shannon Site, Montgomery County, Virginia.* Richmond: Virginia State Library.

Bettina, Arnold and Nancy L. Wicker (Eds.)
2001 G*ender and the Archaeology of Death.* Walnut Creek: Alta Mira Press.

Beverley, Robert
1947[1705] *The History and Present State of Virginia.* Ed. Louis B. Wright. Chapel Hill: University of North Carolina Press.

Binford, Lewis R.
1962 A New Method of Calculating Dates from Kaolin Pipe Stem Samples. *Southeastern Archaeological Conference Newsletter* 9(1): 19-21.

1964 *Archaeological and Ethnohistorical Investigations of Cultural Diversity of Progressive Development among the Aboriginal Cultures of Coastal Plain Virginia and North Carolina*. Ph.D. Dissertation, Department of Anthropology, University of Michigan. University Microfilms, Ann Arbor, MI.

1965 Archaeological Systematics and the Study of Cultural Process. *American Antiquity* 31: 203-10.

1967 An Ethnohistory of the Nottoway, Meherrin, and Weanock Indians of Southeastern Virginia. *Ethnohistory* 14(3/4): 103-218.

1979 Organization and Formation Process: Looking at Curated Technologies. *Journal of Anthropological Research* 35(3): 255-273.

1986 An Alyawara Day: Making Men's Knives and Beyond. *American Antiquity* 51(3): 547-562.

Blaker, Margaret

1963 Aboriginal Ceramics from the Townsend Site, Lewes, Delaware, by Omeke and Stewart. *The Archeolog* 15.

Blakeslee, Donald J.

1981 The Origin and Spread of the Calumet Ceremony. *American Antiquity* 46(4): 759-768.

Blanton, Dennis B.

1992 Middle Woodland Settlement Systems in Virginia. In *Middle and Late Woodland Research in Virginia: A Synthesis.* Ed. Theodore A. Reinhart and Mary Ellen N. Hodges. Pp 65-96. Richmond: Dietz Press.

2012 *The Inalienable Rite: Smoking Ritual During the Mississippian Stage in the South Appalachian Mississippian Region*. Ph.D. Dissertation, Department of Anthropology, University of Virginia. University Microfilms, Ann Arbor, MI.

Blanton, Dennis B. and Julia A. King (Eds.)

2004 *Indian and European Contact in Context: The Mid-Atlantic Region.* Gainsville, University Press of Florida.

Blanton, Dennis B., S. C. Pullins, and V. L. Deitrick.

1999 *The Potomac Creek Site (44ST2) Revisited.* Research Reports Archaeological Society of Virginia. Richmond: Archaeological Society of Virginia.

Boulanger, Matthew T. and Michael D. Glascock

2008 Geographic and Compositional Variability of Ceramic Resources in Northern New England. *North American Archaeologist* 29(3): 269-285.

Boyce, Douglas W.

1978 Iroquoian Tribes of the Virginia-North Carolina Coastal Plain. In *Handbook of North American Indians, Northeast.* Vol. 15 Ed. Ed. Bruce G Trigger. Washington: Smithsonian Institution Press.

Boyd, C. Clifford and Boyd, Donna C.

1992 Late Woodland Mortuary Variability in Virginia. In *Middle and Late Woodland Research in Virginia: A Synthesis.* Archaeological Society of Virginia Special Publication Ed. Theodore Reinhart and Mary Ellen Hodges. Richmond: Dietz Press.

Boyd, Clifford C.

2004 Monacans as Moundbuilders? *American Antiquity* 69(2): 361-363.

Braudel, Fernand

1972 History and the Social Sciences. In *Economy and Society in Early Modern Europe: Essays From Annales.* Ed. Peter Burke. London: Routledge.

Braun, David P. and Stephen Plog

1982 Evolution of "Tribal" Social Networks: Theory and Prehistoric North American Evidence. *American Antiquity* 47(3): 504-525.

Braun, E.L.

1950 *The Deciduous Forests of Eastern North America.* Philadelphia: Blakiston, Inc.

Brian, Jeffrey P. and Phillip Phillips

1996 *Shell Gorgets: Styles of Late Prehistoric and Protohistoric Southeast.* Cambridge, Massachusetts: Peabody Museum Press.

Brooks, J.E.

1952 *The Mighty Leaf: Tobacco Through the Centuries.* Boston: Little, Brown and Company.

Brown, Ian W.

1989. The Calumet Ceremony in the Southeast and its Archaeological Manifestations. *American Antiquity* 54(1): 311.

Bushnell, David

1920 Native Cemetaries and Burial Forms East of the Mississippi. In *Bureau of American Ethnology Bulletin 71.* Washington D.C.: Smithsonian Institution.

1930 The Five Monacan Towns of Virginia. In *Smithsonian Institution Miscellaneous Collections.* Washington D.C.: Smithsonian Institution.

Cadzow, Donald

1936 *The Susquehannock Indians of Pennsylvania.* Harrisburg: Pennsylvania Historical Commission.

Capone, Patricia and Elinor Downs

2004 Red Clay Tobacco Pipes: Petrographic Window into Seventeenth Century Economics at Jamestown, Virginia, and New England. In *Smoking and Culture: The*

Archaeology of Tobacco Pipes in Eastern North America. Ed. Sean Raffety and Robert Mann. Knoxville: University of Tennessee Press.

Carpenter, Edmund S.

1950 Five Sites of the Intermediate Period. *American Antiquity* 15(4): 298-314.

Carr, Christopher

1995 Building a Unified Middle-Range Theory of Artifact Design: Historical Perspectives and Tactics. In *Style, Society, and Person: Archaeological and Ethnological Perspectives.* Ed. Christopher Carr and Jill E Neitzel. New York: Springer.

Carr, Christopher and Troy D. Case

2005 *Gathering Hopewell: Society, Ritual, and Ritual Interaction.* New York: Springer.

Carr, Christopher and Jill E. Neitzel (Ed).

1995 S*tyle, Society, and Person: Archaeological and Ethnological Perspectives.* New York: Springer.

Chapdelaine, C.

1992 The Mandeville Site: A Small Iroquoian Village and Large Smoking Pipe Collection - an Interpretation. In *Proceedings of the 1988 Smoking Pipe Conference.* Ed. Christopher F. Hayes. Rochester: Rochester Museum and Science Service.

Chilton, Elizabeth S.

1998 The Cultural Origins of Technical Choice: Unraveling Algonquian and Iroquian Ceramic Traditions in the Northeast. In *The Archaeology of Social Boundaries.* Ed. Miriam T. Stark. Washington D.C.: Smithsonian Institution Press.

1999 One Size Fits All: Typology and Alternatives in New England Ceramic Research. In *Material Meanings: Critical Approaches to the Interpretation of Material Culture.* Ed. Elizabeth S Chilton. Salt Lake City: University of Utah Press.

Clarke, Wayne E. and Helen C. Rountree

1993 The Powhatans and the Maryland Mainland. In *Powhatan Foreign Relations: 1500-1722.* Ed. Helen C. Rountree. Charlottesville: University of Virginia Press.

Coe, Joffre Lanning

1952 The Cultural Sequence of the Carolina piedmont. In *Archaeology of the Eastern United States.* Ed. James B Griffin. Chicago: University of Chicago Press.

1965 The Formative Cultures of the North Carolina Piedmont. *Transaction of the American Philsophical Society* 54(5).

1995 *Town Creek Indian Mound: A Native American Legacy.* Chapel Hill: University of North Carolina Press.

Conkey, Margaret W.

1980 The Identification of Prehistoric Hunter-Gatherer Aggregation Site: The Case of Altamira. *Current Anthropology* 21(5): 609-620.

Conkey, Margaret and Christine A. Hastorf (Eds.)

1990 T*he Uses of Style in Archaeology.* New York: Cambridge University Press.

Conkey, Margaret W. and Christine A. Hastorf

1990 Experimenting with Style in Archaeology: Some Historical and Theoretical ssues. In *The Uses of Style in Archaeology.* Ed. Margaret W. Conkey and Christine A. Hastorf. Cambridge: Cambridge University Press.

Conklin, Abe

1994 Made with Prayer. In *All Roads Are Good: Native Voices on Life and Culture.* Ed. National Museum of American Indian. Washington D.C.: Smithsonian Institution Press.

Cordell, Lisa and Bruce Smith

1996 Indigenous Farmers. In *The Cambridge History of the Native Peoples of North America, Part I.* Cambridge: Cambridge University Press.

Curry, Dennis C.

1999 *Feast of the Dead: Aboriginal Ossuaries in Maryland.* Myersville: Archaeological Society of Maryland.

2008 Aboriginal Ossuaries in Maryland: An Update. *Maryland Archaeology* 44(1).

Curry, Dennis C. and Maureen Kavanagh

2004 Excavations at the Rosenstock Village Site (18FR18), Frederick County, Maryland: A Preliminary Report. *Maryland Archaeology* 40(1).

Custer, Jay F.

1986 *Late Woodland Cultures of the Middle Atlantic Region.* Newark: University of Delaware Press.

1994 Current Archaeological Research in the Middle Atlantic Region of the Eastern United States. *Journal of Archaeological Research* 2(4): 324-360.

2004 Cultural Context and Cordage Twist Direction. *North American Archaeologist* 25 (2):139-152.

Davenport, Sam L. and Joseph R. Judge

1952 The Leesville Mound. *Quarterly Bulletin of the Archaeological Society of Virginia* 7(2).

Davis, R.P. Stephen Jr., Brett H. Riggs, and Mark R. Plane

2006 Catawba Pottery in the Post-Revolutionary Era: A View from the Source. *North Carolina Archaeology* 55:60-88.

Davis, R. P. Stephen Jr., Jane Eastman, Thomas O. Maher, and Richard P. Gravely Jr.

1997a *Archaeological Investigations at the Belmont Site, Henry County, Virginia.* Research Report No.15 Research Laboratories of Archaeology, The University of North Carolina, Chapel Hill.

1997b *Archaeological Investigations at the Box Plant Site, Henry County, Virginia.* Research Report No.13 Research Laboratories of Archaeology, The University of North Carolina, Chapel Hill.

1997c *Archaeological Investigations at the Gravely Site, Henry County, Virginia.* Research Report No.17 Research Laboratories of Archaeology, The University of North Carolina, Chapel Hill.

1997d *Archaeological Investigations at the Stockton Site, Henry County, Virginia.* Research Report No.14 Research Laboratories of Archaeology, The University of North Carolina, Chapel Hill.

1998a *Archaeological Investigations at the Dallas Hylton Site, Henry County, Virginia.* Research Report No. 18 Research Laboratories of Archaeology, The University of North Carolina, Chapel Hill.

1998b *Archaeological Investigations at the Philpott Site, Henry County, Virginia.* Research Report No. 19 Research Laboratories of Archaeology, The University of North Carolina, Chapel Hill.

Davis R.P. Stephen Jr. and I. Randolph Daniel Jr.

1990 The Projectile Point Classification Project: The Classification of Projectile Points in Existing Archaeological Collections from North Carolina (Phase I).

Delaware, Forks Of, Chapter 14.

1980 Forks of the Delaware Chapter: The Overpeck Site. *Pennsylvania Archaeologist* 50(3): 1-46.

Dent, Richard J.

1995 *Chesapeake Prehistory: Old Traditions, New Directions.* New York: Plenum Press.

2003 Excavations at a Late Woodland Village in the Middle Potomac Valley: Theory and Practice at the Winslow Site. *Journal of Middle Atlantic Archaeology* 19.

Dent, Richard J., Jr. and Christine A. Jirikowic

2001 Accokeek Creek: Chronology, the Potomac Creek Complex, and Piscataway Origins. *Journal of Middle Atlantic Archaeology* 17: 39-58.

Dickens, Roy S. Jr.

1980 Ceramic Diversity as Indicator of Cultural Dynamics. *Tennessee Anthropologist* 5(1):34-46.

Dietler, Michael and Ingrid Herbich

1998 Habitus, Techniques, Style: An Integrated Approach to the Social Understanding of Material Culture and Boundaries. In *The Archaeology of Social Boundaries.* Ed. Miriam Stark. Washington D.C.: Smithsonian Institution Press.

Dietrich, Richard Vincent

1970 *Virginia Minerals and Rocks.* Blacksburg: Virginia Polytechnic Institute.

Driver, Harold E.

1961 *Indians of North America.* Chicago: University of Chicago Press.

Drooker, Penelope B.

2004 Pipes, Leadership, and Interregional Interaction in Protohistoric Midwestern and Northeastern North America. In *Smoking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Ed. Sean M Rafferty and Rob Mann. Knoxville: University of Tennessee Press.

Dunham, Gary H.

1994 *Common Ground, Contesting Visions : The Emergence of Burial Mound Ritual in Late Prehistoric Central Virginia.* Ph.D. Dissertation, Department of Anthropology, University of Virginia. University Microfilms, Ann Arbor, MI.

Dunham, Gary H., Debra L. Gold, and Jeffrey L. Hantman

2003 Collective Burial in Prehistoric Virginia: Excavation and Analysis of the Rapidan Mound. *American Antiquity* 68(1): 109-128.

Dunnell, Robert C.

1971 Sabloff and Smith's "The Importance of Both Analytic and Taxonomic Classification in the Type-Variety System". *American Antiquity* 36(1): 115-118.

1972 *Systematics in Prehistory.* New York: MacMillian.

1978 Style and Function: A Fundamental Dichotomy. *American Antiquity* 43(2): 192-202.

1986 Methodological Issues in Americanist Artifact Classification. In *Advances in Archaeological Method and Theory.* Ed. Michael Schiffer. New York: Academic Press.

Earle, Timothy K.

1990 Style and Iconography as Legitimation in Complex Chiefdoms. In *The Uses of Style in Archaeology.* Ed. Margaret W Conkey and Christine E. Hastrof. Cambridge: Cambridge University Press.

Eastman, Jane M.

1994a The North Carolina Radiocarbon Date Study (part 1). *Southern Indian Studies* 42.

1994b The North Carolina Radiocarbon Date Study (part 2). *Southern Indian Studies* 43.

1999 *The Sara and Dan River Peoples: Siouan Communities in North Carolina's Interior Piedmont from A.D. 1000 to A.D. 1700*. Ph.D. Dissertation, Department of Anthropology. University of North Carolina. University Microfilms, Ann Arbor, MI.

2001 Life Courses and Gender Among Late Prehistoric Siouan Communities. In *Archaeological Studies of Gender in the Eastern United States.* Ed. Christopher J. Rodning and Jane M. Eastman. Gainsville: University of Florida Press.

Egghart, Christopher.

2008 Carolina Bays of the Atlantic Coastal Plain: An Archaeological Overview. *Journal of Middle Atlantic Archaeology* 24.

Egloff, Keith T. and Celia Reed

1980 Crab-Orchard Site - A Late Woodland Palisaded Village. *Archeological Society of Virginia Quarterly Bulletin* 34(3): 130-148.

Egloff, Keith T.

1985 Spheres of Interaction Across the Coastal Plain of the Virginia Woodland Period. In *Structure and Process in Southeastern Archaeology.* Ed. Roy S. Jr Dickens and H. Trawick Ward. Tuscaloosa: University of Alabama Press.

1992 The Late Woodland Period in Southwestern Virginia. In *Middle and Late Woodland Research in Virginia: A Synthesis.* Ed. Mary Ellen Norrisey Hodges and Theodore Reinhart. Richmond: Archaeological Society of Virginia.

Egloff, Keith T., J.T. Moldenhauer, and David E. Rotenizer

1987 The Otter Creek Site (44FR31): A Late Woodland Hamlet Along the Blue Ridge Escarpment. *Quarterly Bulletin of the Archaeological Society of Virginia* 42(1): 1-15.

Egloff, Keith T. and Deborah Woodward.

1992 *First People: The Early Indians of Virginia.* Richmond: Virginia Department of Historic Resources.

Egloff, Keith T. and Stephen R Potter

1982 Indian Ceramics from Coastal Plain Virginia. *Archaeology of Eastern North America* 10: 95-117.

Emerson, Matthew C.

1988 *Decorated Clay Tobacco Pipes From the Chesapeake.* Ph.D. Dissertation, Department of Anthropology, University of California. Berkley. University Microfilms, Ann Arbor, MI.

1994 Decorated Clay Tobacco Pipes from the Chesapeake: An African Connection. In *Historical Archaeology of the Chesapeake.* Ed. Paul Shackel and Barbara J Little. Washington D.C.: Smithsonian Institution Press. University Microfilms, Ann Arbor, MI.

1999 American Aspirations in a New World Art and Artifact: Decorated Pipes from the Chesapeake. In *I, Too, Am America.* Ed. Teresa A Singleton. Charlottesville: University Press of Virginia.

Evans, Clifford

1955 *A Ceramic Study of Virginia Archaeology.* Washington D.C.: Bureau of American Ethnology.

Feest, Christian F.

1978a Nanticokes and Neighboring Tribes. In *Handbook of North American Indians, Northeast.* Volume 15 ed. Ed. Bruce G Trigger. Washington: Smithsonian Institution Press.

1978b North Carolina Algonquians. In *Handbook of North American Indians, Northeast.* Volume 15 ed. Ed. Bruce G Trigger. Washington: Smithsonian Institution Press.

1978c Virginia Algonquians. In *Handbook of North American Indians, Northeast.* Volume 15 ed. Ed. Bruce G Trigger. Washington: Smithsonian Institution Press.

Fenton, William N.

1978 Northern Iroquoian Culture Patterns. In *Handbook of North American Indians, Northeast.* Ed. Bruce Trigger. Washington D.C.: Smithsonian Institution Press.

Ford, J. A. and Gordon R. Willey

1941 An Interpretation of the Prehistory of the Eastern United States. *American Anthropologist, New Series* 43(3): 325-363.

Fowke, Gerard

1893 Aboriginal Remains of the Piedmont and Valley Region of Virginia. *American Anthropologist* 6(4): 415-422.

Freed, Stanley A. and Ruth S. Freed

1983 Clark Wissler and the Development of Anthropology in the United States. *American Anthropologist* 85(4): 800-825.

Frye, Keith

1986 *Roadside Geology of Virginia.* Missoula: Mountain Press.

Funk, R.

1983 The Northeast. In *Ancient North Americans.* Ed. J.W. Jennings. San Francisco: W.H. Freeman.

Gager, F.

1991 *Studies of the History of Tobacco Use: Nicotine As a Chemical Marker.* Paper Presented at the Society of American Archaeology Annual Meetings, New Orleans.

Gallivan, Martin.

1997 The Leatherwood Creek Site: A Dan River Phase Site in the Southern Virginia Piedmont. *Quarterly Bulletin of the Archaeological Society of Virginia* 52: 150-171.
1999 *James River Chiefdoms: The Rise of Social Inequality in the Chesapeake*. Ph.D. Dissertation, Department of Anthropology, University of Virginia. University Microfilms, Ann Arbor, MI.
2003 *James River Chiefdoms: The Rise of Social Inequality in the Chesapeake.* Lincoln: University of Nebraska Press.
2007 Powhatan's Werowocomoco: Constructing Place, Polity, and Personhood in the Chesapeake, C.E. 1200--C.E. 1609. *American Anthropologist* 109(1): 85-100.
Gallivan, Martin, Buck Woodward, and Christopher Shepard
2008 Chesapeake frontiers and algonquian community construction before and after contact. In *South Carolina Institute for Archaeology's Frontiers of the Colonial Southeast Conference in Columbia, South Carolina.* University Microfilms, Ann Arbor, MI.
Gallivan, Martin D., Shannon S. Mahoney, Michael Blakey, Danielle Moretti-Langholtz, Christopher Shepard, Meredith Mahoney, and Jennifer A. Fitzgerald
2009 *The Chickahominy River Survey: Native Communities in Tidewater Virginia, A.D 200-1600.* College of William and Mary, Department of Anthropology Archaeological Research Report Series, No. 2. Williamsburg.
Gardner, William M.
1986 *Lost Arrowheads and Broken Pottery: Traces of Indians in the Shenandoah Valley.* Manassas: Thunderbird Publications.
1987 Comparison of the Ridge and Valley, Blue Ridge, Piedmont, and Coastal Plain Archaic Period Site Distribution: An Idealized Transect (Preliminary Model). *Journal of Middle Atlantic Archaeology* 3:49-80.
Geier, Clarence R.
1984 Protohistoric Settlement in the Central Ridge and Valley Province Region of Western Virginia. In *Upland Archaeology in the East: A Symposium No. 2.* 166-177. Atlanta: U.S. Forest Service, Southern Region.
Geier, Clarence R, Michael B. Barber, George A. Tolley, and Randolph E. Turner
1983 The Archaeological Identification of Chiefdom Societies in Southwestern Virginia. In *Upland Archaeology in the East: A Symposium.* Atlanta: U.S. Forest Service, Southern Region.
Gleach, Fredric
1997 *Powhatan's World and Colonial Virginia: A Conflict of Cultures.* Lincoln: University of Nebraska Press.
Goddard, Ives

1978 Eastern Algonquian Languages. In *Handbook of North American Indians, Northeast.* Ed. Bruce G. Trigger. Washington D.C.: Smithsonian Institution Press.
Gold, Debra L.
1999 *Subsistence, Health, and Emergent Inequality in Late Prehistoric Interior Virginia.* Department of Anthropology, University of Michigan. University Microfilms, Ann Arbor, MI.
2004 *The Bioarchaeology of Virginia Burial Mounds.* Tuscaloosa: University of Alabama Press. University Microfilms, Ann Arbor, MI.
Goodspeed, T.H.
1954 *The Genus Nicotiana: Origins, Relationships, and Evolution of Its Species in the Light of Their Distribution, Morphology, and Cytogenetics.* Waltham: Chronica Botanica Co.
Gregory, C A.
1982 *Gifts and Commodities.* London: Academic Press.
Griffin, James B.
1945 An Interpretation of Siouan Archaeology in the Piedmont of North Carolina and Virginia. *American Antiquity* 10(4): 321-330.
1952 Culture Periods in Eastern United States Archaeology. In *Archaeology of the Eastern United States.* Chicago: University of Chicago Press.
Griffin, James B. (Ed.)
1952 A*rchaeology of the Eastern United States.* Chicago: University of Chicago Press.
Grillo, Kate, Jennifer Aultman, and Nick Bon-Harper
2003 DAACS Cataloging Manual: Tobacco Pipes. www.daacs.org
Grumet, Robert S.
1995 *Historic Contact: Indian People and Colonists in Today's Northeastern United States in the Sixteenth Through Eighteenth Centuries.* Norman: University of Oklahoma Press.
Guthe, C.E.
1952 Twenty five years of Archaeology in the Eastern United States. In *Archaeology of the Eastern United States.* Ed. James B. Griffin. Chicago: Chicago University Press.
McIlwaine, H.R.
1925 E*xecutive Journals of the Council of Colonial Virginia.* Richmond: Virginia State Library.
Haberman, Thomas W.
1984 Evidence for Aboriginal Tobaccos in Eastern North America. *American Antiquity* 49(2): 269-287.
Hall, Robert L.

1997 *Archaeology of the Soul.* Chicago: University of Illinois Press.
Hall, Thomas D. and Christopher Chase-Dunn
1999 *The Chesapeake World-System: Complexity, Hierarchy, and Pulsations of Long Range Interaction in Prehistory.* Chicago: A Paper Presented at the 94th Annual Meeting of the American Sociological Association.
Hamor, Ralphe
1971[1615] *A True Discourse of the Present Estate of Virginia.* Jackson: Da Capo Press. University Microfilms, Ann Arbor, MI.
Hantman, Jeffrey, Ashley Atkins, Karenne Wood, and Martin Gallivan
2009 *Materiality and Immateriality of Indigenous Landscapes of Power in the Greater Chesapeake.* Paper Presented at the 74th Annual Society of American Archaeology Annual Meetings, Atlanta.
Hantman, Jeffrey L.
1985 The Archaeology of Albemarle County. Archaeological Survey Monograph No. 2 Department of Anthropology, University of Virginia.
1987 Cultural Boundaries and Lithic Procurement in Central Virginia. In *Upland Archaeology in the East: A Third Symposium.* Ed. Michael B. Barber. United States Forest Service.
1990 Between Powhatan and Quirank: Reconstructing Monacan Culture and History in the Context of Jamestown. *American Anthropologist* 92(3): 676-690.
1993 Relations Between Powhatan and the Piedmont Monacans. In *Powhatan's Foreign Relations.* Ed. Helen C. Rountree. Charlottesville: University of Virginia Press.
1998 *Ancestral Monacan Society.* Paper Presented at the Society for American Archaeology Conference, Seattle Washington.
Hantman, Jeffrey L. and Debra L. Gold
2002 The Woodland in the Middle Atlantic: Ranking and Dynamic Political Stability. In *The Woodland Southeast.* Ed. David G. Anderson and Robert C. Mainfort. Tuscaloosa: University of Alabama Press.
Hantman, Jeffrey L. and Michael J. Klein
1992 Middle and Late Woodland Archaeology in Piedmont Virginia. In *Middle and Late Woodland Research in Virginia: A Synthesis.* Ed. Theodore R. Reinhart and Mary Ellen N. Hodges. Richmond: Archaeological Society of Virginia.
Hantman, Jeffrey L. and Stephen P. Plog
1982 The Relationship of Stylistic Similarity to Patterns of Material Exchange. In *Contexts for Prehistoric Exchange.* Ed. Jonathan E. Ericson and Timothy K. Earle. New York: Academic Press.

Hariot, Thomas
1972[1590] *A Briefe and True Report of the New Found Land of Virginia.* New York: Dover.
Harrington, J.C.
1950 The Wirt Robinson Collection: Twenty Thousand Indian Artifacts From Eastern Siouan Sites in the Vicinity of Wingina, Nelson County, Virginia. *Quarterly Bulletin of the Archaeological Society of Virginia* 4(4).
1954 Dating Stem Fragments of Seventeenth and Eighteenth Century Clay Tobacco Pipes. *Quarterly Bulletin of the Archaeological Society of Virginia* 1: 10-14.
Hart, John
1992 *A Critique of the Adaptive-Type Concept in Eastern Woodlands Prehistory (Ohio River Basin).* Department of Anthropology, Northwestern University. University Microfilms, Ann Arbor, MI.
Hart, John P. and Hetty Jo Brumbach
2003 The Death of the Owasco. *American Antiquity* 68(4): 737-752.
Hayes, Charles F., III (Ed.)
1992 P*roceedings of the 1989 Smoking Pipe Conference: Selected Papers.* Research Records no. 22. Rochester: Rochester Museum and Science Center.
Heckewelder, John
1881 *An Account of the History, Manners, and Customs of the Indian Nations.* Philadelphia: Publication Fund of the Historical Society of Pennsylvania.
Hegmon, Michelle
1992 Archaeological Research on Style. *Annual Review of Anthropology* 21(1): 517-536.
1995 *The Social Dynamics of Pottery Style in the Early Puebloan Southwest.* Occasional Papers No. 5. Cortez: Crow Canyon Archaeological Center.
1998 Technology, Style, and Social Practices: Archaeological Approaches. In *Archaeology of Social Boundaries.* Ed. Miriam T Stark. Washington D.C.: Smithsonian Institution Press.
Heighton, Robert F. and Kathleen A. Deagan
1971 A New Formula for Dating Kaolin Clay Pipestems. *The Conference on Historic Site Archaeology Papers* 220-229.
Heisey, Henry W. and Paul J. Witmer
1964 The Shenks Ferry People: A Site and Some Generalities. *Pennsylvania Archaeologist* 34(1): 8-34.
Helms, Mary W.

1993 *Craft and the Kingly Ideal: Art, Trade, and Power.* Austin: University of Texas Press.

Henry, Susan L.

1979 Terra-Cotta Tobacco Pipes in 17th Century Maryland and Virginia: A Preliminary Study. *Historical Archaeology* 13: 14-37.

Herbert, Joseph M.

2002 A Woodland Period Prehistory of Coastal North Carolina. In *The Woodland Southeast.* Ed. David G. Anderson and Robert C. Mainfort. Tuscaloosa: University of Alabama Press.

2010 *Woodland Potters and the Archaeological Ceramics of the North Carolina Coast.* Tuscaloosa: The University of Alabama Press.

Herbert, Joseph M. and Theresa E. McReynolds

2004 Compositional Variability in Prehistoric Native American Pottery from North Carolina: A Report of Clay Sources and Performance Trials North Carolina Department of Cultural Resources, Office of State Archaeology.

Hill, John N.

1970 Broken K Pueblo: Prehistoric Social Organization in the American Southwest. *Anthropological Papers of University of Arizona No. 18*.

Hodder, Ian.

1982 *Symbols in Action: Ethnoarchaeological Studies of Material Culture.* Cambridge: Cambridge University Press.

Hodges, Mary Ellen N.

1998 *Native American Settlement at Great Neck: Report on VDHR Archaeological Investigations of Woodland Components at Site 44VB7, Virginia Beach, Virginia, 1981-1987*. Virginia Department of Historic Resources Research Report Series No. 9. Richmond: Virginia Department of Historic Resources.

Holland, C. Gilly

1955 An Analysis of Projectile Points and Large Blades. In *A Ceramic Study of Virginia Archaeology.* 2nd Annual ed. Ed. Clifford Evans. Washington: Smithsonian Institution, Bureau of American Ethnology.

1966 Archaeology and Ethnohistory: An Illustration. *Quarterly Bulletin of the Archaeological Society of Virginia* 21: 2.

1978 Albemarle County Settlements: A Piedmont Model. *Quarterly Bulletin of the Archaeological Society of Virginia* 33: 29-44.

Holland, C. Gilly, Clifford Evans, and Betty J. Meggers

1953 The East Mound. *Quarterly Bulletin of the Archaeological Society of Virginia* 7 (3).

Holmes, William H.
1903 *Aboriginal Pottery of the Eastern United States.* Bureau of American Ethnology. 20th Annual edition. Washington D.C.: Smithsonian Institution.
1914 Areas of Culture Characterization Tentatively Outlined as an Aid in the Study of Antiquities. *American Anthropologist* 16(3): 413-446.
Hranicky, William Jack
2002 *Lithic Technology in the Middle Potomac River Valley of Maryland and Virginia.* New York: Kluwer Academic/Plenum Publishers.
Hutchinson, Dale L.
2002 *Foraging, Farming, and Coastal Biocultural Adaptation in the Late Prehistoric North Carolina.* Gainsville: University Press of Florida.
Hutchinson, Dale L. and Lorraine V. Aragon
2002 Collective Burials and Community Memories: Interpreting the Placement of the Dead in the Mid-Atlantic and Southeastern United States with Reference to Ethnographic Cases from Indonesia. In *The Space and Place of Death.* Ed. Helaine Silverman and David Small. Arlington: Archaeological Papers of the American Anthropological Assocation No. 11.
Irwin, Jeffrey D.
2004 Stone Pipes of the Southern Coastal Region of North Carolina: Smoke, Ritual, and Contact. In *Smoking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Ed. Sean Rafferty and Rob Mann. Knoxville: University of Tennesse Press.
Irwin, Jeffrey D., Wayne C.J Boyko, Joseph M. Herbert, and Chad Braley
1999 Woodland Burial Mounds in the North Carolina Sandhills and Southern Coastal Plain. *North Carolina Archaeology* 48:59-86.
James, W. D., E. S. Dahlin, and D. L. Carlson
2005 Chemical Compositional Studies of Archaeological Artifacts: Comparison of LA-ICP-MS to INAA Measurements. *Journal of Radioanalytical and Nuclear Chemistry* 263(3): 697-702.
Jefferies, R.W.
2001 Living on the Edge: Mississippian Settlement in the Cumberland Gap Vicinity. In *Archaeology of the Appalachian Highlands.* Ed. Lynne P. Sullivan and Susan C. Prezzano. Knoxville: The University of Tennessee Press.
Jefferson Patterson Park and Museum, State Museum of Archaeology
2012 Prehistoric Ceramics in Maryland. Accessed January 2012. http://www.jefpat.org/diagnostic/Prehistoric_Ceramic_Web_Page/Prehistoric_Main.htm

Jelinek, Arthur J.
1976 Form, Function, and Style in Lithic Analysis. In *Cultural Change and Continuity.* Ed. C.E. Cleland. New York: Academic Press.
Jennings, Francis
1978 Susquehannock. In *Handbook of North American Indians, Northeast.* Ed. Bruce Trigger. Washington D.C.: Smithsonian Institution Press.
Jirikowic, Christine A.
1990 The Political Implications of a Cultural Practice: A New Perspective on Ossuary Burial in the Potomac Valley. *North American Archaeologist* 11(4): 353-374.
1995 *The Hughes Village Site: A Late Woodland Community in the Potomac Piedmont.* Ph.D. Dissertation, Department of Anthropology, The American University. University Microfilms, Ann Arbor, MI.
Jones, Sian
1997 *The Archaeology of Ethnicity: Constructing Identities in the Past and Present.* New York: Routledge.
Kavanagh, Maureen
1982. Archaeological Resources of the Monocacy River Region, Frederick and Carroll Counties. Maryland Geological Survey, Division of Archaeology Field Report.
2001 Late Woodland Settlement in the Monocacy River Valley. *Maryland Archaeology* 37(1): 1-12.
Kelso, William and Beverly Straube
2004 *Jamestown Rediscovery:1994-2004.* Richmond: APVA Preservation Virginia.
Kent, Barry C.
1984 *Susquehanna's Indians.* Harrisburg: Commonwealth of Pennsylvania, The Pennsylvania Historical and Museum Commission.
Killgrove, Kristina
2002 Defining Relationships Between Native American Groups: A Biodistance Study of the North Carolina Coastal Plain. M.A., Department of Anthropology, East Carolina University.
King, Jonathan C. H.
1977 *Smoking Pipes of the North American Indian.* London: British Museum Publications.
Kinsey, W. F.
1971 The Middle Atlantic Culture Province: A Point of View. *Pennsylvania Archaeologist* 41(1-2): 1-8.
Kintigh, Keith W.

1989 Sample size, Significance, and Measures of Diversity. In *Quantifying Diversity in Archaeology.* Ed. R.D. Leonard and G.T. Jones. Cambridge: Cambridge University Press.

Klein, Michael

1986 Settlement Patterns in Prehistoric Virginia. M.A. Thesis, Department of Anthropology, University of Virginia.

1990 The Potential of X-ray Diffraction Analysis of Prehistoric Ceramics in the Middle Atlantic Region: An Analysis of Clay Mineralogy, Firing Temperature, and Clay Source of Sherds from Virginia. *Journal of Middle Atlantic Archaeology* 6.

1994 *An Absolute Seriation Approach to Ceramic Chronology in the Roanoke, Potomac, and James River Valleys, Virginia and Maryland.* Ph.D. Dissertation, University of Virginia, Department of Anthropology. University Microfilms, Ann Arbor, MI.

1997 The Transition from Soapstone Bowls to Marcey Creek Ceramics in the Middle Atlantic Region: A Consideration of Vessel Technology, Ethnographic Data, and Regional Exchange. *Archaeology of Eastern North America* 25:143-158.

2003 Ceramics, Style, and Society in the Potomac Valley of Virginia. *Journal of Middle Atlantic Archaeology* 19: 25-36.

Knepper, D., J.M. Rutherford, D.R. Hayes, C. Shields, and C.L. Bowen

2006 The Archaeology of an Urban Landscape, the Whitehurst Freeway Archaeology Project, Volume I: Prehistoric Sites 51NW103 (Peter House), 51NW117 (Ramp 3), and 51NW117 W (Whitehurst West). Washington D.C., Report submitted to the District of Columbia Department of Transportation.

Kroeber, Alfred L.

1939 *Cultural and Natural Areas of Native North America.* Berkeley: University of California Publications in American Archaeology and Ethnology.

Kuhn, Robert D.

1986 *Trade and Exchange Among the Mohawk-Iroquois: A Trace Element Analysis of Ceramic Smoking Pipes*. Ph.D. Dissertation, Department of Anthropology, State University of New York, Albany. University Microfilms, Ann Arbor, MI.

Kuhn, Robert D. and Martha L. Sempowski

2001 A New Approach to Dating the League of the Iroquois. *American Archaeology* 66 (2): 301-314.

Kvamme, Kenneth L.

1994 Ranter's corner - GIS Graphics and Spatial Statistics: How Do they Fit Together? *Archaeological Computing Newsletter* 38:1-2.

1999 Recent Directions and Developments in Geographic Information Systems. *Journal of Archaeological Research* 7(2): 153-201.

Lapham, Heather

2005 *Hunting for Hides: Deer Skins, Status, and Cultural Change in the Protohistoric Appalachians.* Tuscaloosa: University of Alabama Press.

Larson, Daniel O., Sachiko Sakai, and Hector Neff

2005 Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) as a bulk chemical characterization technique: Comparison of LA-ICP-MS, digestion ICP-MS, and INAA data on Virgin Branch Anasazi Ceramics. In *Laser Ablation ICP-MS in Archaeological Research.* Ed. Robert Speakman and Hector Neff. Albuquerque: University of New Mexico Press.

Lawson, John

1967 *A New Voyage to Carolina.* Chapel Hill: University of North Carolina Press.

Lechtman, H.

1977 Technologies of Power: The Andean Case. In *Configurations of Power: Holistic Anthropology in Theory and Practice.* Ed. J.S. Henderson and P.J. Netherly. Ithaca: Cornell University Press.

Lederer, John

1672 *The Disccoveries of John Lederer.* London: J.C.

Lightfoot, Kent G.

1995 Culture Contact Studies: Redefining the Relationship Between Prehistoric and Historical Archaeology. *American Antiquity* 60: 199-217.

Linton, Ralph

1924 *Use of Tobacco Among Native North Americans.* Chicago: Field Museum of Natural History.

Lizee, Jonathan M., Hector Neff, and Michael D. Glascock

1995 Clay Acquisition and Vessel Distribution Patterns: Neutron Activation Analysis of Late Windsor and Shantok Tradition Ceramics from Southern New England. *American Antiquity* 60(3): 515-530.

Lock, G. and T. Harris

1992 Visualizing Spatial Data: The Importance of Geographic Information Systems. In *Archaeology and the Information Age: A Global Perspective.* Ed. P. Reilly and S. Rahtz. London: Routledge.

Loftfield, Thomas C.

1987 Archaeological Data Recovery and Osteological Analysis at 31On309, Marine Corps Base, Camp Lejune, North Carolina University.

1990 Ossuary Internments and Algonquian Expansion on the North Carolina Coast. *Southeastern Archaeology* 9(2).

Longacre, William A.

1964 Sociological implications of the ceramic analysis. In *Chapters in the Prehistory of Eastern Arizona, II.* Ed. P.S. Martin and J.B. Rinaldo. Pp 155-167. Fieldiana: Anthropology vol 55. Chicago: Chicago Natural History Museum.

1970 *Archaeology As Anthropology: A Case Study.* Anthropological Papers of the University of Arizona No 17. Tucson: University of Arizona Press.

Lounsbury, Floyd G.

1978 Iroquoian languages. In *Handbook of North American Indians, Northeast.* Ed. Bruce G. Trigger. Washington D.C.: Smithsonian Institution Press.

Luckenbach, Al

2004 The Swan Cove Kiln: Chesapeake Tobacco Pipe Production, circa 1650-1669. In *Ceramics in America, 2004.* Ed. Robert Hunter. Hanover and London: Chipstone Foundation, distributed by University Press of New England.

Luckenbach, Al and Taft Kiser

2006 Seventeenth-Century Tobacco Pipe Manufacturing in the Chesapeake Region: A Preliminary Delineation of Makers and Their Styles. *Ceramics in America* 6:160-178.

Lucketti, Nicholas M., Mary Ellen N. Hodges, and Charles T. Hodges

1994 Paspahegh Archaeology: Data Recovery Investigations at Site 44JC308 at the Governor's Land at Two Rivers. James City County: James River Institute for Archaeology Inc.

MacCord, Howard A., Sr.

1966 The Mclean Mound, Cumberland County, North Carolina. *Southern Indian Studies* XVIII: 3-45.

1969 Camden: A Postcontact Indian Site in Caroline County. *The Quarterly Bulletin of the Archaeological Society of Virginia* 24(1): 1-55.

1970 The John Green Site, Greensville County, Virginia. *The Quarterly Bulletin of the Archaeological Society of Virginia* 25(2): 98-138.

1986 *The Lewis Creek Mound Culture in Virginia.* Richmond: Archaeological Society of Virginia.

1996 Prehistoric Territoriality in Virginia. *Southern Indian Studies* 45: 57-77.

2001 Dan River Culture and its Expansion West of the Blue Ridge. *Archeological Society of Virginia Quarterly Bulletin* 56(1): 18-25.

Magoon, Dane T.

1999 “Chesapeake" Pipes and Uncritical Assumptions: A View from Northeastern North Carolina. *North Carolina Archaeology* 48: 107-127.

Mallios, Seth
2006 *The Deadly Politics of Giving: Exchange and Violence at Ajacan, Roanoke, and Jamestown.* Tuscaloosa: University of Alabama Press.
Mann, Rob
2004 Smokescreens: Tobacco, Pipes, and the Transformational Power of Fur Trade Rituals. In *Smoking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Ed. Sean Rafferty and Rob Mann. Knoxville: University of Tennesse Press.
Manson, Charles, Howard A. MacCord, and James B. Griffin
1944 The Culture of the Keyser Farm Site. *Papers of the Michigan Academy of Science, Arts and Letters* 29: 375-418.
Mathews, Z P.
1980 Of Man and Beast: The Chronology of Effigy Pipes Among Ontario Iroquoians. *Ethnohistory* 27(4): 295-307.
Mathias, Mark A.
1993 *Beyond the Shell of Shell Middens.* Paper Presented at the Conference on Shell Midden Archaeology, Georgetown SC. University Microfilms, Ann Arbor, MI.
Mauss, Marcel
1950 *The Gift: The Form and Reason for Exchange in Primitive Societies.* New York: WW Norton, Trans. WD Halls.
Mayer-Oakes, William J.
1955 *Prehistory of the Upper Ohio Valley: An Introductory Archaeological Study.* Pittsburgh: Carnegie Museum.
McCary, Ben C.
1957 *John Smith's Map of Virginia:With a Brief Account of Its History.* Jamestown 350th Anniversary Historical Booklet ed. Williamsburg, Va: Virginia 350th Anniversary Celebration Corp.
McGuire, Joseph D.
1899 *Pipes and Smoking Customs of the American Aborigines, Based on Material in the U.S.* Washington D.C.: Smithsonian Institution.
McKern, W. C.
1939 The Midwestern Taxonomic Method as an Aid to Archaeological Culture Study. *American Antiquity* 4(4): 301-313.
McKnight, Justine.
2009 Archeobotanical Evidence from the Chickahominy in a Chesapeake Context. *Journal of Middle Atlantic Archaeology* 25.
McMillian, Lauren K.

2010 Put This in your Pipe and Smoke it: An Evaluation of Tobacco Pipe Stem Dating Methods. M.A. Thesis, Department of Anthropology, East Carolina University.

McNett, Charles

1975 Archaeology of the Lower and Middle Potomac. Unpublished manuscript, American University, Washington D.C.

Means, Bernard K.

2003 Deliver Me from Mononga-hell: Thinking Beyond the Culture History Paradigm to Examine the Temporal and Spatial Parameters of Somerset Monogahela Village Settlements. *Journal of Middle Atlantic Archaeology* 19: 37-58.

2005 New Dates for New Deal-Excavated Monongahela Villages: Some Implications for the Chronology of Late Prehistoric Southwestern Pennsylvania. *Pennsylvania Archaeologist* 75(1): 49-61.

2007 *Circular Villages of the Monogahela Tradition.* Tuscaloosa: University of Alabama Press.

Means, Bernard K. and Justine McKnight

2010 Constructing Chronologies from Curated Collections for Northern Virginia's Late Woodland Period: A Threatened Sites Project. *Quarterly Bulletin Archaeological Society of Virginia* 65(1): 16-29.

Merrill, James H.

1989 “Our Bonds of Peace": Patterns of Intercultural Exchange in the Carolina Piedmont (1650-1750). In *Powhatan's Mantle: Indians in the Colonial Southeast.* Ed. Gregory A., Wood, Peter H., Hatley, Tom Waselkov. Lincoln: University of Nebraska Press.

Meyers, Maureen E.

2011 *Political Economy of Exotic Trade on the Mississippian Frontier: A Case Study of a Fourteenth Century Chiefdom in Southwestern Virginia*. Ph.D. Dissertation, Department of Anthropology, University of Kentucky. University Microfilms, Ann Arbor, MI.

Miller, Carl L.

1957 Revaluation of the Eastern Siouan Problem with Particular Emphasis on the Virginia Branches -- the Occaneechi, the Saponi, and the Tutelo. In *Bureau of American Ethnology Bulletin 164.* Washington D.C.: United States Government Printing Office.

Miller, Henry M.

1991 Tobacco Pipes from Pope’s Fort, St. Mary’s City, Maryland: An English Civil War Site on the American Frontier. In *The Archaeology of the Clay Tobacco Pipe:*

Chesapeake Bay. Ed. P. Davey and D.J. Pogue, pp. 73-88. BAR International Series 566. Oxford: British Archaeological Reports.

Monroe, Cameron J.

2002 Negotiating African-American Identity in the Seventeenth-Century Chesapeake: Colono Tobacco Pipes and the Ethnic Uses of Style. In *The Archaeology of the Clay Tobacco Pipe, XVI.* Ed. Peter Davey. British Archaeological Reports Interational Series. Oxford: Archaeopress.

Monroe, Cameron J., and Seth Mallios

2004 A Seventeenth-century Colonial Cottage Industry: New Evidence and a Dating Formula for Colono Tobacco Pipes in the Chesapeake. *Historical Archaeology* 38(2): 68-82.

Mook, Maurice A.

1943 The Anthropological Position of the Indian Tribes of Tidewater, Virginia. *William and Mary Quarterly* 23: 27-40.

Mooney, James

1894 *The Siouan Tribes of the East.* Washington D.C.: Bureau of American Ethnology Bulletin 22.

Moore, Lawrence E.

1993 Piscataway, Doeg, and the Potomac Creek Complex. *Journal of Middle Atlantic Archaeology* 9: 117-138.

Mouer, Daniel L, Mary Ellen Hodges, Stephen R. Potter, Susan L. Henry, Ivor Noel Hume, Dennis J. Pogue, Martha W. McCartney, and Thomas E. Davidson.

1999 Colonoware Pottery, Chesapeake Pipes, and “Uncritical Assumptions". In *I, Too, Am America.* Ed. Teresa A Singleton. Charlottesville: University of Virginia Press.

Mouer, Daniel L.

1981 Powhatan and Monacan Regional Settlement Hierarchies: A Model of Relationship Between Social and Environmental Structure. *Quarterly Bulletin of the Archaeological Society of Virginia* 36(1-2): 1-21.

1983 A Review of the Archaeology and Ethnohistory of the Monacans. In *Piedmont Archaeology.* Ed. J.M. Witofski and L.E. Browning. Richmond: Archaeological Society of Virginia.

1993 Chesapeake Creoles: The Creation of Folk Culture in Colonial Virginia. In *Archaeology of 17th-Century Virginia.* Ed. Theodore R. Reinhart and Dennis J. Rogue. Richmond: The Dietz Press.

Muller, J.

1983 The Southeast. In *Ancient North Americans.* Ed. J.W. Jennings. San Francisco: W.H. Freeman.

Murry, David
2005 *Indian Giving: Economies of Power in Indian-European Exchanges.* Amherst: University of Massachusetts Press.
Myer, William E.
1928 Indian Trails of the Southeast. Bureau of Ethnology 42nd Annual Report for 1924-1925. Washington D.C.: Smithsonian Institution Press.
Nassaney, Michael S.
2004 Men and Women, Pipes and Power in Native New England. In *Smoking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Ed. Sean Rafferty and Rob Mann. Knoxville: University of Tennessee Press.
Neff, Hector
2003 Analysis of Mesoamerican Plumbate Pottery Surfaces by Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry. *Journal of Archaeological Science* 30(1): 21-35.
Neiman, Fraser D.
1995 Stylistic Variation in Evolutionary Perspective: Inferences from Decorative Diversity and Interassemblage Distance in Illinois Woodland Ceramic Assemblages. *American Antiquity* 60(1): 7-36.
Neitzel, Jill E.
1995 Elite Styles in Hierarchically Organized Societies: The Chacoan Regional System. In *Style, Society, and Person: Archaeological and Ethnographic Perspectives.* Ed. Christopher Carr and Jill E. Neitzel. New York: Plenum Press.
Noel Hume, Ivor
1991 *Guide to Artifacts of Colonial America.* New York: Vintage.
Otto, Martha Potter
1992 A Prehistoric Menagerie: Ohio Hopewell Effigy Pipes. In *Proceedings of the 1989 Smoking Pipe Conference: Selected Papers.* Ed. Charles F. Hayes. Rochester: Rochester Museum and Science Center.
Painter, George
1967 Late Tubular Pipes from the Triangle Site. *The Chesopiean* 5 (5-6): 135-136.
Paper, Jordan
1988 *Sacred Offerings.* Moscow: University of Idaho Press.
1992 Iroquoian and Pan-Indian Sacred Pipes: Comparative Ritual and Symbolism. In *Proceedings of the 1989 Smoking Pipe Conference: Selected Papers.* Ed. C.F. Hayes. Rochester: Rochester Museum and Science Center.
Peattie, Roderick

1943 *The Great Smokies and the Blue Ridge: The Story of the Southern Appalachians.* New York: Chessler Books.

Percy, George

1969[1606] *Observations Gathered Out of a Discourse of the Plantation in the Southern Colony in Virginia by the English.* New York: James MacLehose and Sons, Publishers to the University.

Pevarnik, George L, Matthew T. Boulanger, and Michael D. Glascock

2008 Instrumental Neutron Activation Analysis of Middle Woodland Pottery from the Delaware Valley. *North American Archaeologist* 29(3): 239-268.

Phelps, David S.

1980 Archaeological Salvage of an Ossuary at the Baum Site. Archaeological Laboratory, Dept. of Sociology and Anthropology. Greenville: East Carolina University.

1983 Archaeology of the North Carolina Coast and Coastal Plain: Problems and Hypotheses. In *The Prehistory of North Carolina: An Archaeological Symposium.* Ed. M.A. Mathias and J.J. Crow. Raleigh: North Carolina Division of Archives and History.

1984 Archaeology of the Tillet Site: The First Community at Wanchese, Roanoke Island. Greenville: East Carolina University.

Phelps, David S. and Charles L. Heath

1998 *Cashie Series Ceramics From the Interior Coastal Plain of North Carolina.* Paper Presented at the 55th Annual Meeting of the Southeastern Archaeological Conference, Greenville, South Carolina.

Plog, Stephen P.

1980 *Stylistic Variation in Prehistoric Ceramics.* Cambridge: Cambridge University Press.

1983 Analysis of Style in Artifacts. *Annual Review of Anthropology* 12:125-142.

1990 Sociopolitical Implications of Stylistic Variation. In *The Uses of Style in Archaeology.* Ed. Margaret W. Conkey and Christine A. Hastrof. Cambridge: Cambridge University Press.

1995 Equality and Hierarchy: Holistic Approaches to Understanding Social Dynamics in the Pueblo Southwest. In *Foundations of Social Inequality.* Ed. T.D. Price and G.M Feinman. New York: Plenum Press.

Plog, Stephen P. and Michelle Hegmon

1993 The Sample Size-Richness Relation: The Relevance of Research Questions, Sampling Strategies, and Behavioral Variation. *American Antiquity* 58(3): 489-496.

Pollack, David A., Gwynn Henderson, and Christopher T. Begley

2002 Fort Ancient/Mississippian Interaction on the Northeastern Periphery. *Southeastern Archaeology* 21(2): 206-220.

Potter, Stephen R.

1993 *Commoners, Tribute, and Chiefs: The Development of Algonquin Culture in the Potomac Valley.* Charlottesville: University Press of Virginia.

2006[1989] early effects on virginia exchange and tribute systems in the seventeenth century: An example from the tidewater potomac. In *Powhatan's Mantle: Indians in the Colonial Southeast.* Ed. Peter Wood, Gregory A. Waselkov, and Tom Hatley. Lincoln: University of Nebraska Press.

Rafferty, Sean M.

2004 "They Pass Their Lives in Smoke, and at Death Fall into the Fire": Smoking Pipes and Mortuary Ritual During the Early Woodland Period. In *Smoking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Ed. Sean Rafferty and Rob Mann. Knoxville: University of Tennessee Press.

2001 *They Pass Their Lives in Smoke and at Death Fall into the Fire: Smoking Pipes and Mortuary Ritual During the Early Woodland Period*. Ph.D. Dissertation, Department of Anthropology, Binghamton University. University Microfilms, Ann Arbor, MI.

2002 Identification of Nicotine by Gas Chromatography/Mass Spectroscopy Analysis of Smoking Pipe Residue. *Journal of Archaeological Science* 29:897-907.

2006 Evidence of Early Tobacco in Northeastern North America? *Journal of Archaeological Science* 33(4): 453-458.

Renfrew, Colin

1972 *The Emergence of Civilisation.* London: Metheun.

Richie, William A.

1944 *The Pre-Iroquoian Occupation of New York State.* Rochester: Memoir of the Rochester Museum of Arts and Sciences.

Roe, Peter G.

1995 Style, Society, Myth, and Structure. In *Style, Society, and Person: Archaeological and Ethnological Perspectives.* Ed. Christopher Carr and Jill E. Neitzel. New York: Springer.

Rountree, Helen C. (Ed.)

1993 P*owhatan Foreign Relations: 1500-1722.* Charlottesville: University Press of Virginia.

Rountree, Helen C.

1992 *The Powhatan Indians of Virginia: Their Traditional Culture.* Norman: University of Oklahoma Press.

Rountree, Helen C. and Randolph E. Turner
2002 *Before and After Jamestown: Virginia's Powhatans and Their Predecessors.* Tallahessee: University of Florida Press.
Rountree, Helen C. and Thomas E. Davidson
1997 *Eastern Shore Indians of Virginia and Maryland.* Charlottesville: University of Virginia Press.
Rouse, Irving
1960 The Classification of Artifacts in Archaeology. *American Antiquity* 25(3): 313-323.
Sackett, J.R.
1977 The Meaning of Style in Archaeology: A General Model. *American Antiquity* 43 (3): 368-380.
1982 Approaches to Style in Lithic Archaeology. *Journal of Anthropological Archaeology* 1:59-112.
1985 Style and Ethnicity in the Kalahari: A Reply to Wiessner. *American Antiquity* 50 (1): 154-159.
1990 Style and Ethnicity in Archaeology: The Case for Isochrestism. In *The Uses of Style in Archaeology.* Ed. M.W. Conkey and C.A. Hastrof. Cambridge: Cambridge University Press.
Sahlins, Marshall
1985 *Islands of History.* Chicago: University of Chicago Press.
Sassaman, Kenneth and Victoria Rudolphi
2001 Communities of Practice in the Early Pottery Traditions of the American Southwest. *Journal of Archaeological Research* 57:407-425.
Schmitt, Karl
1952 Archaeological Chronology of the Middle Atlantic States. In *Archaeology of the Eastern United States.* Ed. James B Griffin. Chicago: Chicago University Press.
Schortman, Edward M.
1989. Interregional Interaction in Prehistory: The Need for a New Perspective. *American Antiquity* 54:52-65.
Schwartz, B.K.
1996 The Mckern "Taxonomic" System and Archaeological Culture Classification in the Midwestern United States: A History and Evaluation. *Bulletin of the History of Archaeology* 6(1): 3-9.
Rafferty, Sean and Robb Mann (Ed.)
2004 S*moking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Knoxville: University of Tennessee Press.

Shanks, Michael and Christopher Y. Tilley
1982 Ideology, Symbolic Power and Ritual Communication: A Reinterpretation of Neolithic Mortuary Practices. In *Symbolic and Structural Archaeology.* Ed. Ian Hodder. Cambridge: University Press.
Shelford, Victor E.
1963 *The Ecology of North America.* Urbana: University of Illinois Press.
Shennan, Stephen
1989 *Archaeological Approaches to Cultural Identity.* Oxford: Routledge.
Sikes, Kathryn
2008. Stars as Social Space? Contextualizing 17th-century Chesapeake Star-motif Pipes. *Post-Medieval Archaeology* 42(1): 75-103.
Silliman, Stephen W.
2005. Cultural Contact or Colonialism? Challenges in the Archaeology of Native North America. *American Antiquity* 70(1): 55-74.
Slattery, Richard G. and Douglas R. Woodward
1992 *The Montgomery Focus: A Late Woodland Potomac River Culture.* Myersville: Archaeological Society of Maryland.
Smith, Bruce D.
1989 Origins of Agriculture in Eastern North America. *Science* 246 (4937): 1566-1571.
Smith, Gerald P.
1984 The Hand Site: Southampton County, Virginia. Archaeological Society of Virginia, Special Publication No. 11. Richmond: Archaeological Society of Virginia.
Smith, John
1986 Generall History of Virginia. In *The Complete Works of Captain John Smith (1580-1631).* Ed. Philip Barbour. 3 vols. Chapel Hill: University of North Carolina Press.
Snyder, Kimberly A. and April M. Fehr
1984 Data Recovery Excavations at 44WR3, 44WR29, 44WR300, and 44WR301. Front Royal: Thunderbird Research Corporation.
South, Stanley A.
1966 Exploratory Excavations at Mcfayden Mound, Brunswick County, North Carolina. *Southern Indian Studies* 18:68-87.
Speakman, R. J., Neff, H., Glascock, M. D., and Higgins
2002 Characterization of Archaeological Materials by LA-ICP-MS. In *Archaeological Chemistry, Materials, Methods, and Meaning.* ACS Symposium. Ed. Kathryn Jakes. Washington D.C.: American Chemical Society.
Speakman, Robert J. and Michael D. Glascock

2006 Instrumental Neutron Activation Analysis of Ceramic Materials from Fort Bragg Cultural Resources Program, Department of the Army.

Speck, Frank G.

1924 The Ethnic Position of the Southeastern Algonkian. *American Anthropologist* 26 (2): 184-200.

1928 *Chapters on the Ethnology of the Powhatan Tribes of Virginia.* New York: Museum of the American Indian, Heye Foundation.

Springer, James W.

1981 An Ethnohistoric Study of the Smoking Complex in Eastern North America. *Ethnohistory* 28(1): 217-235.

Stark, Miriam T. (Ed.)

1998 T*he Archaeology of Social Boundaries.* Washington D.C.: Smithsonian Institution Press.

Stark, Miriam T.

1998 Technical Choices and Social Boundaries in Material Cultural Patterning: An Introduction. In *The Archaeology of Social Boundaries.* Washington D.C.: Smithsonian Institution Press.

1999 Social Dimensions of Technical Choice in Kalinga Ceramic Traditions. In *Material Meanings: Critical Approaches to the Interpretation of Material Culture.* Ed. Elizabeth S Chilton. Salt Lake City: The University of Utah Press.

Steadman, Laura

2008 Uncovering the Origins of Abbott Zoned Incised Pottery in Coastal Plain Virginia: An LA-ICP-MS Study. *Journal of Middle Atlantic Archaeology* 24:79-86.

Stearns, Richard E.

1940 The Aboriginal Village Site on the Potomac River in Montgomery County, Maryland. Baltimore: The Natural History Society of Maryland, Proceeding No. 6.

Stephenson, R. L. and A. L. Ferguson

1963 *The Accokeek Creek Site: A Middle Atlantic Seaboard Culture Sequence.* Ann Arbor: Museum of Anthropology, University of Michigan.

Steponaitis, Vincas P., M. James Blackman, and Hector Neff

1996 Large-Scale Patterns in the Chemical Composition of Mississippian Pottery. *American Antiquity* 61(3): 555-572.

Stewart, Michael R.

1989 Trade and Exchange in Middle Atlantic Prehistory. *Archaeology of Eastern North America* 17(1): 47-79.

1993 Comparison of Late Woodland Cultures: Delaware, Potomac, and Susquehanna River valleys, Middle Atlantic Region. *Archaeology of Eastern North America* 21:163-178.

1998 Unraveling the Mystery of Zoned Decorated Pottery: Implications for Middle Woodland Society in the Middle Atlantic Region. *Journal of Middle Atlantic Archaeology* 14.

2004 Changing Patterns of Native American Trade in the Middle Atlantic Region and Chesapeake Watershed: A World Systems Perspective. *North American Archaeologist* 25(4): 337-356.

Stewart, Dale T.

1992 *Archeology Exploration of Patawomeke: The Indian Town Site (44St2) Ancestral to the One (44St1) Visited in 1608 by Captain John Smith.* Smithsonia ed. Washington D.C.: Smithsonian Institution Press.

Strachey, William

1953 *A Historie of Travell Into Virginia Britania.* Glasgow: The University Press.

Sturtevant, William C.

1958 Siouan Languages in the East. *American Anthropologist* 60(4): 738-743.

Sullivan, Lynne P.

1995 T*he Prehistory of the Chickamauga Basin in Tennessee.* Knoxville: University of Tennessee Press.

Swanton, John R.

1928 *Aboriginal Culture of the Southeast.* 42nd Annual Report, Bureau of American Ethnology. Washington D.C.: Smithsonian Institution.

Thomas, David H.

1986 *Refiguring Anthropology: First Principles of Probability and Statistics.* Prospect Heights: Waveland Press, Inc.

Thomas, Nicholas

1991 *Entangled Objects: Exchange, Material Culture, and Colonialism in the Pacific.* Cambridge: Harvard University Press.

Thomas, R.A.

1973 Prehistoric Mortuary Complexes of the Delmarva Peninsula. In *Proceedings of the 1973 Middle Atlantic Archaeological Conference*, Ed. R.A. Thomas, 50-72. Penns Grove: Middle Atlantic Archaeological Research Inc.

1977 Radiocarbon dates of the Woodland period from the Delmarva Peninsula. *Bulletin of the Archaeological Society of Delaware* 11: 49-57.

Thornbury, W.D.

1965 *Regional Geomorphology of the United States.* New York: John Wiley.

Tooker, Elizabeth
1964 An Ethnography of the Huron Indians, 1615-1649. In *Smithsonian Institution Bureau of Ethnology Bulletin 190.* Washington D.C.: Smithsonian Institution.

Trubowitz, Neal L.
1992 Thanks, But We Prefer Our Own: Pipes in the Great lakes-Riverine Region During the Eighteenth Century. In *Proceedings of the 1989 Smoking Pipe Conference: Selected Papers.* Ed. C.F. Hayes. Rochester: Rochester Museum and Science Center.
2004 Smoking Pipes: An Archaeological Measure of Native American Cultural Stability and Survival in Eastern North America, A.D. 1500-1850. In *Smoking and Culture: The Archaeology of Tobacco Pipes in Eastern North America.* Ed. Sean Rafferty and Rob Mann. Knoxville: University of Tennessee Press.

Tuck, James A.
1978 Northern Iroquoian Prehistory. In *Handbook of North American Indians, Northeast.* Ed. Bruce Trigger. Washington D.C.: Smithsonian Institution Press.

Turner, E. Randolph, III.
1976 *An Archaeological and Ethnohistorical Study of the Evolution of Rank Societies in the Virginia Coastal Plain*. Ph.D. Dissertation, Department of Anthropology, Pennsylvania State University. University Microfilms, Ann Arbor, MI.
1978 An Intertribal Deer Exploitation Buffer Zone for the Virginia Coastal Plain - Piedmont Region. *Archeological Society of Virginia Quarterly Bulletin* 32(3): 42-48.
1986 Difficulties in the Archaeological Identification of Chiefdoms as Seen in the Virginia Coastal Plain during the Late Woodland and Early Historic Periods. In *Late Woodland Cultures of the Middle Atlantic Region.* Ed. J.F. Custer. Newark: University of Delaware Press.
1992 The Virginia Coastal Plain During the Late Woodland Period. In *Middle and Late Woodland Research in Virginia: A Synthesis.* Ed. Theodore R Reinhart and Mary Ellen N Hodges. Richmond: Archaeological Society of Virginia.
1993 Native American Protohistoric Interactions in the Powhatan Core Area. In *Powhatan Foreign Relations: 1500-1722.* Ed. Helen C. Rountree. Charlottesville: University of Virginia Press.

Ubelaker, D.H.
1974 *Reconstructions of Demographic Profiles From Ossuary Skeletal Samples.* Washington D.C.: Smithsonian Institution Press.

Valentine, Edward P.
1903 *Report of the Exploration of the Hayes' Creek Mound, Rockbridge County, Va.* Richmond: Valentine Museum.

von Gernet, Alexander

1992 Hallucinogens and the Origins of the Iroquoian Pipe/Tobacco/Smoking Complex. In *The Proceedings of the 1988 Smoking Pipe Conference.* Ed. Charles F. Hayes. New York: Rochester Museum and Science Service.

1995 Nicotian Dreams: The Prehistory and Early History of Tobacco in Eastern North America. In *Consuming Habits: Drugs in History and Anthropology.* Ed. J. Goodman, P.E. Lovejoy, and A. Sherrat. New York: Routledge.

2000 North American Indigenous Nicotiana Use and Tobacco Shamanism: The Early Documentary Record, 1520-1660. In *Tobacco Use by Native North Americans: Sacred Smoke and Silent Killer.* Ed. Joseph C. Winter. Norman: University of Oklahoma Press.

Voss, Jerome A. and Robert L. Young

1995 Style and Self. In *Style, Society, and Person: Archaeological and Ethnological Perspectives.* Ed. Christopher Carr and Jill E. Neitzel. New York: Springer.

Wagner, Gail E.

2000 Tobacco in Prehistoric Eastern North America. In *Tobacco Use by Native North Americans: Sacred Smoke and Silent Killer.* Ed. Joseph C. Winter. Norman: University of Oklahoma Press.

Walker, Joan M. and Glenda F. Miller

1992 Life on the Levee: The Late Woodland Period in the Northern Great Valley of Virginia. In *Middle and Late Woodland Research in Virginia: A Synthesis.* Ed. Theodore R. Reinhart and Mary Ellen N. Hodges. Richmond: Archaeological Society of Virginia.

Ward, H. Trawick

1985 Social Implications of Storage and Disposal Patterns. In *Structure and Process in Southeastern Archaeology.* Ed. R.S. Dickens and H. Trawick Ward. Tuscaloosa: University of Alabama Press.

Ward, H. Trawick and R. P. Stephen Davis

1993 *Indian Communities on the North Carolina Piedmont, AD 1000 to 1700.* Chapel Hill: Research Laboratories of Anthropology, University of North Carolina.

1999 *Time Before History: The Archaeology of North Carolina.* Chapel Hill: University of North Carolina Press.

Washburn, Dorothy K.

1977 *A Symmetry Analysis of Upper Gila Area Ceramic Design.* Cambridge: Harvard University Press.

Weiner, Annette B.

1992 *Inalienable Possessions: The Process of Keeping While Giving.* Berkeley: University of California Press.

Wells, John H. (Ed.)
2002 A*bbyville: A Complex of Archaeological Sites in the John H. Kerr Reservoir, Halifax County, Virginia.* Richmond: Archaeological Society of Virginia.

West, George A.
1934 *Tobacco, Pipes, and Smoking Customs of the American Indians.* Milwaukee: Bulletin of the Public Museum of the City of Milwaukee.

White, Father Andrew
1910[1634] A Brief Relation of the Voyage Unto Maryland. In *Narratives of Early Maryland 1633-1684.* Ed. Clayton C. Hall. New York: Charles Scribner's Sons.

Whitthoft, John and Fred W. Kinsey
1959 *Susquehannock Miscellany.* Harrisburg: Pennsylvania Historical and Museum Commission.

Wiessner, Polly
1983 Style and Social Information in Kalahari San Projectile Points. *American Antiquity* 48(2): 253-276.
1985 Style or Isochrestic Variation? *American Antiquity* 50(1): 160-166.
1990 Is There Unity to Style? In *The Uses of Style in Archaeology.* Ed. Margaret W Conkey and Christine A Hastrof. Cambridge: Cambridge University Press.

Willey, Gordon R. and Jeremy A. Sabloff
1974. *A History of American Archaeology.* London: Thames and Hudson.

Winter, Joseph C.
2000 Traditional Uses of Tobacco by Native Americans. In *Tobacco Use by Native North Americans.* Norman: University of Oklahoma Press.

Wissler, Clarke
1922 *The American Indian: An Introduction to the Anthropology of the New World.* New York: Oxford University Press.

Wobst, H. Martin
1977 Stylistic Behavior and Information Exchange. In *For the Director: Research Essays in Honor of James B. Griffin.* Ed. C.E. Clelan. Anthropological Papers No. 61. Ann Arbor: University of Michigan, Museum of Anthropology.

Wonderley, Anthony
2005 Effigy Pipes, Diplomacy, and Myth: Exploring Interaction Between St. Lawrence Iroquoians and Eastern Iroquois in New York State. *American Antiquity* 70(2): 211-240.

Wood, Peter H.
2006 The Changing Population of the Colonial South: An Overview by Race and Region, 1685-1790. In *Powhatan's Mantle: Indians in the Colonial Southeast.* Ed.

Gregory A, Waselkov, Peter H. Wood, and Tom Hatley. Lincoln: University of Nebraska Press.

Wylie, Alison

2002 *Thinking From Things: Essays in the Philosophy of Archaeology.* Berkeley: University of California Press.

Appendix I: Attribute Descriptions

Before describing the variables in detail, it is necessary to note three important caveats. If a particular attribute was not present (i.e. a bore diameter could not be present if the specimen in question was a bowl fragment), "N/A" was used to designate that it was not applicable. If an aspect of an attribute was present but not enough was available to be categorized, "UNID" was used. For example, one of attributes I recorded was the shape of the bowl base. If a specimen consisted of a whole bowl fragment, or a bowl and stem fragment, it was sometimes possible to identify the base shape. However, it was not possible for specimens that were more fragmented. In the latter situation, "UNID" was entered in the bowl base shape column. Finally, "Not available" was also used to designate instances when attributes were present but could not be recorded. Generally this occurred when specimens were encased in museum exhibits and could not be accessed to take measurements.

Nominal Variables

General Form

Terms: *Tubular, Platform, Elbow (Obtuse, Right, or Acute angled), Bent Tube, Effigy, Multi-stemmed, Reed/Stub Stemmed, UNID*

The first six terms were recorded only if enough of the pipe was present to determine the general shape. If there was no discernable angle between the bowl and stem, the pipe was designated as "tubular." If the bowl sat in the middle of the stem, it was recorded as "platform." If the bowl was connected to the stem at an angle, "Elbow" was used. In many instances, not enough of the specimen was complete to determine the size of the angle between the bowl and stem. Thus, "Obtuse," "Right," or "Acute angled" were only included if it could be observed or determined from the fragment, if not, the specimen was simply designated as "Elbow." Bent tube was used if the bowl was an extension from the stem. Reed/stub stem was used if only a bowl with a large bore diameter was identified.

Manufacturing Technique

Terms: *Handmade, Carved.*

Generally pipes made of clay were described as "Handmade." Initially I had planned to use this term to contrast with "Molded" in case I came across any historic clay pipes that showed evidence of molding. However, I realized that it was difficult to determine whether molded pipes in the Contact period assemblages were Native or European made. Consequently, molded pipes were excluded from my analysis. Stone pipes were described as carved.

Raw Material

Terms: *Local clay (color designation), Steatite (soapstone), Chlorite, Shale, Sandstone, UNID*

The raw material column was mostly used to designate whether the pipe was made of clay or stone, and if it was made of stone, the type used. This generally varied between steatite or soapstone, which generally is a gray or black stone, chlorite schist, which is usually a dark green color, especially when polished. A few samples were made of shale or limestone. I used the term "local clay" to designate that none of the pipes were the white clay pipes that were imported from England. For local clay pipes I also recorded a color designation such as buff, pink, red etc. While pipes that are the same color admittedly made not be made from the same clay, as color is dependent on a number of factors including firing temperature and inclusions in the clay, I thought it could provide a useful comparison. In addition, some pipes exhibited swirls of two different clays. In previous literature (Agbe-Davies 2004b) this has been designated as "agate" and the two colors were recorded. I have followed this approach. European or white clay pipes were not included in the survey and thus were not recorded.

Surface Treatment

Terms: *None, Polished, Smoothed, Burnished, UNID*

Many of the clay pipes, especially tubular ones, showed no signs of finishing. The term "none" was used to describe pipes that had a rough surface with inclusions sticking out of the clay and showed no signs of being smoothed. Other pipes had surfaces that had clearly been smoothed but did not exhibit a highly polished surface. Finally some clay pipes were burnished. Burnishing is a technique where an object with a hard, smooth surface, such as a stone or wooden paddle is rubbed on the surface of an object. After the object is fired it gives off an extremely polished look. The term "Polished" was used to designate treatments given to stone pipes. Some stone pipes had surfaces that were not treated in any way, where you could still see the carving or pecking marks. Others, however, particularly those made of chlorite had a smoothed and highly polished surface.

Inclusions

Terms: *Hematite, None, Mica, Quartz, Sand, Shell, Leeched Shell*

The default for this variable is none. Inclusions were observed with the naked eye or with a 10E magnifying glass on the surface or at fractures of the specimen. "Leeched

Shell" refers to voids that were left when shell decomposed either upon firing or due to natural decomposition while situated in the ground.

This category was initially labeled temper but during the data collection it became increasingly clear that it is was difficult to determine whether mineral additions in the clay were purposely included or simply natural inclusions. Thus following Agbe-Davies (2004b) and Orton et al. (1993) it has not been assumed that the presence of material inclusions indicates deliberate choices by the pipe maker, nor that they indicate distinct clay beds that can be compared. Rather, following the successful approach used by Agbe-Davies (2004b), the information from this category is used in conjunction with other variables to address material questions.

Fragment or Whole

Terms: *Whole, Whole Bowl (WB), Bowl Fragment (BF), Bowl Stem Juncture (BSJ), Stem Bowl Fragment (SBF), Stem Fragment (SF), Stem Mouthpiece Fragment (SMF), Mouthpiece Fragment (MF)*

As previously noted, the majority of pipes included in my study were fragments, thus it was necessary to designate what kinds of fragments were included. I also thought that this category would be useful if it was necessary to try and determine how many pipes were located at one site. Also, as noted by Agbe-Davies (2004b:149), knowing the completeness of a specimen is useful for calculating rough minimum pipe counts.

Mended

Terms: *Yes or No*

Noting whether the specimen was mended was important because this could affect measurements taken of pipe characteristics.

Bowl Form

Terms: *Bulbous, Cylindrical, Effigy, Elongated, Elongated/Bulbous, Flared, Inverted, Squared, Trumpet, Tulip*

Bowl form has traditionally been one of the primary characteristics used to distinguish different types of historic period pipes. Previous investigations have drawn from the tobacco pipe classifying system developed by Atkinson and Oswald (1969). While this system served as a useful example, the specific classifications did not serve my purposes as many of my specimens were prehistoric and therefore did not fall into the same classifications used by Atkinson and Oswald. Thus, I used information from pipe descriptions in site reports to create different categories that I thought would be more applicable to the data. They are as follows: The term "Bulbous" indicates a bowl that is more wide than long and is inverted towards the rim. "Cylindrical" is the label used for bowls that exhibit a longer length than width, no flare, and no curving back towards rim. Elongated/bulbous describes bowls that are longer than they are wide but invert toward the rim so that they have a bulbous shape. "Elongated" describes bowls where the length is longer than the width, and curves out in middle of bowl then curves back in slightly towards rim. The term "Flared" indicates a bowl that flares out at rim. "Squared" bowls are those that have have carved into a square with four sides. "Trumpet" bowls is a term used by Kent (1984) for bowls that exhibit drastically flaring rims. These bowl are often associated with Susquehanna sites. "Tulip" bowls are another type of bowl form identified by Kent (1984) that is associated with the Susquehanna. These bowls are longer than they are wide, and invert towards the rim. While these bowl types are similar to my categories of "Flared" and "Inverted", it should be noted that I did not want to apply the labels of “Trumpet” and “Tulip” to pipes outside of the Susquehanna territory because this might create associations that were not real. However, as discussed in later chapters, I did compare the bowl forms in these four categories to see if bowls labeled “Flared” and “Inverted” from outside of Susquehanna territory had other indications that they might be from that area.

Bowl Base Form

Terms: Heel, flat, curved, rounded, spur, bulbous, long thin heel

Heel and Flat were also designations used by the Digital Archaeological Archive of Comparative Slavery. “Heel” refers to the presence of a raised flattened, area for the pipe to rest on. “Flat” indicates that there is a flattened surface for the pipe to rest on. I added the term “curved”, which refers to instances where the stem actually curves out from underneath the bowl. “Rounded” designates instances where there is no surface for the pipe to rest on. “Spur” refers to a thin, pointed spur for the pipe to rest on. “Bulbous” refers to junctures that had a bulbous protrusion. Finally a long thin heel describes a heel that ran from one outer edge of the stem to the other.

Bowl Lip Finishing Technique

Terms: *Rounded, Cut, Phalange, Square Phalange, Collared, Beveled, Inverted*

In addition to variations in bowl shape, bowl lips also demonstrated variation. Rounded lips exhibited no finishing techniques but were simply rounded. Cut lips exhibited a flat surface that had been created either by cutting off the upper surface of a clay bowl lip, or by carving or grinding down the lip of a stone pipe. Phalanged and square flanged lips were generally thin, carved extensions of the bowl. Collared areas were thick, appliqué pieces added onto pipe bowls. Beveled lips were carved into sharp angles. Inverted lips were those that were angled inwards.

Stem Shape

Terms: *Rounded, Flattened, Alate, Squared, Triangular, Oval/biconvex, Ovular, Curved*

Although the vast majority of stems were rounded, a number of other shapes were identified. Some shapes were geometric, such as squared or triangular stems. Other differentiations were based on more subtle differences. For example, oval/biconvex stems generally had sizes that ended in two sharp corners, which simulated an eye shape. In contrast, ovular stems had the general ovular shape but did not have the tight corners found on oval/biconvex specimens. Finally alate stems had two phalanges on either side that were larger than those found on biconvex stems.

Mouthpiece Form

Terms: *Cut, Flattened Oval, Nipple, Reed/Stub Stem, Rounded* (Grillo et al. 2003), *Eye-shaped, Squared*

"Cut" refers to a mouthpiece that has not been finished, but was simply cut off with a knife or another sharp object. "Rounded" is a similar category and refers to a mouthpiece that was a simple rounded end, likely hand-formed. "Flattened Oval" refers to mouthpieces were the stem ends in an oval shaped section. "Nipple" refers to circular sectioned stem that has a raised nipple on the end. "Reed/stub Stem" is a label that is used for pipes having stems that end very near to the bowl and have large bores where reeds can be inserted and used as the pipe stem. "Eye-shaped" indicates when a mouthpiece is oval shaped but in contrast to the Flattened Oval, where the sides remain somewhat circular, "Eye-shaped" mouthpieces have an oval shape but with sides that meet at sharp points. Finally, "Squared" mouthpieces are those that are square shaped.

Decorative Aspects

My initial survey of site reports demonstrated that decorations on pipes often featured multiple design elements. In order to derive as much information as possible and keep variables separate for later comparisons, I recorded all of the elements present in the decorations separately. While my designations of individual elements may be somewhat subjective, I focused on those that exhibited patterns and on others that previous researchers had already identified. As explained in detail below I designated a motif, location, technique, and design for each element, which were later compared using GIS.

Decorative Motif

Terms: *Anthropomorphic, Botanical, Geometric, Zoomorphic, Other (Grillo et al. 2003:7)*

Most of these terms are the same used in the Digital Archaeological Archive of Comparative Slavery (DAACS) cataloguing manual to classify decorative motifs. While these classifications were originally designed to catalog historic pipes, I found that they fit with the decorations that were present on the prehistoric specimens as well. "Anthropomorphic" indicates that a human figure has been decorated with an image that depicts a human figure or body part. "Zoological" indicates the presence of an image of an animal, either real or mythological. "Botanical" indicates the presence of an image of botanical, floral, or other plant elements. "Geometric" is the label used when a pipe exhibits an abstract geometric shape, such as a band of diamonds, hanging triangles, or concentric rectangles. Finally, "Other" describes designs that don't fall into any of the previous categories, such as bands of horizontal and diagonal lines, or randomly distributed punctate designs.

Design Location

Terms: ***H:** On Base of Heel, **BB:** Beneath the Bowl when a pipe has neither heel nor spur, **SH:** On Sides of Heel, **SS:** On Sides of Spur, **BF:** On Bowl, facing smoker, **BL:** On Bowl, on left hand side as smoked, **BR:** On Bowl, on right hand side as smoked, **BA:** On Bowl, facing away from the smoker, **BC:** On Bowl, circumference of bowl rim, **BU:***

*On Bowl, unidentified location, **BO:** On Bowl, covering entire bowl, **SX:** On top of the stem, reading across the stem (text encircling the stem), **SA:** On top of the stem, reading along the length of the stem, **SM:** Multiple individual stamps tight around the stem, as a band or pattern, **SR:** Stamp or decoration along the length of stem, on right hand side as smoked, **SL:** Stamp or decoration along the length of stem, on left hand side as smoked, **RS:** Rouletted stem, a continuous band or zone around the stem, **SBJ:** Decoration located at the juncture of the bowl and stem, most often a continuous roulette band around the stem directly at the stem's juncture with the bowl* (Gallio et al. 2003)*, **TP:** Top of bowl*
***SC:** Runs around circumference of stem, **M**: Mouthpiece*

Design location refers to the location of the decorative design on the pipe using the standardized directions listed above. Recording each location allowed me to determine whether certain decorative elements consistently showed up in the same places on pipes. If certain elements consistently showed up in the same location it could indicate shared techniques or interactions between groups.

Decorative Technique

Terms: *Carved, Incised, Knife-Nicked, Molded, Punctate, Dentate-stamped, Shell-Impressed, Reed Stamped, Stamped, Cord-marked*

"Carved" is used to describe points or bases that were carved into stone pipes. "Incised" describes decorations that have been cut into the surface of the pipe with a sharp object. "Knife-nicked" indicates that small ticks have been made with a knife or other sharp object. These are usually very small horizontal nicks that run down the stem of the pipe. "Molded", contrary to its associations with molding devices used to make historic pipes, here means hand molded. It was clear that certain aspects of pipes and stems had been hand molded into certain forms. Given that there was no evidence of the other type of molding production used to manufacture historic pipes, it seemed appropriate to use it here. The term "Punctate" is used when a piercing that goes through the body of the pipe is present. "Dentate-stamped" is used to describe when small, notched or toothed object was used to make rows of dots, slits, or perforations. In some cases it was possible to identify whether the rouletting was made with a watch wheel or shell. These were designated "WR" for watch rouletting and "SI" for shell impressions. "Reed stamped" was used when it was clear that the circular stamps on a pipe had been made by reeds. "Stamped" was used when it was not possible to identify what object had been used to make the impressions in the clay.

Decorative Design

Terms: Horizontal lines connected by diagonal lines, Double horizontal line, Diagonal line, Barred triangle, Band of triangles, Hanging triangles, Band of hanging triangles, Criss-cross diagonal lines (form an X), Criss-cross lines form diamonds, Zig zag line, Vertical lines, Band of horizontal lines, Set of Horizontal lines, Diagonal line connected to circle, Running Deer, Bands of Diagonal Lines, Checkerboard pattern, Faceted, Reed Stamps, Lip is square flanged, Lip is flanged, Bowl is squared, Rim is inverted, Rim has a raised lip, Nested triangles, Nested squares, Nested diamonds, Random lines, Painted bowl, Lines encircling heel, Double parallel lines, While inlay, Filled with vertical lines, Finger pulled, Diamond filled with lines, Hanging Triangles filled with lines, Flanged Pipe, Stem is triangular, Stem is rectangular, Stem is squared, Stem is flattened, Top of stem flattened, Knife nicks, Connecting horizontal lines, Effigy, Ring bowl, Lip on bowl, Multiple triangles, Continuous Rectangles, Bulbous Protrusions, Incised line, Vertical Line Punctate, Curved Stem Fragment, Molded Points, Incised Curved Lines, Arrow, Concentric Rectangles, Line of filled triangles, Stem curved, Notched line, Three parallel lines that form a corner

Most of the design designations are self-explanatory. It is not surprising that there are a multitude of different designs found on pipes all over the region. This field allowed me to record them all individually using either designations that I created or others that I had drawn from site reports and previous studies (Agbe-Davies 2004b; Luckenbach and Kiser 2006). It should be noted that the difference between a "Set of lines" and a "Band of lines" was that a set of lines was not as tightly spaced as a band, but still was distinctly together, set apart from other decorations, and the lines are similar in length and are fairly evenly spaced. "White inlay" refers to a white slip that is found in the recessed of pipes that have been rouletted or incised when decorated. As noted by Agbe-Davies (2004b), it is not clear whether this slip was intended to only be in these recesses or if it originally covered the entire surface of the bowl or stem. "Random lines" indicates that there were lines on a fragment but that it was difficult to tell which direction they were running because the small size of the fragment prevented me from figuring out its orientation.

Tapering

Terms: *Tapers slightly towards mouthpiece, Tapers right before mouthpiece, Tapers drastically towards mouthpiece, Tapers towards stem*

This field was added because a survey of site reports indicated that the majority of researchers indicated whether pipes were tapered and the degree to which they narrowed as they approached the mouthpiece or stem. Tapering information provides further insight into production techniques.

Metric Measurements

While it is obvious that no pipe molds were used to make any of the pipes in my dataset, I did not want to base my arguments solely on nominal variables, as decorative attributes are usually linked to certain kinds of identity. Furthermore, given that this was the first study to explore variation amongst pipes, it was important to discern whether there was any evidence of standardization within assemblages because this could provide further insight into the ways native communities may have been adapting and changing. The variables described below were collected to explore whether isochrestic variations in technical characteristics of pipes could provide some insight into similarities or differences that might be related other facets of social organization, such as learning groups or methods of production. The two figures below show where the measurements were taken on each specimen. These measurements were also drawn from site reports, cataloging manuals (Grillo et al. 2003) and previous studies (Agbe-Davies 2004b).

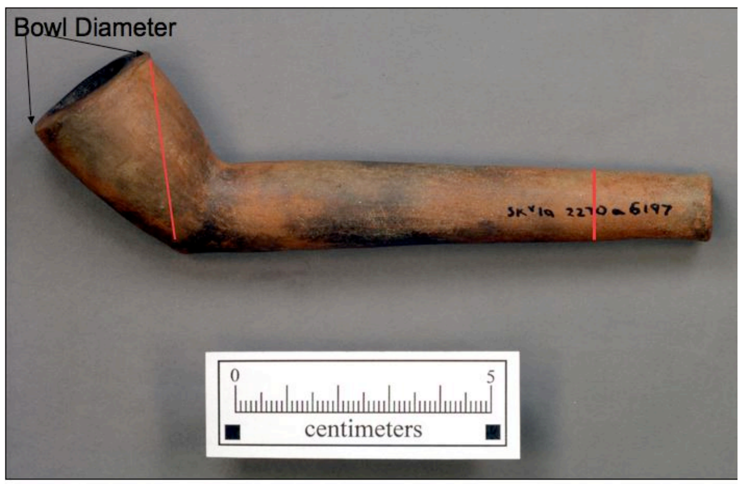
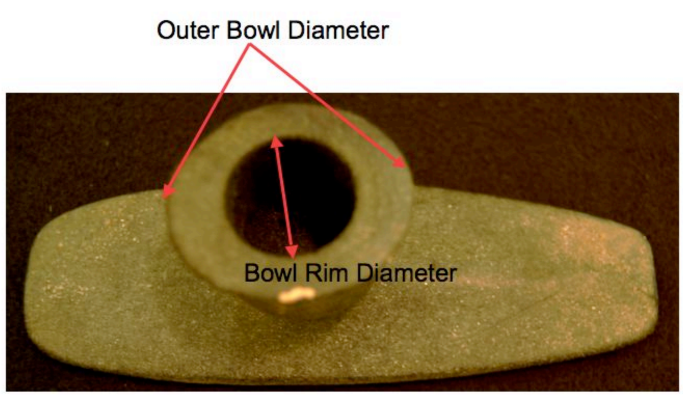


Figure 1: Bowl measurements



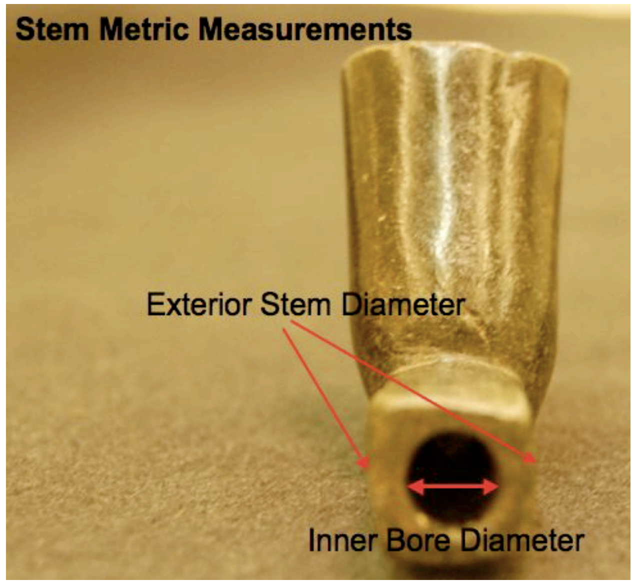


Figure 2: Stem and bore measurements

Bowl Inner Rim Diameter

The interior of the bowl, at the lip, front to back (Agbe-Davies 2004b; Emerson 1988:47). This measurement, along with the bowl's outer diameter, given a general indication of size.

Bowl Outer Rim Diameter

Exterior diameter, at the lip, from front to back (Agbe-Davies 2004b:152; Emerson 1988:47). The measurement, along with the bowl's inner diameter, helps give a general indication of size.

Bowl Height

Bottom of the bowl (in front of heel) to top of inner lip. This measurement obviously depends on enough of the bowl being available to discern its orientation. The measurement, along with the rim and outer diameters helps to determine the size of the bowl.

Bore Diameter

The primary purpose of including this variable was to see if a range of sizes could be discerned and examine whether there was any evidence of standardization. While the bore diameters of historic local and nonlocal pipes are measured on the 64ths of an inch scale following the approaches defined by previous studies (Binford 1961; Deetz 1987; Harrington 1954; Monroe and Mallios 2004), this did not seem relevant for prehistoric specimens as it was likely different makers on different sites were using different tools. Thus, measurements were taken on a metric scale so that both Late Woodland and Contact era pipes could be compared.

Stem Length

This could only be taken if the entire pipe was available or if the fragment included the stem bowl juncture at one end and the mouthpiece on the other. This was other measurement that would primarily be used in conjunction with other measurements to discern whether there was any standardization of pipes. For example, were pipes with similar sized bore diameters also of similar lengths?

Greatest Exterior Diameter of the Mouthpiece of the Stem

This measurement is also used in conjunction with other measurements, especially interior bore diameter to explore whether there were scales of difference or any standardization in production.

Additional Information Fields

Comments

Terms: *Vary*

This field was used to record any comments about the pipe, such as observations about characteristics that did not fit into any of the aforementioned fields or useful notes from any catalog cards associated with the object.

Site Number

Terms: *Vary* (see Table 2 for a complete listing of all the sites included in this project)

Knowing the site each specimen was associated with was obviously crucial for comparative purposes.

Context

Terms: *Vary*

This field was used to document any information about intra-site context that pipes were associated with, such as features or burials, that was provided in site reports or catalog cards.

UTM Coordinates, Lat and Long

Term: *Vary*

In order to map each site in ArcGIS, it was necessary to collect the Lat and Long coordinates so each site could be spatially referenced. It should be noted that all participating facilities granted me permission to use site coordinates for my research. Oftentimes, however, because of the sensitive nature of the data, I was only given coordinates to the minute, rather than the second. Nevertheless, given the scope of this study, the difference of a few feet one way or the other would not affect my results. In order to make coordinates readable in GIS I transformed them to Universal Transverse Mercator (UTM) points using a free online converter found at http://www.rcn.montana.edu/resources/tools/coordinates.aspx. I also made sure that all the coordinates were based on the datum WGS_1984, which was the datum my base map was based on.

Appendix II: LA-ICP-MS Samples

ANID	Sample ID	Site	Comp. Group	Surface Decoration	Rouletted Motif[a]	Other Decoration[b]	Mouthpiece
BB001	18PR853728A-1	Accokeek Creek	1	None	BHL	SS	N/A
BB003	18PR853728C-1	Accokeek Creek	1	None	BDL	WI	N/A
BB005	18PR853728E-1	Accokeek Creek	1	None	BHT	None	N/A
BB006	18PR853728F-1	Accokeek Creek	1	None	BDL/BHL	None	N/A
BB007	18PR853728G-1	Accokeek Creek	1	None	BDL	None	N/A
BB008	18PR853728H-1	Accokeek Creek	1	None	SHL/SBJSHL	None	N/A
BB009	18PR853728I-1	Accokeek Creek	1	None	BHL/BDL	None	N/A
BB010	18PR853728J-1	Accokeek Creek	1	None	BDL	None	N/A
BB012	18PR853728L-1	Accokeek Creek	1	None	BDL	None	N/A
BB013	18PR853728M-1	Accokeek Creek	1	None	BDL	WI	N/A
BB014	18PR853728N-1	Accokeek Creek	1	None	TFHL	None	N/A
BB015	18PR853728O-1	Accokeek Creek	1	None	BDL	None	N/A
BB016	18PR853728P-1	Accokeek Creek	1	None	BDL	None	N/A
BB018	18PR853728R-1	Accokeek Creek	1	None	TFHL	WI	N/A
BB019	18PR853728S-1	Accokeek Creek	1	None	BDL	None	N/A
BB020	18PR853728T-1	Accokeek Creek	1	None	None	None	N/A
BB021	18PR853728U-1	Accokeek Creek	1	None	BHL/BDL	None	N/A
BB022	18PR853728V-1	Accokeek Creek	1	None	BHL/BDL	None	N/A
BB023	18PR853728W-1	Accokeek Creek	1	None	BHT/BDL	None	N/A
BB025	18PR853729A-1	Accokeek Creek	1	Burnished	None	None	N/A
BB026	18PR853729A-2	Accokeek Creek	1	Smoothed	None	None	N/A

BB035	18PR853731D-1	Accokeek Creek	1	None	None	OS	Ovular
BB037	18PR853731F-1	Accokeek Creek	1	None	SHL	None	N/A
BB038	18PR853731G-1	Accokeek Creek	1	None	None	None	N/A
BB039	18PR853731H-1	Accokeek Creek	1	None	None	OS	Ovular
BB040	18PR853731I-1	Accokeek Creek	1	None	None	None	N/A
BB043	18PR853731N-1	Accokeek Creek	1	None	None	None	N/A
BB048	18PR853733A-1	Accokeek Creek	1	Smoothed	None	None	Rectangular
BB053	18PR853733F-1	Accokeek Creek	1	Burnished	None	None	N/A
BB055	18PR853733H-1	Accokeek Creek	1	Burnished	None	None	Rectangular
BB061	18MO13092.001-1	Hughes	1	None	DFHL	None	N/A
BB070	18MO13173.001-1	Hughes	1	None	BHL	None	N/A
BB075	18MO13211B-1	Hughes	1	None	BHL	None	N/A
BB081	18PR853734B-1	Accokeek Creek	1	None	HTFL	None	N/A
BB084	18MO13088-1	Hughes	1	None	TFHL	None	N/A
BB101	44ST2_9-W.5-15-1	Potomac Creek	1	None	BHL	None	N/A
BB106	44ST2_E-14-1g-1	Potomac Creek	1	Burnished	None	None	N/A
BB158	18PR8_419750e-1	Accokeek Creek	1	Smoothed	None	None	N/A
BB160	18PR8_419750g-1	Accokeek Creek	1	Smoothed	None	None	N/A
BB161	18PR8_419750h-1	Accokeek Creek	1	None	SDL	None	N/A
BB162	18PR8_419750i-1	Accokeek Creek	1	Smoothed	None	None	N/A
BB163	18PR8_419750j-1	Accokeek Creek	1	Smoothed	None	None	N/A
BB002	18PR853728B-1	Accokeek Creek	2	None	RFHL/TFHL	None	N/A
BB004	18PR853728D-1	Accokeek Creek	2	None	HTFL	None	N/A
BB017	18PR853728Q-1	Accokeek Creek	2	None	BHL	None	N/A
BB024	18PR853728X-1	Accokeek Creek	2	None	RFDL	WI	N/A
BB027	18PR853729B-1	Accokeek Creek	2	Smoothed	None	None	N/A
BB028	18PR853729C-1	Accokeek Creek	2	Burnished	None	None	Cut
BB029	18PR853729D-1	Accokeek Creek	2	Burnished	None	None	N/A
BB033	18PR853731B-1	Accokeek Creek	2	Smoothed	None	None	Cut

BB034	18PR853731C-1	Accokeek Creek	2	None	None	SS	Rounded
BB036	18PR853731E-1	Accokeek Creek	2	None	None	None	N/A
BB044	18PR853732A-1	Accokeek Creek	2	None	None	None	N/A
BB045	18PR853732B-1	Accokeek Creek	2	None	None	None	N/A
BB046	18PR853732C-1	Accokeek Creek	2	None	None	None	N/A
BB047	18PR853732D-1	Accokeek Creek	2	None	None	None	N/A
BB049	18PR853733B-1	Accokeek Creek	2	None	None	None	Expanding oval
BB050	18PR853733C-1	Accokeek Creek	2	None	None	None	Cut
BB051	18PR853733D-1	Accokeek Creek	2	None	None	None	Expanding oval
BB052	18PR853733E-1	Accokeek Creek	2	None	None	Punctates	N/A
BB057	18MO11064-2A-1	Hughes	2	Burnished	None	None	N/A
BB058	18MO11064-2B-1	Hughes	2	Burnished	None	None	N/A
BB059	18MO13024-1	Hughes	2	Burnished	None	None	N/A
BB060	18MO13090-1	Hughes	2	None	None	None	N/A
BB062	18MO13092.004-1	Hughes	2	None	BHL/BHL	None	N/A
BB063	18MO13094-1	Hughes	2	None	None	None	N/A
BB064	18MO13102-1	Hughes	2	None	None	None	N/A
BB065	18MO13125-1	Hughes	2	None	None	None	N/A
BB066	18MO13159-1	Hughes	2	None	None	None	N/A
BB067	18MO13169.002-1	Hughes	2	None	BHL	None	N/A
BB068	18MO13171A-1	Hughes	2	None	None	None	N/A
BB069	18MO13171B-1	Hughes	2	None	None	None	N/A
BB071	18MO13181-1	Hughes	2	None	None	None	N/A
BB072	18MO13192-1	Hughes	2	None	None	None	N/A
BB073	18MO13210-1	Hughes	2	None	None	None	N/A
BB076	18MO13217-1	Hughes	2	None	None	None	N/A
BB077	18MO13224-1	Hughes	2	None	None	None	N/A
BB078	18MO13233.001-1	Hughes	2	None	DRL	None	N/A
BB079	18PR853673A-1	Accokeek Creek	2	None	None	None	N/A

BB080	18PR853674A-1	Accokeek Creek	2	None	None	None	Rounded
BB083	18MO13055.003-1	Hughes	2	None	VL/DL	None	N/A
BB085	18MO13225-1	Hughes	2	None	BHL	None	N/A
BB086	18MO13235-1	Hughes	2	None	None	None	N/A
BB098	44ST2_3-B-1a-1	Potomac Creek	2	None	BDL	None	N/A
BB165	18PR8_53731J-1	Accokeek Creek	2	None	None	None	N/A
BB159	18PR8_419750f-1	Accokeek Creek	3	Smoothed	None	None	Rounded
BB164	18PR8_419750k-1	Accokeek Creek	3	Burnished	None	None	N/A
BB166	18PR8_53731K-1	Accokeek Creek	3	None	None	None	N/A
BB167	44PA1_382774-1	Keyser	3	Smoothed	None	None	Ovular
BB168	44PA1_382778-1	Keyser	3	None	None	None	N/A
BB171	44PA1_382873-1	Keyser	3	None	BHL	None	Rounded
BB172	44PA1_382875a-1	Keyser	3	None	None	None	N/A
BB173	44PA1_382875b-1	Keyser	3	None	None	None	N/A
BB174	44PA1_382879-1	Keyser	3	None	None	None	Oval
BB175	44PA1_382911-1	Keyser	3	None	HTFL	None	N/A
BB176	44PA1_382922-1	Keyser	3	None	None	None	Expanding oval
BB177	44PA1_382945-1	Keyser	3	None	None	None	Rounded
BB178	44PA1_382948a-1	Keyser	3	None	None	None	N/A
BB179	44PA1_382948b-1	Keyser	3	None	None	None	N/A
BB180	44PA1_382958-1	Keyser	3	None	BHL	None	N/A
BB181	44ST2_196344a-1	Potomac Creek	3	None	None	None	Oval
BB182	44ST2_196344b-1	Potomac Creek	3	None	None	None	Rounded
BB056	18PR853734A-1	Accokeek Creek	4	None	None	SS	N/A
BB087	44ST2_10-C-1-1	Potomac Creek	4	None	None	None	N/A
BB088	44ST2_14-E-1a-1	Potomac Creek	4	None	None	None	Expanding oval
BB089	44ST2_14-E-1b-1	Potomac Creek	4	None	None	None	N/A
BB090	44ST2_14-E-1h-1	Potomac Creek	4	None	None	None	N/A
BB091	44ST2_14-E-1i-1	Potomac Creek	4	None	SFL	None	N/A

BB092	44ST2_14-E-1j-1	Potomac Creek	4	None	None	None	N/A
BB094	44ST2_15-D-1b-1	Potomac Creek	4	None	None	None	N/A
BB095	44ST2_15-D-1c-1	Potomac Creek	4	None	None	None	N/A
BB096	44ST2_15-D-1d-1	Potomac Creek	4	None	None	None	N/A
BB097	44ST2_16-S.5-17-1	Potomac Creek	4	None	None	None	Rounded
BB102	44ST2_E-14-1c-1	Potomac Creek	4	None	None	None	Rounded
BB103	44ST2_E-14-1d-1	Potomac Creek	4	None	None	None	Cut
BB104	44ST2_E-14-1e-1	Potomac Creek	4	None	None	None	N/A
BB105	44ST2_E-14-1f-1	Potomac Creek	4	None	None	None	N/A
BB107	44PA1_A104-F6-03-1	Keyser	4	None	None	None	Cut
BB108	44PA1_C142-L2.2-1	Keyser	4	None	RL	None	N/A
BB109	44PA1_D102-L2.3-1	Keyser	4	None	SFL	None	N/A
BB110	44PA1_F06-4-1	Keyser	4	None	TFHL	None	N/A
BB111	44ST2_17-F-1a-1	Keyser	4	None	None	None	Rectangular
BB112	44ST2_17-F-1b-1	Potomac Creek	4	None	HRL	None	N/A
BB113	44ST2_17-F-1c-1	Potomac Creek	4	None	None	None	N/A
BB115	44ST2_22-C-4-1	Potomac Creek	4	None	None	None	N/A
BB116	44ST2_28-C-3-1	Potomac Creek	4	None	TFHL	None	N/A
BB117	44ST2_28-C-7-1	Potomac Creek	4	None	RL	None	N/A
BB118	44ST2_31-A-10-1	Potomac Creek	4	None	None	None	Cut
BB119	44ST2_40-E.5-15-1	Potomac Creek	4	None	SFL	None	N/A
BB120	44ST2_46-G-1a-1	Potomac Creek	4	None	None	None	N/A
BB121	44ST2_46-G-1b-1	Potomac Creek	4	None	None	None	N/A
BB122	44ST2_50-S.5-26-1	Potomac Creek	4	None	None	None	N/A
BB123	44ST2_62-J-1a-1	Potomac Creek	4	None	None	None	N/A
BB124	44ST2_62-J-1b-1	Potomac Creek	4	None	None	None	N/A
BB125	44ST2_65-K-1-1	Potomac Creek	4	None	None	IL	N/A
BB126	44ST2_66-K1-1a-1	Potomac Creek	4	None	None	None	N/A
BB127	44ST2_66-K1-1b-1	Potomac Creek	4	None	None	None	N/A

BB128	44ST2_H-1a-1	Potomac Creek	4	None	BDL	None	N/A
BB129	44ST2_H-1b-1	Potomac Creek	4	None	TFHL	None	N/A
BB139	44ST2196344b-1	Potomac Creek	4	Burnished	None	None	Rounded
BB140	44ST2196344c-1	Potomac Creek	4	Burnished	None	None	N/A
BB141	44ST2196344d-1	Potomac Creek	4	None	Tri	None	N/A
BB142	44ST2378734a-1	Potomac Creek	4	Burnished	None	None	Expanding oval
BB143	44ST2378734b-1	Potomac Creek	4	Burnished	None	None	Expanding oval
BB144	44ST2378734c-1	Potomac Creek	4	Burnished	None	None	Expanding oval
BB145	44ST2378748a-1	Potomac Creek	4	None	BDL	None	Expanding oval
BB146	44ST2378748b-1	Potomac Creek	4	None	BDL/BHL	None	Expanding oval
BB147	44ST2378754-1	Potomac Creek	4	Smoothed	None	OS	Ovular
BB148	44ST2378776a-1	Potomac Creek	4	Burnished	None	None	Rectangular
BB149	44ST2378776b-1	Potomac Creek	4	Burnished	None	SS	N/A
BB150	44ST2378792-1	Potomac Creek	4	Burnished	None	None	Rectangular
BB151	44ST2378824-1	Potomac Creek	4	Burnished	None	None	Oval
BB152	44ST2378885-1	Potomac Creek	4	Burnished	None	None	Expanding oval
BB153	44ST2378951-1	Potomac Creek	4	Smoothed	None	None	N/A
BB154	44ST2378952-1	Potomac Creek	4	None	BDL	None	Ovular
BB155	44ST2385155_166-1	Potomac Creek	4	None	None	None	Rectangular
BB156	44ST2385155_41-1	Potomac Creek	4	Burnished	None	None	Expanding oval
BB011	18PR853728K-1	Accokeek Creek	Unassigned	None	BDL	WI	N/A
BB030	18PR853730A-1	Accokeek Creek	Unassigned	None	None	None	None
BB041	18PR853731L-1	Accokeek Creek	Unassigned	None	None	None	Rounded
BB042	18PR853731M-1	Accokeek Creek	Unassigned	None	None	None	N/A
BB054	18PR853733G-1	Accokeek Creek	Unassigned	None	CC	None	Rectangular
BB074	18MO13211A-1	Hughes	Unassigned	None	None	None	N/A
BB082	18PR853734C-1	Accokeek Creek	Unassigned	None	None	RB	N/A
BB093	44ST2_15-D-1a-1	Potomac Creek	Unassigned	None	None	None	Flared
BB099	44ST2_3-B-1b-1	Potomac Creek	Unassigned	None	BDL	None	N/A

BB100	44ST2_8-W.5-12A-1	Potomac Creek	Unassigned	None	None	None	N/A
BB114	44ST2_17-F-1d-1	Potomac Creek	Unassigned	None	SHL	None	N/A
BB137	44PA1382958-1	Keyser	Unassigned	Burnished	SVL/SBJSHL	None	N/A
BB157	18PR8_419750b-1	Accokeek Creek	Unassigned	Smoothed	Smoothed	None	N/A
BB169	44PA1_382820-1	Keyser	Unassigned	None	None	None	Rounded
BB170	44PA1_382872-1	Keyser	Unassigned	None	None	None	Rounded
BB130	18PR8419746A-1	Accokeek Creek	Unassigned	None	None	None	None
BB131	18PR8419746B-1	Accokeek Creek	Unassigned	None	None	None	None
BB132	18PR8419746C-1	Accokeek Creek	Unassigned	None	None	None	None
BB133	18PR8419749A-1	Accokeek Creek	Unassigned	DL	None	None	Rectangular
BB134	18PR8419749B-1	Accokeek Creek	Unassigned	BDL	None	None	Rectangular
BB135	18PR8419749C-1	Accokeek Creek	Unassigned	None	None	None	Expanding oval
BB136	18PR8419750A-1	Accokeek Creek	Unassigned	None	None	None	None
BB138	44ST2196344a-1	Potomac Creek	Unassigned	None	None	None	Ovular

[a]: BHL = Band Horizontal Lines, BDL = Band Diagonal Lines, BHT = Band Hanging Triangles, TFHL = Triangle Filled with Horizontal Lines,
SHL = Set Horizontal Lines, SFL = Shape Filled with Lines, VL = Vertical Line of Rouletting, DL = Line of Diagonal Rouletting
[b]:SS = Squared Stem, OS = Ovular Stem, WI= White Inlay, P= Punctates, IL = Incised Line

Appendix III: PCA Values for LA-ICP-MS Analysis

Principal Components Analysis Based on the File: all

Date: 5/31/11

Simultaneous R-Q Factor Analysis Based on Variance-Covariance Matrix

Eigenvalues and Percentage of Variance Explained:

	Eigenvalue	%Variance	Cum. %Var.
1	1.3308	49.9995	49.9995
2	0.4247	15.9578	65.9574
3	0.2027	7.6149	73.5722
4	0.1884	7.0804	80.6526
5	0.1416	5.3220	85.9746
6	0.0742	2.7891	88.7637
7	0.0696	2.6160	91.3797
8	0.0348	1.3080	92.6877
9	0.0315	1.1824	93.8701
10	0.0269	1.0090	94.8791
11	0.0242	0.9104	95.7894
12	0.0171	0.6420	96.4314
13	0.0148	0.5575	96.9889
14	0.0127	0.4758	97.4646
15	0.0118	0.4415	97.9061
16	0.0098	0.3696	98.2757
17	0.0096	0.3594	98.6352
18	0.0068	0.2537	98.8889
19	0.0064	0.2388	99.1277
20	0.0052	0.1962	99.3238
21	0.0039	0.1470	99.4708
22	0.0034	0.1290	99.5998
23	0.0029	0.1082	99.7080
24	0.0026	0.0965	99.8045
25	0.0016	0.0601	99.8647
26	0.0015	0.0569	99.9215
27	0.0010	0.0372	99.9587
28	0.0005	0.0198	99.9785
29	0.0004	0.0136	99.9921
30	0.0002	0.0079	100.0000

```
Eigenvectors (largest to smallest):

Al        0.0258  0.0651 -0.0172 -0.0144 -0.0913  0.1288  0.0391 -
0.0911 -0.0060 -0.0771  0.0833  0.1372 -0.0591 -0.0669  0.0701
0.0978 -0.0966  0.0038  0.1106  0.2396 -0.0828 -0.7940  0.2544 -
0.0870 -0.1552 -0.0241  0.0990 -0.0171  0.0226  0.2861
Ba        0.0682 -0.0197 -0.2434  0.0938  0.1540  0.2154 -0.1263 -
0.3751  0.3832  0.1890 -0.0106 -0.5500  0.1800  0.0551 -0.1292
0.2868 -0.0767  0.1420 -0.0132  0.0062  0.0903 -0.0308  0.0072 -
0.0967 -0.0337  0.1815  0.0361 -0.0085  0.0167  0.0077
Ca        0.0627 -0.0550 -0.4010  0.4102  0.3693 -0.1721  0.0610
0.2185 -0.3482 -0.0148  0.1204  0.0775  0.0244  0.3900 -0.1939
0.2258  0.0880 -0.1494  0.1085 -0.0353 -0.0428 -0.0612  0.0212 -
0.0469 -0.0313  0.0982  0.0122  0.0029  0.0116  0.0334
Ce        0.3166  0.0077  0.1375  0.1108 -0.0696  0.0351  0.2689
0.0815 -0.0997 -0.0581 -0.2329  0.0737  0.0913  0.1055 -0.1160 -
0.1777 -0.2481  0.5523  0.1358 -0.0949  0.0645  0.0870  0.2624 -
0.3024  0.0213  0.2547 -0.0999  0.0259 -0.0561  0.0264
Co       -0.0370 -0.5934  0.0494  0.2366 -0.3745 -0.1786  0.1406 -
0.3172 -0.2929  0.2216  0.2518 -0.0777 -0.0151 -0.1618 -0.1938 -
0.0692 -0.0180  0.0399 -0.0949  0.0159  0.0631 -0.0448 -0.0477
0.0499 -0.0029  0.0055  0.0212 -0.0056  0.0088  0.0005
Cs       -0.1303 -0.2510  0.0954 -0.0406  0.1074  0.3361 -0.0664
0.0363  0.0228  0.3975 -0.3829  0.2387 -0.0275 -0.0091 -0.2712
0.1224 -0.0206 -0.1326  0.1949  0.0127 -0.1601  0.0707  0.3552
0.3169  0.0534 -0.0210 -0.0954  0.0404 -0.0132  0.0003
Dy        0.3059 -0.0434  0.0197 -0.0106 -0.0429  0.0083 -0.3050
0.0792  0.0144  0.0693  0.1108  0.0284 -0.0568 -0.0392 -0.0980 -
0.0267 -0.0149 -0.1247 -0.0127  0.2614 -0.0265  0.0659  0.1088 -
0.3330  0.4174 -0.1143 -0.0154  0.2326  0.5613 -0.0306
Eu        0.3256 -0.0668  0.0761  0.0765 -0.0181  0.0144  0.0723
0.0572  0.1020  0.1527  0.0801 -0.0456 -0.0818 -0.0358  0.1577
0.0341 -0.0441 -0.2226  0.1060  0.1465 -0.1171  0.2119  0.0163 -
0.1702 -0.6792 -0.1618 -0.3529 -0.0633  0.0670 -0.0001
Fe       -0.1049 -0.0565 -0.1193  0.0950 -0.1734  0.2659  0.0159
0.1452  0.2913  0.0185  0.3451  0.2253  0.5962  0.1051 -0.0221 -
0.3507  0.2216 -0.0969  0.0360 -0.0672  0.0024  0.0296  0.0682 -
0.0304 -0.0307  0.1072 -0.0367  0.0203  0.0102  0.1015
Hf        0.0955 -0.2230 -0.3210 -0.4259  0.0260  0.0177  0.1323
0.0448 -0.1736 -0.0450 -0.0776 -0.0437  0.2818 -0.0639  0.1642 -
0.0083 -0.5674 -0.3330 -0.0238 -0.1757  0.0065 -0.0357 -0.0437 -
0.0499  0.0965  0.0377 -0.0641 -0.0261  0.0019  0.0031
K        -0.0977 -0.1378  0.0399  0.0380 -0.0282  0.2132 -0.0215
0.2219 -0.2247  0.1141 -0.1455 -0.4644 -0.0594  0.3852  0.3727 -
0.3315  0.0668  0.0172 -0.0379  0.2791  0.1904 -0.0727  0.0548
0.1327  0.0615 -0.0735 -0.0608  0.0405 -0.0053  0.1033
La        0.2672 -0.0341  0.0851  0.0896 -0.0101  0.1626  0.1987
0.0549  0.0867  0.0015  0.0453  0.0154  0.1918  0.1846 -0.0777
0.1405 -0.1373  0.2225 -0.0365  0.0921 -0.3248 -0.0457 -0.3702
0.1812  0.2007 -0.5676  0.0439 -0.0667 -0.1015  0.0435
```

Lu 0.2200 -0.0651 -0.0967 -0.1018 -0.0384 0.0294 -0.4872
0.0142 -0.1400 -0.0421 0.0050 0.0544 0.0469 0.0424 -0.0554 -
0.0577 -0.0171 0.1988 -0.0444 -0.2510 0.0897 -0.0827 -0.0539
0.1732 -0.3116 -0.1372 0.0894 0.5955 -0.1475 -0.0075
Mg -0.1320 0.0208 -0.0840 0.0788 -0.0616 0.3645 0.0183
0.4793 -0.1708 -0.1473 0.2794 -0.3329 -0.1276 -0.4766 -0.1045
0.1512 -0.0295 0.1381 0.0381 -0.1528 -0.1481 0.0693 0.1103
0.0081 0.0049 -0.0205 -0.0303 -0.0070 0.0023 0.0095
Na -0.0894 -0.5889 0.3667 -0.0099 0.3910 -0.1170 -0.1062
0.1646 0.2706 -0.4411 0.0309 -0.0194 0.0754 0.0092 0.0359
0.1023 -0.0287 0.0495 -0.0286 0.0488 0.0543 -0.0600 0.0405 -
0.0406 -0.0383 0.0335 0.0020 -0.0040 0.0047 0.0103
Nb 0.0916 0.0017 0.0177 -0.0147 -0.0197 0.2107 0.0427 -
0.3036 -0.0125 -0.3605 0.0916 -0.0639 -0.2340 0.1378 -0.1180 -
0.1258 0.1039 -0.1461 0.1320 -0.1426 -0.1572 -0.1183 -0.1166
0.1204 0.2003 0.1568 -0.6170 0.1422 -0.0543 -0.0297
Nd 0.3413 0.0209 0.1237 0.0944 -0.0091 0.0446 0.2187
0.1482 0.1226 0.0113 -0.0116 -0.0362 -0.0692 -0.0678 0.0301 -
0.0614 -0.0545 -0.1117 0.0780 -0.0016 0.0005 -0.0822 -0.2505
0.4848 -0.0788 0.4568 0.2972 0.0938 0.3400 -0.0511
Rb -0.1243 -0.1574 0.0061 0.0291 0.0429 0.3129 -0.0141
0.1109 0.0290 0.1519 -0.2383 0.1034 -0.2147 -0.0173 -0.1343 -
0.1488 0.0668 -0.0708 0.1121 -0.1916 0.1135 -0.1867 -0.5651 -
0.4707 -0.0723 0.0146 0.1163 -0.0439 0.0130 -0.0117
Sc -0.0044 -0.1814 -0.0103 0.0167 -0.0931 0.0490 -0.1392 -
0.0684 -0.0153 0.1416 0.0615 0.0931 -0.1017 0.1455 0.5649
0.1731 0.1065 0.1455 -0.0212 -0.2473 -0.5643 0.0508 0.0227 -
0.1366 0.0918 0.2460 0.1183 -0.0031 0.0048 -0.0277
Si2 0.0106 0.0073 0.0313 -0.0341 0.0306 -0.0846 -0.0078 -
0.0239 0.0096 0.0172 -0.0503 -0.0148 -0.0679 -0.0470 -0.0414
0.0321 0.0213 -0.0273 -0.0581 -0.0987 -0.0123 0.2369 -0.1035
0.0199 0.0446 0.0535 -0.0217 0.0529 0.0373 0.9408
Sm 0.3383 -0.0263 0.1286 0.0768 -0.0246 -0.0110 0.1672
0.1093 0.1577 0.1575 0.0213 -0.0465 -0.0926 0.0046 0.1399
0.1406 0.2277 -0.2026 -0.1786 -0.5322 0.3480 -0.1873 0.2549 -
0.0166 0.1906 -0.2064 -0.0280 -0.0564 -0.0962 0.0010
Sr 0.1003 -0.1014 -0.4046 0.3476 0.3467 0.0694 0.0275 -
0.1660 0.1202 -0.0329 -0.1083 0.1999 -0.1323 -0.4190 0.2978 -
0.3380 -0.0270 0.1285 -0.0713 0.0831 0.0510 0.0402 0.0323
0.1082 0.0993 -0.1408 -0.0352 0.0064 -0.0348 0.0116
Ta 0.0736 -0.0315 0.0016 -0.0035 -0.0052 0.2803 0.0383 -
0.2983 -0.0700 -0.3455 0.0601 -0.0589 -0.1897 0.2042 -0.1106 -
0.2057 -0.0458 -0.1939 0.0905 -0.1404 -0.0656 0.2502 0.2619 -
0.0487 -0.1242 -0.1981 0.5231 -0.1534 0.0591 0.0131
Tb 0.3238 -0.0234 0.0595 0.0072 -0.0311 0.0082 -0.1793
0.1135 0.0541 0.0654 0.1136 -0.0221 -0.0992 -0.0848 -0.0805 -
0.0679 -0.0269 -0.2485 0.0318 0.3151 -0.0581 0.0656 -0.0129 -
0.0968 0.1899 0.2385 0.1644 -0.0271 -0.7038 0.0117
Th 0.0651 -0.0170 -0.0273 -0.0136 -0.0367 0.3565 0.1132 -
0.0296 -0.1439 -0.1482 -0.1241 0.1990 0.0178 0.0407 -0.0470

0.2174 0.1027 -0.0271 -0.7727 0.2029 0.0495 0.0697 -0.0047 -
0.0520 -0.1117 0.1663 -0.0373 0.0368 0.0130 -0.0258
U   0.2137 -0.0579 0.0000 -0.0666 -0.0330 -0.0036 0.0416 -
0.1173 -0.2909 -0.2045 -0.3745 -0.1416 0.4021 -0.2827 0.0814
0.1251 0.5361 -0.0715 0.2566 0.0793 -0.0552 -0.0020 -0.0456 -
0.0627 0.0073 -0.0292 0.0663 -0.0183 0.0041 0.0022
V   -0.0180 -0.0553 -0.0385 0.0141 -0.1648 0.2599 -0.0107 -
0.0778 -0.0476 -0.0956 0.1844 0.2839 -0.0641 0.0645 0.2791
0.4241 -0.0725 0.0932 0.3689 0.1473 0.5086 0.2167 -0.1086
0.0642 0.0858 0.0093 -0.0121 0.0126 -0.0252 0.0188
Yb   0.2380 -0.0489 -0.0702 -0.0863 -0.0461 0.0268 -0.4960
0.0540 -0.1162 -0.0191 0.0121 0.0751 0.0044 0.0299 -0.0879 -
0.0815 0.0207 0.1737 -0.0538 -0.0819 0.0774 -0.0762 -0.0520
0.1871 -0.0378 0.0707 -0.1296 -0.7170 0.1165 0.0358
Zn   -0.0649 -0.1050 -0.3033 0.2811 -0.5634 -0.1713 -0.0991
0.2023 0.3269 -0.2964 -0.4083 -0.0365 -0.0975 0.0799 -0.0357
0.1032 -0.0815 -0.1089 -0.0047 0.0107 -0.0492 0.0116 0.0341
0.0299 0.0012 -0.0458 -0.0141 0.0004 -0.0092 0.0023
Zr   0.1063 -0.2355 -0.4079 -0.5484 -0.0113 -0.0931 0.2743
0.1237 0.1964 0.0430 0.1065 0.0168 -0.2770 0.0940 -0.1326 -
0.0278 0.3471 0.2505 0.0454 0.1361 -0.0057 0.0244 0.0509
0.0239 -0.0320 -0.0158 0.0424 0.0100 0.0026 -0.0071

Scaled Factor Loading Matrix (largest to smallest component):

Al   0.0297 0.0424 -0.0077 -0.0063 -0.0344 0.0351 0.0103 -
0.0170 -0.0011 -0.0126 0.0130 0.0179 -0.0072 -0.0075 0.0076
0.0097 -0.0095 0.0003 0.0088 0.0173 -0.0052 -0.0465 0.0137 -
0.0044 -0.0062 -0.0009 0.0031 -0.0004 0.0004 0.0042
Ba   0.0786 -0.0128 -0.1096 0.0407 0.0580 0.0587 -0.0333 -
0.0700 0.0680 0.0310 -0.0016 -0.0719 0.0219 0.0062 -0.0140
0.0284 -0.0075 0.0117 -0.0010 0.0005 0.0056 -0.0018 0.0004 -
0.0049 -0.0013 0.0071 0.0011 -0.0002 0.0003 0.0001
Ca   0.0723 -0.0359 -0.1805 0.1781 0.1390 -0.0469 0.0161
0.0408 -0.0618 -0.0024 0.0187 0.0101 0.0030 0.0439 -0.0210
0.0224 0.0086 -0.0123 0.0087 -0.0026 -0.0027 -0.0036 0.0011 -
0.0024 -0.0013 0.0038 0.0004 0.0001 0.0002 0.0005
Ce   0.3653 0.0050 0.0619 0.0481 -0.0262 0.0096 0.0710
0.0152 -0.0177 -0.0095 -0.0363 0.0096 0.0111 0.0119 -0.0126 -
0.0176 -0.0243 0.0454 0.0108 -0.0069 0.0040 0.0051 0.0141 -
0.0153 0.0009 0.0099 -0.0031 0.0006 -0.0011 0.0004
Co   -0.0427 -0.3867 0.0222 0.1027 -0.1410 -0.0486 0.0371 -
0.0592 -0.0520 0.0363 0.0392 -0.0102 -0.0018 -0.0182 -0.0210 -
0.0069 -0.0018 0.0033 -0.0076 0.0011 0.0039 -0.0026 -0.0026
0.0025 -0.0001 0.0002 0.0007 -0.0001 0.0002 0.0000
Cs   -0.1503 -0.1636 0.0429 -0.0176 0.0404 0.0916 -0.0175
0.0068 0.0040 0.0651 -0.0596 0.0312 -0.0034 -0.0010 -0.0294
0.0121 -0.0020 -0.0109 0.0155 0.0009 -0.0100 0.0041 0.0191
0.0161 0.0021 -0.0008 -0.0030 0.0009 -0.0003 0.0000

Dy 0.3529 -0.0283 0.0089 -0.0046 -0.0161 0.0023 -0.0805
0.0148 0.0026 0.0114 0.0173 0.0037 -0.0069 -0.0044 -0.0106 -
0.0026 -0.0015 -0.0102 -0.0010 0.0189 -0.0017 0.0039 0.0058 -
0.0169 0.0167 -0.0044 -0.0005 0.0053 0.0107 -0.0004
Eu 0.3756 -0.0435 0.0343 0.0332 -0.0068 0.0039 0.0191
0.0107 0.0181 0.0250 0.0125 -0.0060 -0.0100 -0.0040 0.0171
0.0034 -0.0043 -0.0183 0.0085 0.0106 -0.0073 0.0124 0.0009 -
0.0086 -0.0272 -0.0063 -0.0111 -0.0015 0.0013 0.0000
Fe -0.1210 -0.0368 -0.0537 0.0412 -0.0653 0.0725 0.0042
0.0271 0.0517 0.0030 0.0537 0.0294 0.0726 0.0118 -0.0024 -
0.0348 0.0217 -0.0080 0.0029 -0.0049 0.0001 0.0017 0.0037 -
0.0015 -0.0012 0.0042 -0.0012 0.0005 0.0002 0.0015
Hf 0.1102 -0.1453 -0.1445 -0.1849 0.0098 0.0048 0.0349
0.0084 -0.0308 -0.0074 -0.0121 -0.0057 0.0343 -0.0072 0.0178 -
0.0008 -0.0555 -0.0274 -0.0019 -0.0127 0.0004 -0.0021 -0.0023 -
0.0025 0.0039 0.0015 -0.0020 -0.0006 0.0000 0.0000
K -0.1127 -0.0898 0.0179 0.0165 -0.0106 0.0581 -0.0057
0.0414 -0.0399 0.0187 -0.0227 -0.0607 -0.0072 0.0433 0.0404 -
0.0329 0.0065 0.0014 -0.0030 0.0202 0.0119 -0.0043 0.0029
0.0067 0.0025 -0.0029 -0.0019 0.0009 -0.0001 0.0015
La 0.3082 -0.0222 0.0383 0.0389 -0.0038 0.0443 0.0524
0.0102 0.0154 0.0002 0.0071 0.0020 0.0234 0.0208 -0.0084
0.0139 -0.0134 0.0183 -0.0029 0.0067 -0.0203 -0.0027 -0.0199
0.0092 0.0080 -0.0221 0.0014 -0.0015 -0.0019 0.0006
Lu 0.2538 -0.0424 -0.0435 -0.0442 -0.0145 0.0080 -0.1286
0.0026 -0.0248 -0.0069 0.0008 0.0071 0.0057 0.0048 -0.0060 -
0.0057 -0.0017 0.0163 -0.0035 -0.0181 0.0056 -0.0048 -0.0029
0.0088 -0.0125 -0.0053 0.0028 0.0137 -0.0028 -0.0001
Mg -0.1523 0.0136 -0.0378 0.0342 -0.0232 0.0993 0.0048
0.0894 -0.0303 -0.0241 0.0435 -0.0435 -0.0155 -0.0536 -0.0113
0.0150 -0.0029 0.0113 0.0030 -0.0110 -0.0093 0.0041 0.0059
0.0004 0.0002 -0.0008 -0.0010 -0.0002 0.0000 0.0001
Na -0.1031 -0.3838 0.1651 -0.0043 0.1471 -0.0319 -0.0280
0.0307 0.0480 -0.0723 0.0048 -0.0025 0.0092 0.0010 0.0039
0.0102 -0.0028 0.0041 -0.0023 0.0035 0.0034 -0.0035 0.0022 -
0.0021 -0.0015 0.0013 0.0001 -0.0001 0.0001 0.0001
Nb 0.1057 0.0011 0.0080 -0.0064 -0.0074 0.0574 0.0113 -
0.0567 -0.0022 -0.0591 0.0143 -0.0084 -0.0285 0.0155 -0.0128 -
0.0125 0.0102 -0.0120 0.0105 -0.0103 -0.0098 -0.0069 -0.0063
0.0061 0.0080 0.0061 -0.0194 0.0033 -0.0010 -0.0004
Nd 0.3938 0.0136 0.0557 0.0410 -0.0034 0.0122 0.0577
0.0277 0.0218 0.0019 -0.0018 -0.0047 -0.0084 -0.0076 0.0033 -
0.0061 -0.0053 -0.0092 0.0062 -0.0001 0.0000 -0.0048 -0.0134
0.0246 -0.0032 0.0178 0.0093 0.0022 0.0065 -0.0007
Rb -0.1434 -0.1026 0.0027 0.0126 0.0161 0.0852 -0.0037
0.0207 0.0052 0.0249 -0.0371 0.0135 -0.0261 -0.0020 -0.0146 -
0.0148 0.0065 -0.0058 0.0089 -0.0138 0.0071 -0.0109 -0.0303 -
0.0239 -0.0029 0.0006 0.0037 -0.0010 0.0002 -0.0002
Sc -0.0051 -0.1183 -0.0047 0.0073 -0.0351 0.0133 -0.0367 -
0.0128 -0.0027 0.0232 0.0096 0.0122 -0.0124 0.0164 0.0612

0.0172 0.0104 0.0120 -0.0017 -0.0179 -0.0353 0.0030 0.0012 -
0.0069 0.0037 0.0096 0.0037 -0.0001 0.0001 -0.0004
Si2   0.0123 0.0048 0.0141 -0.0148 0.0115 -0.0230 -0.0021 -
0.0045 0.0017 0.0028 -0.0078 -0.0019 -0.0083 -0.0053 -0.0045
0.0032 0.0021 -0.0022 -0.0046 -0.0071 -0.0008 0.0139 -0.0056
0.0010 0.0018 0.0021 -0.0007 0.0012 0.0007 0.0137
Sm   0.3902 -0.0171 0.0579 0.0333 -0.0093 -0.0030 0.0441
0.0204 0.0280 0.0258 0.0033 -0.0061 -0.0113 0.0005 0.0152
0.0139 0.0223 -0.0166 -0.0142 -0.0385 0.0218 -0.0110 0.0137 -
0.0008 0.0076 -0.0080 -0.0009 -0.0013 -0.0018 0.0000
Sr   0.1158 -0.0661 -0.1822 0.1509 0.1305 0.0189 0.0072 -
0.0310 0.0213 -0.0054 -0.0169 0.0261 -0.0161 -0.0471 0.0323 -
0.0335 -0.0026 0.0106 -0.0057 0.0060 0.0032 0.0024 0.0017
0.0055 0.0040 -0.0055 -0.0011 0.0001 -0.0007 0.0002
Ta   0.0849 -0.0205 0.0007 -0.0015 -0.0020 0.0764 0.0101 -
0.0557 -0.0124 -0.0566 0.0094 -0.0077 -0.0231 0.0230 -0.0120 -
0.0204 -0.0045 -0.0159 0.0072 -0.0101 -0.0041 0.0147 0.0141 -
0.0025 -0.0050 -0.0077 0.0165 -0.0035 0.0011 0.0002
Tb   0.3735 -0.0152 0.0268 0.0031 -0.0117 0.0022 -0.0473
0.0212 0.0096 0.0107 0.0177 -0.0029 -0.0121 -0.0095 -0.0087 -
0.0067 -0.0026 -0.0204 0.0025 0.0228 -0.0036 0.0038 -0.0007 -
0.0049 0.0076 0.0093 0.0052 -0.0006 -0.0134 0.0002
Th   0.0751 -0.0111 -0.0123 -0.0059 -0.0138 0.0971 0.0299 -
0.0055 -0.0255 -0.0243 -0.0193 0.0260 0.0022 0.0046 -0.0051
0.0216 0.0100 -0.0022 -0.0616 0.0147 0.0031 0.0041 -0.0003 -
0.0026 -0.0045 0.0065 -0.0012 0.0008 0.0002 -0.0004
U   0.2465 -0.0377 0.0000 -0.0289 -0.0124 -0.0010 0.0110 -
0.0219 -0.0516 -0.0335 -0.0583 -0.0185 0.0490 -0.0318 0.0088
0.0124 0.0524 -0.0059 0.0205 0.0057 -0.0035 -0.0001 -0.0024 -
0.0032 0.0003 -0.0011 0.0021 -0.0004 0.0001 0.0000
V   -0.0208 -0.0360 -0.0173 0.0061 -0.0620 0.0708 -0.0028 -
0.0145 -0.0084 -0.0157 0.0287 0.0371 -0.0078 0.0073 0.0303
0.0421 -0.0071 0.0077 0.0294 0.0106 0.0318 0.0127 -0.0058
0.0033 0.0034 0.0004 -0.0004 0.0003 -0.0005 0.0003
Yb   0.2746 -0.0319 -0.0316 -0.0375 -0.0174 0.0073 -0.1309
0.0101 -0.0206 -0.0031 0.0019 0.0098 0.0005 0.0034 -0.0095 -
0.0081 0.0020 0.0143 -0.0043 -0.0059 0.0048 -0.0045 -0.0028
0.0095 -0.0015 0.0028 -0.0041 -0.0164 0.0022 0.0005
Zn   -0.0749 -0.0684 -0.1365 0.1220 -0.2120 -0.0467 -0.0261
0.0377 0.0580 -0.0486 -0.0636 -0.0048 -0.0119 0.0090 -0.0039
0.0102 -0.0080 -0.0090 -0.0004 0.0008 -0.0031 0.0007 0.0018
0.0015 0.0000 -0.0018 -0.0004 0.0000 -0.0002 0.0000
Zr   0.1226 -0.1535 -0.1836 -0.2381 -0.0043 -0.0254 0.0724
0.0231 0.0348 0.0070 0.0166 0.0022 -0.0337 0.0106 -0.0144 -
0.0028 0.0340 0.0206 0.0036 0.0098 -0.0004 0.0014 0.0027
0.0012 -0.0013 -0.0006 0.0013 0.0002 0.0000 -0.0001