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Interpreting Ritual in Ceramics of Late Mississippian Southern Illinois

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INTERPRETING RITUAL IN CERAMICS OF LATE MISSISSIPPIAN SOUTHERN ILLINOIS

by

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A Thesis
Submitted in Partial Fulfillment of the Requirements for the
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Master of Arts

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This research aims to understand whether and how ritual manifests in ceramic objects dating to the Late Mississippian Period (ca. late 1200s A.D. to A.D. 1500) in southern Illinois. The study focuses on ritual phenomena that occurred at two village sites: Millstone Bluff (11Pp3) and Dillow's Ridge (11U635). Millstone Bluff has been interpreted as a site of public ritual and unusual symbolic importance evidenced by its general location and topography, spatial organization, and distinctive rock art. Though Dillow's Ridge was the locale for an inordinate level of lithic tool production, in other ways the site is understood to be typical of Mississippian villages for this region and time and unlikely to have accommodated large-scale public ritual activity. Through the analysis and comparison of ceramics from each site, this research seeks to identify the ceramic correlates of public ritual activity for this region and time. Statistical results suggest very little differentiation between the ceramic assemblages, suggesting the ritual activities that took place at either site may not have been substantially different from one another. Alternatively, the lack of differentiation may indicate ceramics do not play an active role in large-scale public ritual activity in this context.

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CHAPTER 1

INTRODUCTION

For the past half century, Southeastern archaeologists have attempted to identify measures of ritual activity and social status by analyzing various attributes exhibited in ceramic assemblages (Alt 2001; Blitz 1993; Carey 2006; Childress 1992; Claassen 2015; Kassabaum 2014; Kruchten 2004; Pauketat and Koldehoff 2002; Sears 1973; Steponaitis 1983; Welch and Scarry 1995; Wilson 1999). However, these studies have demonstrated that ceramic indicators of social phenomena are highly variable between different contexts and that the application of a single model for interpreting ritual through ceramics is problematic. Due to the great variation in both ceramics and the degree and type of ritual throughout the Mississippian Southeast (Figure 1.1), greater consideration must be given to regional and temporal contexts in the creation of models for ceramic correlates of ritual practices. As such, models of ritualistic ceramics remain unclear in some regions. This study aims to understand the applicability of existing models to Late Mississippian southern Illinois contexts (Figure 1.2) and to elucidate how ceramics may or may not have varied in relation to ritual practices.

As a case study for this region, this study compares materials from two sites in southern Illinois in order to examine the ritual framework of ceramic use in this regional and temporal context. The Millstone Bluff site (11PP3) has been interpreted as a site of public ritual and unusual symbolic importance evidenced by its general location and topography, spatial organization, and distinctive rock art (Butler and Cobb 2012; Wagner et al. 2004). Though Dillow's Ridge (11U635) was the locale for abundant chert tool production, in other ways the site is understood to be typical of Mississippian villages for this region and time (Cobb 2000; Thomas 1994, 1995). These sites

and their current archaeological interpretations have presented a unique opportunity to examine ritual and how it physically manifests in public and private settings. Several excavations at both sites have yielded the wealth of ceramic artifacts used to conduct the detailed analysis and comparison necessitated by this study. The presence and absence of several ceramic types and attributes are evaluated to understand whether and how ritual manifests.

The study of Late Mississippian period ceramics and their use in interpreting ritual has been minimal in the Ohio River Valley of southern Illinois. Drawing from what is known about Millstone Bluff and Dillow's Ridge, these sites provide a basis from which the relationship between ritual and ceramics from this specific context may be assessed. Using the ceramic refuse recovered from excavations at both sites, the following set of complementary questions will be addressed:

1. How do the ceramics of Millstone Bluff compare to the ceramics of Dillow's Ridge? If ceramics in this context can provide insight into symbolic activities, samples between Millstone Bluff and Dillow's Ridge should have attributes that are predominantly associated, respectively, with public and domestic ritual.
2. Does ritual manifest in the Late Mississippian ceramics of Southern Illinois? If so, what are the ceramic correlates of public and domestic ritual in this context? If ceramics contain manifestations of ritual, the differing forms of ritual practice at Millstone Bluff and Dillow's Ridge should produce variations in ceramic materials in terms of type and attribute frequencies.
3. What do the ceramic assemblages reveal about ritual practices at each site? Do the ceramics reflect previous interpretations of Millstone Bluff as a site of large-scale, public ritual activity? If ceramics can provide insight into the activities of the people at each location,

the degree and type of ritual at each site may be determinate. Based on conceptions of Mississippian public ritual, the Millstone Bluff assemblage should demonstrate evidence for ceremonial gathering, such as feasting-ware, larger and elevated levels of food storage vessels, and mass deposition episodes, whereas the largely domestic Dillow's Ridge assemblage should present a relative lack of large-scale activity.

Importance of Research

Several factors contribute to the archaeological importance of this research. In recognition of the multiscalar and multidimensional nature of ritual and the wealth of data ceramic analysis can generate, this research is intended to reveal more information about the peoples who lived in the remote uplands of southern Illinois in the Late Mississippian period. Several attributes of the Millstone Bluff site have led to its interpretation as a principal settlement in the region during this period. Despite the site's importance, little is understood about the activities of people who lived there in the late prehistoric centuries or their social, economic, political, or religious roles within the broader Millstone Bluff polity. The abundance of materials collected from four seasons of excavations at the Millstone Bluff site provide numerous avenues through which new and looming anthropological questions may be addressed. This research aims to further develop our understanding of the Late Mississippian period occupation of the site, permitting future studies to explore other social dynamics at play in this sociopolitical context of settlement depopulation and increased migration.

Furthermore, this research examines the physical manifestations of ritual processes, specifically evaluating present conceptions of ritualistic or high-status ceramic materials. While

ceramics have been analyzed for numerous purposes in archaeological contexts throughout the Mississippian Southeast, the role of ceramic materials in ritual activities are less understood for the Late Mississippian cultures of that took residence in the upland hills of southern Illinois. This study aims to illuminate specific ceramic attributes that are most helpful in providing information about ritual in this regional and temporal context.

Organization of Research

The following chapter summarizes key theoretical conceptualizations of ritual developed throughout the history of anthropological and archaeological research (Chapter 2). This historical overview of theory also discusses the role of ritual practice in society and the many forms ritual can take. Next, background is provided on the history of ceramic analysis in archaeology. Additionally, reviews of several case studies based throughout the Mississippian Southeast provide a regional perspective. These studies are specifically chosen for discussion as they have shaped present functional understandings of ceramic variation as well as models of ritualistic and status-based ceramics in the Mississippian period, thus creating the basis from which the comparison of ceramics from Millstone Bluff and Dillow's Ridge is conducted. The expected ceramic correlates as shaped by these models are presented in detail. The final portion of this chapter provides an overview of the Mississippian period in the lower Ohio River Valley, particularly in Southern Illinois, to convey the broader sociopolitical context within which this study is set. The archaeological interpretations of the Millstone Bluff and Dillow's Ridge sites are further discussed, including how ritual is conceived to have occurred at either site.

After the theoretical, methodological, and contextual backgrounds are established, Chapter 3 reviews the methods and materials used in conducting this study. Information on the excavations by which the analyzed ceramic assemblages were collected are summarized. Importantly, reasoning is provided for the selection of these two sites as the foci of this study of Late Mississippian ceramics and ritual. The chapter ends with an overview of the laboratory methods through which ceramic data were collected and the statistical methods used to compare the two sites. The chapter that follows presents the findings of the ceramic assemblage analyses, including general ceramic attribute frequencies observed at each site and the results of the statistical tests (Chapter 4).

The last chapter entails the anthropological implications of the ceramic analysis results and the interpretation of how ritual may be understood through Late Mississippian ceramics of southern Illinois (Chapter 5). The findings of this case study are broadly compared to those of several parallel studies based in the Southeast. Finally, concluding remarks discuss the general takeaways of this research and potential directions future research related to this topic may consider.

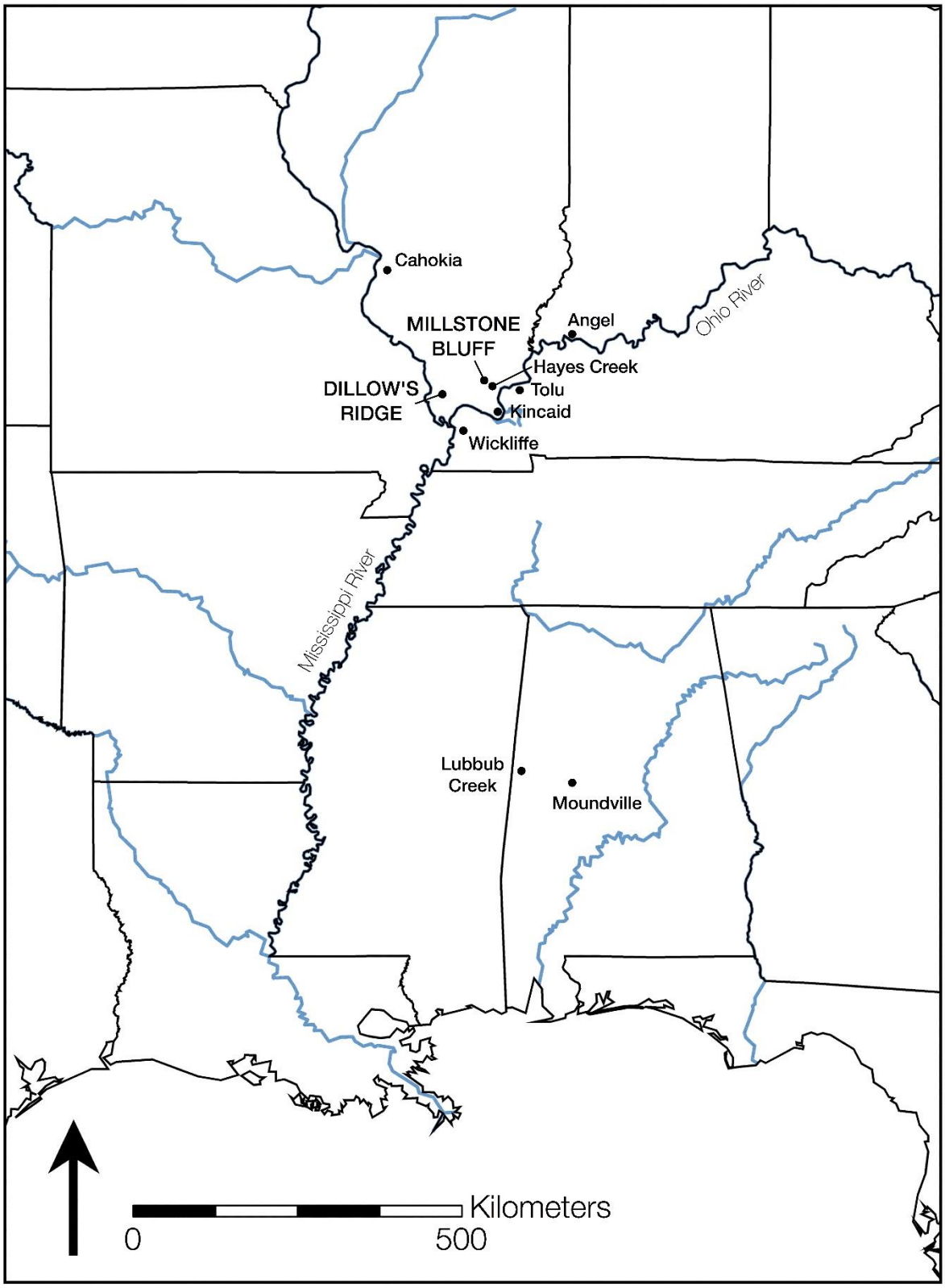

Figure 1.1. Location of sites discussed in text.

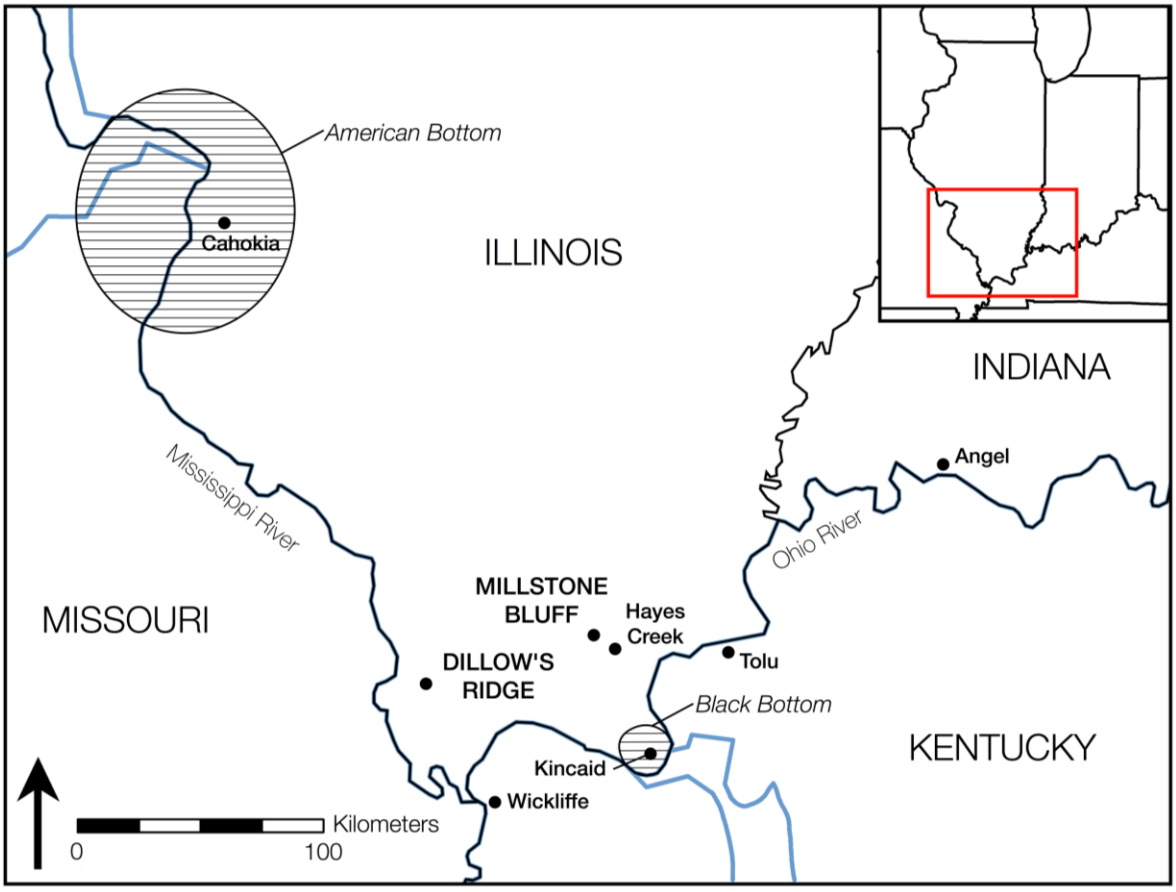

Figure 1.2. Sites discussed in text located in and near the lower Ohio River Valley.

CHAPTER 2

BACKGROUND

Ritual has a long history of research in both anthropology and archaeology. This chapter summarizes some of the many theoretical developments in ritual studies over time, including how ritual has been defined, its social implications, and the forms it takes in cultures and societies. Major approaches to ritual in archaeology are also discussed, with special attention paid to the Mississippian Southeast and the utility of ceramic analysis in this region. An overview of several studies exploring the social implications of Mississippian ceramics demonstrates the numerous ceramic attributes useful for understanding social status and ritual activity.

Following discussion of the study's theoretical background, this chapter situates Millstone Bluff and Dillow's Ridge within the broader regional context of the lower Ohio River Valley, providing information on the sociopolitical climate of the Late Mississippian period in this region. Additional discussion expands on the known histories of each site as well as the archaeological evidence that has allowed for interpretations of differing site function. Lastly, the position this study takes in terms of its conception of ritual for the purposes of discussing Late Mississippian ritual and ceramics is provided.

Ritual

Conceptualization of ritual has been a continuous process throughout the history of anthropological discourse. The definition of ritual itself is dynamic; in its broadest anthropological sense, ritual is the repetitive social practice of symbolic behaviors that may take on many forms,

scales, and purposes. Rappaport (1999:24) defined ritual as "the performance of more or less invariant sequences of formal acts and utterances not entirely encoded by the performers." Historically, many perspectives have viewed ritual as deeply associated with or exclusive to religious practice—as a phenomenon nested in religion (Bell 1997; Douglas 2003[1970]; Durkheim 1912; Frazer 1890; Geertz 1973; Rappaport 1999; Turner 1967). In this interpretation, ritual has been construed as the observable, symbolic manifestation of the otherwise intangible religious belief (Fogelin 2008b:3). This understanding has encouraged anthropologists to look more closely at ritual symbolism to discern religion and other less conspicuous schema of cultures and societies. However, though many continue to emphasize the role of ritual in religion, others have more recently broadened its meaning to also include secular symbolic activities or have more greatly considered the secular roles ritual may have in a society (Kyriakidis 2007; Renfrew 2007).

Anthropologists have been keenly interested in how and why ritual has become an integral component of society due to its pervasiveness in cultures throughout time and space. Religious studies scholar Catherine Bell (1992) perceived a trend in how this interest has been academically pursued: one way in which ritual is a means to an end—a *tool* for understanding another sociocultural dynamic—and another way in which it is a *subject* in and of itself. Between both orientations, many have sought to understand rituals in terms of their meanings, functions, and implications. As a symbolic activity, ritual has meaning to its participants. It is through the intended meaning that society may be actively shaped. Whether religious or secular, it is clear ritual acts as a powerful means of communication and is perhaps essential to human sociality (Rappaport 1999). Ritual may literally communicate shared beliefs or ideas within a group—especially to those becoming integrated or desiring to identify as a group member, such as in a rite of passage. However, its most powerful means of communication is symbolic in nature. As Barbara

Myerhoff (1984:155) describes, ritual is "a form by which culture presents itself to itself. In ritual, not only are particular messages delivered, but the ritual also creates a world in which cultures can appear." Rituals aid in establishing social conventions and contracts by inculcating sets of ideals, meaning, and purpose that structure social norms and values (Rappaport 1999 as cited by Stephenson 2015).

Though many rituals become traditions that are passed down from generation to generation, the associated ideological meanings of these rituals are unfixed; as rituals are practiced, they may change in orientation and significance, with meanings strengthened or reconstructed by people over time and throughout successive acts of participation (Bell 1997; Hill 2011; Humphrey and Laidlaw 1994; Virtanen 2011). Furthermore, ritual meaning may be socially inscribed, but it can be individually altered. In this sense, ritual, motivated by flexible ideologies, can establish social structure through the purposeful actions or unintended consequences of social agency. Therefore, ritual can act not only as a way to preserve memories and traditions of the past, but it can simultaneously be an innovative process that promotes social transformation and, in some cases, ethnogenesis (Basso 2011; Hornborg and Hill 2011; Levi-Strauss 1964 as cited by Virtanen 2011; Virtanen 2011).

Ritual thus becomes a way people position themselves within society in terms of identity and status. Bucholtz and Hall (2005:286) define identity as the "social positioning of self and other"; intended to be flexible by the authors, this definition works well in a discussion of ritual. That is, the use of the word "positioning" subtly links identity to ritual in that it implies movement and, in a way, materialization—a process of making intangible ideology into a tangible, observable phenomenon. As Mary Douglas (2003[1970]:53-54) so eloquently described, the "wordless channel of communication" that is ritual enables "symbolic lines and boundaries" to be drawn

around and between experiences that may ultimately constitute social identities. This deep interrelationship has advanced the anthropological understanding of ritual as foundational for defining the spaces of and boundaries between groups and communities and the identities they encompass.

How is it that, despite differences in identity and social status, it is possible for people to work together within a society? Ritual does not act solely as a means for drawing social boundaries but can also foster social cohesion among disparate peoples by communicating shared belief and encouraging cooperation. Victor Turner describes this aspect of ritual as *communitas*, "[the experience] of blurring or merging self and other, the production of oneness and integrative harmony" (Turner 1969 as cited by Stephenson 2015:40). In this sense, social difference is multidimensional; though "self" and "other" may identify differently on one level, a shared experience of symbolic activity may integrate both entities into a single, more encompassing identity during the "period of liminality" (Turner 1969). It is through the ritual process that common ground is created for people through mutual participation in an activity, fostering a sense of community and collective identity as well as providing an expression of distance from those who are excluded (Leach 1976). Furthermore, rituals—particularly those religious—may evoke *effervescence*, or powerful emotions, in participants which may promote allegiance and group solidarity at a deeply personal level (Durkheim 1995[1912]; Kertzer 1988:97).

Interpreting ritual as a component of religion, Durkheim (1995[1912]) posited that ritual translates cosmological order into social order in the earthly world. In this way, rituals allow people to make sense of their various positions in the world while also promoting unity, despite fundamental inequality, by conveying a cosmological rationale. Ritual materializes ideological power and authority, distinguishing those in positions of domination from those in positions of

subservience, by situating that difference as a natural component of worldly order (DeMarrais et al. 1996; Marx and Engels 1848). Thus, those with the ability to draw upon religion and ritual to legitimize and perpetuate their place in a social hierarchy have access to a vastly powerful tool. Ritual can grow to be so powerful that it can create collective action through situational pressure without necessitating common belief (Kertzer 1988:96).

Due to the wide range of definitions, interpretations, and perceived implications of ritual, activities of varying scales and forms have been conceptualized as ritual. Perhaps the most widely discussed types are those that occur publicly. Public ritual can take on an assortment of religious and nonreligious forms: Catholic mass, attending a football game, or a funeral. In each of these, participants together take on a set of customary, though flexible, symbolic actions; these may include consuming a wafer for Holy Communion, wearing the home team's jersey, or singing a dirge. While the discussion held thus far may suggest ritual as only occurring in public spaces with numerous participants, ritual can also occur at smaller scales while conveying the same types of meaning. In the privacy of a home, a Catholic may pray with a rosary, a sports fan may wear a jersey and watch the game on television, and mourners may share memories with one another and take comfort together. Such private, domestic forms of ritual may naturally go overlooked in anthropological study due to an inherent lack of visibility. It is important to remember that a ritual's size may not necessarily be relative to its weight of importance to participants nor is its place or time restricted to any one location or period.

Ritual in Archaeology

The theoretical basis on which archaeological studies of ritual are oriented stems from theory developed in cultural anthropology and other social sciences and humanities. Though interest in and the study of ritual are not recent developments for the field of anthropology, studies that aim to understand the meaning of ritual in archaeological contexts have burgeoned out of the post-processual era of thought. Post-processual archaeology has been characterized by a movement away from positivistic thinking, growing recognition and acceptance of subjective interpretation, and an emphasis on the importance of contextually-cognizant discussion. Unsurprisingly, the tenets of this intellectual milieu have produced numerous approaches to and interpretations of ritual in archaeology—a movement quintessential to postmodernist insights and concerns.

Just as cultural anthropologists have straddled interpretations of ritual, archaeologists have also approached the study of ritual seeking a better understanding of past religion while also aiming to understand the many secular functions ritual may have had in society. Colin Renfrew (2007:109) describes these two prevailing approaches in contemporary archaeology; "Archaeologists of religion" are those who maintain traditional approaches to ritual and seek religious meaning in ritual residues. "Cognitive archaeologists" argue ritual may indeed be motivated by or provide insight into past religion in some contexts but may also relate to other immaterial social schema such as identity, class, and kinship. Lars Fogelin (2008b) also sees a divide in archaeological ritual studies: those that are symbolically-oriented pursuits of ritual meaning (i.e., ideological motivations) and those that are more functionally-oriented interests in the societal implications of ritual participation (e.g., power relations, community cohesion). As a result of the ongoing

conceptual expansion, ritual continues to be a popular topic in archaeological inquiry. Ritual practice has become untethered from strict associations to religion; rather, many suggest ritual is multidimensional in that it not only can be religious or secular, but it can have a combination of religious and secular components (Renfrew 2007).

Though some research benefits from the availability of historical and ethnohistorical sources, archaeologists must often approach the study of ritual practice without first-hand insight or the ability to directly observe activities; they must rely solely on the material remains of past peoples. This obstacle has encouraged many archaeologists to focus on identifying signals in different forms of material culture that enable the detection and interpretation of ritual. The search for material indices has produced numerous studies that measure and categorize symbolic activity using a variety of artifact types, archaeological features, or combinations of both (Carmichael et al. 1994; Fogelin 2008a; Garwood 1991; Renfrew 1985). Studies have involved the analysis of ceramics (Blitz 1993; Welch and Scarry 1995), lithics (Cobb 2000; Sievert 1994; Herrmann 2013), faunal and botanical materials (Buchanan 2007; Jackson and Scott 2003; Kelly 2001; Knight 2001; Scarry 1996), human skeletal remains (Ambrose et al. 2003; Buikstra and Milner 1991; Fowler et al. 1999; Peebles and Schoeninger 1981), the built environment (Wesson 1998), and other cultural objects of archaeological interest (Duncan and Diaz-Granados 2000; Steinmetz 1984; Wagner et al. 2004), all in search of extraordinary trends that may shed light on ritual activity and meaning.

The reliance on the archaeological record to decipher ritual poses numerous challenges for archaeologists. Ritual as a symbolic act does not fundamentally necessitate physical materials. Therefore, certain types of ritual that involve objects—and great numbers of the types that preserve well—may fundamentally be more easily detected and interpreted than others. Ceremonial events involving the mass congregation of people, such as feasting, are likely to leave larger impressions

in the archaeological record (Dietler and Hayden 2001). Thus, this facility may cause archaeologists to be inadvertently biased toward examining large-scale, public rituals of the past while domestic rituals tend to be underexplored. However, growing interest in household archaeology has begun to address ritual at smaller scales (Gonlin and Lohse 2007; Plunket 2002; Steadman 2015).

Ritual in the Mississippian Southeast

The Mississippian period (ca. A.D. 1000 to 1600) in southeastern North America can be characterized by several major cultural trends observed throughout the region; these include the widespread adoption of maize-based agriculture, use of shell as a predominant tempering agent in ceramics, increased population aggregation, particularly in riverine locations, and the development of complex, kin-based social differentiation and stratification (Peebles and Kus 1977; Scarry 1996; Steponaitis 1986). Archaeological research has demonstrated that by about A.D. 1000, chiefdom societies varying in size and complexity emerged throughout the region (Cobb 2003). Coinciding with the rise of these settlements is the evident spread of new belief systems and ritual practices. Ethnohistorical accounts made by European colonists suggest that chiefdom sociopolitical organization was still present among indigenous peoples by at least the 16th century (Knight 1990).

For several decades, the study of ritual activities in the Southeast examined the ideological principles related to what has been called the Southern Cult or the Southeastern Ceremonial Complex (SECC), an assumed major exchange network of practices, styles, and ideas (Galloway 1989; King 2007; Waring and Holder 1945). More recently, archaeologists have shifted from examining the Mississippian Southeast as a whole and have paid more attention to smaller regional

contexts to frame discussions of religion and ritual (Knight 2006). Investigations of ritual have been diverse in subject, theoretical orientation, and method. A variety of analytical approaches has been used to identify and discuss ritual spaces and activities, including the examination of monumentality and architecture, landscape, spatial organization, iconography, mortuary contexts, and numerous components of material culture (e.g., Brown 2006; Buchanan 2007; Claassen 2015; Pauketat and Koldehoff 2002; Parker 2001; Pursell 2016; Wagner et al. 2004).

The corresponding emergence of trends involved in Mississippianization has led archaeologists to believe powerful elite classes developed at the beginning of the Mississippian period, and allowing them to come to power was a religious ideological system that legitimized to others their place in society (Emerson 1997a, 1997b; Pauketat and Emerson 1991; Pauketat 1994; Welch and Butler 2006). Chiefs and others of the ruling class were the "mediators of the cosmos" (Pauketat and Emerson 1991:919) who were able to communicate their innate supernatural connections to the rest of the population through controlled access of religious ritual. The establishment of a dominant ideology and its materialization through ritual activity appears to have been a successful power strategy that enabled Mississippian elite classes to sustain their positions as rulers.

Due to the interpretation of ritual as a mode of power (Earle 1997; Spielmann 2002), research of Mississippian ritual practice often involves identifying archaeological markers of the authoritative elite class. Much of this work is centered on the largest prehistoric settlements of the Southeast presumed to have been home for the most powerful Mississippians. In contrast to small hinterland communities, major Mississippian centers are generally characterized by their large sizes, the presence of large-scale earthworks such as mounds or artificially-leveled plazas, greater amounts of display goods, evidence of ritual gathering, and often elaborate burials (Cobb 2003).

The primary manifestations of ritual power—ceremonies, symbolic objects, and public monuments and landscapes (Earle 1997)—are observed in plenty at mound settlements. By living at cosmologically-important centers, elite rulers may have more easily commanded tribute from lower-ranking groups and gained access to a wider range of items such as food, scarce or nonlocal goods, and raw materials (Earle 1997; Pauketat and Emerson 1997:192-193). Thus, it is commonly perceived that the goods and materials elite groups procured, used, and created at large Mississippian settlements were more likely to be ritualistically valuable (Pauketat 1997; Trubitt 2000). As a result of this political economy approach, archaeological studies of Mississippian ritual and its paraphernalia often coincide with examinations of status differentiation (Emerson 1997a, 1997b); objects recovered from contexts of power may be indicative of "extraordinary activities or exceptional people" (Pauketat and Koldehoff 2002).

Mississippian rituals likely took on several public or private, large- or small-scale forms. At mound centers, grand monuments such as platform mounds and plazas were often the sites of ceremonies and "group-building" rituals such as mound building and feasting (Beck 2006; Pauketat and Koldehoff 2002). Ritualistic monument construction—both the process and the product—would have been a means for elites to display and emphasize exclusive status and prestige within a society (Beck 2006; Trubitt 2000:669). Elite groups orchestrated feasting ceremonies to redistribute food and other items to followers, further boosting their personal prestige and strengthening existing positions of power (Cobb 2003:76; Pauketat et al. 2002). Feasting and other forms of ritualistic gift giving also functioned as ways to retain allegiance by indebting followers and limiting any political rivalry within a chief's domain (Beck 2006:24-25; Hayden 1996:24-27; Pauketat 1994:21). These forms of public, large-scale ritual activity would have been a powerful elite strategy of social reproduction (Pauketat 1994:19). Some of the other

forms of Mississippian rites speculated through ethnographic analogy involve the purification of sacred spaces in temple ceremonialism (Waring 1968 as cited by Knight 1986) and of individuals through the ritual consumption of a sacred beverage English colonists, and anthropologists thereafter, have called Black Drink (Crown et al. 2012; Hudson 2004).

The Mississippian ritual narrative has been dominated by discussions of feasting and other major gathering events perhaps due to the great degree of material residues such activities can leave in the archaeological record. This trend may have also arisen due to the functional conceptualization of ritual as a mode of production—a theoretical orientation from which many archaeologists have interpreted Mississippian culture in the past half century. In any case, this conventional approach to ritual has until recently led to the underexamination of other forms and scales of ritual practice such as those that are conducted in smaller, secular, private, domestic, or nonelite contexts. More recent studies have shifted from the "preoccupation with 'chiefs'" (Blitz 2010) to the exploration of diversity that may arise in heterarchical organization. This has aided in the disintegration of elite-ritual exclusivity (Brown 2006 as cited by Blitz 2010).

Ceramics

Over the past tens of thousands of years, ceramics have grown to become a vital component of the cultural toolkit. The invention of ceramic pottery developed independently in numerous places throughout the world beginning roughly twenty thousand years ago, with other clay-based goods, such as the Venus figurines of Dolní Věstonici in Czechoslovakia, having been created several thousands of years prior (Rice 2015; Vandiver et al. 1989). The motivations for the use of clay to make vessels is not entirely clear nor simple to address archaeologically. Some patterns

seem to suggest that pottery arose as a result of increased sedentism and the adoption of agricultural practice (Arnold 1985), while other trends point to an association of pottery use and the need for a person or peoples to build prestige within a society (Hayden 1998). Regardless of the impetus, ceramics—both pottery vessels and other clay-based objects—have been demonstrated to be ubiquitously created and used for a wide variety of utilitarian and social purposes, and thus their forms and styles contain clues about the society and activities of people who made and used them.

Several factors may affect the physical attributes of a pot. Classes of pottery, or wares, are defined by similarities in firing technology, composition, and surface finishes, and may range from highly robust to very fragile (Rice 2015:4-6). A ware may be selected for use by the potter as fit to serve a certain purpose, particularly depending on the susceptibility to attrition or breakage the vessel may encounter while fulfilling its role. The intended function of a pot may also dictate its form as some shapes are better suited for storage, cooking, serving, or transport (Rice 2015:412-415). Ceramics variation may also be driven by the level of visibility they have while in use. Stylistic characteristics of pottery can be effective modes of communication (Wobst 1977), and in some cases, ceramics used in public, communal settings have been found to have greater symbolic features and symbol diversity than those used in private, domestic, and low-visibility settings (DeBoer and Moore 1982; Hegmon 1992; Rice 2015). However, decorative, symbolic features are not restricted to communicating messages publicly (Wobst 1999); in some cultures, decoration on pottery used in domestic rituals serves as a way of communicating with the cosmos (Sterner 1989 as cited by Rice 2015:405).

It is the intimacy with which ceramics are deeply intertwined in social processes of peoples that have attracted researchers to their study. The study of ceramic items and their technological, functional, and decorative attributes can illuminate nuanced information embodied in the material,

revealing trends in use and style through the consideration of the social contexts in which items are found (Rice 2015). As such, ceramic analysis has become valuable for anthropologists and archaeologists, who have utilized this method to address topics of social structure such as status hierarchy, identity, kinship, gender, and quite frequently, ritual practice and religious belief. Moreover, ceramic assemblages have become helpful in conducting inferential, inter-, and intra-site comparative studies (Rice 2015:214).

Ethnoarchaeological studies have been conducted to aid in the interpretation of prehistoric site formation processes and derived ceramic data. It has been proposed that study of the interactions, relationships, and materials of people in ethnographic settings is helpful for interpreting such elements in the archaeological record (DeBoer 1990; DeBoer and Lathrap 1979). Archaeologists have drawn upon ethnographic data to understand how ceramics reflect demography (DeBoer and Lathrap 1979; Nelson 1981; Turner and Lofgren 1966), ritual activity (Hilgeman 2000), and social status (Arthur 2002). Ethnoarchaeology has also demonstrated ceramics may contain social information even in cases where potters view vessel making as mundane and a "labor of responsibility rather than expressive art" (Dietler and Herbich 1989:148).

With all its benefits, the use of ethnoarchaeological analogy has its caveats. Turner and Lofgren (1966) conducted a study on cooking jar volumes among the Shipibo-Conibo people of Peru and found variations in vessel capacity were reflected by differences in household size, with larger pots tending to be used to accommodate greater numbers of household members. However, DeBoer (1979) demonstrated that the use of greater numbers of pots may also effectively accommodate larger numbers of people. Furthermore, Nelson (1981) examined ethnographic ceramics from a village in the Maya Highlands as a test of Turner and Lofgren's findings and found variations in volume may also be affected by household social status, wealth, or even

occupant age. Ethnoarchaeological studies such as these ultimately demonstrate the difficulty of transmitting understood associations between ceramics and social dynamics from one culture to another, particularly if the cultures are entirely unrelated. Ceramic variation can be explained by a great number of variables related to the motivations of pottery making, and the use of analogy in archaeological interpretation of ceramics or any component of material culture must be carefully considered for its appropriateness.

Though ceramics can serve many nonculinary functions, the pervasive use of pottery in foodways for people of all ranks, identities, and origins permits broad archaeological dialogue, both diachronically and synchronically (Rice 2015:411-412). In sum, ceramic analysis has permitted archaeologists another means to understand the wide-ranging social processes of past peoples and reconstruct a more holistic picture of their societies.

The Role of Ceramics in Mississippian Ritual

Ceramics have long been a focal point of study in Eastern North American archaeology. Some of the most extensive work on ceramic assemblages occurred during the earliest years of archaeology in this region; ceramic studies conducted during this period (e.g., Ford and Griffin 1938; Ford and Willey 1941; McKern 1939) have demonstrated the utility of establishing cultural chronologies and traditions as the first steps for conducting archaeological research. As the archaeological discipline grew more anthropological in its orientation, the typological motivations of ceramic studies in Southeastern archaeology also progressed into more comprehensive considerations of function and social meaning. Ceramics have since been recognized for their profound significance to Mississippian lifeways. Consequently, ceramic analysis has been used to

discern an array of social phenomena in Mississippian cultures, contributing to larger discussions concerning social stratification (Blitz 1993), identity (Twiss 2007), gender (Thomas 1997), interaction (Pollack et al. 2002), and ideology (Emerson 2000; Pauketat and Emerson 1991).

In the Southeast, several studies have recognized patterns in Mississippian ceramics in terms of use and affiliated social status by comparing materials recovered from contexts differing in their interpreted function. Despite the deceptively simplistic nature of ritual these models may convey, each can operate as an effective starting point in the interpretation of new or different contexts. The remaining discussion summarizes the key findings of major ceramic studies conducted throughout the Mississippian Southeast, specifically those that have identified parameters useful for deciphering the results of this analysis. This nonexhaustive collection includes studies that have been curated for their cultural and temporal relevance to Late Mississippian southern Illinois. Studies are grouped regionally where possible to facilitate discussion, and any identified ceramic correlates of elite/ritual, commoner/domestic, and feasting contexts are summarized in Table 2.1.

West-Central Alabama

Several parallel phase sequences in west-central Alabama demonstrate patterns in Mississippian ceramic manufacture and use. In the Black Warrior River Valley, Moundville (A.D. 1050 to 1450) operated as a political and ceremonial hub for numerous single-mound centers throughout the region. Archaeological evidence from Moundville's ceremonial precinct indicates that the mounds, plaza, residential areas, and palisade were rapidly constructed, suggesting the community was largely planned and structured (Beck 2006:30; Blitz 2012:4; Knight and Steponaitis 1998). The arrangement of monuments in this area of Moundville has been described

as a sociogram, a layout of the built environment reflecting ranked status and kin affiliations (Knight and Steponaitis 1998:17;). Mound groups of varying size may have served as ceremonial facilities for different elite kin groups (Knight 1998).

Drawing from ceramic ware distinctions proposed by Phillips (1970), Steponaitis (1983) recognized functional trends in the use of Bell Plain and Mississippi Plain wares at Moundville. Bell Plain ware is identified by finer-shell temper and burnished surface finishes (Phillips 1970:58-59) and tends to be used for serving vessels such as bottles, plates, and some forms of bowls. Mississippi Plain ware, characterized by its combination of coarser-shell temper and unburnished surface finishes (Phillips 1970:58-59), tends to be used for cooking vessels including jars, pans, and other forms of bowls. Steponaitis' (1983:33-45) study suggests the use of either ware is related to the desired resistance to thermal and mechanical stresses which the vessel would experience. Bell Plain ware is better at withstanding mechanical stresses of serving activities, while the properties of Mississippi Plain ware are better suited to handle the stresses of cooking activities.

Welch and Scarry (1995) build from Steponaitis' (1983) study and demonstrate elites and commoners in the Moundville vicinity were found to vary in their foodways; they did this by comparing pottery and subsistence refuse from public mound settings and domestic village contexts. Proportions of cooking and serving ware—categories akin to Steponaitis' (1983) conceptions of Mississippi and Bell Plain ware—were found to be associated with differences in social status and public or private activities. Unburnished, coarse-shell pottery tended to be used more frequently for utilitarian purposes in domestic contexts, whereas burnished, fine-shell vessels had ceramic properties making them more appealing for use in public presentation such as in large-scale communal gatherings.

A study of ceramics from Lubbub Creek, located to the west of Moundville, was conducted to understand differences in food consumption activities between the elite ceremonial precincts near mounds and the nonelite domestic contexts in villages (Blitz 1993). Surprisingly, no differences were detected in the distributions of ceramic decoration, ratios of coarse-temper cooking ware versus fine-temper serving ware, or vessel forms. However, Blitz found that bowls and jars were significantly larger in elite, ritually-important contexts than those from the village. Blitz interprets these findings as evidence of ritual feasting and elevated food storage at the mound location and more individualized activities in the village.

The American Bottom

The American Bottom, a region located in the Mississippi River floodplains east of modern-day St. Louis, was the locale for some of the largest Mississippian mound settlements, including Cahokia (A.D. 900 to 1300), the largest of known Mississippian sites. By 1050 AD, Cahokia had a population in the thousands and a sufficient labor force and surplus of foods required to undertake what Pauketat (2009:21) calls "the first government-sponsored urban renewal project" in the New World north of Mexico. Cahokia featured North America's largest pyramidal-mound complex with at least 100 mounds, a grand central plaza, and public, elite, and ceremonial buildings. The profound physical transformation at Cahokia's onset was accompanied by radical change in subsistence practices, sociopolitical organization, and religious practice.

Researchers working at Cahokia and throughout the greater American Bottom have for years aimed to ascertain the types of ceramics used by the Mississippian peoples for ritualistic purposes. Pauketat et al. (2002) identified several ceramic correlates of public ritual activity through analysis of materials recovered from the sub-Mound 51 borrow pit at Cahokia believed to

have been associated with large-scale, public gathering and single-event deposition. When the sub-Mound 51 ceramics were compared to those from domestic, village contexts (Alt 2001 as cited by Pauketat et al. 2002), several patterns emerged; there was a higher proportion of fineware serving vessels, larger density of sherds in general, and a greater diversity of vessel forms (Pauketat et al. 2002:269). The orifice diameters and sooting patterns of cooking jars were not qualitatively different from jars found in domestic assemblages (Pauketat et al. 2002:268-269).

Pauketat and Koldehoff (2002) identified similar trends by studying materials recovered by artifact collectors from Cahokia's East Plaza area—the locale for large-scale, public gathering and mound-top rituals. Even accounting for the biased sampling method of the collectors toward items perceived as greater in quality, higher proportions of sherds with incised religious motifs (i.e., Ramey Incised Jars and Wells Incised plates), seed jars (i.e., a form of restricted jar with a relatively small orifice), effigy bowls, and fineware vessels, especially beakers were found in the public ritual context. Additional evidence suggests the beaker vessel form was used in the ritual consumption of Black Drink (Crown et al. 2012).

Other studies in the American Bottom have recognized similar trends and additional traits of ritual paraphernalia. Fineware ceramics have consistently been found to be more common in elite and public ritual contexts (Pauketat et al. 2002; Pauketat and Koldehoff 2002; Wilson 1999). Fineware, much like Bell Plain ware, is generally characterized by its high-quality manufacture, including the use of finely-crushed, typically-shell temper, burnished, slipped, or often incised surfaces, and thin walls (Holley 1989 as cited by Wilson 1999:98-100; Phillips et al 1951:122-126) and has been found to be both made locally (Holley 1989; Pauketat 1998) and obtained nonlocally as trade wares (Bareis and Porter 1965 as cited by Pauketat et al. 2002; O'Brien 1972). Similarly, consistent is the finding of Ramey Incised jars, generally identified by their sharp

shoulders, highly burnished or black-slipped surfaces, and the characteristic incised design (Emerson 1989, 2000). Lastly, ritual deposits have also indicated effigy vessels or figurines in the form of a kneeling or squatting female are religiously symbolic (Emerson 2000).

The Lower Ohio River Valley

Several studies based in the lower Ohio River Valley have provided perhaps the most relevant ceramic information for this study focused on southern Illinois sites. Located along the Ohio River in southwestern Indiana, The Angel site, occupied from A.D. 1100 to 1450, was likely the chiefdom center of political, economic, and religious activity for nearby contemporaneous Mississippian sites (Black 1967; Hilgeman 2000). Hilgeman's (2000) seriation of ceramic materials from Angel produced a comprehensive chronology for the site and highlighted patterns in and divergences from ceramics among the larger mound centers of the lower Ohio River Valley. Though her analysis included only sherds with incised, painted, punctated, or modeled surfaces, Hilgeman's study is still helpful in illuminating functional ceramic trends relevant to the present study. In particular, a comparison of jar handle types (i.e., open versus closed forms) and orifice diameters demonstrated that jars with closed handles (i.e., loop, intermediate, strap) tend to be smaller and were likely used for general purposes, while jars with open handles (i.e., lugs, nodes) are often larger and were likely better suited for storage functions (Hilgeman 2000:162-163). This statistically significant pattern may have implications in how Blitz' (1993) findings may be tested in the present study. Furthermore, an analysis of the iconography found on Angel Negative Painted plates led Hilgeman to conclude decorated, open Bell Plain vessel forms were more likely to be used in ritual presentation and serving (Hilgeman 2000:198-203).

Downstream the Ohio River from Angel is the Kincaid site located in southernmost Illinois. Kincaid (AD 1050-1400), with its plaza, burial contexts, and numerous earthen mounds, shares many characteristics with Angel in terms of its settlement size, earthen features, and material culture. While it has been proposed that each site was a major settlement within the same polity (Muller 1986:179), some recognize a connection exists, but its nature is not entirely clear (Hilgeman 2000:241-244).

Studies at Kincaid have illustrated some ceramic trends relevant to this study. Brennan (2014:236) found vessel thickness to be associated with temper size, with thinner vessel walls corresponding more closely with fine-shell-tempered wares. Miniature vessels, as well as plates, were also found to be more common in the Kincaid plaza than anywhere else excavated at the site. Furthermore, miniature vessel forms discovered at Kincaid have indicated associations with ritual practices. In 2009, two miniature effigy bottles—one intact and the other in fragments—and three miniature jars were discovered along with a juvenile burial located within a burned special-function, non-domestic structure in the plaza (Brennan 2014; Campbell and Brennan 2009; Welch 2013a, 2013b as cited by Brennan 2014). Similar findings of miniatures and effigies have been made in burial or ritual contexts elsewhere at Kincaid (Martin 1991:97; Orr 1951:332) and other sites in the lower Ohio River Valley (Carey 2006; Wesler 2001:62). However, they have also been found in domestic contexts in other areas of the Midsouth (Carey 2006), including Wickliffe, a Mississippian mound site located at the confluence of the Ohio and Mississippi rivers (Wesler 2001:62).

Case Study Background: Ritual in Late Mississippian Southern Illinois

Longstanding Mississippian social institutions began to wane throughout Southeastern North America toward the end of the prehistoric period (Anderson 1994; Blitz 1999). In many parts of the Southeast, the fragmentation of late prehistoric societies can be attributed to the arrival of European colonists. However, settlements in regions of the Middle Mississippian had experienced mass depopulation well before colonists had entered the area. Despite its once paramount importance, Cahokia and neighboring settlements in the American Bottom were abandoned sometime in the fifteenth century, defining the northern extent of the so-called "Vacant Quarter" (Williams 1980, 1983; Cobb and Butler 2002).

In the lower Ohio River Valley, the Late Mississippian period similarly marks a time of political decentralization and migration away from archetypical Mississippian mound settlements (Cobb and Butler 2006). People began to move northward, resettling in areas among the great hills and rocky bluffs of the Shawnee Hills—places not previously occupied earlier in the Mississippian period. By the fifteenth century, the once thriving mound centers of Angel and Kincaid were entirely vacated while the Caborn-Welborn complex located around the Wabash-Ohio confluence grew. Caborn-Welborn is the only known Late Mississippian phase in the region, having been established and maintained from the fifteenth century through the historic period (Muller 1986:255). In the case of the Millstone Bluff and Dillow's Ridge sites of southern Illinois, their "late" Mississippian occupations are defined relative to the evident widespread abandonment of settlements throughout the region.

Previously settled during the Late Woodland period, the Millstone Bluff site went unoccupied for roughly three centuries before Mississippian peoples lived at the location from

roughly A.D. 1250 to 1500 (Butler and Cobb 2004, 2012). The initial years of Mississippian occupation at Millstone Bluff correspond with a late thirteenth century trend of migration away from larger settlements located throughout the Ohio River Valley toward more remote interior locations (Butler and Cobb 2004). Other nearby sites, such as the Great Salt Springs located further to the southeast, are said to have been settled for the purposes of extracting valuable resources such as salt or other raw materials (Muller 1984). However, no important Mississippian resources are known to be near Millstone Bluff, suggesting it was occupied for other purposes (Butler and Cobb 2004; Cobb 2000:118). Millstone Bluff is understood to have been the center of a polity encompassing a number of smaller Mississippian camps in a roughly 18 (E-W) by 10 (N-S) kilometer region (Butler and Cobb 2012:49); these settlements include the Hayes Creek site 5 kilometers to the southeast and the Kavelman site 7 kilometers to the northwest (Butler and Cobb 2012:47-48).

Unlike most other Mississippian sites in the uplands, Millstone Bluff features a number of unusual characteristics indicating it was a long-term settlement with ritual significance. The site, located within the Bay Creek drainage area, is situated atop a prominent and perhaps symbolic mound-shaped hill—one of the highest among the Shawnee Hills (Butler and Cobb 2004:85-86). Its elevated and rocky location would have been undesirable for farming in the Mississippian period and also evidently worked as a deterrent for historic farmers. To the benefit of archaeological interpretation, the site has been largely undisturbed by historic activity, aside from some unfortunate episodes of looting. As a result, still visible in the site plan are 26 structure depressions loosely organized around a central plaza that may have been used for ceremonies and gatherings (Figure 2.1) (Butler and DiCosola 2008). The presence of two stone box grave cemeteries along the eastern edge of the settlement are unlike other contemporaneous sites; few

other sites in this region have cemeteries located within their habitation areas, though it is possible the burials at Millstone Bluff represent the use of the site as a necropolis after it was largely depopulated (Butler and Cobb 2004, 2012:66). The hilltop was also the site of a Late Woodland occupation during which one of few known stone forts in the region was constructed (Brieschke and Rackerby 1973). While the purpose of stone forts is not entirely clear (Muller 1986:150-153), they are believed to hold ritual significance (Butler and Cobb 2012:55); thus, the return of people to Millstone Bluff in the Mississippian period may be indicative of ancestral or cosmological ties to the location. Additional factors contributing to the interpretation of Millstone Bluff as a ritual center are elevated levels of symbolically-important red cedar (Parker 2001), the presence of uncommon taxa such as black bear and mountain lion (Breitburg 2002; Buchanan 2007), and most perceptibly, the presence of public rock art.

Rock art corresponding with Mississippian religious symbology is found in three areas along the northern edge of the site (Wagner et al. 2004). The grouping and inclusion of varying motifs in each of these locations suggests a dualistic ritual landscape was planned at Millstone Bluff, with the lower world associated to the west of the site, and the upper realm linked to the east (Wagner et al. 2004). The western panel contains various serpentine or piasalike depictions, symbolizing the types of beings that occupy the Under World of southeastern Native American cosmology (Figure 2.2). The easternmost panel represents the birdman figure, a cosmological being associated with the Upper World (Knight et al. 2001:129-139 as cited by Wagner et al. 2004:54) (Figure 2.3). Motifs related to both the Under and Upper Worlds are located on the central panel and signify This World within which humans and animals live (Wagner et al. 2004:58-60) (Figure 2.4). The cross-and-circle motif occurs at each rock-art location, which ties the three groups together and situates the symbolic messages within the horizonal and vertical directionality

believed to exist in each of the Worlds. Beyond the cosmological content and its patterned organization, the exposed placement of the rock art panels is also unusual. Located on horizontal sandstone slabs, the public and easily-visible Millstone Bluff petroglyphs deviate from other instances of rock art in southern Illinois. Other rock-art sites are typically located in more restricted and hidden places such as rock shelters and caves and tend to not be directly associated with open-air villages as is the case with Millstone Bluff (Wagner 1996; Wagner et al. 2004:42). The strikingly patterned symbolic messages and departure from the norm of Mississippian rock art placement—along with the other numerous lines of evidence—have consequently led to the interpretation of Millstone Bluff as a site of power, religious significance, and likely public ritual (Butler and Cobb 2012; Cobb and Butler 2006; Wagner et al. 2004).

Located to the west of Millstone Bluff, the Dillow's Ridge site is a small Mississippian village likely settled for different purposes than the ritually-significant Millstone Bluff. Dillow's Ridge was the location of a permanent, year-round residence dating to roughly A.D. 1200 to 1400 and is located near the largest known Mill Creek chert quarry in southwestern Illinois. It is conceivable that the site was settled to allow its occupants a vantage point from which the quarry could be monitored and its access controlled. Unsurprisingly, the site exhibits abundant debris from chert hoe and other lithic tool production, signaling its function as a lithic workshop settlement. The manufacture of these predominantly non-prestige tools is greater here than at other nearby sites but is at a level that would not have demanded full-time specialists (Butler and Cobb 2001). Other materials recovered from the site, including ceramics, daub, and floral and faunal remains, are typical of domestic refuse (Butler and Cobb 2001:61).

Like Millstone Bluff, Dillow's Ridge is unplowed and features 27 still-visible structure basins understood to be the remains of domestic houses (Figure 2.5) (Butler and Cobb 2001).

Despite similarity to Millstone Bluff in terms of the number of observable structure basins, it is unlikely that all 27 detected structures at Dillow's Ridge were inhabited simultaneously due to the restricted space of the bluff and instances of overlapping depressions and instead represent multiple construction episodes (Butler and Cobb 2001:61). Additional structure basins were found buried during subsurface investigations (Butler and Cobb 2011:64-68). At present, there is no evidence of a plaza or any patterning to the spatial organization, but this may be clarified with additional dating of the known structure basins (Butler and Cobb 2001:73). Furthermore, no cemetery is located on-site (Butler and Cobb 2001:58). In sum, the evidence from Dillow's Ridge indicates it was relatively typical of Mississippian village sites of its time. The Hale site, a mound settlement located 2.5 kilometers to the east, was likely the ritual and political center with which the Dillow's Ridge community was affiliated (Butler and Cobb 2001:81). While it is likely that ritual occurred on a more household- or individual-basis at Dillow's Ridge, the archaeological record appears to indicate that large-scale, public ritual was unlikely to occur here.

Summary

Ritual is a highly powerful, complex, and variable social activity, making the anthropological interpretation of its implications convoluted. The present study draws from some of the more recent theoretical conceptualizations and perceives ritual as occurring on a scale of size, from public to private, and for varying purposes, from religious to secular. Consequently, this thesis does not assert that ritual only occurred at Millstone Bluff and no ritual occurred at Dillow's Ridge; rather, ritual activity differed in scale and visibility between the sites. The evidence from Millstone Bluff makes it clear that Late Mississippian peoples in the region were likely still

practicing at least some of the public ritual practices developed at the height of Mississippian culture. However, the nature of these activities, in terms of degree and type, remains poorly understood. Ritual events at Millstone Bluff were likely to be larger and more communal than the more private ritual practices that occur in domestic settings at Dillow's Ridge. Therefore, the Millstone Bluff site operates here as a proxy for high public and probably religious ritual in the Late Mississippian Southeast. Dillow's Ridge represents a site of low public ritual activity within this temporal and regional context.

Understanding the role of material culture in ritual practices can unlock greater insight into the social dynamics of past (and present) cultures. In the case of ceramic materials, a spectrum of attributes can be analyzed to contribute to important anthropological discussions. All of the case studies summarized in this chapter contribute to the discussion of ritual and its manifestations in ceramics specifically for Mississippian cultures of southeastern North America. Correlates highlighted here do not represent the totality of those recognized in Mississippian period ceramics. They are neither the only studies that support the models of ceramic variation which they shape (e.g., Childress 1992; Hally 2008; Sears 1973), nor do they always produce agreeing results. As such, this chapter illustrates the need for understanding the relationship between ceramics and ritual practices specifically in Late Mississippian southern Illinois. This gap in knowledge can be addressed by using the findings of previous studies as a baseline for interpreting patterns of ceramic variability that may be encountered in elite/ritual contexts—especially feasting events—and commoner/domestic settings. The theory, methods, and findings of these studies have served in structuring the methods and materials for the present analysis as discussed in the following chapter.

Table 2.1. Expected Mississippian Ceramic Correlates Based on Context.

Context	Expected Ceramic Correlates
Elite/Public Ritual	Higher proportions of serving ware (also called Bell Plain ware or fineware) (Hilgemann 2000; Pauketat et al. 2002; Welch and Scarry 1995; Wilson 1999), indicated by: • Fine-shell temper (Steponaitis 1983) • Burnished surfaces (Steponaitis 1983) • Certain vessel forms: bottles, plates, some types of bowls (Brennan 2014; Steponaitis 1983) • Thinner vessel walls (Brennan 2014; Wilson 1999) Higher proportions of storage ware (Blitz 1993), indicated by: • Large jars and bowl orifice diameters (Blitz 1993) • Closed handle forms (Hilgeman 2000) Evidence of large-scale, single-event deposition (Pauketat et al. 2002) Greater diversity of vessel forms and their attributes (Pauketat et al. 2002; Welch and Scarry 1995) Higher proportions of nonlocal items (Pauketat and Emerson 1997) Higher proportions or presence of special-use vessel forms and ceramic items: • Beakers (Crown et al. 2012; Pauketat and Koldehoff 2002) • Seed jars (Pauketat and Koldehoff 2002) • Miniature vessels (Brennan 2014; Carey 2000; Martin 1991; Orr 1951; Wesler 2001) • Effigies (Brennan 2014; Pauketat and Koldehoff 2002; Wesler 2001) Higher proportions of decorated vessel surfaces (Pauketat and Koldehoff 2002; Pauketat et al. 2002) Higher proportions of religious iconography (Hilgemann 2000; Emerson 2000; Pauketat and Koldehoff 2002; Pauketat et al. 2002)
Feasting	Higher proportions of serving ware (also called Bell Plain ware or fineware) (Hilgemann 2000; Pauketat et al. 2002; Welch and Scarry 1995; Wilson 1999), indicated by: • Fine-shell temper (Steponaitis 1983) • Burnished surfaces (Steponaitis 1983) • Certain vessel forms: bottles, plates, some types of bowls (Brennan 2014; Steponaitis 1983) • Thinner vessel walls (Brennan 2014; Wilson 1999) Higher proportions of storage ware (Blitz 1993), indicated by: • Large jars and bowl orifice diameters (Blitz 1993) • Closed handle forms (Hilgeman 2000) Evidence of large-scale, single-event deposition (Pauketat et al. 2002)
Commoner/ Domestic	Similar or greater proportions of cooking (also called Mississippi Plain ware) to serving ware (Welch and Scarry 1995), indicated by: • Coarse-shell temper (Steponaitis 1983) • Unburnished surfaces (Steponaitis 1983) • Certain vessel forms: jars, pans, some types of bowls (Steponaitis 1983) • Thicker vessel walls (Brennan 2014; Wilson 1999) Lesser diversity of vessel forms and their attributes (Pauketat et al. 2002; Welch and Scarry 1995) Lower proportions of nonlocal items (Pauketat and Emerson 1997) Lower proportions or absence of special-use vessel forms and ceramic items: • Beakers (Crown et al. 2012; Pauketat and Koldehoff 2002) • Seed jars (Pauketat and Koldehoff 2002) • Miniature vessels (Brennan 2014; Carey 2000; Martin 1991; Orr 1951) • Effigies (Brennan 2014; Pauketat and Koldehoff 2002; Wesler 2001) Greater proportions of plain/undecorated vessel surfaces (Pauketat and Koldehoff 2002; Pauketat et al. 2002) Lower proportions of religious iconography (Hilgemann 2000; Emerson 2000; Pauketat and Koldehoff 2002; Pauketat et al. 2002)

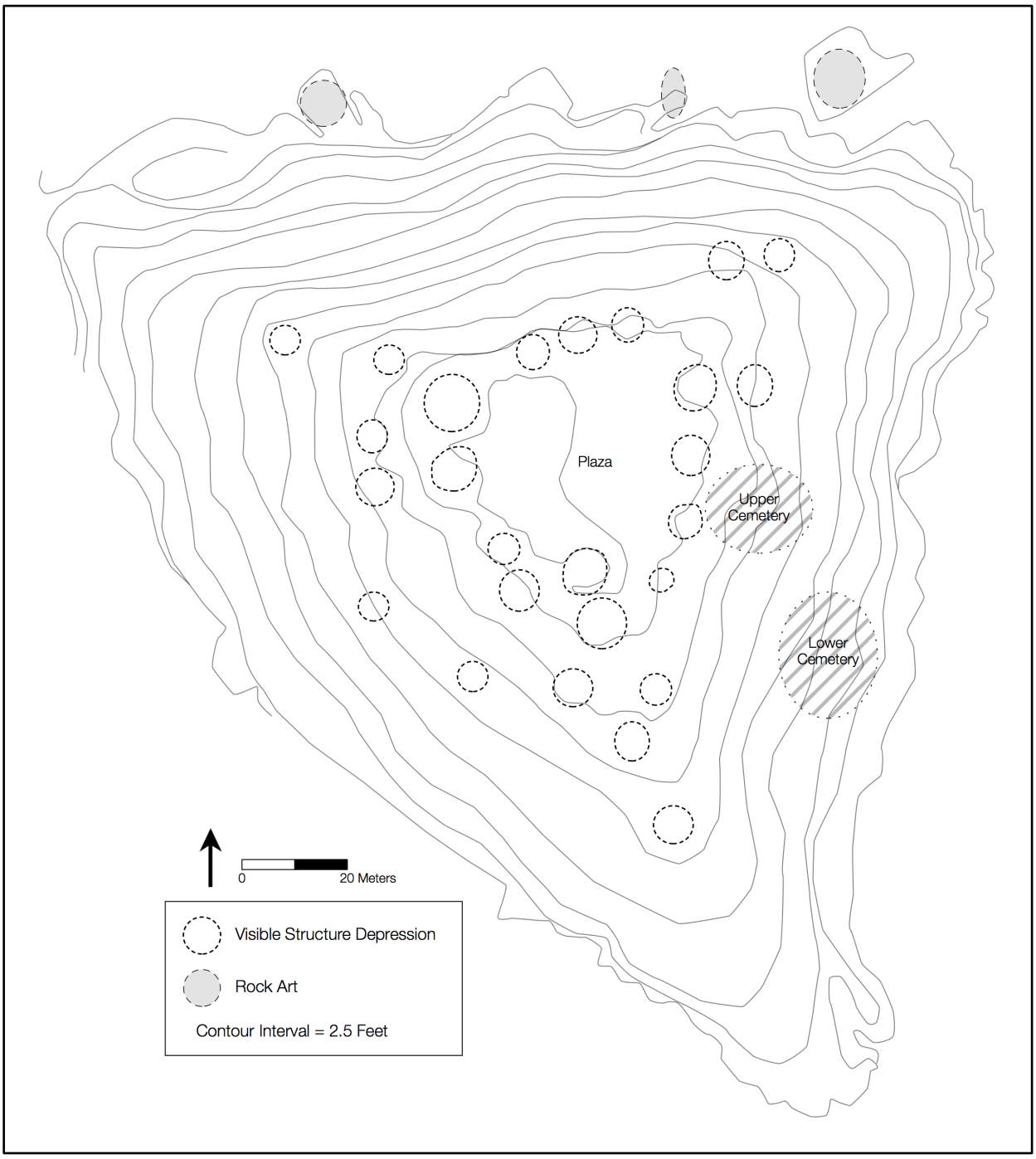

Figure 2.1. Millstone Bluff site plan.

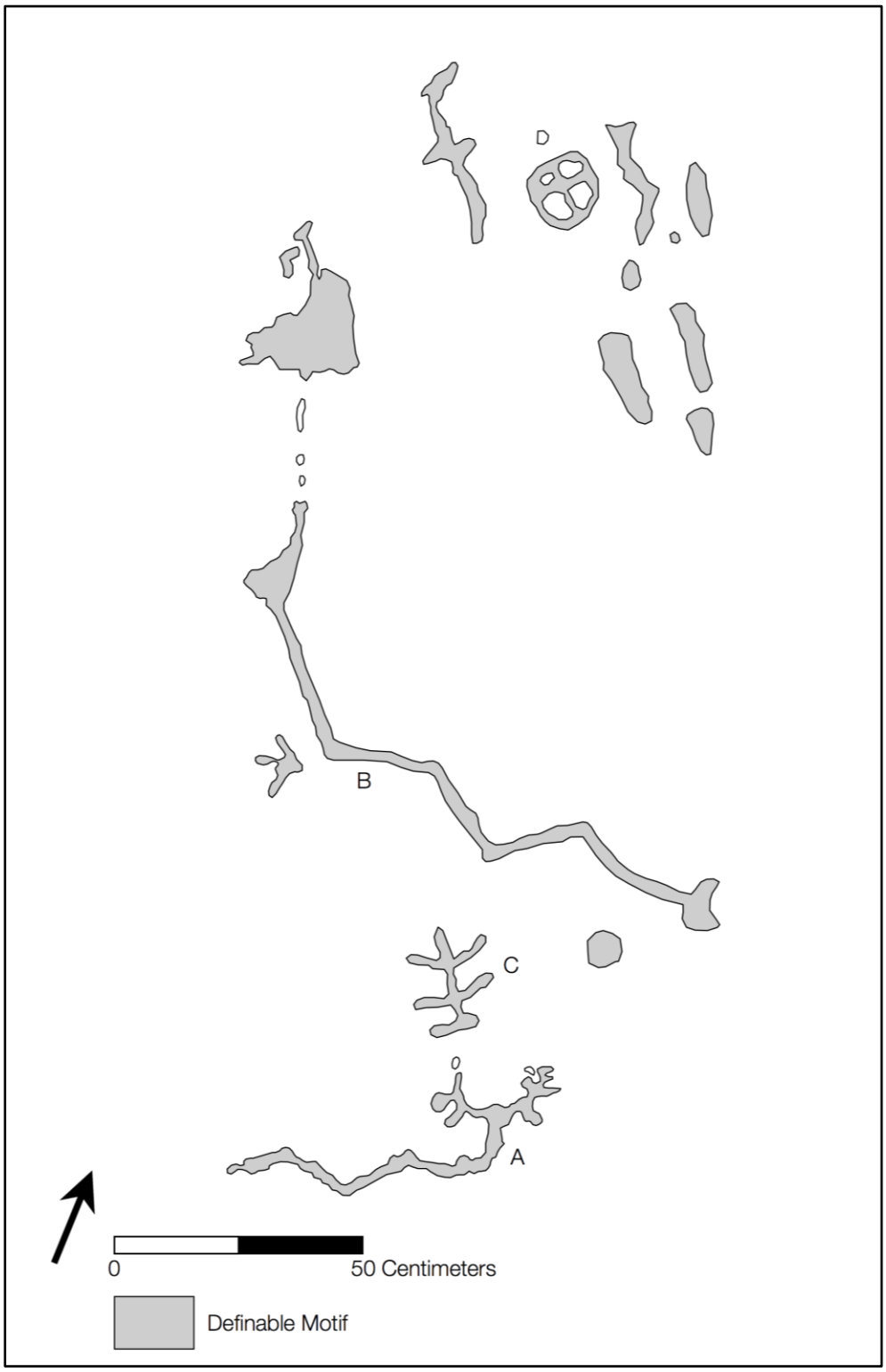

Figure 2.2. Map of western rock art group at Millstone Bluff (adapted from Wagner et al. 2004). *A*, antlered serpent; *B*, possible winged serpent; *C*, piasalike creature; *D*, cross-and-circle.

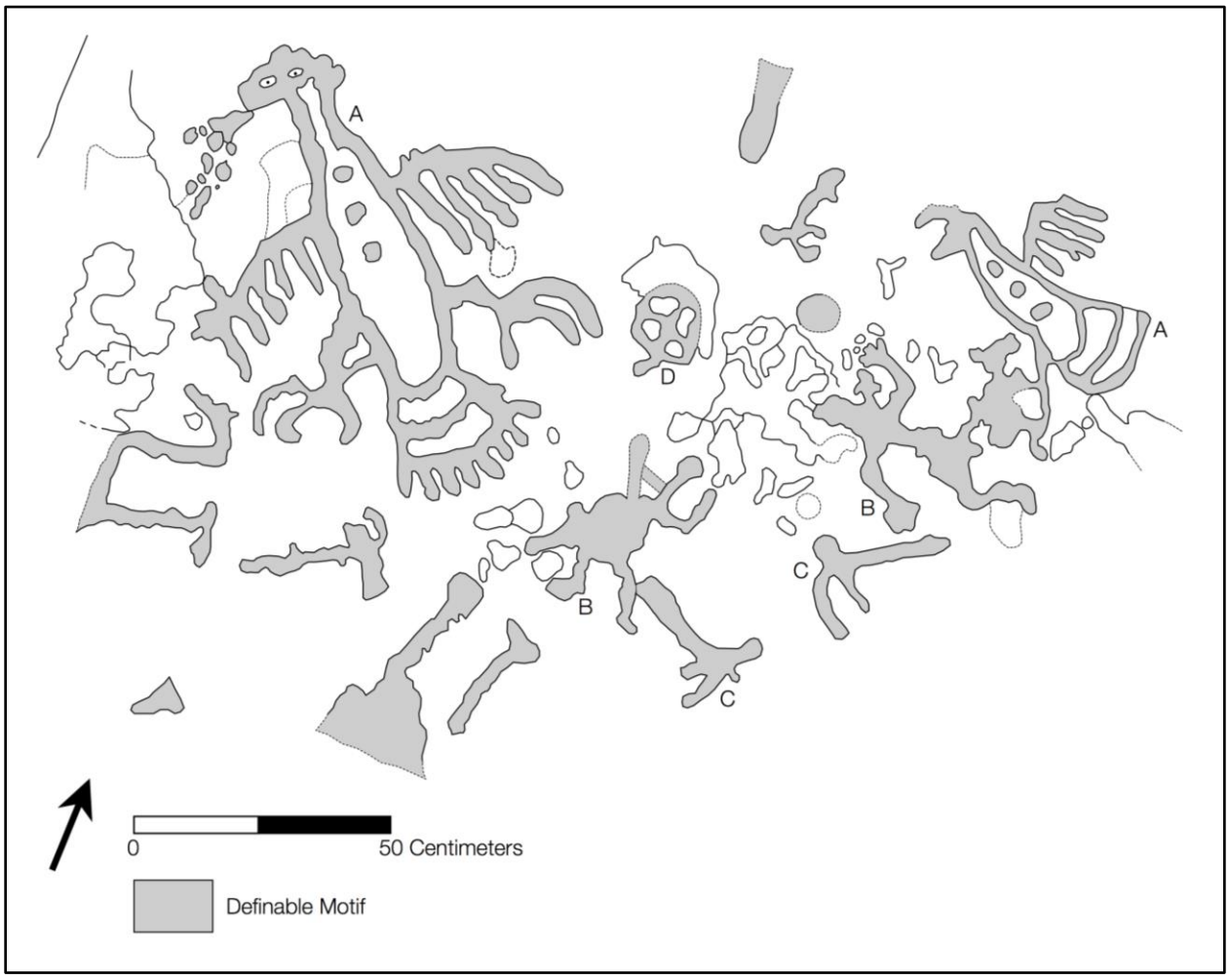

Figure 2.3. Map of eastern rock art group at Millstone Bluff (adapted from Wagner et al. 2004). *A*, falconid bird; *B*, anthropomorph; *C*, bilobed arrow; *D*, cross-and-circle.

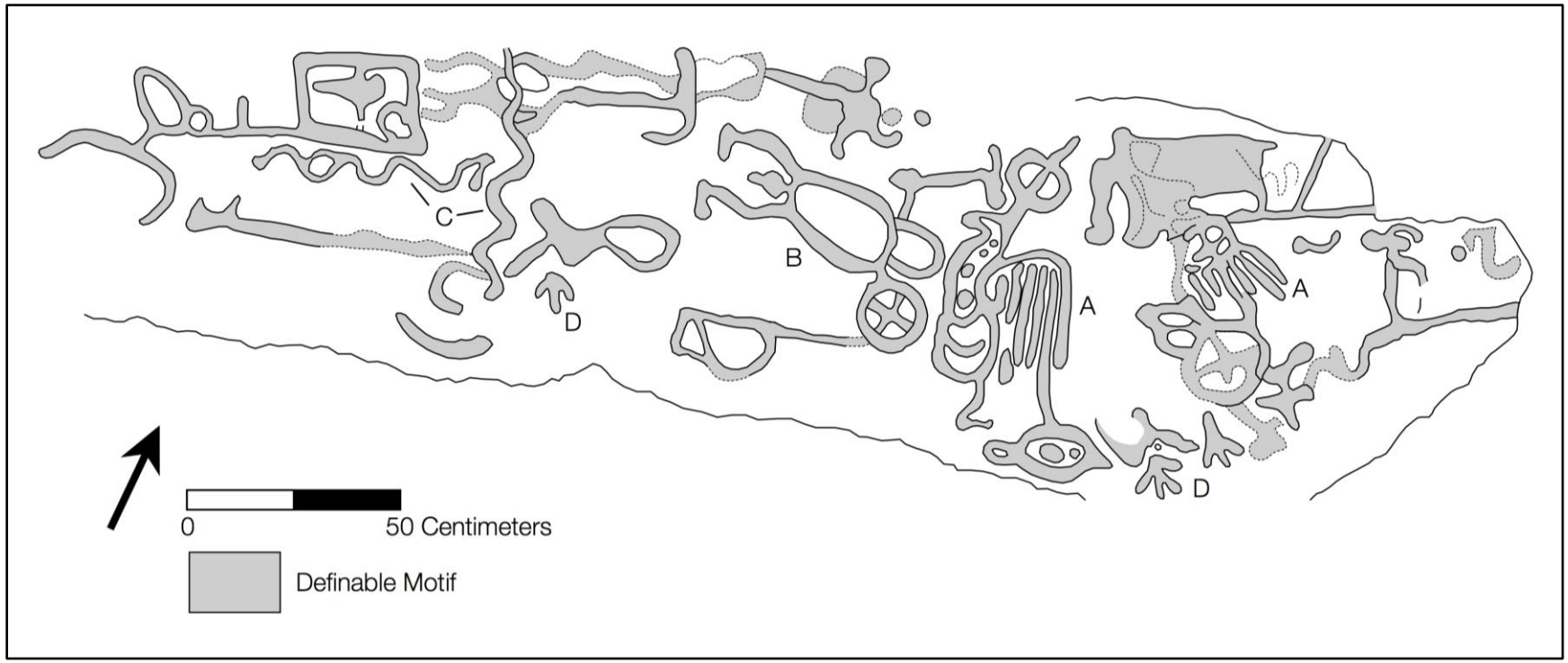

Figure 2.4. Map of central rock art group at Millstone Bluff (adapted from Wagner et al. 2004). *A*, falconid with bilobed arrow emerging from head; *B*, anthropomorph; *C*, serpentinelike line; *D*, bisected chevron.

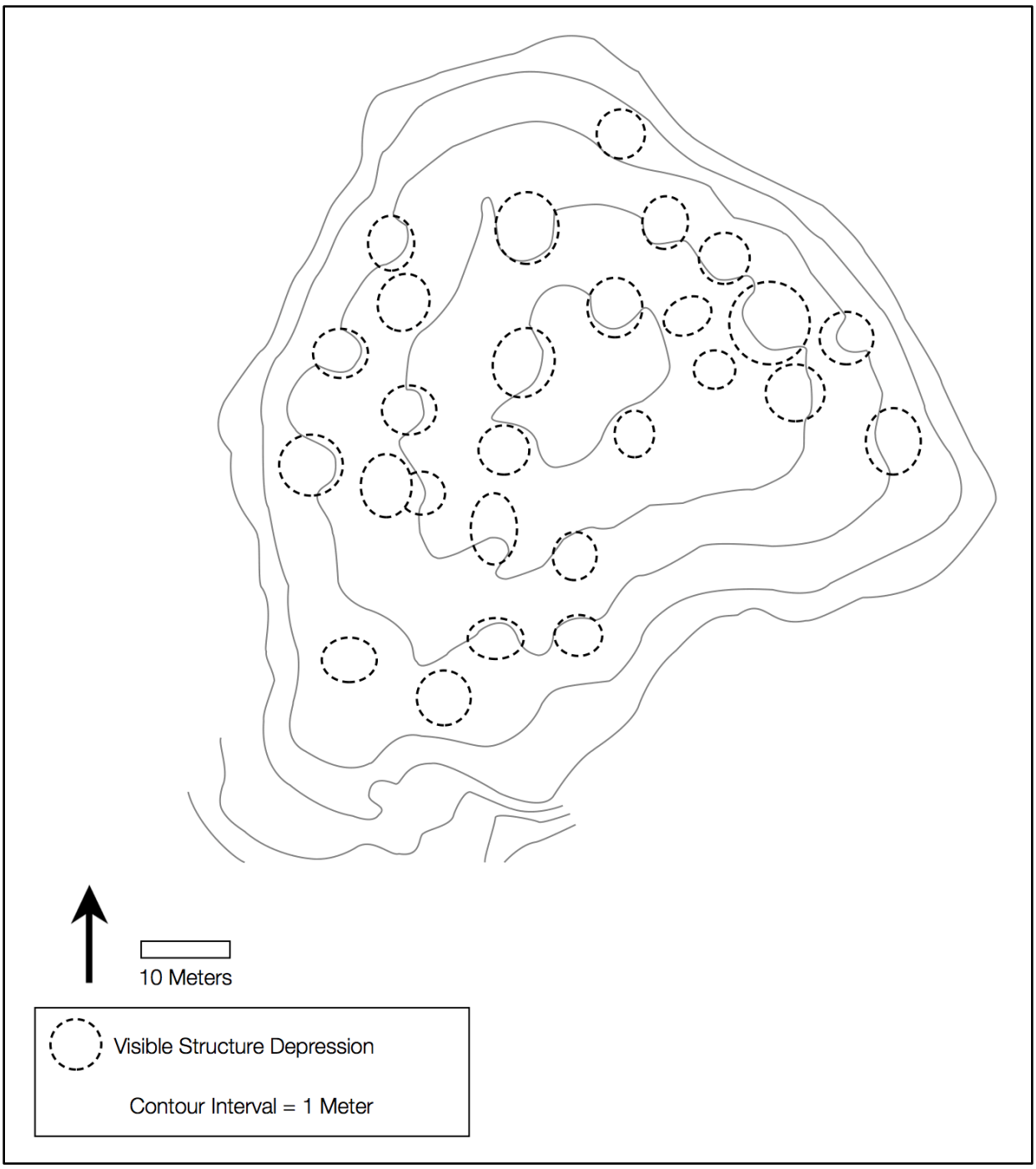

Figure 2.5. Dillow's Ridge site plan.

CHAPTER 3

MATERIALS AND METHODS

Guided by the approaches and typologies developed by Southeastern archaeologists in the past century, this research aims to identify differences between two ceramic assemblages in search of ritual signals. In this chapter, details surrounding the Millstone Bluff and Dillow's Ridge ceramic assemblages are summarized, including general characteristics, preservation quality, how they have been utilized by previous researchers, and the reason the present study has selected each to address its research objectives. Also discussed are the laboratory methods used in this study, including the steps taken in preparation of data collection, the sampling strategy, and the ceramic analysis itself. An overview of the types of ceramic data that were collected and how each was considered is provided. Lastly, the forms of statistical tests used are discussed in terms of process and the types of data considered.

Review of Materials

Millstone Bluff (11PP3)

Millstone Bluff had been known amongst relic hunters and local archaeologists for many years before any formal excavations were held at the site. Finally, in 1996, the first excavations were conducted at the site as a part of the Southern Illinois University Carbondale (SIUC) and State University of New York Binghamton (SUNY Binghamton) archaeological field schools. Archaeologists aimed to learn more about the late thirteenth or early fourteenth Mississippian migration into the interior uplands north of the Ohio River and were also curious about the role

Millstone Bluff played among other settlements (Butler and Cobb 2004:85). The Mississippian occupation of Millstone Bluff was again the primary target of investigations in 1997 and 1999. Excavators returned in 2003 to further investigate the Late Woodland occupation. Excavations at Millstone Bluff targeted house basin features, many of which were filled with midden, though a few intact deposits were identified as features (Cobb 1998; Cobb and Butler 2000).

Portions of the ceramic assemblage have been studied in piecemeal fashion over the years. Kruchten's (2004) research paper compared ceramics from Millstone Bluff and nearby Hayes Creek to understand the nature of sociopolitical hierarchy among the sites. Rim sherds from 1996, 1997, and 1999 were used to characterize the ceramic assemblage in terms of vessel form distribution (Kruchten 2004:15-16), though rim sherd totals from this analysis are considerably lower than that of the present study. The characterizations of temper use and surface treatments were based only on the raw count and weight data from materials recovered in 1997 and 1999 as recorded by numerous SIUC undergraduates (Kruchten 2004:11-15). Carey's (2006) study of Mississippian miniature vessels from throughout the Midsouth included the five recovered from Millstone Bluff. Appendage sherds have gone largely unstudied. Because the final year of excavations at Millstone Bluff targeted the Late Woodland component of the site, no analysis has been previously conducted on Mississippian ceramics recovered during the 2003 season.

Unsurprisingly, four field seasons of excavation at a mostly undisturbed site have produced a copious amount of pottery and other ceramic items (Table 3.1; Figure 3.1). This study involves the examination of materials recovered from all archaeological research efforts at Millstone Bluff. This includes only ceramic items measuring greater than 0.5 inch and excludes daub and burnt clay. The Millstone Bluff ceramic assemblage is composed of 19,065 sherds and other ceramic objects measuring greater than 0.5 inch, weighing a total of 71,110.1 grams. Included in this total

count are 848 rim sherds that have been identified in the collection. Also included are five complete or mostly complete miniature vessels.

Dillow's Ridge (11U635)

Dillow's Ridge was excavated as the focus of numerous SIUC and SUNY Binghamton researchers in 1993, 1994, and 1995 (Cobb 1994, 1995; Cobb and Thomas 1994; McGimsey 1994). No historic disturbance was observed prior to excavations, however, the site was vandalized by looters in between the 1993 and 1994 field seasons (Butler and Cobb 2001:61). Investigations at the site were able to elucidate the relationship between the Mississippian community who lived there and the nearby Mill Creek chert quarry. The site was widely sampled across the hilltop, with test units placed over structure basins and areas in between (Butler and Cobb 2001:63).

While the lithic assemblage has received extensive analysis over the years (Butler and Cobb 2001; Cobb 2000; Thomas 1997, 2001), characterization of the ceramic assemblage has been limited to materials collected in 1993 and 1994, and discussion has been centered more on the interpretation of gendered divisions of labor (Thomas 1994, 1995, 1997, 2001). Several fabric-impressed sherds were also analyzed as a part of a report on cordage and fabric-impressed pottery found in the American Bottom and surrounding regions (Drooker 1998). The 1995 ceramic assemblage had been unanalyzed.

Lithic debitage is understandably and by far the most common material recovered from this workshop site, though a substantial amount of ceramic refuse has also been collected throughout the site. For the present study, all archaeologically recovered ceramic materials from Dillow's Ridge are examined (Figure 3.2). Excavations have produced a total of 4470 sherds and

non-daub ceramic materials measuring greater than 0.5 inch, including 282 rim sherds and one nearly complete vessel. The total weight of this sample of ceramic materials is 19794.5 grams.

Justification of Materials Selection

The Millstone Bluff and the Dillow's Ridge ceramic assemblages were selected for this study due to current interpretations of site function and period of occupation for each settlement. The particular similarities and differences between the sites offer a unique opportunity to examine Late Mississippian ritual and its ceramic correlates by means of comparison. Situated about 50 kilometers apart, the sites are contemporaneous during their Mississippian occupations and were initially settled amid widespread depopulation of mound centers located along the Mississippi and Ohio Rivers. Importantly, these similarities limit the inherent variability often encountered in archaeological comparative studies such as this; they are therefore advantageous for identifying ceramics patterns of ritual activity that could otherwise be undetectable or masked by other social dynamics.

The understood differences between the sites fall in line with the research objectives of this study. As discussed in the previous chapter, Millstone Bluff exhibits numerous lines of evidence pointing to its ritual significance, whereas Dillow's Ridge has produced materials that typify it as a fairly unextraordinary domestic settlement. While the exact types of ritual performed at either site may not be immediately clear, the archaeological interpretations of each site allow ritual to be discussed broadly in terms of communal visibility and involvement; public ritual events were more likely to occur and be accommodated at the Millstone Bluff site than at Dillow's Ridge where ritual was likely practiced in smaller, more domestic settings. Any differences detected from the comparison of ceramics from a site where greater degrees of public ritual likely occurred to

ceramics where it was unlikely to occur may indicate the role of ceramics in ritual activity in Late Mississippian southern Illinois.

The state of the ceramic assemblages has also encouraged and facilitated this study. First, because both sites are mostly undisturbed by historic activity, refuse deposits are more pristine and more likely to be in the state of which they were initially disposed. This is far from the case for many archaeological sites in the American Bottom and lower Ohio River Valley where modern farming activities and other forms of disturbance have left archaeological materials more fragmented and stratigraphy unclear. Second, and perhaps related to the minimal disturbance at either site, numerous field seasons at each of the sites have produced a substantial amount of ceramics, all of which are housed at the SIUC Center for Archaeological Investigations curation facility. The ease of access to these large collections accommodated the substantial time commitment needed to complete this analysis. Lastly, both ceramic assemblages were determined to deserve more analysis than had been conducted in the past, with portions having received no formal comprehensive analysis until this study.

Preparation and Sampling

The Millstone Bluff and Dillow's Ridge ceramic assemblages have received varying degrees of attention from archaeologists in the past three decades. Prior to formally beginning the ceramic analysis for this study, an effort was made to understand the extent to which individual sherds from either assemblage had been examined by previous researchers and how analyses had been structured. Ceramic analysis sheets from Millstone Bluff indicated that bulk data on temper and surface treatment were compiled, but no efforts to uniquely identify sherds were made.

Therefore, this existing data proved to be insufficient for use in addressing the present research questions. For Dillow's Ridge ceramics, the initial intention was to utilize Thomas' (1994, 1995, 1997, 2001) data after learning and adopting her analytical technique for the purposes of analyzing the Millstone Bluff assemblage. This was done by comparing her analysis sheets of uniquely-identified diagnostic sherds in the assemblage. However, it was ultimately determined there was value in repeating the analysis of materials she had analyzed in addition to examining the unanalyzed ceramics from the last field season at Dillow's Ridge.

The overwhelming size of both assemblages required the adoption of a sampling strategy, resulting in the creation of two sample groups. Though this study involves the analysis of ceramic materials, daub and pieces of burnt clay were excluded from the analysis. In the creation of these sample groups, it is assumed that vessels used in ritual activities at either site would have been disposed of in the same way as ceramics used for other purposes instead of in special off-site disposal locations. Excavation units whose pottery is included in the samples are shown in Figures 3.1 and 3.2. The first sample was compiled to address questions related to frequencies of decorative attributes and vessel form and to look for evidence of vessel forms other archaeologists have argued were used for ritual purposes. These forms include miniatures (Brennan 2014), negative painted plates (Hilgeman 2000), beakers (Crown et al. 2012), conch shell effigies (Kozuch 2013), terraced rectangular bowls (Knight 2010), and Fortune Noded vessels (Lankford 2012; Phillips et al. 1951). This sample group will hereafter be referred to as the Specials Sample. Ceramics in this group included all available complete or mostly complete vessels, rim sherds, decorated body sherds, appendages, base sherds, and effigies or effigy fragments. To gather this sample, every sherd measuring at least 0.5 inch in diameter was examined individually to determine if it had the appropriate characteristics to be included. Any questionable or otherwise unidentifiable sherds

encountered at this stage were set aside for more adept ceramic analysts to assess and were subsequently either included in or excluded from the sample. This step also permitted the removal of Late Woodland sherds present throughout the Millstone Bluff assemblage.

As a result of Kruchten's (2004) and Thomas' (1994, 1995) studies, many of the diagnostic sherds needed for the Specials Sample were already bagged separately from the masses of undecorated body sherds. However, complete reexamination of the assemblages identified a substantial number of additional diagnostic ceramic materials; this study identified over 500 more rim sherds in the Millstone Bluff assemblage than in Kruchten (2004). This influx cannot entirely be explained by the added analysis of materials excavated in the 2004 season. Sherds with cordmarked, fabric-impressed, or slipped surface treatments were not considered decorated and thus were not pulled to be included in the first sample; they are instead included in the sample population for the second sample group. Details about this determination are provided under the section discussing surface finish later in this chapter. One item—an effigy of unknown representation—was evidently missing from the Millstone Bluff assemblage, though its absence is not anticipated to have any profound impact on the results of this analysis.

For each of the ceramic items included in the first sample group, the following information was recorded: temper, temper size (if shell-tempered), exterior and interior surface finish, decoration type and motif (if applicable), wall thickness (mm), and weight (g). Though limited in frequency for both Millstone Bluff and Dillow's Ridge assemblages, complete or nearly complete vessels provide definitive information on vessel form as well as valuable insight into vessel styles that may have otherwise been difficult to reconstruct with sherds alone. Such vessels and rim sherds received further assessment, with the following attributes recorded: rim orientation, orifice

diameter (cm), percentage of rim present, and vessel form. A rim profile illustration was also created for all vessels and rim sherds where the orientation was discernable.

The second sample group was created with the purpose of characterizing trends in temper use, exterior and interior surface treatments, and vessel wall thickness at each site. This group was formed through a combination of cluster and simple random sampling of the population of ceramics not selected in the first sample. Clusters are composed of sherds bagged and curated by provenience; simple random sampling was used within each cluster to form the sample group. For each cluster, all sherds that did not pass through a 0.5-inch mesh screen were counted and weighed. These sherds were then laid on a table, and up to five sherds were selected at random. This process was repeated for every provenience available in the assemblages. Due to time constraints, Late Woodland period sherds were unable to be removed from the Millstone Bluff population prior to selecting the sample. Instead, any selected Late Woodland sherds were still analyzed but subsequently removed from the sample group to facilitate comparison of Mississippian period ceramic attributes.

Ceramic Analysis

This ceramic analysis involves the collection of technological, morphological, functional, and decorative data to discern ceramic trends in the lower Ohio River Valley. Due to the fragmented nature of the assemblages, a diverse range of attributes are considered to maximize the potential of identifying correlates of ritual practices. Data were recorded in a Microsoft Access database made specifically for this project.

Despite relatively minimal cultural disturbance at either site, the archaeological record in this region tends to be poorly preserved and artifacts are often found highly eroded. In order to more accurately assess observed differences in attributes between the Millstone Bluff and Dillow's Ridge ceramic assemblages, differences in ceramic preservation at each site must also be evaluated. Measurements of preservation quality used in this study include comparisons of eroded sherd surface frequencies and mean sherd weights. Differing preservation between sites may affect analyses and comparisons of several ceramic variables including exterior and interior surface finish, sherd thickness, vessel form, and vessel orifice diameter. Furthermore, issues of poor preservation may in some cases necessitate slight adjustments to categories commonly used for interpretation in other areas of Mississippian archaeology. The following discussion provides a description of each variable considered in this study as well as any deviations from traditional analysis necessitated by the state of the ceramic materials.

Temper

The low frequency of informative diagnostic ceramic attributes, such as painted or incised motif, is not uncommon for Mississippian sites of the lower Ohio River Valley; this issue may be exacerbated by heavy erosional processes. As a result, temper has become an important attribute for Mississippian archaeologists to assess trends in pottery. Temper type can be observed in virtually all sherds, allowing statistical analysis to be more feasible than uncommon ceramic attributes. Sherds in both the Specials Sample and Undecorated Body Sherd Sample were examined for temper composition.

In this study, three categories of temper type were identified: shell, grog and grit/sand. Temper was primarily determined through visual inspection of paste in the sherd cross-section,

though the surface was often examined to confirm initial identifications. A microscope was used in only in a few rare instances where temper particles were too small to identify otherwise. The size of temper was rated as fine or coarse for only shell-tempered sherds with the hopes of recognizing trends in Bell Plain and Mississippian Plain ware use. The distinction between fine- and coarse-shell temper was made by a single observer. Fine shell was generally characterized by temper particles measuring less than 1 millimeter in diameter; shell-tempering of greater size was designated as coarse.

Surface Finish

Surface finish constitutes how the exterior and interior of a vessel were decorated or treated. For the purposes of this study, surface decoration and surface treatment are distinguished, with the latter referring to surface finishing techniques that cover most of the exterior or interior vessel body. Decorated vessel sherds include those with incised, modeled (i.e., with either effigial form or bead/node[s]), painted, perforated, or punctated surfaces and are included in the Specials Sample. The surface embellishment of decorated sherds is assessed and tallied by motif where determinate. Surface treatments include the categories of plain/smoothed/undecorated, cordmarked, and fabric-impressed and constitute the types of surface finish found in the Undecorated Body Sherd sample population.

Surface finishes can be both ornamental and functional. Textured surfaces, such as those left by cordmarking or fabric-impressing, are sometimes used on utilitarian vessels to improve grip and resistance to thermal shock (Boulanger and Hudson 2012 as cited by Rice 2015:151). Burnishing—the processes of rubbing the vessel surface with a smooth, hard object after it has partially dried—can produce an aesthetically-pleasing sheen on the vessel surface. However,

burnishing also makes the clay of a vessel denser, increasing its hardness, reducing its permeability, and thus improving the vessel's resistance to abrasion and breakage (Rice 2015:310-311, 318). In the case of decorated sherds, motifs are identified where possible.

In the lower Ohio River Valley, archaeological ceramics are commonly found highly eroded, causing surface finishes to be unidentifiable. While no formal studies have addressed patterns of preservation in this region as they may relate to various ceramic attributes, it has been observed that the coarseness of temper may have an effect on how well burnishing, in particular, is preserved on a sherd surface (Paul Welch, personal communication 2018). The present analysis corroborates this observation; the compacted burnished surfaces on fine-shell-tempered pottery were commonly found flaking off the sherd walls, leaving a surface smooth but unpolished in appearance. For this study, sherds with eroded surfaces are excluded from statistical testing of surface finish trends as they are not informative of anthropological matters. Furthermore, an attempt to formally designate sherds into Bell Plan and Mississippi Plain ware categories is not made here due to the unreliability of surface finish observations. Rather, the individual attributes that constitute each type of ware (i.e., shell-temper size and surface finish) are compared separately.

Wall Thickness

Minimum and maximum thickness measurements were made on every pottery sherd included in either sample group, save for appendages and effigies. Measurements were also not made on heavily eroded sherds. Rims were measured approximately 1 to 2 centimeters below the lip. Body sherds were measured in several locations along the perimeter to identify minimum and maximum measurements. Thickness was measured to the nearest tenth of a millimeter using digital

calipers. An average of the minimum and maximum measurements is used for statistical testing, the calculation of which may produce mean measurements valued to the spurious accuracy of a hundredth of a millimeter.

Vessels: Rim Orientation, Orifice Diameter, and Form Designation

The identification of vessel form is helpful for understanding the functions a pot may have performed. The vessel form categories adopted for this study are derived from those recognized throughout the Southeast, such as defined in Steponaitis (1983) and simplified for use in the Black Bottom region of southern Illinois by Brennan (2014, citing Orr 1951 and Martin 1991). Rim orientations and orifice diameter measurements are the primary modes of designating a rim sherd to a vessel form. Rim orientation categories were adapted from other ceramic studies in this region (Figure 3.3) (Brennan 2014; Orr 1951). Orifice diameters of rim sherds were measured to the nearest half of a centimeter using a rim orifice diameter chart.

Rim and base sherds, and the infrequent effigy or handle, were assigned to one of eight Mississippian vessel forms recognized in this study: jars, bowls, plates, pans, carafe-neck bottles, hooded bottles, beakers, and funnels (Figure 3.4). Forms can be further categorized by their restricted or unrestricted orifices or their special usages. As defined by Steponaitis (1983:69), jars "have a more or less globular body, and a wide neck that is constricted in profile. The neck is typically less than one third of the height of the body, and the minimum diameter of the neck is no less than three fourths of the maximum diameter of the body." Jars are a restricted vessel form with rim orientations that are inslanted, vertical, or everted. Bowls are generally unrestricted vessels with flat or rounded bases and can be identified by rim orientations that are vertical or outcurved. Restricted bowls are less common and are recognized by an incurved rim orientation.

Plates, while also unrestricted, differ from bowls in that their basins are shallower, and their rims are outslanted. Pans are similar in form to unrestricted bowls but generally have much larger orifices. Pans also have rim orientations that are outcurved or outslanted. In the lower Ohio River Valley, pans are often found with fabric-impressed exteriors and occasionally with fabric-impressed interiors. Bottles come in two forms—carafe-neck and hooded—which are made distinct in this study. Carafe-neck bottles have globular bodies and vertical rims similar to jars but have much smaller orifice diameters relative to their maximum vessel diameters. Hooded bottles are distinguished from carafe-neck bottles by their vertically-facing orifices and are often found as effigies. Beakers are special-use, unrestricted vessels with tall, vertical walls. In this study, only beaker handles contributed to the raw count of beaker sherds due to the difficulty in discerning the vessel form of vertically-oriented rim sherds. Funnels are conoidal in profile and have a larger, unrestricted orifice on one end and a smaller, restricted orifice on the base. In the regional context of this study, they are commonly made with crude grog temper.

Miniature vessels are also present in the assemblages, both in complete and fragmented form. Carey (2006:15) defined miniature vessels as those measuring "less than twelve centimeters in both greatest height and body diameter." Thus, her study involved only complete or mostly complete vessels. To identify miniatures using only rim sherds, rough parameters were set by considering the known orifice diameter measurements of complete miniature vessels (n=5) recovered from the Millstone Bluff site in addition to metrics defined in other studies (Orr 1951 as cited by Brennan 2014:223-224). Jar rims producing orifice diameters measuring no larger than 6 centimeters while also exhibiting characteristics in curvature informative of the absent body shape were conservatively treated as parts of miniature vessels. Parameters were similarly defined for bowls, which can measure up to 8 centimeters to qualify as miniature, and for plates, which

can also measure up to 8 centimeters. As a result of these criteria, no rims of indeterminate orifice diameter or vessel form were considered for miniature size. A number of appendages were also identified as likely belonging to miniature vessels but were not considered in estimating the numbers of miniature vessels. Miniature vessels occur in three vessel forms in the two assemblages: bowls, jars, and plates.

Generally, minimum number of vessel counts are more beneficial to archaeological interpretation than sherd counts or weights because "whole vessels are more culturally relevant units of analysis" (Rice 2015:262). However, estimates of the minimum number of vessels present in either the Millstone Bluff or Dillow's Ridge assemblages are largely hampered by the partitioned way in which materials were excavated and eventually curated. Raw counts of sherds assigned to vessel forms were therefore used here instead of minimum number of vessel estimates. Though it is possible to determine vessel form using body sherds, only rim, base, and effigy sherds were used in contributing to the raw count of vessel forms. To improve the accuracy of raw counts as much as possible, rim sherds were cross-mended where matches were recognized; regardless, the raw counts inevitably overestimate vessel counts.

Appendages

Appendages attached to vessels can provide more information on stylistic variation and the function of a vessel. In this study, appendages include loop, intermediate, or strap handles, lugs, and beads or nodes. Departing from Hilgeman's (2000) approach, appendages here are not considered decorated sherds. Moreover, frequencies of loop, intermediate, or strap handles, though observed in the assemblages, are not logged or compared because the shift from loop handles to more strap-like handles is a known chronological progression in the region (Hilgeman 2000: Orr

1951:331; Phillips et al. 1951:152). Though Millstone Bluff and Dillow's Ridge appear to be mostly contemporaneous, differences in handle type occurrence could still be explained by differences in temporality, even for relatively short periods during which occupations at the sites do not overlap (Hilgeman 2000). Rather, appendages are distinguished and compared by open and closed forms in this study. Following Hilgeman (2000:162-163), closed appendages include loop, intermediate, and strap handles and are often found affixed to smaller jars likely used for general purposes such as cooking and serving. Open appendages include lugs and beads or nodes. Lugs tend to be used on larger storage jars as they are sturdier and result in less damage to the vessel than closed handles if broken off (Hilgeman 2000). Frequencies of closed handles and lugs may therefore meaningfully contribute to this study. Because beads or nodes mostly occur on bowls, they will not be included for the purposes of defining closed and open appendages as outlined here. Though technically appendages that may have functional properties, beads/nodes are instead examined as a form of surface decoration.

Effigies

As with decorative motifs, effigy forms are immensely informative for the present study as they commonly occur in ritual contexts and may represent cosmological figures (Emerson 2000; Knight 2013; Pauketat and Koldehoff 2002). Effigies may be incorporated into any of the major vessel form categories but may also occur as figurines. Hooded bottles are often adorned with anthropomorphic or animal effigial components, commonly on their hoods and less commonly as the entire vessel. In this study, the designation of a sherd as belonging to an effigy vessel or fragment does not preclude it from the other vessel form categories. Where determinate, effigial

representations are tallied in categories including anthropomorphic, owl, indeterminate bird, fish, and whelk shell.

Statistical Methods

The use of statistical testing can enable the recognition of patterns in the ceramics data that are indiscernible through visual inspection alone. The statistical methods adopted here are used to examine intersite differences that may be present among the suite of attribute data collected during the ceramic analysis. At present, not enough is known about the spatial organization of the sites to break either into more specific intrasite contexts of ceremonial, elite, domestic, or commoner, though these areas can be speculated. A small portion of materials were recovered from hearth and pit features, particularly at the Millstone Bluff site, but not enough to permit statistical comparisons between the assemblages. Not only were these types of features infrequent, but the quantities of ceramic materials recovered them are limited. Consequently, it is difficult to compare feature assemblages with one another. Furthermore, many ceramic item types and attributes are too infrequent in the assemblages to undergo statistical testing. Categorical attributes such as effigial representations and incised motifs benefit from more qualitative forms of comparison and discussion. These notable discoveries are not compared statistically but instead discussed qualitatively in the closing chapter.

Chi-squared tests of association or Fisher's exact tests of independence were used to compare categorical data between the assemblages to understand if any variables were significantly associated with either site. As is the case with this study, chi-squared tests are more likely to exhibit significant differences when sample sizes are large. Therefore, the Cramer's V

strength of association measurement is used to provide a meaningful descriptor for observed statistical differences. Parameters for qualitatively translating the numerical Cramer's V strength of association measurements are adapted from Cohen (1988) (Table 3.2) When the chi-squared test signals an association between the sites and variables, post hoc analysis of the contingency table, as formulated by Beasley (1995), is conducted to determine the predominant factors contributing to the statistical difference. This method adjusts the p-value based on the number of comparisons made in a contingency table and becomes increasingly conservative as the number of individual comparisons increases. The variables tested for associations with site locations include temper, exterior surface treatment, interior surface treatment, vessel form, temper by vessel form, exterior surface finish by vessel form, interior surface finish by vessel form, rim orientation by vessel form, miniature vessel form distribution and frequency, handle form (i.e., open versus closed) frequency, surface decoration frequency, and effigy frequency.

The Welch's T-test for unequal variances and two-way analysis of variance (ANOVA) were performed to determine if the means of ratio-scale data from each site are significantly different. Variables compared using the Welch's T-test include orifice diameters by vessel form and rim thickness by vessel form. Two-way ANOVA was used to compare body sherd thickness between the assemblages.

All tests are performed at the 95% confidence level and may be performed at more conservative levels in cases of post hoc assessment. Statistical testing was conducted using IBM SPSS Statistics software (version 24) or the free MYSTAT software in few cases where SPSS did not have sufficient features.

Evaluation of Potential Error and Bias

As with any major analytical undertaking such as this, there are many opportunities to make mistakes. A number of steps were taken throughout the ceramic analysis and statistical testing stages to reduce the likelihood of human error and bias unbeknownst to the researcher. The first of these was an effort to improve intraobserver reliability by assessing materials included in the Specials Sample a second time, paying special attention to temper type and size designations, rim orientation, and the ultimate vessel form identification. Another effort was made to reduce potential error by cross-checking the Microsoft Access database with the original ceramic analysis sheets after all data entry was complete. If any inconsistencies or uncertainties arose at this stage, the ceramic assemblages were visited for clarification. Fortunately, the digital database was preemptively constructed in a way to reduce the likelihood of careless mistakes. Lastly, the transfer of data into the SPSS software was done carefully, and many of the tests were run multiple times to ensure results were being interpreted properly.

Summary

This chapter provided an overview of the materials and methods used to address the research questions of this study. Based on the archaeological interpretations of the Millstone Bluff and Dillow's Ridge sites, a comparison of their respective ceramic assemblages enables the manifestations of differential ritual practice to be recognized. Data produced by the ceramic analysis underwent rigorous statistical testing, the results of which are presented in the following chapter.

Table 3.1. Ceramic Assemblage Ceramic Item Composition by Site and Excavation Season.

Site	Season	Count	%	Weight (g)	%
Millstone Bluff	1996	2761	14.48 %	10468.6	14.72 %
	1997	6833	35.84 %	22948.0	32.27 %
	1999	8236	43.20 %	33960.9	47.76 %
	2003	1235	6.48 %	3732.6	5.25 %
	TOTAL	19065		71110.1	
Dillow's Ridge	1993	1226	27.43 %	5742.0	29.01 %
	1994	1775	39.71 %	7948.2	40.15 %
	1995	1469	32.86 %	6104.3	30.84 %
	TOTAL	4470		19794.5	

Table 3.2. Interpreting Cramer's V Strength of Association for Chi-squared Tests (Cohen 1988).

	Effect Size		
Degrees of Freedom	Small	Medium	Large
1	$\leq .10$	$.10 < x \leq .30$	$\geq .50$
2	$\leq .07$	$.07 < x \leq .21$	$\geq .35$
3	$\leq .06$	$.06 < x \leq .17$	$\geq .29$
4	$\leq .05$	$.05 < x \leq .15$	$\geq .25$
5	$\leq .04$	$.04 < x \leq .13$	$\geq .22$

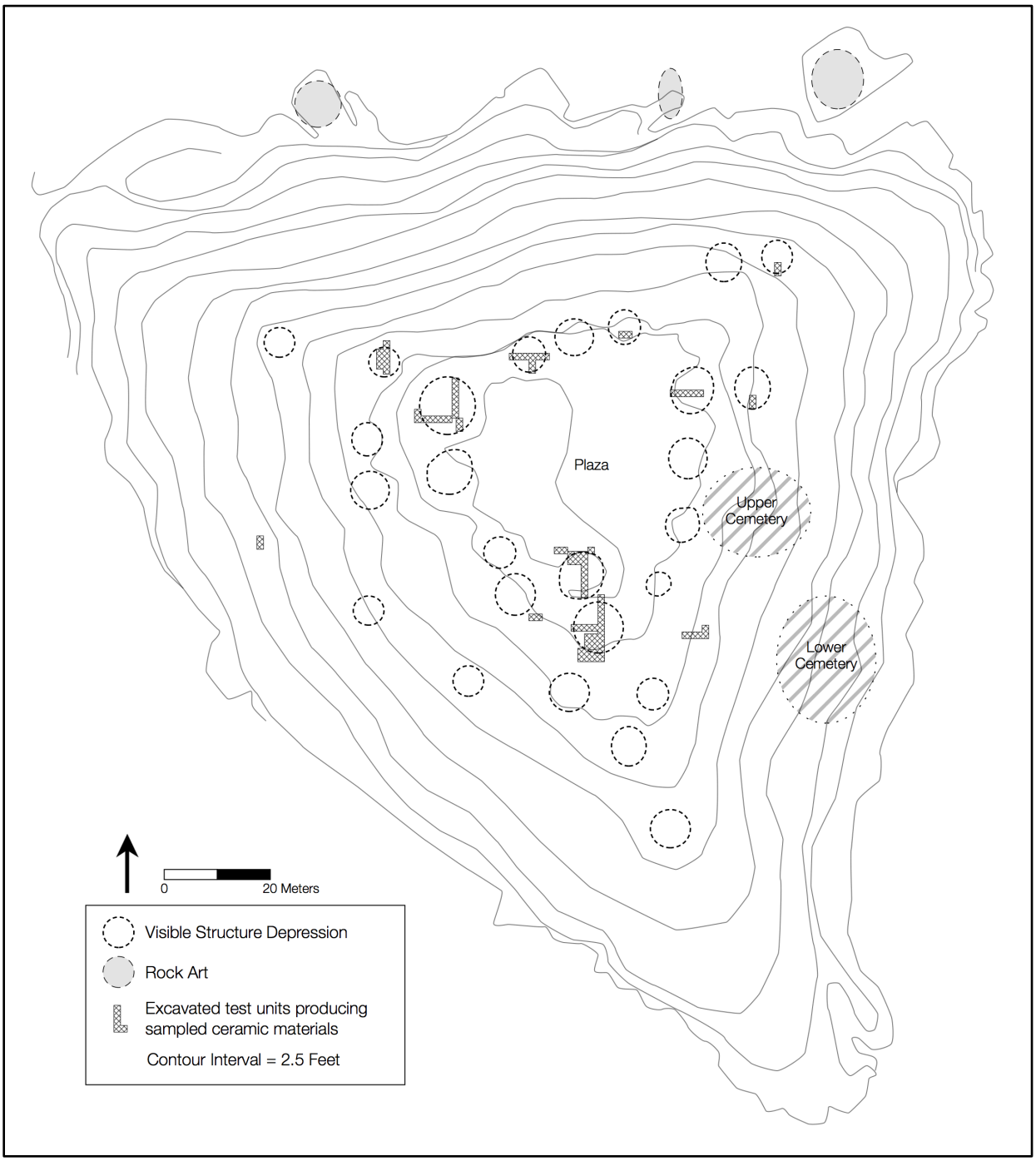

Figure 3.1. Map of excavations at Millstone Bluff.

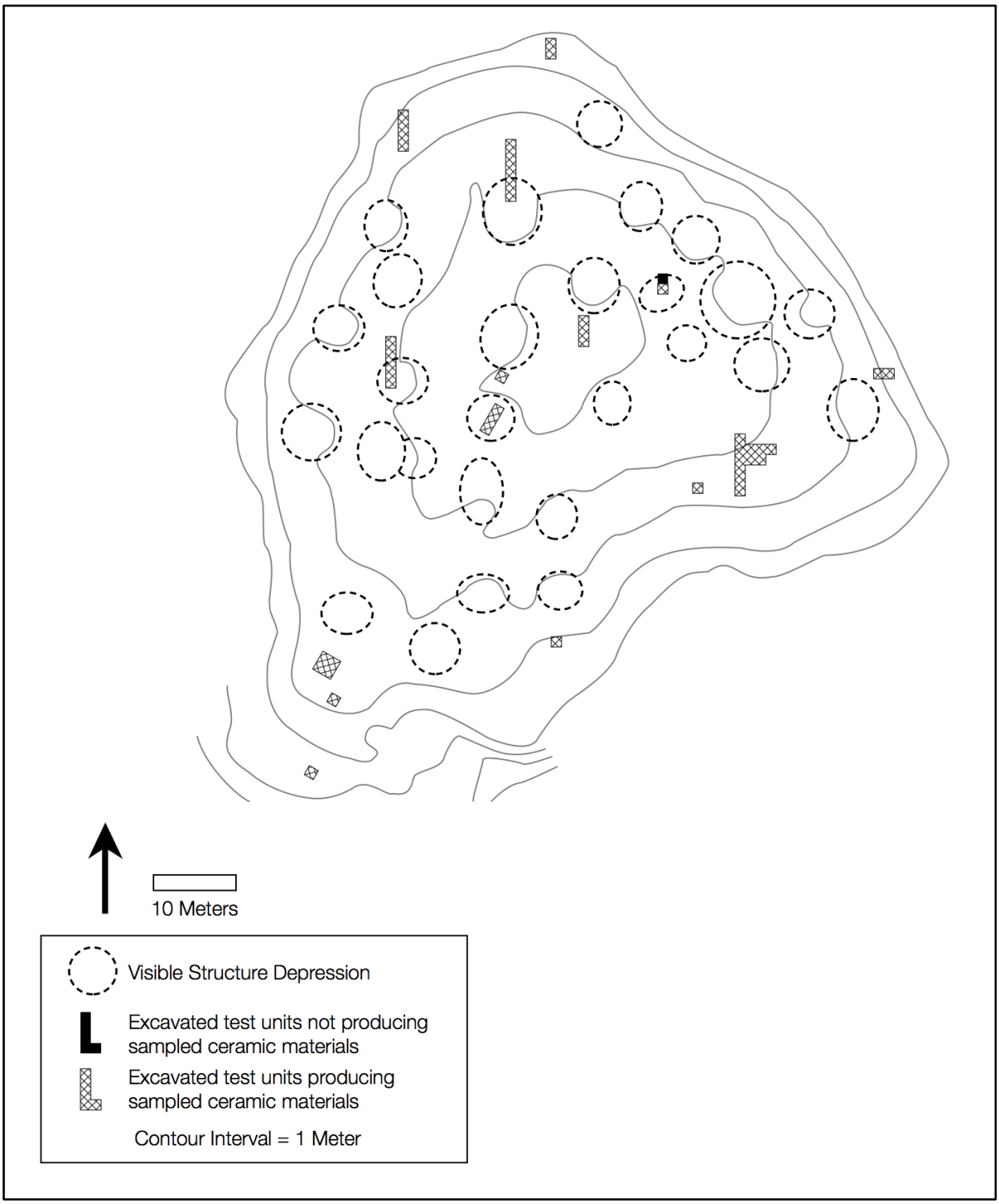

Figure 3.2. Map of excavations at Dillow's Ridge.

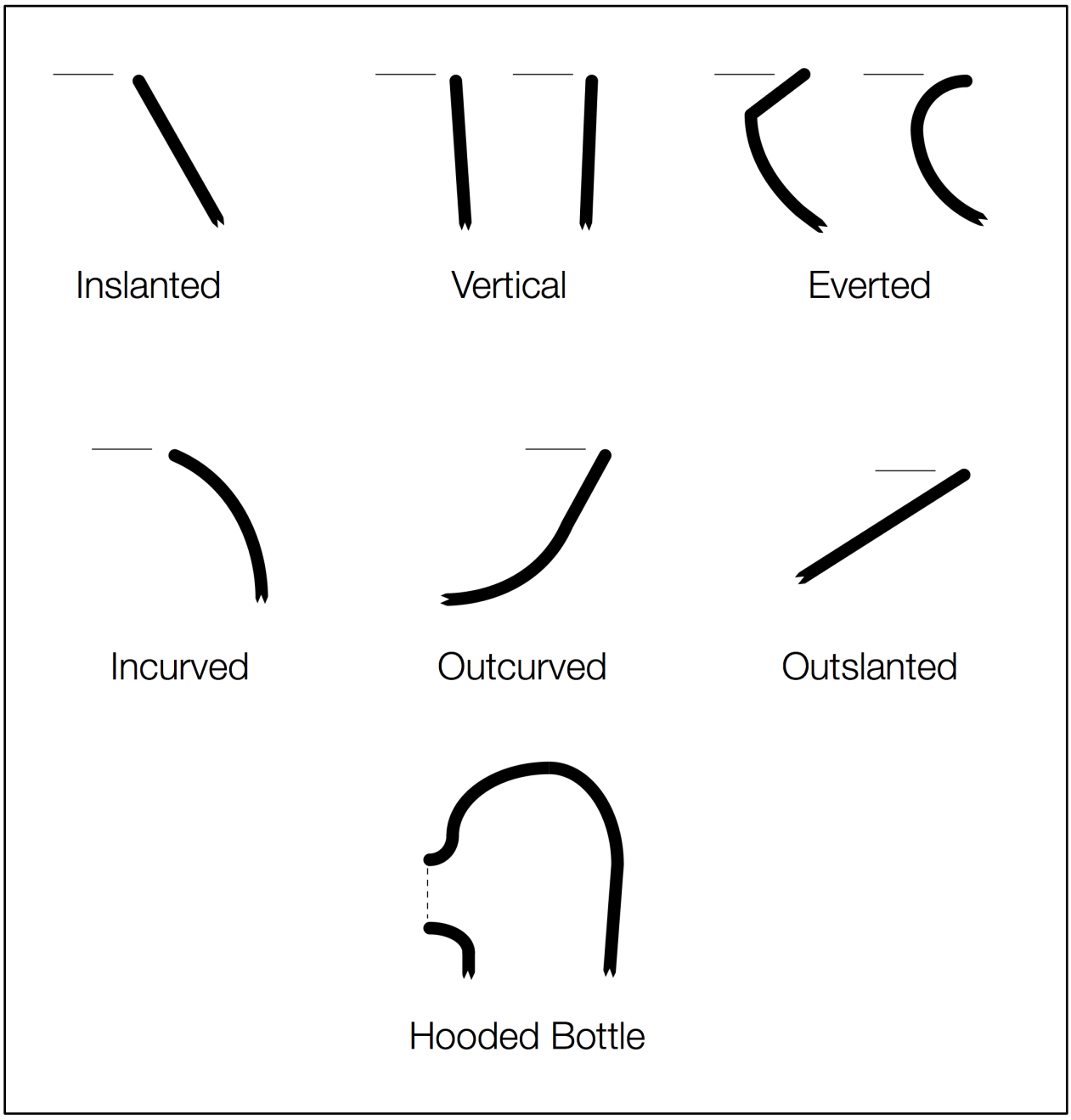

Figure 3.3. Vessel rim orientations.

Figure 3.4. Vessel forms of Late Mississippian southern Illinois. *A*, pan; *B*, beaker; *C to H*, jar; *F and G*, miniature jar; *I*, funnel; *J to M*, bowl; *M*, effigy bowl with rim adornos; *N*, carafe-neck bottle; *O*, hooded bottle; *P*, plate.

CHAPTER 4

RESULTS

The analysis of the Millstone Bluff and Dillow's Ridge ceramic assemblages produced an abundance of data for addressing the research objectives of this study. The purpose of this chapter is to provide the general ceramic attribute data collected from each assemblage and the results of the statistical tests conducted. A more qualitative discussion of results will be had in the concluding chapter. To facilitate a coherent discussion, the first section reviews the general characterization of the ceramics. The second section provides characterizations of special categories of ceramics, including vessel forms, handle forms, decorated sherds, and effigies, and presents the results of tests using this set of data

General Assemblage Characterizations and Comparisons

General characterizations of each ceramic assemblage come from the undecorated body sherd sample. As a result of the sampling process outlined in Chapter 3, a total of 2,505 sherds were selected for analysis in this sample group, including 1,278 undecorated body sherds from Millstone Bluff and 1,227 undecorated body sherds from Dillow's Ridge. These totals exclude any Late Woodland sherds initially selected from the Millstone Bluff sample population. This sample group was used to measure differences in ceramic preservation at each site. Eroded sherd surface frequencies at each site were compared as the first measure of preservation quality. This did not ostensibly indicate any differential trends in preservation (χ^2=.043; df=1; p=.835). However, evidence of poorer preservation at Millstone Bluff is shown in the difference of fragmentation; the

average weight per sherd at Dillow's Ridge is 4.4 g, whereas the average weight per sherd at Millstone Bluff is 3.7 g.

Temper

Nine temper types or mixes were identified among the sample of 2505 undecorated body sherds: coarse shell, fine shell, grog, grit, coarse shell with grog, coarse shell with grit, fine shell with grog, grog with grit, and coarse shell with grog and grit/sand (Table 4.1; Figure 4.1). The sites are compared using counts of sherds by temper group rather than weights of sherds by temper group because weight data would not provide reliable information on differential usage due to natural variations in temper type density. Frequencies of sherds with coarse shell with grog and grit/sand (n=1) and with no observed temper (n=4) were so low that they were excluded from statistical testing. The tempering of the remaining 2500 undecorated body sherds was compared using a non-directional Chi-squared test of association performed at the 95% confidence level. A statistically significant difference in the distribution of tempers between sites was detected (χ^2=29.408; df=7; p=.000); with 7 degrees of freedom, the strength of association is a medium strength (Cramer's V=.108). Post hoc assessment of the Chi-squared contingency table for this test (adj. critical p value = .003125) demonstrated that fine-shell temper is more common at Millstone Bluff than at Dillow's Ridge (Table 4.2).

Exterior Surface Treatment

Five exterior surface treatment techniques were identified among the undecorated body sherd sample: plain, burnished, cordmarked, fabric-impressed, and slipped (Table 4.3; Figure 4.2). Sherds with heavily eroded or otherwise indeterminate exterior surface treatments (n=59) were

excluded from statistical testing. A non-directional Chi-squared test of association performed at the 95% confidence level was used to compare the frequencies of observed exterior surface treatments (n=2446). This test found a small statistical difference in the distributions of exterior surface treatments by site (χ^2=39.907; df=4; p=.000; Cramer's V=.128). Further post hoc assessment of the Chi-squared contingency table for this test (adj. critical p value = .005) found three major factors contributing to the statistically significant difference between the sites: (1) plain exterior surfaces are more common at Millstone Bluff than at Dillow's Ridge (p=.002); (2) burnished exterior surfaces are more common at Dillow's Ridge than at Millstone Bluff (p=.000); and (3) fabric-impressed sherds are more common at Millstone Bluff than at Dillow's Ridge (p=.000) (Table 4.4).

Interior Surface Treatment

Four interior surface treatment techniques were identified among the body sherd sample: plain, burnished, fabric-impressed, and slipped (Table 4.5; Figure 4.3). Sherds with fabric-impressed (n=3) or slipped (n=2) interior surfaces were excluded from statistical testing due to low frequencies of occurrence. Sherds that were too heavily eroded to determine interior surface treatment type (n=83) were also excluded. The remaining 2417 sherds with plain or burnished interior surface treatments were compared using a non-directional Chi-squared test of association performed at the 95% confidence level. This test found a statistical association between the frequencies of plain or burnished surface treatments between sites (χ^2=20.804; df=1; p=.000). However, the Cramer's V measure of association is extremely low (Cramer's V=.09), and thus a statistical association of any interior surface finish with either site cannot be reasonably supported.

Sherd Thickness

Sherds with heavily eroded exterior or interior surfaces were not measured to be included in tests of thickness. A two-way ANOVA was run on 2356 sherds to compare patterns of variance of sherd thicknesses between sites and temper types (Table 4.6; Figures 4.4 and 4.5). This test found no statistically significant difference in mean sherd thickness between Millstone Bluff and Dillow's Ridge (F=1.614; df=1; p=.204) but did indicate statistically significant differences in comparisons of thicknesses by site and temper type together (F=3.916; df=4; p=.004). By examining the confidence intervals of temper thicknesses by site, coarse-shell sherd thicknesses are found to differ between sites (Millstone Bluff sherds are slightly thicker), whereas all other sherd temper types overlap in confidence intervals and therefore are not different between sites.

Vessel, Handle, Decoration, and Effigy Characterizations and Comparisons

The following tests utilized data collected from the special sample of diagnostic sherds. As a result of the sampling strategy discussed in the previous chapter, this sample group (n=1297) included 979 ceramic items from Millstone Bluff and 318 items from Dillow's Ridge. Included in the Millstone Bluff count are 848 rim sherds and five complete or mostly complete miniature vessels. The Dillow's Ridge count included 282 rim sherds and one nearly complete vessel. Several miscellaneous ceramic items such as jewelry beads, discs or discoidals, stumpware, and a spindle whorl are present in the assemblages but do not occur in great enough frequencies to permit any statistical testing (Table 4.7). Late Woodland sherds identified during analysis were not included in this study.

Vessel Form

A vessel form was assigned to 803 sherds collected from both sites (Figure 4.6). One bowl and two plates were identified using base sherds. One of eight hooded bottles was identified from a effigial body sherd despite the absence of a rim. A total of three beakers were identified through the presence of unique beaker-style handles. The remaining 796 vessel forms were identified either through the assessment of rim sherds or complete or semi-complete vessels.

Of the eight vessel forms identified, four were too infrequent to sustain statistical analysis and were therefore excluded from testing (Table 4.8); the excluded forms are hooded bottles, carafe-neck bottles, funnels, and beakers. Frequencies of jars, bowls, plates, and pans (n=783) between both sites were compared using a non-directional Chi-squared test of association performed at the 95% confidence level. This test found the distribution of vessel forms is statistically different though the strength of association is small (χ^2=8.022; df=3; p=.046; Cramer's V=.101). Post hoc assessment of the chi-square contingency table for this test (adj. critical p value = .00625) reveal that no particular vessel form is more or less associated with either site (Table 4.9).

Temper by Vessel Form

The sample sizes of three vessel forms were sufficient to statistically compare temper usage among each vessel form; these forms are jars, bowls, and plates. Seven temper types or mixes were identified for the 430 jar sherds collected from both sites (Table 4.10): coarse shell, fine shell, grog, coarse shell with grog, fine shell with grog, grog with grit, and coarse shell with grog and grit. Frequencies of grog, grog with grit, and coarse shell with grog and grit were low and thus excluded from statistical testing. The remaining jar sherd temper frequencies (n=420) were

compared using a non-directional Chi-squared test of association performed at the 95% confidence level. A statistically significant difference was detected (χ^2=8.491; p=.037) but the strength of association was found to be small (df=3; Cramer's V=.142). Post hoc assessment of the chi-square contingency table for this test (adj. critical p value = .00625) found that no temper type or mix is statistically more or less common in jars at either site (Table 4.11).

Seven temper types or mixes were identified for the 181 bowl sherds sampled from both sites (Table 4.12): coarse shell, fine shell, grog, grit, coarse shell with grog, fine shell with grog, and coarse shell with grit. The usage of grit and coarse shell with grit were too infrequent to be assessed statistically. The remaining bowl sherd temper frequencies (n=178) were compared using a non-directional Chi-squared test of association performed at the 95% confidence level. No statistical association was found between bowl temper usage and site (χ^2=3.485; df=4; p=.480).

Five temper types or mixes were identified for the 149 plate sherds identified from both sites (Table 4.13): coarse shell, fine shell, grog, coarse shell with grog, and fine shell with grog. The usage of grog and fine shell with grog were eliminated from the Chi-squared test as their initial inclusion led to greater than 20% of the cells in the contingency table having expected values less than 5. The result of the non-directional Chi-squared test of association performed at the 95% confidence level revealed a statistical association was present (n=125; χ^2=10.339; p=.006) with a medium strength of association (df=2; Cramer's V=.288). Post hoc assessment of the chi-square contingency table for this test (adj. critical p value = .00833) demonstrated that plates with coarse-shell-with-grog tempering are more common at Dillow's Ridge than they are at Millstone Bluff (Table 4.14).

Exterior Surface Finish by Vessel Form

Three vessel forms had a sufficient sample of detectable exterior surface finish for testing; these forms were jars, bowls, and plates. Six exterior surface finishes were identified across the three vessel forms: plain, burnished, incised, slipped, cordmarked, and perforated. Sherds with more than one type of surface decoration or treatment were counted in each applicable category. Sherds with eroded or otherwise indeterminate surface treatments were also excluded from testing.

The frequencies of all types of jar surface finish except for plain and burnished exterior surfaces were too infrequent to be statistically compared. After jars with incised, cordmarked, modeled, slipped, or eroded exterior surfaces were excluded, 419 jar sherds remained for statistical testing (Table 4.15). A non-directional Chi-squared test of association performed at the 95% confidence level found no statistical difference between the frequencies of plain or burnished jar sherds between sites (χ^2=.167; df=1; p=.682).

The frequencies of all types of bowl surface finish except for plain, burnished, and modeled exterior surfaces were too infrequent to be statistically compared. After bowls with incised, slipped, perforated, or eroded exterior surfaces were excluded, 178 bowl surface finishes remained for statistical testing (Table 4.16). The result of the non-directional Chi-squared test of association performed at the 95% confidence level revealed a statistical association was present (χ^2=6.815; p=.033) with a small strength of association (df=2; Cramer's V=.196). However, post hoc assessment of the chi-square contingency table for this test (adj. critical p value = .00833) found no particular exterior surface finish to be more common on bowls at either site (Table 4.17).

After plates with modeled, slipped, or eroded exterior surfaces were excluded due to low frequencies, 143 plain or burnished plate surface finishes remained for statistical testing (Table 4.18). A non-directional Chi-squared test of association performed at the 95% confidence level

found no statistical difference between the frequencies of plain or burnished plate sherds between sites (χ^2=.445; df=1; p=.505).

Interior Surface Finish by Vessel Form

Of the three unrestricted vessel forms present in both assemblages, bowls and plates, but not pans, were frequent enough to statistically compare interior surface decoration or treatment. Four interior surface finishes were identified across the three vessel forms: plain (untreated), burnished, incised, and slipped. Sherds with more than one type of surface decoration or treatment were counted in each applicable category. However, the frequencies of all types except for plain and burnished interior surfaces were too infrequent to be statistically compared.

After bowls with slipped interior surfaces were excluded, 179 plain or burnished bowl sherds remained for statistical testing (Table 4.19). A non-directional Chi-squared test of association performed at the 95% confidence level found that the distribution of interior surface finishes was statistically different between the two sites (χ^2=3.857; p=.050) though the strength of association was small (df=1; Cramer's V=.147). Inspection of the Chi-squared contingency table for this test suggests bowls with plain interior surfaces are more closely associated with Millstone Bluff and bowls with burnished interior surfaces are more closely associated with Dillow's Ridge.

After plates with incised or slipped interior surfaces were excluded, 153 interior surface finishes remained for statistical testing (Table 4.20). A non-directional Chi-squared test of association performed at the 95% confidence level found no statistical difference between the frequencies of plain or burnished plate sherds between sites (χ^2=.043; df=1; p=.836).

Rim Orientation by Vessel Form

Jar and bowl vessel forms exhibit sufficient variability in rim orientation to rationalize statistical testing of differences between the sites. Jar rim orientations were attributed to one of three categories: vertical, everted, or inslanted (Table 4.21). Two of 430 jar sherds were indeterminate for rim orientation, leaving 428 sherds for testing. A non-directional Chi-squared test of association performed at the 95% confidence level found no statistical difference between jar rim orientations from each site (χ^2=4.795; df=2; p=.091). The rim orientations of unrestricted and restricted bowl rim sherds were categorized as vertical, outcurved, or incurved (Table 4.22). Four of 181 bowl sherds were indeterminate for rim orientation, leaving 177 sherds for testing. A non-directional Chi-squared test of association performed at the 95% confidence level found no statistical difference between bowl rim orientations from each site (χ^2=3.313; df=2; p=.191).

Orifice Diameter by Vessel Form

Three vessel forms had a sufficient sample of rims with measurable orifice diameters to undergo statistical testing (Table 4.23): jars (n=244), bowls (n=87), and plates (n=44). The distributions of jar and plate orifice diameters at both sites are largely normal, but the distribution of bowl orifice diameters at both sites is left-skewed (Figure 4.7); therefore, the original measurements (cm) were transformed ($cm^{1/3}$) in order to properly conduct the following statistical test. Visual inspection of boxplots comparing orifice diameters by vessel form and site demonstrate strikingly similarities (Figure 4.8). A Welch's t-test confirms there is no statistical difference in orifice diameters in jars (t=-.084; df=70.253; p=.934), bowls (t=.014; df=52.172; p=.989), or plates (t=-.464; df=26.324; p=.646) between the two sites.

Rim Thickness by Vessel Form

After eroded sherds were excluded from the sample, three vessel forms had enough measurable rim thicknesses to statistically test for differences between sites (Table 4.24): jars (n=416), bowls (n=176), and plates (n=43). The distributions of mean rim thicknesses for all three vessel forms were normal. Visual inspection of histograms (Figure 4.9) and boxplots (Figure 4.10) comparing rim thickness by vessel form and site demonstrate pronounced similarities in distributions. A Welch's t-test confirms there is no statistical difference in mean rim thickness in jars (t=.199; df=171.184; p=.843), bowls (t=.428; df=98.223; p=.670), or plates (t=-.089; df=64.349; p=.930) between the two sites.

Miniature Vessel Form Distribution and Frequency

Several rim sherds in the Millstone Bluff and Dillow's Ridge assemblages exhibit characteristics of miniature vessel form. Using the parameters set for miniature vessel identification through rim sherds as discussed in the previous chapter, a total of 40 miniature vessel rims were identified in the assemblages: 32 sherds from Millstone Bluff and 8 sherds from Dillow's Ridge. Vessel forms were identified for all 40 sherds (Table 4.25). A Fisher's exact test revealed that the distribution of the three miniature vessel forms is statistically similar between the sites (p=.133). Additionally, the total count of miniature vessel rim sherds was compared against the total number of rim sherds from standard-sized vessels. A non-directional Chi-squared test of association performed at the 95% confidence level found no statistical difference in miniature vessel rim sherd frequency between each site (χ^2=0.544; df=1; p=.461).

Handle Forms

Based on trends in jar function recognized through handle form analysis, the counts of closed and open handle forms from each site were compared to detect potential differences in use frequency between sites. Total counts of handle form frequencies at each site are ostensibly similar (Table 4.26), and a non-directional Chi-squared test of association performed at the 95% confidence level confirmed no statistical difference exists in handle form between sites (χ^2=0.066; df=1; p=.797).

Decoration Type and Frequency

Counts of decoration types on either exterior or interior surfaces from each site were compared in order to assess whether decorated surface treatments are statistically more common at either site. Incised, modeled, perforated, and punctated vessel sherds were observed in the assemblages (Table 4.27), but perforated (n=1) and punctated (n=6) sherds were too infrequent on their own to be statistically compared. However, perforated and punctated sherds were included in testing by collapsing the two categories in an "Other Decoration" Category. The non-directional Chi-squared test of association performed at the 95% confidence level assessed the distributions of decoration type (n=104) and found a statistically significant difference between the sites (χ^2=8.151; p=.017) with a medium strength of effect (df=2; Cramer's V=.280). Post hoc assessment of the chi-square contingency table for this test (adj. critical p value = .00833) demonstrated that incising is a more common decorative technique used at Millstone Bluff than at Dillow's Ridge (Table 4.28). Though motifs were identified on many of the decorated sherds (Table 4.29), no additional comparisons between sites could be performed to better understand the distribution of motif type due to the small sample size.

An additional test was conducted to assess whether decoration itself was statistically more common at either site. A non-directional Chi-squared test of association performed at the 95% confidence level assessed the distributions of decorated (n=102) and undecorated (n=23433) sherds, finding no statistical difference in decorated sherd frequency between the sites (χ^2=.442; df=1; p=.506).

Effigies

The frequencies of effigies, either in vessel or figurine form, from each site were compared in order to assess whether effigies are statistically more common at either site. Unfortunately, too few effigial representations were identifiable (Table 4.30), and therefore no tests could be performed to better understand the distribution of effigy forms in a statistical sense. A non-directional Chi-squared test of association performed at the 95% confidence level assessed the occurrence of effigial (n=35) and noneffigial (n=23500) sherds, finding a no statistical difference between the sites (χ^2=.505; df=1; p=.477).

Summary

This chapter presented results from the laboratory analysis and statistical testing of data collected from the Millstone Bluff and Dillow's Ridge ceramic assemblages. While the assemblages do exhibit some statistical differences, they are astoundingly similar. The findings of these tests are summarized in Table 4.31. Many ceramic items and attributes were unable to undergo statistical comparison due to low frequencies of occurrence, but each still offers

information valuable to this study. In the following and last chapter, the anthropological implications of the test results in addition to untested observations will be discussed.

Table 4.1. Temper by Site.

	Sites							
	Millstone Bluff				Dillow's Ridge			
Temper	N	% by Count	Wgt. (g)	% by Wgt.	N	% by Count	Wgt. (g)	% by Wgt.
Coarse Shell	952	74.49 %	5031.8	74.47 %	936	76.28 %	4188.2	74.24 %
Fine Shell	135	10.56 %	504.6	7.47 %	69	5.62 %	230.9	4.09 %
Grog	42	3.29 %	317.6	4.70 %	28	2.28 %	215.1	3.81 %
Grit	15	1.17 %	29.6	0.44 %	15	1.22 %	41.2	0.73 %
Coarse Shell, Grog	87	6.81 %	640.6	9.48 %	114	9.29 %	592.8	10.51 %
Fine Shell, Grog	38	2.97 %	171.1	2.53 %	47	3.83 %	202.7	3.59 %
Coarse Shell, Grit	3	0.23 %	15.3	0.23 %	6	0.49 %	59.7	1.06 %
Grog, Grit	5	0.39 %	22.6	0.33 %	8	0.65 %	100.8	1.79 %
Coarse Shell, Grog, Grit	1	0.08 %	23.2	0.34 %	-	-	-	-
None	-	-	-	-	4	0.33 %	10.2	0.18 %
TOTAL	1278		6756.4		1227		5641.6	

Table 4.2. Post-hoc Adjusted Chi-squared Testing of Temper by Site.

Site	Vessel Form	n	Standardized Residual	Cell χ^2	Cell Sig.[a]
Millstone Bluff	Coarse Shell	952	-1.15	1.32	.250144
	Fine Shell	135	4.50	20.25	.000007*
	Grog	42	1.51	2.28	.131043
	Grit	15	-.12	.01	.904483
	Coarse Shell, Grog	87	-2.31	5.34	.020888
	Fine Shell, Grog	38	-1.20	1.44	.230139
	Coarse Shell, Grit	3	-1.07	1.14	.284619
	Grog, Grit	5	-.91	.83	.362823
	TOTAL	1277			
Dillow's Ridge	Coarse Shell	936	1.15	1.32	.250144
	Fine Shell	69	-4.50	20.25	.000007*
	Grog	28	-1.51	2.28	.131043
	Grit	15	.12	.01	.904483
	Coarse Shell, Grog	114	2.31	5.34	.020888
	Fine Shell, Grog	47	1.20	1.44	.230139
	Coarse Shell, Grit	6	1.07	1.14	.284619
	Grog, Grit	8	.91	.83	.362823
	TOTAL	1223			

[a]The adjusted significance for this test is 0.003125.
*The result is significant at the adjusted level of 0.003125.

Table 4.3. Exterior Surface Treatment by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Surface Treatment	N	% by Count	N	% by Count
Plain	1187	92.88 %	1109	86.78 %
Burnished	26	2.03 %	76	5.95 %
Fabric-Impressed	26	2.03 %	6	0.47 %
Slipped	1	0.08 %	2	0.16 %
Cordmarked	5	0.39 %	8	0.63 %
Indeterminate	33	2.58 %	26	2.03 %
TOTAL	1278		1227	

Table 4.4. Post-hoc Adjusted Chi-squared Testing of Exterior Surface Treatment and Site.

Site	Vessel Form	n	Standardized Residual	Cell χ^2	Cell Sig.[a]
Millstone Bluff	Plain	1187	3.09	9.55	.002*
	Burnished	26	-5.24	27.46	.000*
	Fabric Impressed	26	3.46	11.97	.001*
	Cordmarked	5	-.90	.81	.368
	Slipped	1	-.61	.37	.542
	TOTAL	1245			
Dillow's Ridge	Plain	1109	-3.09	9.55	.002*
	Burnished	76	5.24	27.46	.000*
	Fabric Impressed	6	-3.46	11.97	.001*
	Cordmarked	8	.90	.81	.368
	Slipped	2	.61	.37	.542
	TOTAL	1201			

[a]The adjusted significance for this test is 0.005.
*The result is significant at the adjusted level of 0.005.

Table 4.5. Interior Surface Treatment by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Surface Treatment	N	% by Count	N	% by Count
Plain	1218	95.31 %	1127	91.85 %
Burnished	17	1.33 %	53	4.32 %
Fabric-Impressed	3	0.23 %	-	-
Slipped	1	0.08 %	1	0.08 %
Indeterminate	39	3.05 %	44	3.59 %
TOTAL	1278		1227	

Table 4.6. Averaged Thickness (mm) by Temper and Site.

	Sites							
	Millstone Bluff				Dillow's Ridge			
Temper	Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Coarse Shell	1.85	19.35	6.29	6.10	3.00	11.40	5.77	5.60
Fine Shell	2.15	10.25	5.52	5.38	3.15	8.75	4.97	4.95
Grog	3.70	10.65	6.75	6.50	5.15	11.35	7.60	6.95
Grit	3.60	6.80	5.14	4.95	3.90	8.45	5.56	5.45
Coarse Shell, Grog	3.55	13.15	6.78	6.55	2.85	10.50	6.25	6.05
Fine Shell, Grog	3.10	9.85	5.37	5.28	3.10	7.90	5.36	5.10
Coarse Shell, Grit	8.60	9.20	8.90	8.90	5.90	8.65	7.38	7.63
Grog, Grit	5.70	8.95	6.62	5.95	5.65	10.25	7.76	7.30
Coarse Shell, Grog, Grit	8.50	8.50	8.50	8.50	-	-	-	-
None	-	-	-	-	4.65	8.20	6.73	7.03

Table 4.7. Miscellaneous Ceramic Item Types by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Type	N	% of Assemblage	N	% of Assemblage
Discoidal	5	0.03 %	1	0.02 %
Pipe Fragment	3	0.02 %	-	-
Bead (Jewelry)	3	0.02 %	-	-
Spindle Whorl	1	0.01 %	-	-
Stumpware	-	-	1	0.02 %

Table 4.8. Vessel Form Distribution by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Vessel Form	N	% of Assemblage	N	% of Assemblage
Jar	330	33.71 %	100	31.45 %
Bowl	124	12.67 %	57	17.92 %
Plate	112	11.44 %	37	11.64 %
Pan	21	2.15 %	2	0.63 %
Hooded Bottle	6	0.61 %	2	0.63 %
Carafe-Neck Bottle	4	0.41 %	1	0.31 %
Funnel	1	0.10 %	3	0.94 %
Beaker	2	0.20 %	1	0.31 %
Indeterminate	379	38.71 %	115	36.16 %
TOTAL	979		318	

Table 4.9. Post-hoc Adjusted Chi-squared Testing of Vessel Form Distribution and Site.

Site	Vessel Form	n	Standardized Residual	Cell χ^2	Cell Sig.[a]
Millstone Bluff	Jars	330	1.27	1.61	.20408
	Bowls	124	-2.29	5.24	.02202
	Plates	112	.06	.00	.95216
	Pans	21	1.84	3.39	.06577
	TOTAL	587			
Dillow's Ridge	Jars	100	-1.27	1.61	.20408
	Bowls	57	2.29	5.24	.02202
	Plates	37	.06	.00	.95216
	Pans	2	-1.84	3.39	.06577
	TOTAL	196			

[a]The adjusted significance for this test is 0.00625.

Table 4.10. Jar Temper by Site.

	Sites							
	Millstone Bluff				Dillow's Ridge			
Temper	N	% by Count	Wgt. (g)	% by Wgt.	N	% by Count	Wgt. (g)	% by Wgt.
Coarse Shell	234	71.91 %	6935.4	84.52 %	68	68.00 %	726.2	42.46 %
Fine Shell	41	12.42 %	147.6	1.80 %	4	4.00 %	10.6	0.62 %
Grog	4	1.21 %	27.3	0.33 %	4	4.00 %	69.6	4.07 %
Coarse Shell, Grog	41	12.42 %	1028.9	12.54 %	20	20.00 %	418.4	24.46 %
Fine Shell, Grog	9	2.73 %	60.0	0.73 %	3	3.00 %	482.9	28.23 %
Grog, Grit	-	-	-	-	1	1.00 %	2.6	0.15 %
Coarse Shell, Grog, Grit	1	0.30 %	6.7	0.08 %	-	-	-	-
TOTAL	330		8205.9		100		1710.3	

Table 4.11. Post-hoc Adjusted Chi-squared Testing of Jar Temper and Site.

Site	Vessel Form	n	Standardized Residual	Cell χ^2	Cell Sig.[a]
Millstone Bluff	Coarse Shell	234	.08	.01	.93624
	Fine Shell	41	2.33	5.43	.01981
	Coarse Shell, Grog	41	-2.05	4.20	.04036
	Fine Shell, Grog	9	-.20	.04	.84148
	TOTAL	325			
Dillow's Ridge	Coarse Shell	68	-.08	.01	.93624
	Fine Shell	4	-2.33	5.43	.01981
	Coarse Shell, Grog	20	2.05	4.20	.04036
	Fine Shell, Grog	3	.20	.04	.84148
	TOTAL	95			

[a]The adjusted significance for this test is 0.00625.

Table 4.12. Bowl Temper by Site.

	Sites							
	Millstone Bluff				Dillow's Ridge			
Temper	N	% by Count	Wgt. (g)	% by Wgt.	N	% by Count	Wgt. (g)	% by Wgt.
Coarse Shell	65	52.42 %	829.6	53.71 %	28	49.12 %	335.0	55.26 %
Fine Shell	32	25.81 %	205.2	13.28 %	12	21.05 %	103.1	17.01 %
Grog	7	5.65 %	70.8	4.58 %	7	12.28 %	90.2	14.88 %
Grit	2	1.61 %	7.5	0.49 %	-	-	-	-
Coarse Shell, Grog	13	10.48 %	339.4	21.97 %	5	8.77 %	38.8	6.40 %
Fine Shell, Grog	5	4.03 %	92.1	5.96 %	4	7.02 %	36.6	6.04 %
Coarse Shell, Grit	-	-	-	-	1	1.75 %	2.5	0.41 %
TOTAL	124		1544.6		57		606.2	

Table 4.13. Plate Temper by Site.

	Sites							
	Millstone Bluff				Dillow's Ridge			
Temper	N	% by Count	Wgt. (g)	% by Wgt.	N	% by Count	Wgt. (g)	% by Wgt.
Coarse Shell	57	50.89 %	506.4	43.48 %	16	43.24 %	169.1	28.67 %
Fine Shell	30	26.79 %	181.5	15.58 %	6	16.22 %	87.1	14.77 %
Grog	6	5.36 %	29.6	2.54 %	3	8.11 %	17.5	2.97 %
Coarse Shell, Grog	8	7.14 %	98.8	8.48 %	10	27.03 %	269.4	45.68 %
Fine Shell, Grog	11	9.82 %	348.4	29.91 %	2	5.41 %	46.7	7.92 %
TOTAL	112		1164.7		37		589.8	

Table 4.14. Post-Hoc Adjusted Chi-squared Testing of Plate Temper and Site.

Site	Vessel Form	n	Standardized Residual	Cell χ^2	Cell Sig.[a]
Millstone Bluff	Coarse Shell	57	.90	.81	.36812
	Fine Shell	30	1.46	2.13	.14429
	Coarse Shell, Grog	8	-3.15	9.92	.00163*
	TOTAL	95			
Dillow's Ridge	Coarse Shell	16	-.90	.81	.36812
	Fine Shell	6	-1.46	2.13	.14429
	Coarse Shell, Grog	10	3.15	9.92	.00163*
	TOTAL	32			

[a]The adjusted significance for this test is 0.00833.
*The result is significant at the adjusted level of 0.00833.

Table 4.15. Jar Exterior Surface Finish by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Surface Finish	N	% of Count	N	% of Count
Plain	288	87.27 %	83	83.00 %
Burnished	36	10.91 %	12	12.00 %
Incised	1	0.30 %	4	4.00 %
Modeled	-	-	1	1.00 %
Slipped	1	0.30 %	-	-
Cordmarked	1	0.30 %	-	-
Indeterminate	3	0.91 %	-	-
TOTAL	330		100	

Table 4.16. Bowl Exterior Surface Finish by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Surface Finish	N	% of Count	N	% of Count
Plain	89	69.53 %	40	68.97 %
Burnished	19	14.84 %	15	25.86 %
Incised	2	1.56 %	-	-
Modeled	14	10.94 %	1	1.72 %
Slipped	2	1.56 %	-	-
Perforated	1	0.78 %	-	-
Indeterminate	1	0.78 %	2	3.45 %
TOTAL	128		58	

Note: Sherds with more than one type of surface treatment are counted in each applicable category.

Table 4.17. Post-hoc Adjusted Chi-squared Testing of Bowl Exterior Surface Finish and Site.

Site	Vessel Form	n	Standardized Residual	Cell χ^2	Cell Sig.[a]
Millstone Bluff	Plain	89	-1.77	3.13	.077
	Burnished	19	.21	.04	.834
	Modeled	14	2.16	4.67	.031
	TOTAL				
Dillow's Ridge	Plain	40	1.77	3.13	.077
	Burnished	15	-.21	.04	.834
	Modeled	1	-2.16	4.67	.031
	TOTAL				

[a]The adjusted significance for this test is 0.00833.

Table 4.18. Plate Exterior Surface Finish by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Surface Finish	N	% of Count	N	% of Count
Plain	86	75.44 %	26	70.27 %
Burnished	22	19.30 %	9	24.32 %
Modeled	3	2.63 %	-	-
Indeterminate	3	2.63 %	2	5.41 %
Total	114		37	

Note: Sherds with more than one type of surface treatment are counted in each applicable category.

Table 4.19. Bowl Interior Surface Finish by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Surface Finish	N	% of Count	N	% of Count
Plain	103	83.06 %	41	71.93 %
Burnished	19	15.32 %	16	28.07 %
Slipped	2	1.61 %	-	-
Total	124		57	

Note: Sherds with more than one type of surface treatment are counted in each applicable category.

Table 4.20. Plate Interior Surface Finish by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Surface Finish	N	% of Count	N	% of Count
Plain	82	70.69 %	25	67.57 %
Burnished	30	25.86 %	10	27.03 %
Incised	3	2.59 %	2	5.41 %
Slipped	1	0.86 %	-	-
Total	116		37	

Note: Sherds with more than one type of surface treatment are counted in each applicable category.

Table 4.21. Jars by Rim Orientation and Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Rim Orientation	N	% of Count	N	% of Count
Vertical	187	56.67 %	49	49.00 %
Everted	74	22.42 %	33	33.00 %
Inslanted	67	20.30 %	18	18.00 %
Indeterminate	2	0.61 %	-	-
Total	330		100	

Table 4.22. Bowls by Rim Orientation and Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Rim Orientation	N	% of Count	N	% of Count
Vertical	50	40.32 %	31	54.39 %
Outcurved	44	35.48 %	19	33.33 %
Incurved	26	20.97 %	7	12.28 %
Indeterminate	4	3.23 %	-	-
Total	124		57	

Table 4.23. Averaged Rim Orifice Diameter (cm) by Vessel Form and Site.

	Sites							
	Millstone Bluff				Dillow's Ridge			
Vessel Form	Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Jar	3.0	52.0	20.4	20.0	3.0	54.0	20.6	20.0
Bowl	4.0	49.0	18.4	15.0	5.0	46.0	18.1	15.0
Plate	7.0	41.0	24.2	23.0	9.0	40.0	25.0	24.0
Pan	4.0	56.0	25.3	22.5	-	-	-	-
Carafe-Neck Bottle	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0

Table 4.24. Averaged Rim Thickness (mm) by Vessel Form and Site.

	Sites							
	Millstone Bluff				Dillow's Ridge			
Vessel Form	Minimum	Maximum	Mean	Median	Minimum	Maximum	Mean	Median
Jar	2.45	14.85	6.09	6.00	3.70	10.45	6.06	5.93
Bowl	2.40	10.95	6.57	6.30	3.05	11.60	6.43	6.20
Plate	3.55	10.80	6.55	6.60	4.2	9.9	6.58	6.55
Pan	4.35	11.60	9.01	9.50	7.15	7.15	7.15	7.15
Hooded Bottle	5.05	11.15	7.03	6.65	3.85	5.55	4.70	4.70
Carafe-Neck Bottle	5.00	8.10	6.60	6.70	7.95	7.95	7.95	7.95
Funnel	10.95	10.95	10.95	10.95	8.55	9.40	9.03	9.15
Beaker	-	-	-	-	-	-	-	-

Table 4.25. Miniature Vessel Forms by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Vessel Form	N	% of Count	N	% of Count
Jar	17	53.13 %	2	25.00 %
Bowl	11	34.38 %	6	75.00 %
Plate	4	12.50 %	0	0.00 %
TOTAL	32		8	

Table 4.26. Handle Forms by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Handle Form	N	% of Count	N	% of Count
Closed	49	51.04 %	15	48.39 %
Open	47	48.96 %	16	51.61 %
TOTAL	96		31	

Table 4.27. Decoration Type by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Decoration Type	N	% of Count	N	% of Count
Incised	25	30.49 %	14	63.54 %
Modeled	51	62.20 %	7	31.82 %
Perforated	1	1.22 %	0	0.00 %
Punctated	5	6.10 %	1	4.55 %
TOTAL	82		22	

Table 4.28. Post-hoc Adjusted Chi-squared Testing of Decoration Type and Site.

Site	Decoration Type	n	Standardized Residual	Cell χ^2	Cell Sig.[a]
Millstone Bluff	Incised	25	-2.85	8.12	.004*
	Modeled	49	2.55	6.50	.011
	Other	6	.46	.21	.646
	TOTAL	80			
Dillow's Ridge	Incised	14	2.85	8.12	.004*
	Modeled	7	-2.55	6.50	.011
	Other	1	-.46	.21	.646
	TOTAL	22			

[a]The adjusted significance for this test is 0.008.
*The result is significant at the adjusted level of 0.008.

Table 4.29. Surface Decoration Motif by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Motif	N	% of Count	N	% of Count
O'Byam Incised	2	6.45 %	3	20.00 %
Matthews Incised	2	6.45 %	1	6.67 %
Barton Incised	1	3.23 %	1	6.67 %
Mound Place Incised	6	19.35 %	1	6.67 %
Indeterminate Incised	14	45.16 %	8	53.33 %
Indeterminate Perforated	1	3.23 %	-	-
Indeterminate Punctated	5	16.13 %	1	6.67 %
TOTAL	31		15	

Table 4.30. Effigial Representations by Site.

	Sites			
	Millstone Bluff		Dillow's Ridge	
Representation	N	% of Count	N	% of Count
Anthropomorphic	7	23.33 %	1	20.00 %
Owl	3	10.00 %	2	40.00 %
Indeterminate Bird	2	6.67 %	-	-
Fish	4	13.33 %	-	-
Whelk Shell	3	10.00 %	-	-
Indeterminate	11	36.67 %	2	40.00 %
TOTAL	30		5	

Table 4.31. Overview of Statistical Results.

Sample Group	Variable	Comparison Outcome
Undecorated Body Sherds	Temper	Fine-shell tempering more common at Millstone Bluff
	Exterior Surface Treatment	Plain surfaces more common at Millstone Bluff Burnished surfaces more common at Dillow's Ridge Fabric-impressed surfaces more common at Millstone Bluff
	Interior Surface Treatment	No difference between sites
	Sherd Thickness	Overall, thicker sherds at Millstone Bluff Coarse shell temper, thicker sherds at Millstone Bluff Fine shell temper, thicker sherds at Millstone Bluff Grog temper, thicker sherds at Dillow's Ridge Coarse-shell-with-grog temper, thicker sherds at Millstone Bluff Fine-shell-with-grog temper, no difference between sites
Specials	Vessel Form Distribution	No difference between sites
	Temper by Vessel Form	Jars, no difference between sites Bowls, no difference between sites Plates, coarse-shell-with-grog tempering more common at Dillow's Ridge
	Exterior Surface Finish by Vessel Form	No difference between sites
	Interior Surface Finish by Vessel Form	Bowls, burnished surfaces more common at Dillow's Ridge Plates, no difference between sites
	Rim Orientation	No difference between sites
	Orifice Diameter by Vessel Form	No difference between sites
	Rim Thickness	No difference between sites
	Miniature Vessels Form Distribution	No difference between sites
	Miniature Vessels Frequency	No difference between sites
	Handle Forms	No difference between sites
	Decoration Type	Incising more common at Millstone Bluff
	Decoration Frequency	No difference between sites
	Effigy Frequency	No difference between sites

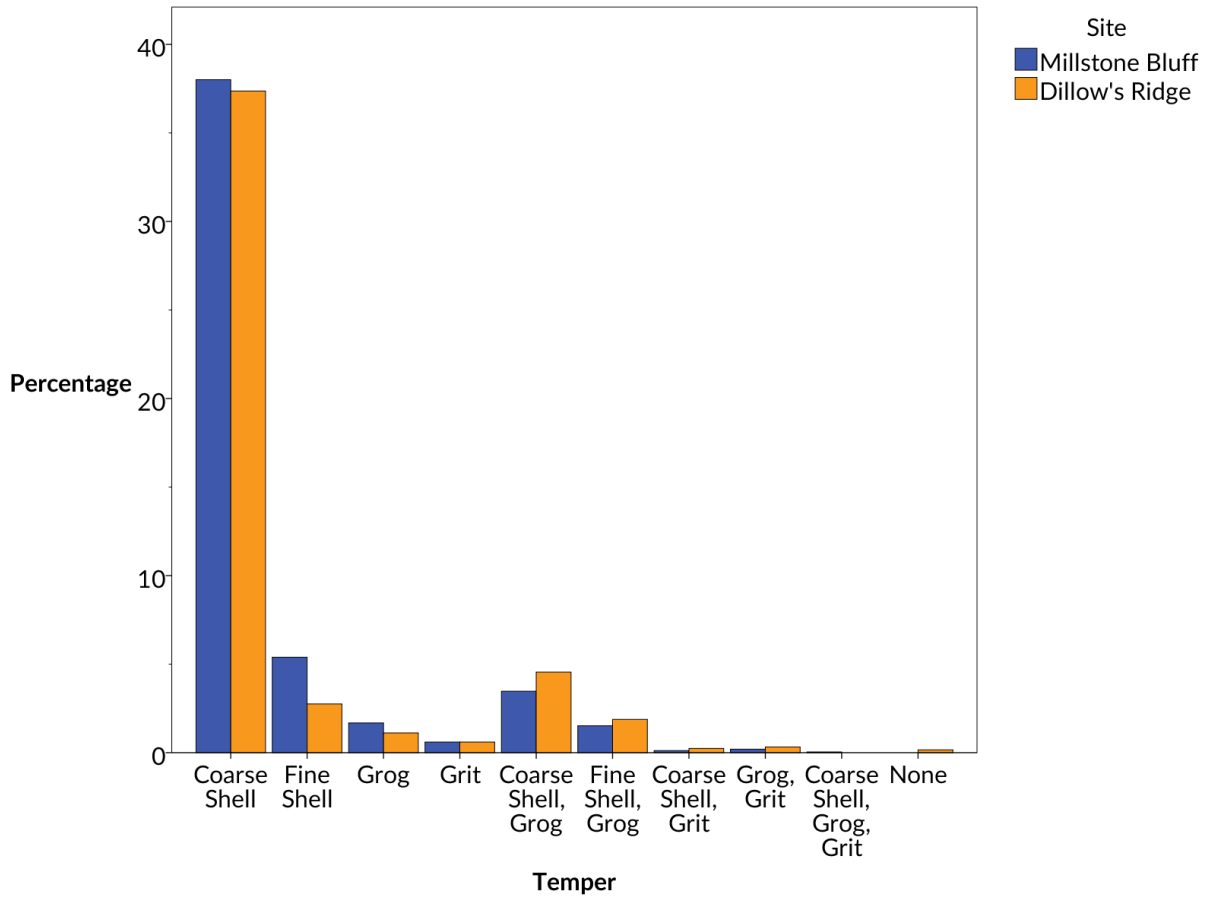

Figure 4.1. Distribution of temper at Millstone Bluff and Dillow's Ridge.

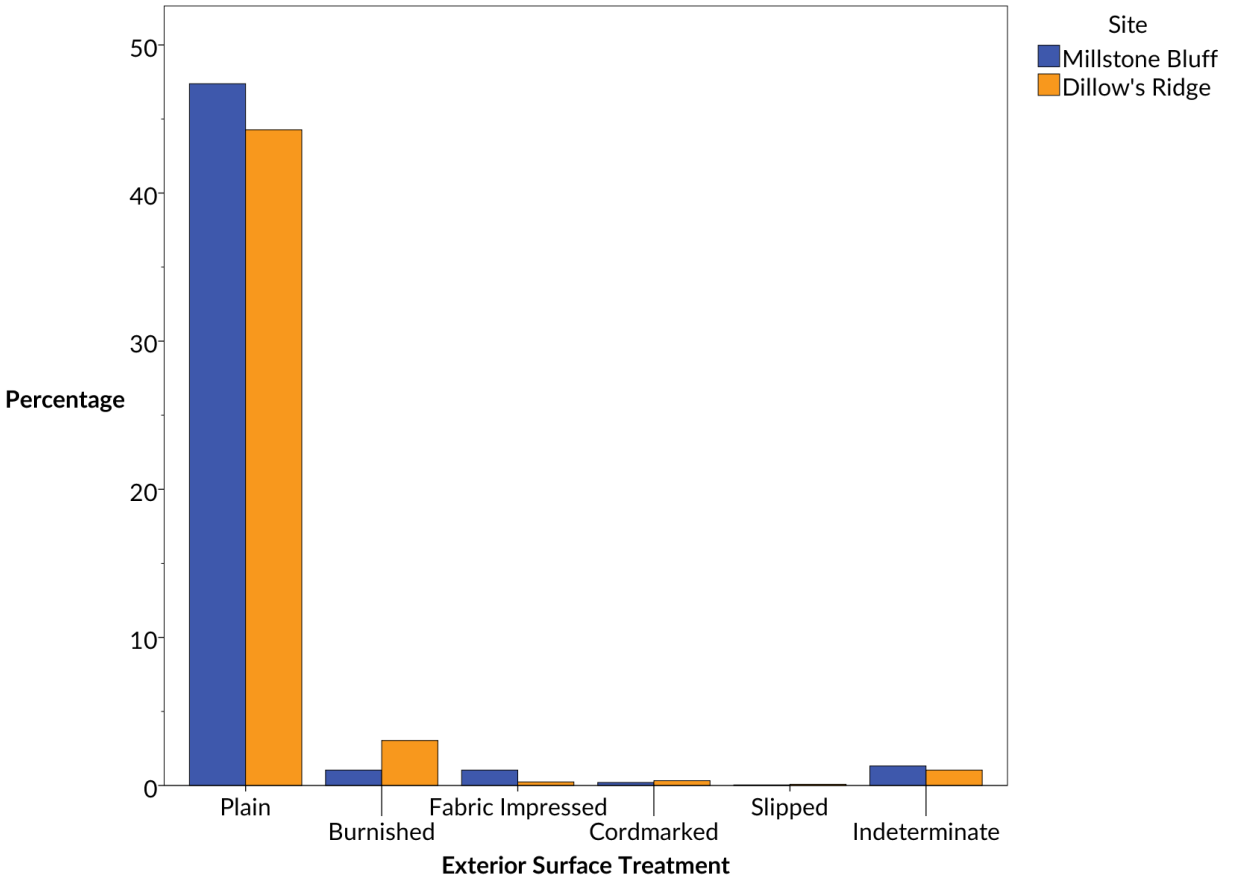

Figure 4.2. Distribution of exterior surface treatment at Millstone Bluff and Dillow's Ridge.

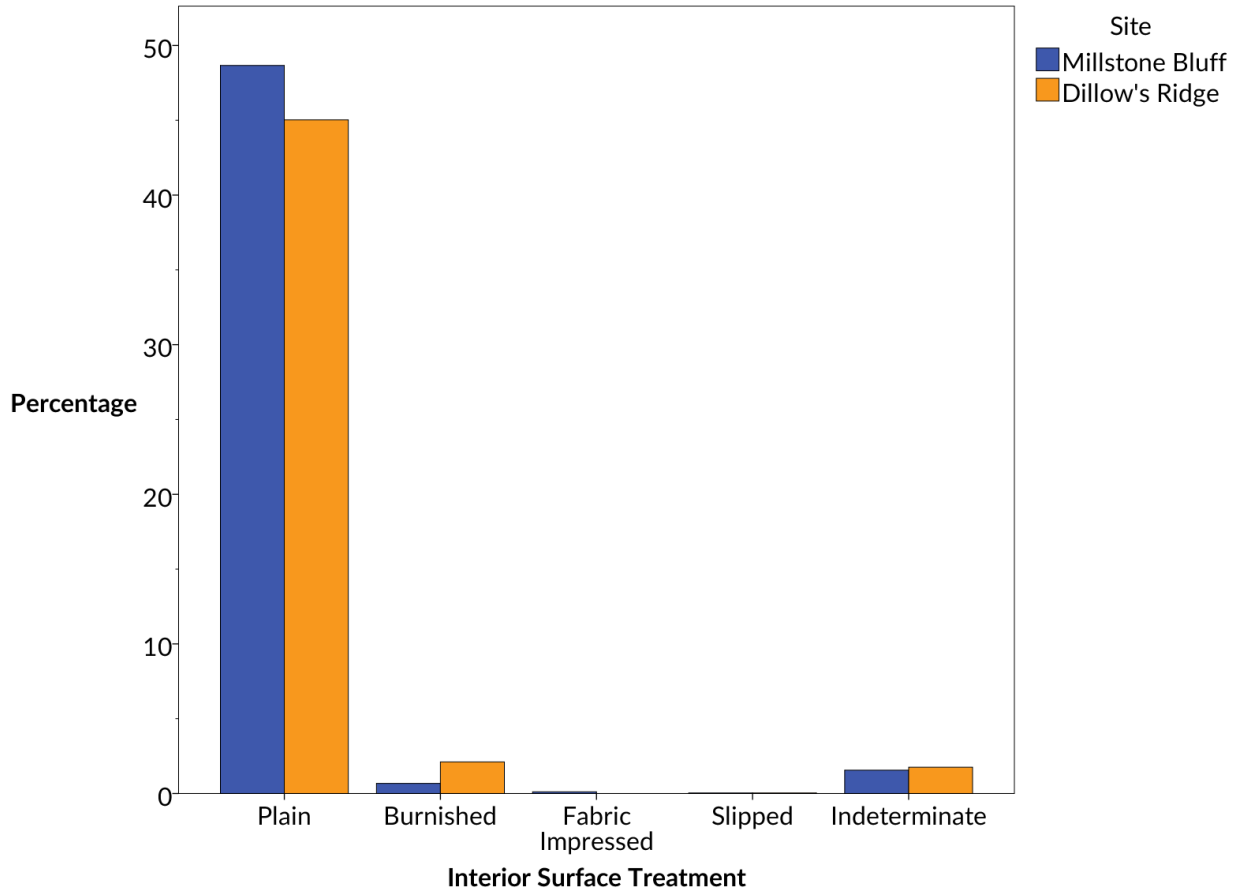

Figure 4.3. Distribution of interior surface treatment at Millstone Bluff and Dillow's Ridge.

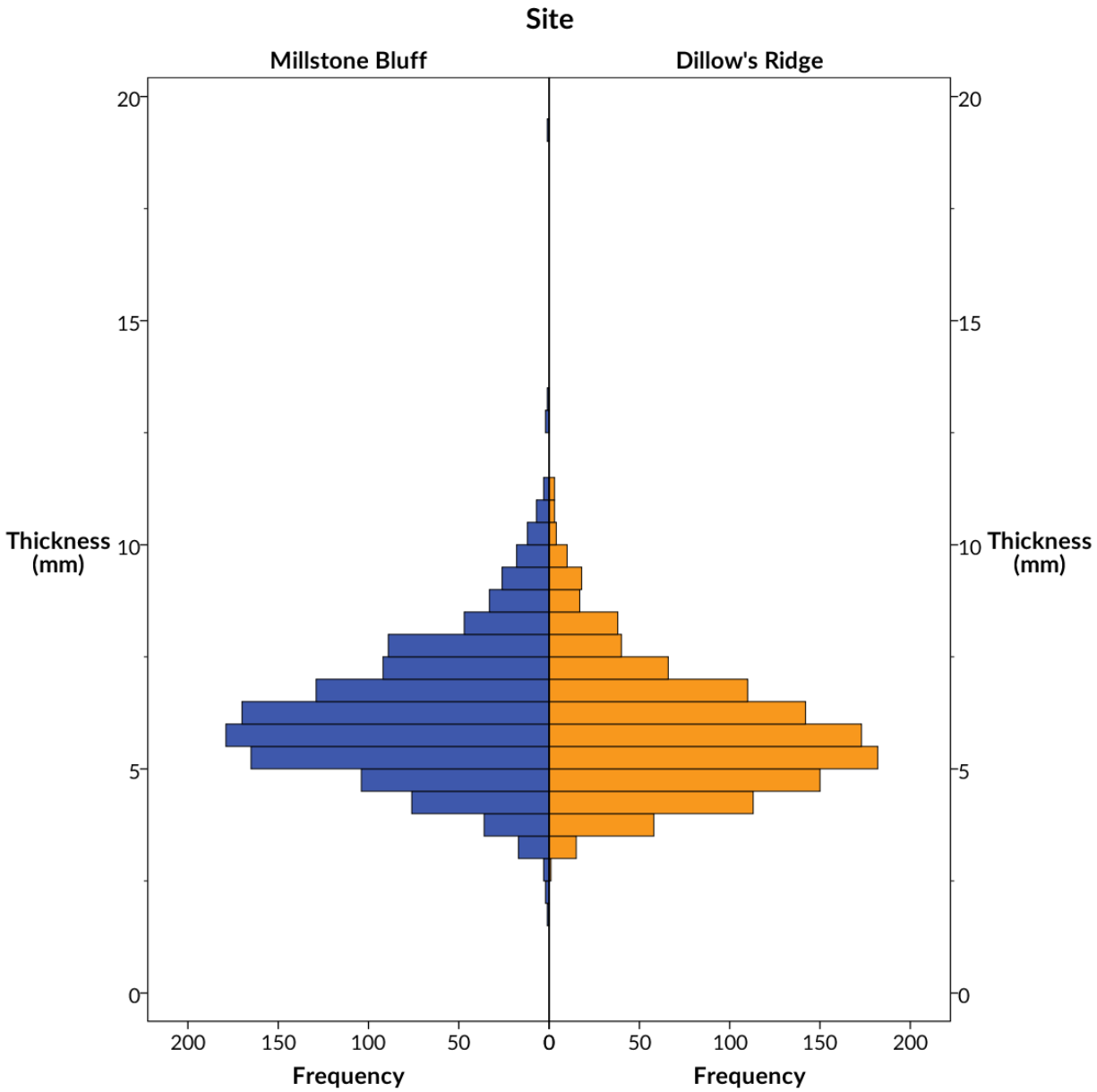

Figure 4.4. Distributions of sherd thickness (mm) by site.

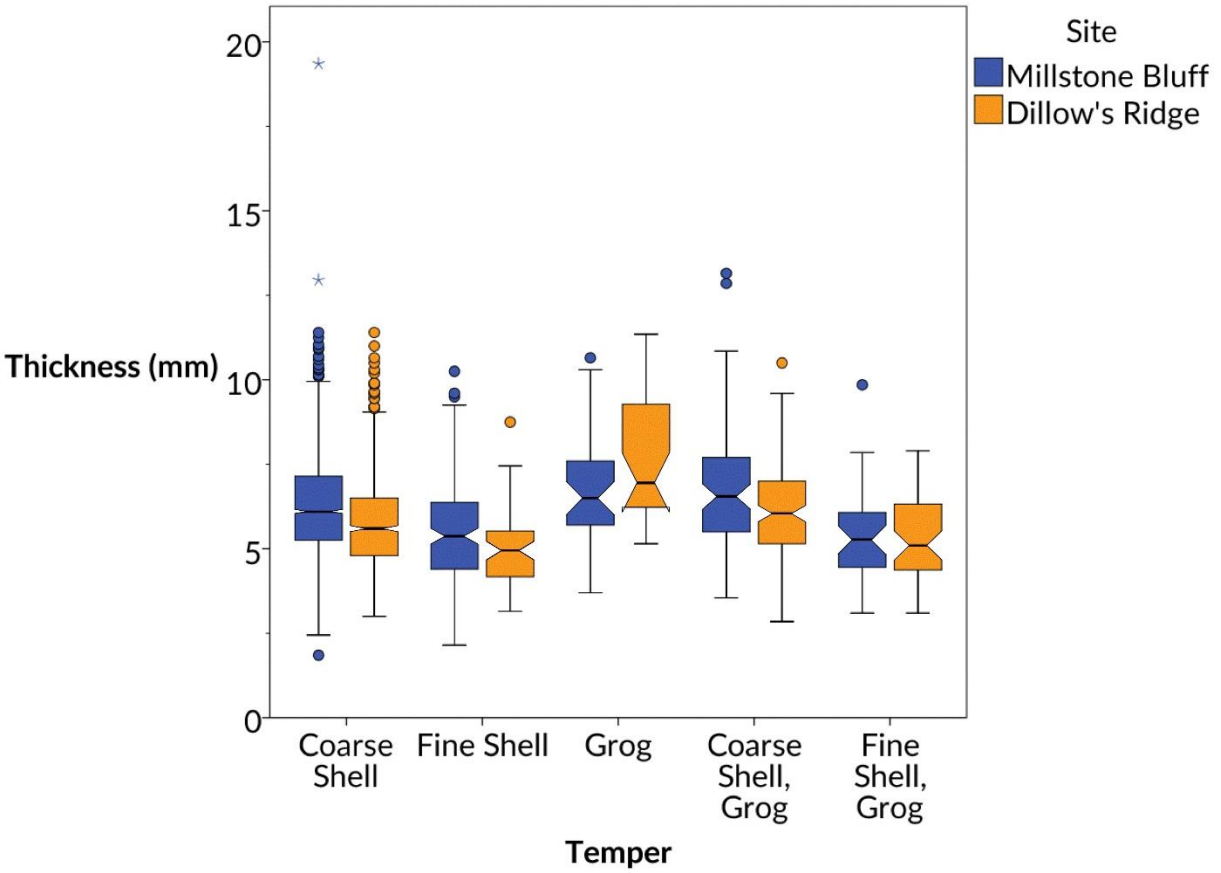

Figure 4.5. Thickness (mm) by temper at Millstone Bluff and Dillow's Ridge excluding tempers with low frequencies.

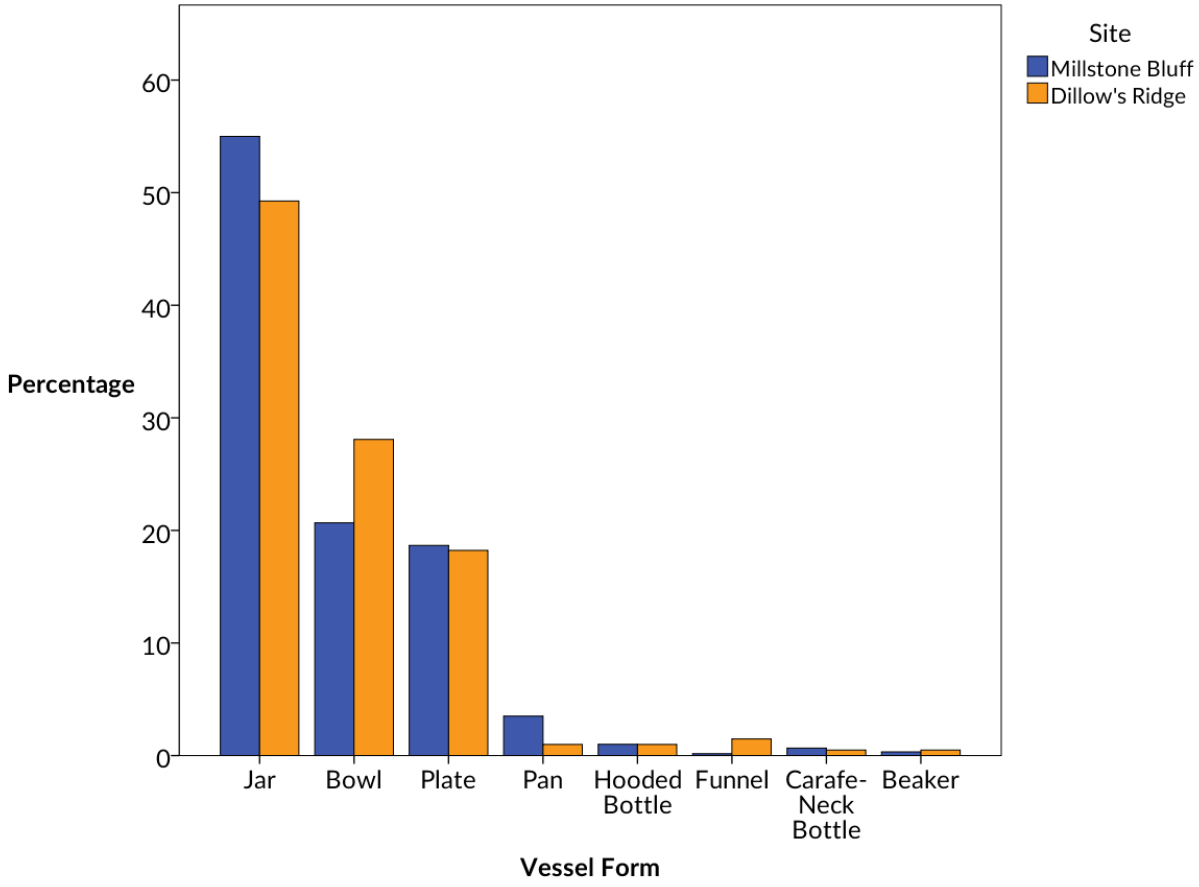

Figure 4.6. Distribution of vessel forms at Millstone Bluff and Dillow's Ridge.

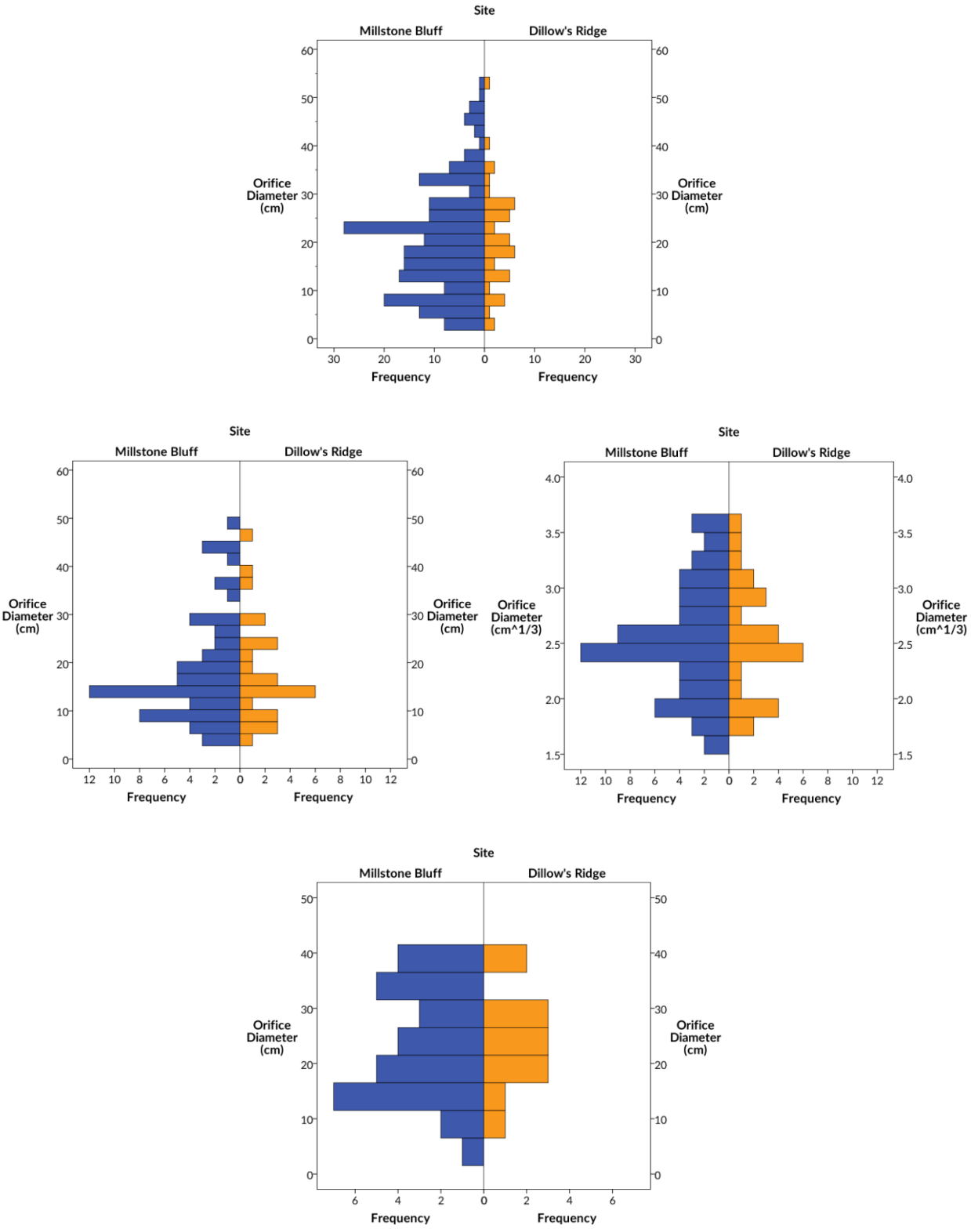

Figure 4.7. Orifice diameter (cm) by vessel form and site; *Top*, jars; *Center Left*, Bowls before data transformation; *Center Right*; bowls after data transformation ($cm^{1/3}$); *Bottom*, Plates.

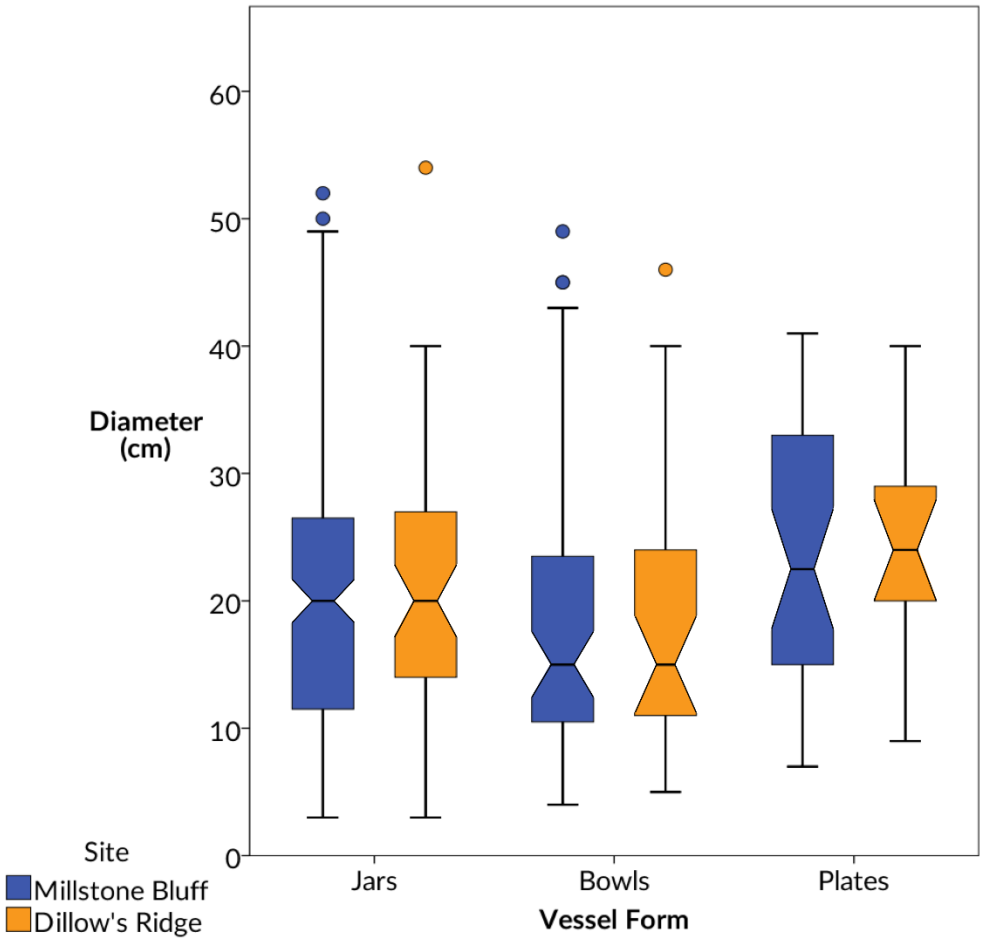

Figure 4.8. Orifice diameters (cm) by vessel form and site.

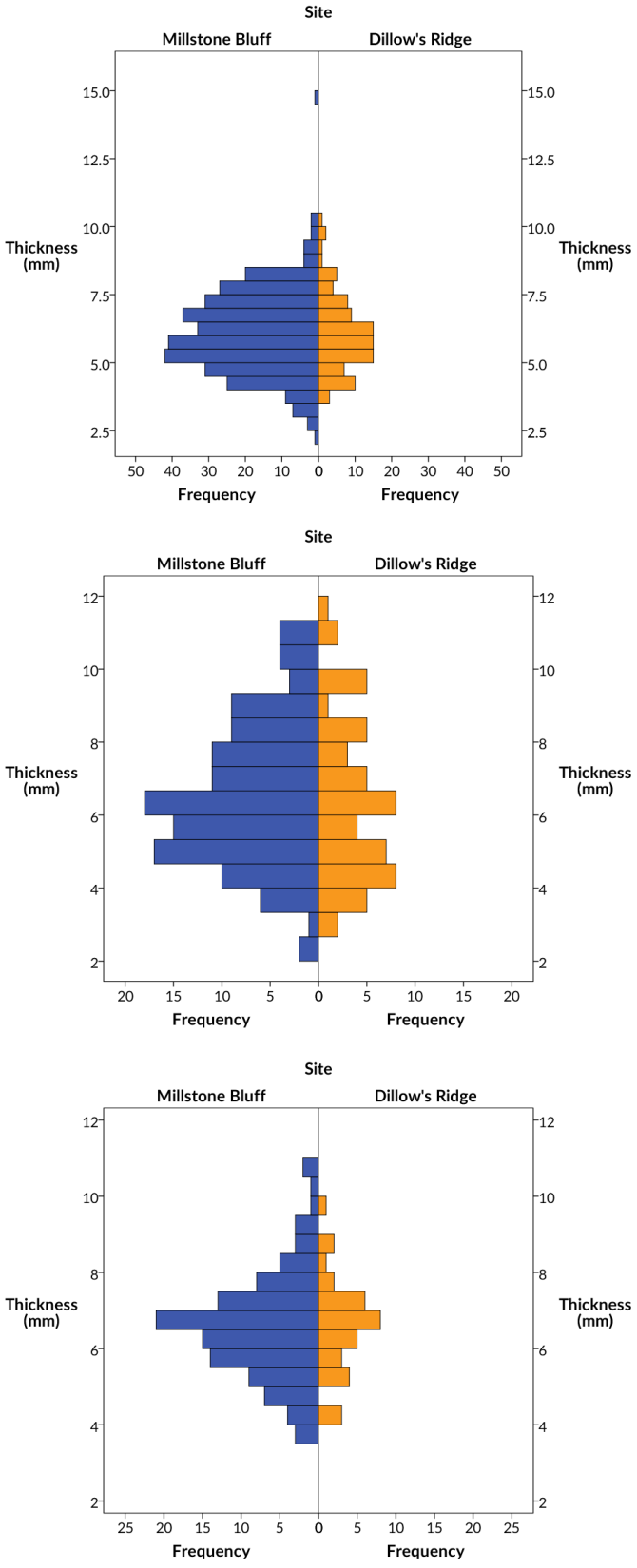

Figure 4.9. Rim thickness (mm) by vessel form and site; *Top*, jars; *Center*, Bowls; *Bottom*, Plates.

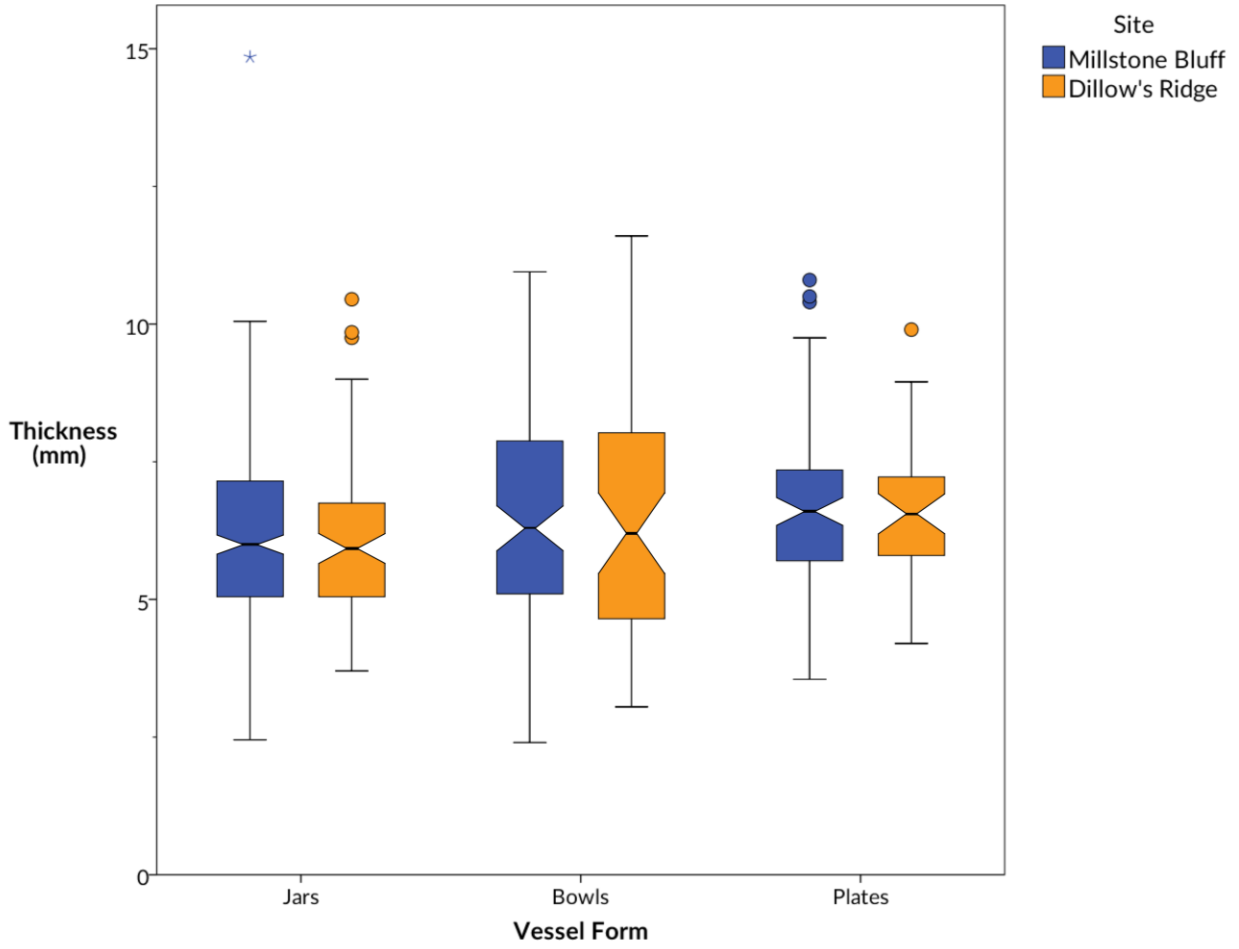

Figure 4.10. Rim thickness (mm) by vessel form and site.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

The previous chapter presented the results of statistical tests; however, the quantitative data alone are insufficient for an anthropological discussion. This chapter will situate the ceramic analysis results and statistical findings into the larger discussion of ceramics and ritual in Late Mississippian southern Illinois. The first section assesses the contents and characterizations of the ceramic assemblages to determine whether ceramics from Millstone Bluff and Dillow's Ridge demonstrate anthropological differences that can be attributed to differences in ritual practice. Included in this discussion are how the conclusions of this study vary from those of parallel studies in other areas of the Mississippian Southeast. This paper concludes with the potential implications these findings have on understanding ceramic variation, a discussion of how research efforts in the future may benefit, and conclusions interpreting ritual in the archaeological record.

Discussion of Results

This section is divided into two segments. The first is an overview of findings related to general assemblage characterizations and comparisons created using total assemblage counts and data from the undecorated body sherd sample. The second segment discusses the data of attributes and categories examined in the special sample.

General Assemblage Comparisons

Erosion and fragmentation were measured to assess the quality of ceramic preservation at each site. A comparison of eroded sherd surface frequencies did not indicate a difference in ceramic preservation, though this may be due to the difficulty of discerning between plain and eroded sherd surfaces in some cases, which can lead to erroneous surface finish categorizations (e.g., eroded burnished and plain surfaces can be similar in appearance). The second assessment of preservation quality examined the average sherd weight for each site and found Millstone Bluff sherds weighed on average 0.7 g less than Dillow's Ridge sherds. This suggests ceramics at Millstone Bluff have experienced a greater degree of breakage. Any differences spurred by post-depositional processes such as erosion and fragmentation may impose unfortunate limitations on certain aspects of the ceramic analysis, and as a result, must be considered when interpreting the findings of statistical tests.

The properties of ceramics from both assemblages, as assessed by undecorated body sherds, are extremely similar overall. Unsurprisingly, each assemblage is dominated by plain, undecorated, coarse-shell-tempered sherds. However, the Chi-squared test examining temper type distributions between the sites signaled a difference: fine-shell tempering was found to be more prevalent at the high public ritual context of Millstone Bluff than at Dillow's Ridge. This finding is in line with several other studies (Hilgeman 2000; Pauketat el al. 2002; Steponaitis 1983; Welch and Scarry 1995; Wilson 1999) that have demonstrated fine-shell pottery occurs in greater amounts in ritual or elite contexts. Fine serving ware tends to be more common where the presentation of food would have been important or large-scale feasting more frequent, as likely was the case at Millstone Bluff—a site with a central plaza, unlike Dillow's Ridge. This could be an indication that the people living at Millstone Bluff were practicing public ritual at a greater degree or

frequency than those living in primarily domestic villages—something other context-based models of ceramics expect to see—but other test results may suggest otherwise.

Burnishing appears to be used as a surface finish more often at Dillow's Ridge. In other Mississippian ceramic studies (Hilgeman 2000; Pauketat el al. 2002; Steponaitis 1983; Welch and Scarry 1995; Wilson 1999), burnished surfaces are commonly found as going hand-in-hand with fine-shell tempering, together forming the classifications of fineware or Bell Plain ware. The discordance of fine-shell tempering and burnishing between the high and low public ritual contexts leaves these observed trends dubious. It is possible that the method of pottery manufacture at Dillow's Ridge included burnishing more frequently. It is also possible the greater number of burnished sherds at Dillow's Ridge is the result of differential preservation of burnishing on fine and coarse-shell-tempered sherds; in fact, only 10.4% of burnished sherds at Dillow's Ridge are tempered with fine shell as opposed to the 19.4% of burnished sherds at Millstone Bluff. Fine-shell-tempered sherds just may not preserve burnished surfaces as well. Furthermore, the appearance of eroded burnished surfaces can be mistaken for plain surfaces; this may have affected the ability to accurately assess differences in eroded sherd frequency.

Another interesting finding of the surface finish comparison is a greater frequency of fabric-impressed sherds at Millstone Bluff. Fabric-impressing is commonly found on the exterior, and sometimes interior, of the pan vessel form; indeed, 56.5% of pan sherds in the assemblages exhibit fabric-impressed surfaces. This surface treatment is understood to be a result of creating pans in a mold over which textiles would be laid (Drooker 1992:16; Orr 1951). However, the observed difference in fabric-impressed sherds alone is not enough to speculate that greater numbers of pans were used at Millstone Bluff because fabric-impressing is sometimes also found on other vessel forms. There is additional discussion of pans and their use later in this chapter.

The results of the sherd thickness comparison also deviate from other Mississippian models of ceramics found in ritualistic contexts. When compared by temper groups, as well as overall, Millstone Bluff sherds tend to measure thicker than those at Dillow's Ridge, with the lone exception of grog- and fine-shell-with-grog-tempered sherds. The statistical test used to examine differences in sherd thicknesses found only coarse-shell sherd thickness to significantly differ between sites, with Millstone Bluff coarse-shell sherds measuring 0.5 of a millimeter larger than Dillow's Ridge coarse-shell sherds on average. This again suggests that ceramics at Millstone Bluff are not following the supposed standard of ritual ceramics vis-à-vis fineware qualities. Generally, vessels with thicker vessel walls are more common for utilitarian purposes due to their increased durability. However, it is important to note that large sample sizes, such as the one used in this test, inherently increase the likelihood of a statistically significant difference, even when the difference of central tendency is small; these minute differences may not have substantial anthropological implications. Moreover, this difference may simply reflect variations in the *habitus* of pottery production, with people living at Millstone Bluff collectively producing thicker pottery as a result of technique standardization within the community.

Vessel Forms and Related Attributes

The vessel form distributions represented in each assemblage are largely similar. Unsurprisingly, the statistical comparison of vessel form counts from each site did not lead to the discovery of a specific vessel form more associated with either location. However, differences in preservation may affect vessel counts; smaller, more delicate vessel forms are more likely to fragment into lesser numbers of discernable sherds and thus become underrepresented in an assemblage. Inversely, larger, more robust vessel forms are more likely to fragment into greater

numbers of discernable sherds and therefore become overrepresented in an assemblage (Rice 2015:262). The poorer preservation of ceramics at Millstone Bluff may ultimately prevented the recognition of differences in vessel form distribution when compared to ceramics from Dillow's Ridge; vessels with larger diameters can only be measured using large sherds, and therefore greater fragmentation at Millstone Bluff may have prevented the recognition of larger pots in the assemblage.

At both sites, the jar is the most commonly occurring form, though this could be due to the often-large size of the Mississippian jar rather than its relative importance in ritual or domestic use. As a generally larger vessel form, the jar is more likely to produce more sherds as a result of breakage compared to smaller vessel forms. Regardless, jars are highly multifunctional, could have been effectively utilized in a variety of activities such as cooking, carrying, or storage. Bowls are the second-most common vessel form, and though a greater percentage of bowls exists in the Dillow's Ridge assemblage, this difference is not statistically significant. This is still somewhat unexpected, however, due to the usefulness of bowls as serving ware in feasting. The nearly identical percentage of plates between the sites further frustrates traditional conceptions of ceramics as used in public ritual activity. Occurrences of both bottle forms, funnels, and beakers are similarly infrequent between the sites.

Though not statistically significant, the greater proportion of pan rim sherds at Millstone Bluff, coupled with greater numbers of fabric-impressed sherds, appear to indicate people at Millstone Bluff were making and using pans more frequently. Though Mississippian pans are often affiliated with salt production processes, some studies suggest they may be used in food preparation as ovens or griddles (Hally 1986 and Hendrickson and McDonald 1983 as cited by Pollack et al. 2002). The location of Millstone Bluff is relatively distant from saline resources

compared to other nearby Late Mississippian sites (Brian Butler, personal communication 2018; Butler and Cobb 2004), thus a possible higher degree of pan usage is intriguing but unclear. This speculation will have to be revisited in future studies.

Examinations of ceramic attributes by vessel form again exhibited mostly similarities between the sites but did also produce some noteworthy differences. While no distinctions could be made in trends of temper use for making jars and bowls, plates found at Millstone Bluff less frequently contained coarse-shell-with-grog tempering than those found at Dillow's Ridge. This may suggest that temper selection for plates was more refined in the high public ritual context, yet no other plate tempering trends necessarily support this conclusion. Millstone Bluff does have a greater percentage of fine-shell plates (26.79%) than Dillow's Ridge (16.22%), but this was not found to be statistically significant. Examinations of surface finish separately for jars, bowls, and plates only found that burnished interior surfaces on bowls is more common at Dillow's Ridge, mimicking the findings of the surface treatment comparisons made with undecorated body sherd data. This again may be explained by the higher quality preservation at Dillow's Ridge than at Millstone Bluff. No differences are found in jar or bowl rim orientations, ruling out the possibility of a greater number of restricted bowls with small orifices (i.e., "seed jars") at either site. Orifice diameters and rim thicknesses of jars, bowls, and plates are essentially the same at Millstone Bluff and Dillow's Ridge. Unlike previous studies that have linked differences of vessel size with social status (Blitz 1993), these data show that vessel sizes are identical at sites that have different ritual functions. Again, this comparison may have been affected by differential ceramic preservation.

Despite the identification of many fragmented miniature vessels, in addition to the five complete miniatures found at Millstone Bluff, there is no difference in counts of miniature vessels between sites. However, four of the five complete miniature vessels recovered from Millstone

Bluff were found in a deposit similar to a context where three were discovered at Kincaid Mounds. In both cases, the vessel concentrations were found within plaza-margin house basins containing post-abandonment refuse. This may be indicative of some form of purification ritual related to the razing and rebuilding of structures, but miniatures have been shown (Carey 2006) to appear outside of ritual contexts, so this conclusion is tenuous. Nevertheless, that multiple, notably complete miniatures were found together in two instances is suspect and gives way to supporting a ritualistic hypothesis. Furthermore, it is important to consider the differences in preservation quality between the Millstone Bluff and Dillow's Ridge assemblages which may have prevented the recognition of additional trends related to miniature vessels.

Other Items and Dynamics

Other ceramic items and categories support the pronounced similarity of the assemblages. Open and closed handle forms occur in virtually the same proportions at each site, and thus their functional connotations provide little help in interpreting ritual in this context. Though incising as a decorative technique is statistically more common at Millstone Bluff, decoration on sherds overall is just as frequent there as it is at Dillow's Ridge. Furthermore, design motifs of Barton Incised, Matthews Incised, Mound Place Incised, and O'Byam Incised are all observed in similar low frequencies in both assemblages, an unfortunate impediment to meaningful discussion of differences in symbolic messages. While modeled sherds are present in both assemblages—such as those that come from beaded rim bowls—the frequencies of occurrence are not statistically different, nor do any of these sherds appear to be from ritually-significant Fortune Noded vessels. Effigy vessels or figurines also appear to occur at similar rates at both sites. Far more effigies at Millstone Bluff could be assigned to specific categories of representation, and certain forms—non-

owl birds, fish, and conch shells—do not appear at Dillow's Ridge at all. Unfortunately, the low sample size of effigies from Dillow's Ridge is not telling of how more or less frequent any type of effigial representation is at either settlement. Finally, one rim sherd from the Dillow's Ridge assemblage may be from a terraced rectangular bowl, but meaningful discussion of this vessel form and ritual in this context is not possible with only one sherd of its kind present. In general, these findings conflict with the ceramic correlates of ritual that have been defined outside of the lower Ohio River Valley.

Some miscellaneous categories of ceramic items differ between sites. There is a greater number of discs or discoidals, commonly interpreted as gaming pieces, at Millstone Bluff. Also present at Millstone Bluff are pipe fragments, jewelry beads, and a spindle whorl, none of which have been found at Dillow's Ridge. The Dillow's Ridge assemblage does however contain a set of stumpware legs. Relatedly, several objects in the assemblages appear to have been produced outside of southern Illinois based on morphological and decorative attributes. While the nonlocal origins and ritual value of these items may be speculated, it is difficult to definitively designate any as tradeware without the use of more absolute methods of analysis, and therefore it is problematic to suggest potential trends. In sum, these item types and categories are unfortunately too infrequent to meaningfully discuss the anthropological implications of presence or absence.

Ceramic attributes and categories aside, the sheer difference in ceramic deposition densities is somewhat peculiar. Excavations at Millstone Bluff targeted similar contexts and at similar degrees yet produced over 51 kilograms (roughly 113 pounds) or about 259% more non-daub ceramics than the Dillow's Ridge excavations. Interestingly, daub is also found extensively at Millstone Bluff and at a level unlike other sites in the region (Butler and Cobb 2004:99). This disparity could be easily explained away as related to the probabilistic nature and potential

sampling bias of archaeological excavation, but it could also have other implications. Both sites are believed to have been occupied for a similar amount of time, and the vessel assemblages appear to indicate each group of people practiced similar everyday activities. Consequently, the greater ceramic density at Millstone Bluff could provide additional support for a larger population who would have made and used greater quantities of pottery and other clay-based items than the population at the smaller Dillow's Ridge settlement. However, higher densities of materials could also indicate ritual-affiliated episodes of mass deposition as found in other Mississippian contexts. If people at Millstone Bluff were practicing large-scale, public ritual such as feasting, there should be some evidence of it since it is a material-heavy activity, and a mass midden deposit may be such a clue. Indeed, a rich midden, measuring 50 to 70 centimeters thick, was found to extend 20 to 25 meters along the eastern portion of the site and adjacent to the two cemeteries (Butler and Cobb 2004:99). Cursory comparison does not seem to suggest that this midden ceramic assemblage differs significantly from those recovered in other areas of the site in terms of vessel form distribution and or frequency of decoration. In order words, the only potential evidence linking this midden to ritual activity is its density. Nonetheless, the nature of this context and a few select others suggest that it may be worthwhile to do a more in depth intrasite analysis in the future.

Conclusion

From providing storage and cooking vessels that allow new subsistence practices to flourish, to offering other physical mediums by which symbolic communication is possible, ceramic objects have numerous functions that have enabled humans to change and expand their

realms of action and expression. Pottery and other ceramic materials, such as effigies, pipes, and body adornments, are often not solely utilitarian in purpose but are also deeply imbued with social meaning—whether it be intentional or not. As a result, archaeologists are able to use ceramics as a way to understand social practices in past societies. This study considered a wide range of ceramic items and attributes as a way to illuminate their roles in ritual practices of Late Mississippian southern Illinois.

The overall lack of difference exhibited in the Millstone Bluff ceramics when compared to Dillow's Ridge materials is a major departure from the numerous studies that have aimed to identify ceramic correlates of ritual in the Mississippian Southeast. This is also an apparent break from the numerous other lines of evidence pointing to Millstone Bluff as a place of political and ceremonial significance. Kruchten's (2004) comparison of Millstone Bluff ceramics with those from the nearby Hayes Creek site led to a similar set of conclusions. Despite a few observed differences, the ceramics from Millstone Bluff appear to be overwhelmingly like those from more typical villages in the region and, for the most part, can be accurately described as "remarkably unremarkable" (Brian Butler, personal communication 2018).

The findings of this study have several implications in interpreting ritual in Late Mississippian southern Illinois. First, it could be argued that Millstone Bluff was not in fact a location of ritual activities that significantly differed in type and scale from those that were practiced at other contemporaneous sites. This does not seem to be the most likely explanation due to other lines of evidence—the rock art, public plaza, cemeteries, and more—demonstrating the unusual circumstances of Millstone Bluff's occupation. A second potential reason for the lack of difference is that traditional ceramic analysis methods may fail to fully elucidate the functions of pots. Though traditional interpretations of pottery function can guide interpretations, studies such

as this could benefit from the use of newer archaeometric techniques, such as organic residue analysis, to more accurately assess how specific pots were used and perhaps the foods they held. A last possible explanation is that ceramics do not play an active role in ritual in this temporal and regional context and therefore are outwardly analogous with assemblages from domestic village sites. Despite potentially producing a greater overall density of ceramics, people living at Millstone Bluff may have found it more feasible to utilize perishable materials for containers than to produce enormous quantities of ceramic goods to accommodate the masses at gathering events. The use of basketry in feasting or other ritual may lead to the reduction in ceramic items and attributes linked to such events as they are observed elsewhere in the Mississippian world. Outside of large-scale ritual activities, the everyday lifeways at Millstone Bluff may not have been so different from Dillow's Ridge as to lead to the production a vastly different ceramic assemblage. The ostensibly equal proportions of ceramic items with potential ritualistic ties at either site seem to indicate ritual behavior occurred similarly at the domestic-level.

In the end, this study serves as a reminder of several points important to anthropological and archaeological research. First, ritual does not occur in a vacuum. Variability in ceramics and forms of material culture may be driven by a multitude of social dynamics. The few differences detected in the statistical comparisons of this study could indeed be attributed to differential types of ritual practice, but several additional cultural factors—identity, differences in foodways, *habitus*, accessibility to raw materials—could all affect ceramic manifestations. Importantly, models that oversimplify or dichotomize social behaviors, such as in elite/ritual versus commoner/domestic activities, can obscure the complexities of human nature. Any vessel form could be utilized for a wide variety of purposes that depart from a supposed standard interpretation of use. Ritual is not restricted to certain areas and held only at great magnitudes, nor should it be

assumed to be practiced in the same ways irrespective of similarity in context. Sacred places may be used for secular purposes, and domestic spaces may be used for ritualistic activity. In this sense, archaeologists must continue to recognize the importance of context-specific interpretations rather than paint the past with a broad brush.

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