LANDSCAPE, COMMUNITY, HOUSEHOLD: EXAMINING THE USE OF SPACE FOR EVIDENCE OF COALESCENCE AMONG MIDDLE MISSISSIPPIAN AND BOLD COUNSELOR ONEOTA PEOPLES OF MORTON VILLAGE

By

Nicole M. Klarmann

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ABSTRACT

What happens when two populations with differing cultural identities interact and cohabitate? Coalescence, or the cultural reorganization and formation of multiethnic and multilingual communities, is one possible outcome (Birch 2012; Kowalewski 2006). In archaeological contexts, material culture can help determine the level of integration or coalescence between distinct groups that interacted or cohabitated. However, it should not be assumed that a one-to-one relationship between cultural materials and people exists. In many contexts of interaction, a mixture of materials attributable to differing groups of people may be found. How then can the mixing of archaeological materials be used to identify the degree of coalescence? Beyond archaeological contexts, understanding prolonged, spatially based interactions and coalescence has larger implications for understanding today's cultural groups who find themselves cohabitating with other groups (e.g., post migration or as refugees) and possibly affecting policy and practice that could promote integration of these migrant or refugee groups into the larger society.

This doctoral dissertation will add to the scholarship of coalescence by examining the understudied spatial dimension of cultural reorganization within an archaeological context. I employ a multiscalar spatial approach to identify processes of coalescence within the Morton Village archaeological site, integrating data from the community, household, and landscape spatial scales.

Morton Village (11F2), located near Lewistown, Illinois, serves as the case study for this multiscalar spatial analysis. Dating to a single occupation, ca. late AD 1200 to 1400, the site provides clear evidence for the cohabitation of Middle Mississippian and Bold Counselor Phase Oneota groups (Conrad 1973; Conrad and Esarey 1983; Hollinger 1993; Santure et al. 1990).

However, the level of cultural integration at the site is under-explored. Varying ceramic attributes and architectural styles have typically been used to discern Oneota and Mississippian contexts within the village.

Material culture provides a valuable line of evidence for examining coalescence, but how people organize themselves within their landscape, community, and household can provide important data as well. Furthermore, analysis of space will allow an innovative and finer contextualization of the distinctions and the merging of material culture. The evidence for interaction, coupled with the number of excavations and analyses already performed at the site, makes Morton Village a prime case study for analyzing coalescence.

Coalescence changes the social, political, ideological, and economic fabric of societies, bringing groups together in new spaces, where specific social strategies for social integration or collective defense are adopted to quell tensions that arise. These strategies are visible archaeologically through changes in infrastructure, including transformations in the size/organization of settlements and alteration of the structure of domestic and public spaces (Birch 2012; Gerritsen 2004:151; Hodder 1986:7-8; Thomas 2004:34). I hypothesize that the processes of coalescence between Oneota and Mississippian cultures occurred at Morton Village. To investigate this hypothesis and to determine the level of coalescence present, I create a dichotomy between total separation (cohabitation of site, but no coalescence) and total integration (integration of both groups at every level, i.e., in households, intermarrying and ethnogenesis), although I expect a spectrum of social arrangements exist within the spatial organization of the site. If Morton Village is a coalesced village, it should show distinct signs of this integration in its spatial organization at the landscape, community, and household levels.

For Cameron Avery Klarmann, you will always be my little excavator.

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CHAPTER 1: INTRODUCTION

1.1. Introduction to the Research Problem

What happens when two populations with differing cultural identities interact and cohabitate? Coalescence, or the cultural reorganization and formation of multiethnic and multilingual communities, is one possible outcome (Birch 2012; Kowalewski 2006). In archaeological contexts, material culture can help determine the level of integration or coalescence between distinct groups that interacted or cohabitated. However, it should not be assumed that a one-to-one relationship between cultural materials and people exists. In many contexts of interaction, a mixture of materials attributable to differing groups of people may be found. How then can the mixing of archaeological materials be used to identify the degree of coalescence? Beyond archaeological contexts, understanding prolonged, spatially based interactions and coalescence has larger implications for understanding today's cultural groups who find themselves cohabitating with other groups (e.g., post migration or as refugees) and possibly affecting policy and practice that could promote integration of these migrant or refugee groups into the larger society.

This dissertation adds to the scholarship of coalescence by examining the understudied spatial dimension of cultural reorganization within an archaeological context. I employ a multiscalar spatial approach to detect the level of coalescence using a case study of Morton Village, an archaeological site in the central Illinois River valley (CIRV), integrating data from three spatial scales: landscape, community, and household.

1.2. Research Problem and Objectives

People express their identity in multiple ways; one such way is through the alteration of space, which can be imbued with specific social aspects of the society or individuals using it. Migration and cultural interaction are the major causes of the transmission of cultural practices and the altering of the identities of participants. When creating or modifying one's identity, material objects are often altered in the process and can reflect aspects of these identities. Space is one such medium used to express one's constructed identity and social or cultural organization. This research seeks to examine the spatial organization of a prehistoric archaeological site at multiple scales to infer the level of integration of the two groups of people living there. At each scale, evidence of integration can be explored, and may provide evidence that varying levels of integration have occurred. An individual scale cannot explain all aspects of culture, but by using a multiscalar approach, these components can be considered in relation to each other, thus providing a more complete understanding of the people that inhabited that space (Walker 2012). The spatial scales utilized here—landscape, community, and household—focus on how artifacts, resource spaces, and activities are organized spatially across regions, within sites, and within structures. Each spatial scale has its own theoretical and methodological approaches that can be used to understand how people created and sustained these relationships, but analysis of each will influence the investigation of the other scales.

Landscape choice refers to the negotiation between people and their physical surroundings or environment (Branton 2009; Clark and Scheiber 2008). I consider landscape choice using a regional approach, where large-scale relationships between archaeological remains and the physical environment can be considered (Kantner 2008). A regional view of landscape is used to examine and compare differences in resource selection, site location (why people chose a certain location to inhabit), and how people inhabit landscapes within the same or different regions.

Community organization investigates the spatial aspects of ‘community,’ defined as the largest grouping of persons in a cultural group whose day-to-day activities unite them into a self-conscious corporate unit that is economically self-sufficient and politically independent (Beardsley et al. 1956). This scale explores the variety of different spaces used by people within the Morton Village community, including domestic, ceremonial, public, and spaces in between. I explore how space is occupied at Morton Village in terms of architecture, including where various types of architecture are located in relation to one another, to public spaces, and where they are situated topographically. These characteristics are informative about smaller scale interactions between individuals within the community.

Household structure investigates the linkages between material culture and the environment, household demography, and activities that make up a household unit (Rogers 1995; Wilk and Rathje 1982). Households are the minimal architectural unit for people who live together and who share in basic domestic economic behavior. The structure of what a household can look like will likely be different within and between communities (Stanish 1989).

Because spatial archaeology deals with human activities at every scale, a multiscalar investigation of the use of space can identify the social components of the individuals inhabiting the space. Combining multiple scales allows these components to be considered in relation to one another and provides a clearer understanding of how the residents inhabited that space (Walker 2012). The three spatial scales used here focus on how artifacts, resource spaces, and activities are allocated to particular locations across landscapes, within sites, and within structures.

The goal of this research is to create a model for examining coalescence within archaeological sites where there is known interaction but unclear levels of integration by examining the use of space. Guiding this research is the following overarching question:

> *If spatial archaeology and the examination of multiple scales of space is informative on the social organization of its inhabitants, what then could the examination of spatial relationships tell us about how social identity may be influenced and altered by instances of cultural interaction and integration within archaeological communities?*

This question helps shape a research model for analyzing cultural interaction and integration on a site-by-site basis as instances of cultural interaction and integration vary across time and space. This question provides a general guide to the research and to the selection of a case study and specific questions related to it. Through a case study of interaction, multiple scales of space can be analyzed to understand whether/how a group integrated with another.

Morton Village (11F2), located near Lewistown, Illinois, is the case study for this multiscalar spatial analysis. Dating to a single occupation ca. late AD 1200s to 1400, the site provides clear evidence for the cohabitation of Middle Mississippian and Bold Counselor phase Oneota groups (Conrad 1973; Conrad and Esarey 1983; Hollinger 1993; O'Gorman and Conner 2023; Santure et al. 1990). In recent work, the level of cultural integration at the site has been explored in several different ways: cooking and foodways through ceramics (Painter 2021; Painter and O'Gorman 2019, 2024), faunal remains (Painter 2022), botanical remains (Nordine 2020), diet (Tubbs 2013), the cemetery population (O'Gorman et al. 2020), and ritual activities (O'Gorman and Conner 2023). Additional work has explored larger scale transitions within social networks as a result of Oneota migration into the CIRV, which likely resulted in a period of communal coexistence within the region (Upton 2019). The approach used here incorporates the spatial dimension of cultural integration by investigating multiple spatial scales to identify processes of coalescence taking place within the village.

To discern Oneota and Middle Mississippian contexts within the village, ceramic attributes and architectural styles have typically been used. Material culture provides a valuable line of evidence for examining coalescence, but how people organize themselves within their landscape, community, and household can provide important data as well. Furthermore, analysis of space will allow an innovative and finer contextualization of the distinctions and the merging of material culture. The evidence for interaction, coupled with the number of excavations and analyses already performed at the site, makes Morton Village a prime case study for analyzing coalescence.

Coalescence changes the social, political, ideological, and economic fabric of societies, bringing groups together in new spaces where specific social strategies for social integration or collective defense are adopted to quell tensions that arise. These strategies are visible archaeologically through changes in infrastructure, including transformations in the size/organization of settlements and alteration of the structure of domestic and public spaces (Birch 2012; Gerritsen 2004:151; Hodder 1986:7-8; Thomas 2004:34). I hypothesize that the ongoing process of coalescence was part of the social fabric of life at Morton Village. To investigate this hypothesis and to determine the level of coalescence present, I create a dichotomy between total separation (cohabitation of site, but no coalescence) and total integration (integration of both groups at every level, i.e., in households, intermarrying and ethnogenesis), although I expect a spectrum of social arrangements exist within the spatial organization of the site. If the process of coalescence is occurring at Morton Village, it should show distinct signs of this integration in its spatial organization at the landscape, community, and household levels.

1.3. Significance of Research

People are in constant interaction with those that are perceived to be different from them. This is true through all of human history, be it Neanderthal interactions with modern humans in Europe or migrant and refugee interactions at the Mexican and American border, or at any nation/country border. Modern-day cultural interactions are often fraught with conflict, aggression, and misunderstanding.

One goal of this research is to explore ways that people of the past have negotiated and navigated these differences. Did acceptance of others and an ability to interact successfully occur (through cohabitation and cultural integration) or was the interaction unsuccessful, leading to conflict? Or was there some combination of successful integration and conflict with others. After its initial discovery and excavations in the 1980s, research on Morton Village and its associated cemetery, Norris Farms 36, focused on the evidence of trauma on the remains. Recently, with the Michigan State University-Dickson Mounds Museum (MSU-DMM) project, a large portion of the site has been investigated and the complexity of the cultural interactions that occurred there are beginning to be understood While acknowledging the clear signs of conflict, the project considers that conflict within a larger contexts of migration and possible coalescence. Evidence of interaction and cohabitation occurring at this site makes it an ideal case study to explore and identify the level of cultural integration of the two groups living at the village.

I consider Morton Village a frontier settlement sitting on the borderlands of Middle Mississippian settlement (Naum 2010). Frontiers are those locations where two (or more) distinct cultural groups interact and where a different or new identity and/or political entity is created (Naum 2010). In this instance two groups, Oneota and Middle Mississippians, both settled in this frontier settlement where violent interaction occurred. Although violence still occurred during the occupation of the village, new interactions within the Morton Village community led to transformation and change, where new practices were invented, and new relationships formed between inhabitants. Archaeologically, evidence for these transformations appears in the material culture, which includes how activities occurred spatially. Using Morton Village as a case study of cultural integration can help identify how people create and maintain interethnic ties in frontier contexts, how the interactions of multiple groups lead to intersections between them, and how frontier relationships can facilitate these cultural changes and innovations.

Because evidence exists for both violent conflict and integration occurring at Morton Village, its complexity can be used to further explore the nature and possibility of human interactions that occurred amongst Indigenous American populations prior to European invasion. Archaeological evidence has proven that Native American communities interacted with each other regularly, exchanging material culture as well as social and cultural customs. The complexity of this cultural interaction can be further explored by incorporating concepts of coalescence to identify how these communities were reshaped to accommodate differing groups.

1.4. Organization of Dissertation

This dissertation is organized into seven chapters. Following the introduction to the research problem and overarching research question discussed in this chapter, Chapter 2 provides an overview of the theoretical framework that guides the research, including an overview of spatial analysis, cultural identity, cultural interaction, integration, and coalescence. Chapter 3 introduces the case study site, Morton Village, and contextualizes its geographic and temporal setting in the Illinois River valley, providing background on the Middle Mississippian and Oneota periods in the midwestern United States.

Chapters 4 through 6 explore each of the three spatial scales incorporated in this analysis. Chapter 4 explores the largest scale, landscape, to identify regional patterns to Oneota and Middle Mississippian settlement choices in an effort to identify which patterns Bold Counselor Oneota sites in the CIRV, i.e., Morton Village, reflect.

Research Question 1: Are there differences or similarities in the positioning of Morton Village on the landscape compared to the positioning of earlier or contemporary Oneota sites in other areas and Middle Mississippian sites in the CIRV and in other areas?

Chapter 5 explores the community scale, exploring how the Morton Village community is constructed. Questions here focus on where Oneota and Middle Mississippian spaces are within the village, how members of the community interact through day-to-day activities and ceremonial or ritual activities.

Research Question 2: How is the Morton Village community organized? Are there differences or similarities when compared to the organization of Oneota and Middle Mississippian sites?

Chapter 6 explores the smallest scale, the household, looking for micro-level interactions within domestic spaces to identify how Oneota and Middle Mississippian people constructed space, and integrated and interacted within this space.

Research Question 3: How are the household spaces within the Morton Village community organized? Does one group utilize these spaces differently or is there overlap between the Oneota and Middle Mississippian spaces at the village?

Finally, Chapter 7 synthesizes the findings of the three spatial scales, bringing the three research questions together to address the overarching research problem. This chapter provides an interpretation of these results and conclusions reached through the research, as well as future directions for utilizing similar theories and analyses at other sites.

The organization of space at the landscape, community, and household scales identify how the Oneota and Middle Mississippian inhabitants of Morton Village were interacting and cohabitating. Identifying evidence of integration of the spatial characteristics at these scales is then used to determine whether the process of coalescence was taking place amongst these residents.

CHAPTER 2: THEORETICAL BACKGROUND

2.1. Introduction

One overarching research question guides this doctoral research: if spatial archaeology and the examination of multiple scales of space is informative on the social organization of its inhabitants, what then could the examination of spatial relationships tell us about how social identity may be influenced and altered by instances of cultural interaction and integration within archaeological communities? This chapter presents multiple theoretical viewpoints on how spatial organization can be used to analyze cultural engagement and the connections between space and identity. Considering archaeological spatial relationships is key to understanding social relationships and the construction of social identity amongst individuals within a community. Where people live and how they inhabit that space affects how social identity is constructed and negotiated.

I begin with a discussion about the history of spatial analysis as it has been used in archaeology and current approaches that will be utilized in this dissertation. This includes the idea that the social organization and cultural identity of a group of people can be reconstructed from contextualizing material culture within the spatial organization of an archaeological site. How space is imbued with this identity, i.e., how it is given a sense of place, is also an important factor in understanding the cultural organization of a community. The difference between 'space' and 'place' will be detailed, followed by a discussion of multiscalar approaches to spatial analysis.

Viewing space at a variety of scales contextualizes the organization of and types of material culture found within it. This dissertation examines three scales of space:

landscape/region, community, and household. Following the discussion of spatial analysis, a sense of place, and spatial scales, I move into a discussion of migration and cultural interaction. The movement of people and their subsequent interaction with other cultural groups often leads to an exchange of ideas, objects, and often identity. Based on this exchange, I consider ideas on how cultural identity is constructed. Specifically focusing on instances of cultural interaction leading to modifications or even the creation of new social and cultural identities through coalescence, and how this intersects with the construction of space and place. Finally, I will discuss how these instances of cultural interaction leading to coalescence can be viewed and interpreted through the archaeological record.

2.2. Spatial Analysis in Archaeology

For over 40 decades, archaeologists have recognized the role of spatial information in research. The incorporation of an analysis of the spatial location and organization of archaeological materials led to the creation of 'spatial archaeology', defined by Clarke (1977) as using archaeological spatial relationships to obtain information and the study of the consequences of human activities on space (1977:9). Being human means embodying spaces within a material world, and our manipulations of and activities within this space are what make humans distinct from each other (Gillings et al. 2020). Space here is defined as the physical location occupied or altered by an individual or group. There are two ways of viewing 'space': absolute, with space as a container for all material objects, existing independently of those objects that fill it, and relative, with space having a positional quality, making it impossible to view space in the absence of material things (Conolly and Lake 2006). Space could also be viewed as a combination of the absolute and relative; space does contain material objects, but the relationships between these objects is important in understanding the individuals that inhabit the space (Conolly and Lake 2006). Early forays into spatial analysis in archaeology focused on the location of activities, without linking these activities to the social actors who conducted them (Ashmore 2002). Over time, the idea that the spatial relationships being analyzed could be linked to social processes of the individuals inhabiting those spaces gained popularity. Another approach, and the one that guides this dissertation is a middle ground between these two views on spatial relationships; focusing on space as a type of material culture (how artifacts are found in specific locations) and understanding how the use of these locations, their spatiality, can inform archaeologists on the social mores of its inhabitants (Baumanová 2016; Gillings et al. 2020).

Human activity tends to be non-random and spatial structure is one result of these non-random human processes, making spatial structure informative about the way a society was organized (Goldstein 1981; Trigger 1989; Willey and Sabloff 1993). Spatial analysis has been referred to as 'Middle Level Theory' by Trigger (1989) because it attempts to connect patterning in the archaeological record with generalizations of higher-level theoretical inferences on the social and cultural aspects of space. This idea is also expressed by Gillings et al. (2020), when they discuss an "assumption of essential human spatiality" within spatial archaeology, meaning that the interpretation of spatial patterns in archaeological evidence can be related to those generative processes people in the past used to create those patterns.

Archaeologists can examine how space was occupied to make inferences on the social organization of the group inhabiting it, as people choose to imbue space with their individual and cultural experiences, which is reflected in the physical space of the archaeological record. Societies and communities place particular force upon individuals to conform to specific social organizations, and spatial patterning can be explained in terms of how these forces interact to form complex spatial structures (Urry 1985). Space is a process of repetitive, habitual, and routinized behavior or daily practices that have been physically manifest in an individual's physical world (Lake 2010). The spatial patterning of these choices is visible in the architecture and artifacts preserved in the archaeological record and can be used to examine inter-cultural regularities or variations (Ashmore 2002; Gillings et al. 2020; Trigger 1989; Willey and Sabloff 1993). Hegmon (1989) found that increased degrees of social integration in historic Pueblo societies could be interpreted from the built environment as architecture is engaged by people negotiating social relations and reformulating cultural identities. As Hegmon demonstrated, social relations are produced and reproduced through the organization of space, a notion supported by other scholars of spatial archaeology (Gregory and Urry 1985; Parker Pearson and Richards 1994). By analyzing the spatial structure of the archaeological record and its material dimensions (i.e., architecture and artifacts), archaeologists are able to interpret the nature of the social relations within past societies and those daily practices that helped create that spatiality.

2.2.1. The Difference Between Space and Place

While 'space' can be considered the physical backdrop on which social events occur (Prohansky et al. 1983), 'place' is how that physical backdrop has been imbued with meaning by the people inhabiting it. When an individual occupies a physical location or space for long enough, they create a 'sense of place' within that location. Space is considered an objective, blank canvas within which human activity takes place and within which these activities can be quantified (Gillings et al. 2020). Space also provides an analytical and conceptual framework within which this quantifiable activity can be integrated, related, and structured into a whole

(Gillings et al. 2020). Place is considered a culturally constructed location imbued with meaning through human actions and experiences that occur there (Cresswell 2004 as cited in Gillings et al. 2020). Places serve as key locales, rich in social meaning and significance, anchored in daily practices and everyday life (Gillings et al. 2020). Whitridge (2004) cautions against putting place in opposition to space, rather it is important to emphasize that space and place are complementary ideas (citing Tilley 1994; Barrett 1994). Place is seen as a movement of thought and practices, which imbues space with meaning, and is an inherently social, qualitative process; while space is taken to refer to a universal, abstract, and quantifiable. Although appearing to be in opposition to space, the creation of meaningful places is actually an aspect of space. Space is shaped by experience, knowledge, material culture, and sociality; it is also physical, people do not move through an "abstract biophysical matrix, but through meaningful cultural landscapes, within socially variable envelopes" (Whitridge 2004).

As Basso (1996) found among the Cibecue Western Apache in Arizona, people's connections to specific locations turns these spaces into places. Basso's original goal was to create a map of the Cibecue area using Apache placenames, however, he discovered that those placenames have a deeper meaning to those that gave them. They tell a story of the people's connections to their landscape and home (Basso 1996). Prohansky et al. (1983) describe this as creating 'place-identity', part of self-identity, focusing on how an individual's experiences in a space create values, attitudes, and beliefs about that physical location. A 'sense of place' or 'place-identity' is shaped by an individual's experiences in the physical space and reflects how a person's relationships with others in these spaces defines their day-to-day life (Prohansky et al. 1983). Different cultural groups will have different senses of place, because they have different experiences within space, and changes in either the space (location) or community (interaction, migration, etc.) will result in changes to the sense of place for people in that community (Prohansky et al. 1983). Our sense of identity is imbedded within the physical location in which we experience day-to-day life (Coen et al. 2017). Our traditions and culture are constructed on the basis of the places we live; the physical environment constructs our personal and our group identity (Coen et al. 2017). A community's sense of place can be understood by investigating how they used space in their day to day lives.

Through this dissertation, I investigate how physical space is structured within a context of cultural interaction and attempt to identify whether locations used in day-to-day life were given a 'sense of place' or 'place identity' by its inhabitants. I will accomplish this by examining the archaeological record and those specific material components housed within it, specifically how those material components are organized in space. According to Wheatley (2004), using appropriate theory and method with available computer mapping tools such as GIS to explore the meaningful spatial configuration of material remains gives archaeologists the freedom to construct an "archaeology of place". An archaeology of place recognizes that how material culture is organized spatially depends on the activities of people. Any large-scale spatial patterns we identify archaeologically are the result of intended and unintended consequences of these people's actions (Wheatley 2004, citing Giddens 1984). In contexts of interaction and possible cultural integration, there is potential for the actions of people of different backgrounds to construct different places within their space. These differences should be visible archaeologically through material culture left behind by the actions of those inhabiting these spaces.

2.2.2. Mapping Technology and Reconstructing a Sense of Place in Space

How we interpret meaning from the spatial structure of the archaeological record has changed and so have the methods used to examine spatial relationships (Ashmore 2002). The identification, representation, and analysis of spatial patterns posed issues for archaeologists prior to the development of computer mapping tools (Gillings et al. 2020). With the development of these tools, utilizing paper maps in spatial analysis became obsolete as archaeologists can now ask more complicated questions of archaeological spatial information. The potential for these types of tools in the management, integration, and display of sizable and complex types of spatial data was significant for those archaeologists conducting spatial analysis (Gillings et al. 2020). Tools such as Geographic Information Systems (GIS) uniquely shape the way researchers examine spatial relationships at archaeological sites and expand the types of questions that can be asked of spatial data.

In the 1970s, geographer Roger Tomlinson, credited as the 'father of GIS', saw the potential for these tools to be used by archaeologists and others because of the ability to store different layers of information in one map. These mapping tools have become so important in archaeological analyses, that some form of GIS are always used in analyses that examine the archaeological spatial relationships between material objects. GIS offers a diversity of options for the organization and analysis of multiple kinds of data at varying scales of analysis. Maps, whether paper or digital, simplify the world into manageable representations or models of spatial phenomena (Conolly and Lake 2006). GIS offer a more dynamic way of viewing spatial information than paper maps, which are static, two-dimensional, difficult to update, and difficult to relate to non-spatial data (Gillings et al. 2019, 2020; Jones 2017).

The advantage of GIS are that they permit the organization of different components of the same map into different layers, and you can view these layers all at once to make inferences on how these different elements interact (Connolly and Lake 2006). Maps can also never be considered 'finished', but as continually remade every time someone engages with them and instead of thinking of it as spatial, mapmaking should be thought of as a process (Gillings et al. 2019). Although rooted in a quantitative system (i.e., coordinates), an archaeologists biological and cultural navigation of the map is more based on qualitative relationships (Gillings et al. 2019). Maps can be viewed as assemblages of archeological knowledge, they distill what we see (sites, features, and artifact locations) for representation, but not an exact replica of what the people that inhabited it would have seen and experienced (Gillings et al. 2019). It is important to emphasize that GIS are a tool in archaeological analysis, and adequate theoretical concerns are required to dictate the use of the tool and to make any inferences based on the results of the analysis (Baumanová 2016; Gillings et al. 2019; Howey and Brouwer Burg 2017; Wheatley 2004). In this dissertation, GIS are used as a tool of representation of archaeological spatial data and the material culture found within these spaces. These representations will be explored at a variety of spatial scales, each of which will be discussed and have their theoretical concerns detailed in the following sections.

2.2.3. Multiscalar Approach to Space

Spatial data exists at a variety of scales, or distinctive relative sizes, extents, or degrees (Curtis 2014; Merriam-Webster 2018) and in the context of this analysis, I am investigating how people inhabit and alter space at multiple scales. Spatial archaeology deals with human activities at every scale: in the environments they impacted, the architecture which accommodated them, the artifacts left behind, and in the relationships between these components. By using a multiscalar approach one can identify the social components of the individuals inhabiting the space. Scale at its simplest level is the details of and associations between artifacts, sites, and landscape (Gillings et al. 2020). An individual scale cannot explain all aspects of culture or behavior, but by combining multiple scales these components can be considered in relation to one another and provide a more holistic understanding of the people that inhabited a particular space (Walker 2012). Clarke (1977) emphasized the need to use a multiscalar approach to examine spatial phenomenon and defined three levels or resolutions of space: macro, semi-micro, and micro; macro refers to spatial phenomenon between sites, semi-micro refers to spatial phenomenon within sites, and micro refers to spatial phenomenon within structures. These three levels correspond to this dissertation's use of the scales of landscape/region, community, and household (respectively) and focus on how artifacts, resource spaces, and activities are allocated to particular locations across landscapes, within sites, and within structures. It is important to identify individual phenomena at single spatial scales and investigate how each relates to, integrates, and influences phenomena at other spatial scales (Curtis 2014; Llobera 2012; Lock and Molyneaux 2006); i.e., the analysis of one scale (community for example) will influence/determine the analysis of the other scales of landscape/region and household (Figure 2.1). Each of the spatial scales used in this project has its own theoretical background of how it has been used to understand how people create and sustain social relationships. I will briefly describe these viewpoints and identify theoretical perspectives used in this analysis.

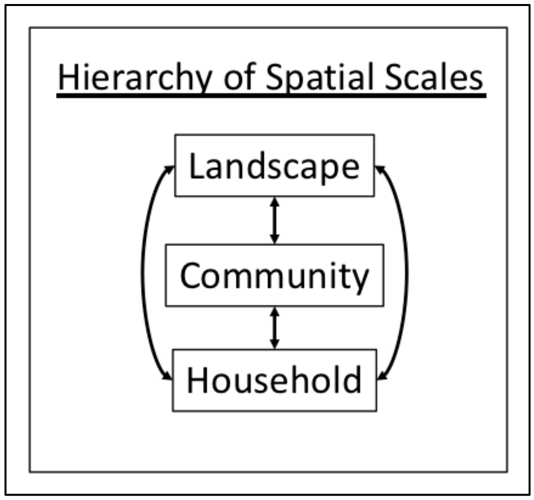

Figure 2.1: Hierarchy of Spatial Scales

2.2.3.1. Landscape/Regional Scale

While there are many different definitions for the word 'landscape', most place an emphasis on the negotiation between people and their physical surroundings (Branton 2009; Clark and Scheiber 2008). Interest in how people inhabit the space around them is not new to archaeology (Anschuetz et al. 2001; Feinman 1999; Knapp and Ashmore 1999). 'Landscape' is not simply a scale of space, but a subjective social formation, dictated by its inhabitants (Anschuetz et al. 2001; Ingold 1993).

Landscape in relation to archaeological research does not necessarily directly correlate with the natural environment (Kozlowski 2011) but can be viewed as the space individuals inhabit and utilize to meet their day-to-day needs. Binford (1982) recognized the landscape as the arena for all of a group's activities, because people derive meaning from their lived, everyday involvement in the world, the landscape they inhabit tells and is a story.

Studying the landscapes that people inhabit or inhabited, as in archaeological contexts, allows for the interpretation of the social experiences of its inhabitants. According to Rossignol (1992), this can be done by viewing the distribution of archaeological materials relative to the various elements on the landscape. These distributions are present because landscape use has continuities in its structure and organization throughout its occupation, making patterns visible archaeologically (Anschuetz et al. 2001). By looking for patterns in how a landscape is inhabited, like where the site is in relation to resources or in relation to other sites, inferences can be made about the experiences of the inhabitants. Human occupation is multilayered and any group occupying a specific physical setting instills their 'sense of place' on that space (see section 2.2.1 on the differences between space and place), which can be recognized by investigating landscape in this way (Anscheutz et al. 2001; Basso 1996; Coen et al. 2017; Gillings et al. 2020; Prohansky et al. 1983; Whitridge 2004). This means that populations inhabit the landscape differently and it is in the physical nature of the landscape in which the social perceptions of its inhabitants can be inferred (Basso 1996; Dommelen 1999).

Archaeologists now recognize that boundaries between people and the relationships between people and the environment were regularly changing (Branton 2009; Kantner 2008). At this broadest scale, it is possible to compare how people inhabit the landscape and how they interact with the environment. By looking at the characteristics of multiple sites, archaeologists can identify and understand regional differences in this relationship between people and environment. According to Kantner (2008), "archaeological regions are spaces for which meaningful relationships can be defined between past human behavior, the material signatures people left behind, and/or the varied and dynamic physical and social contexts in which human activity occurred (41)." By taking a regional approach to archaeology, you can characterize large-scale spatial relationships between archaeological remains and the physical environment (Kantner 2008). A regional view of landscape can be used to examine and compare differences in resource selection, site location (why people chose a certain location for a village/community, etc.), and how people inhabit landscapes within the same or different regions.

2.2.3.2. Community Scale

The ‘community’ scale is defined by Murdock (1949:79) as the maximum number of people who live together in regular, day-to-day association. This definition applies principally to residential groups that occupy nucleated settlements. Beardsley et al. (1956) expanded the definition of community, “as the largest grouping of persons in any particular culture whose normal activities bind them together into a self-conscious corporate unit, which is economically self-sufficient and politically independent (1956:133)”. This expanded description considers the shared social, political, and economical mores of those participating in the community and is the definition that will guide my work.

In more recent research, there is an emphasis on community consisting of two components: the physical and material reality (usually consisting of a habitation site composed of multiple domestic and public structures) and the social concept (the thoughts, ideas, and beliefs that bind people together) (Yaeger and Canuto 2000). Marsh (2016) cites Anderson (1991) to analogize these components to ‘imagined community’, which refers more broadly to groups with shared interests and identity, and ‘geographic community’, which refers to groups that are sharing space. Anderson (1991) used the concept of ‘imagined community’ to analyze the causes of nationalism, describing a nation as a socially constructed community imagined by the people who perceive themselves as its members. Within this nation, participants may never personally know most of their members, but each member possesses knowledge of the shared aspects that constitute the community. People with shared experiences in watching and/or participating in group activities will develop a sense of unity, group identity, and will share ideas about their mutual assumptions and goals with each other (Rautman 2014). This is similar to how a sense of place is created, which was discussed previously. As people inhabit a space and imbue it with their identity, beliefs, and customs, a sense of place or connection to that space is created, and within a physical community, those that consider themselves members of it create an imagined community which unites them socially through this physical location (Anderson 1991; Gillings et al. 2020). Despite there being much research into the social concept of communities, Knapp (2003:570) observes a disconnection between the physical and the social concepts of community in practice. O'Gorman (2010) explores how social concepts drive how people define communities and how, from an archaeological perspective, this will not necessarily correlate to the physical community at the scale of village. While physical interpretation of a site or settlement pattern is important, linking the social concept of community to the patterned material record is vital (O'Gorman 2010).

Communities are settings for multiple social activities, and the built environment of these communities provides a framework for the spatial analysis of prehistoric social interaction and community organization (Byrd 1994:643; Cheney 1992:40; Gijseghem 2007; Kent 1990; Knapp 2003:559; Lawrence and Low 1990; McGuire and Schiffer 1983; Netting et al. 1984; O'Gorman 2010; Tsakirgis 1996; Yaeger and Canuto 2000). For Means (2006), the village is the physical manifestation of this social community concept, which generates the interactions that Murdock (1949) saw as central to the definition of the community. Although the village cannot be correlated directly with the social community, it can be recognized as having central importance in constructing and maintaining community identity (Butt 1977:9; Juan 2009). A material component of community includes the types of architecture or structures used within the community, as social mores or community identity dictate that people conduct particular activities at particular times and conduct activities in appropriate spaces (Parker Pearson and Richards 1994).

In anthropology, there has been a tendency in the past to put many aspects of human existence into a binary, e.g., nature/culture, male/female, life/death, space/time; an approach pioneered by Claude Lévi-Strauss in structural anthropology (Trigger 1989). This dichotomy was adopted in archaeology to divide community space and architecture into two spheres, public and private (Kent 1990). Public space was considered host to communal activities including special events, feasts, and rituals, while private space was considered host to activities involving a small kinship group, usually day-to-day activities confined to domestic structures (Kent 1990). This dichotomy is problematic as it creates predetermined boundaries within a community, rather than considering that there are a variety of different spaces used by people within communities, including domestic, ceremonial, public, and spaces in between. An individual's experiences in these various spheres will help shape their sense of place about the community in which they live (Gillings et al. 2020). How space is occupied within a community, in terms of architecture, including where various types of architecture are located in relation to one another, to public spaces, and where they are situated topographically are informative about smaller scale interactions between individuals within the community and about the place-identity of members in that community.

2.2.3.3. Household Scale

One way to study communities in further depth is by examining domestic architecture, which would be used to meet the daily needs of the community, which is largely studied via the concept of households. Household organization cannot simply be interpreted from dwellings (Wilk and Rathje 1982). The environment, household demography, and activities are all systematically linked with material culture to create the social construct of the household (Rogers 1995; Wilk and Rathje 1982). Wilk and Rathje (1982) describe the household as “the level at which social groups articulate directly with economic and ecological processes (618)”. To reiterate this from the viewpoint of Stanish (1989): these individual co-residential units define the minimal architectural unit of people who live together and who share in basic domestic economic behavior and the structure of what a household can look like will likely be different within and between communities.

Households are adaptive and dynamic, and change in response to localized, short-term fluctuations in the economy or environment, so variation over time is to be expected (Bermann 2014; Hirth 1993). Change over time in the community structures will also lead to changes in the ‘sense of place’ held by the members of individual households (Prohansky et al. 1983). The patterns of house construction, repair, destruction, expansion, and movement within a community constantly fluctuate because household organization and community planning change with the needs of the society (Mehrer and Collins 1995). The archaeological patterns of domestic structures and the variation in these patterns can be analyzed to determine how the inhabitants constructed their day-to-day lives.

2.3. Cultural Interaction and Cultural Identity

I now explore the ways in which the movement of people and their subsequent interaction with other cultural groups leads to the exchange of ideas, objects, and often identity. Through this exchange, the modification of or even the creation of new social and cultural identities is possible through processes of coalescence.

2.3.1. Movement of People and Cultural Interaction

The movement of people and their subsequent interaction with other groups has been the source of the exchange of people, objects, information, and ideas for millennia. This movement or migration can be seen as a catalyst for cultural change as people carry their culture with them to a new location and potentially come into contact with a different group of people at their destination (Curtis 2014; O'Gorman et al. 2020; Rouse 1986). This cultural dispersion does not usually result in cultural replacement or assimilation of one group of people into another, rather it can create a complex social map of intermixing and resilience (Clark 2001). The nature of interactions between local inhabitants and migrants varies; if both groups maintain their own traditions, ethnic boundaries develop (Curtis 2014 citing Barth 1969). This dispersal can also result in cooperative interaction and/or hostility, which can occur in the same location and at the same time depending on context (Clark et al. 2019). Positive outcomes are more likely in contexts where institutions for cooperative migrant-local interaction exists or develops over time, which allows power to be more evenly distributed and diversity to be tolerated or embraced (Clark et al. 2019). Amicable interaction results in reciprocal sharing of cultural traits, with each group adopting elements of the other's culture (Burmeister 2000). If one group is dominant, the other may be absorbed (Burmeister 2000). Contentious interaction and hostility will also result in a variety of cultural strategies taken on by both groups, including those that affect the material record, as the groups attempt to carve out a space for their culture that would otherwise be diminished (O'Gorman and Bengtson 2020).

No matter the type of environment in which it occurs, when it does occur, migration creates and transforms relationships between people and places and is thus woven into a community's social fabric (O'Gorman et al. 2020 citing Li et al. 2017). The idea of people moving around, and interacting is a basic component of humanity, but the results may vary. The focus in this dissertation is not migration, rather understanding that people move, they interact, and exchange goods, people, ideas, and cultures, and to what extent that exchange is visible archaeologically (Cameron 2013; Wobst 1977).

The term 'culture' has gone through several iterations of meaning in anthropology, but it was originally defined by Tylor (1920 [1871]) as the totality of the world created by humans, including knowledge, belief, art, law, morals, customs, and any other attributes acquired by someone as a member of society. Each component of Tylor's definition of culture can be difficult to view archaeologically as often times evidence may not be reflected in the archaeological record. Lewis Binford viewed culture an adaptive system, specifically how humans adapted to their environment, and he broke this system up into three subsystems: technology, social organization, and ideology, each being reflected in the material record (Trigger 1989). In this dissertation, I consider culture as all the aspects of a group of people that differentiate it from another group, their beliefs, ideas, cosmologies, language, all those things that unite members of that community under a shared identity.

The terms frontier and borderland, defined as locations where two (or more) distinct cultural groups interact, and where a different or new 'in-between' identity and/or political entity is created, have gained popularity in cultural interaction analyses (Naum 2010). These distinct locations are found on the borders of the territories occupied by different groups. Frontier contexts are areas of transformation and change, where new practices are invented, and new relationships form between differing groups of people. Frontier contexts are most likely to result in innovative cultural constructs, because these locations are sites for creative combinations of cultural elements from both groups (Rice 2015). Frontiers are active contexts and transitional zones, spatially and temporally, where active social agency and change take place (Rice 2015). There is agreement that analyses of cultural interaction contexts need to consider the variety of backgrounds, interests, and motivations of all parties involved in cultural change (Lightfoot and Martinez 1995). By analyzing material culture, research can potentially identify how people create and maintain interethnic ties in frontier contexts, how the interactions of multiple groups lead to intersections between them, and how frontier relationships can facilitate these cultural changes and innovations.

It should be noted that cultural interaction is a process that occurs across time and space; however, this dissertation focuses specifically on North American contexts. Prior to European colonization, differing Native American communities interacted with each other regularly, exchanging material culture, as well as social and cultural customs. Some of these interactions likely took place on the frontiers or borderlands between two cultural groups. These types of interactions led to the development of new cultural systems, which Cook (2007) suggests occurred at the Fort Ancient Sunwatch Village site ca. A.D. 1200. Cook investigates Fort Ancient development with respect to Mississippian interaction and examined variation among architectural, mortuary, pit feature, and artifact attributes within Sunwatch Village. Cook concluded that the landscape likely consisted of Fort Ancient villages forming in periphery peer types of relations with other Fort Ancient villages and neighboring Middle Mississippian villages. Sunwatch Village can be viewed as existing on the frontiers/borders of Fort Ancient and Middle Mississippian communities.

Cultural interaction occurs whenever two groups of people with different cultural mores encounter each other, a phenomenon that occurs across time and space. Lightfoot (1995) emphasizes the need for an "archaeology of pluralism", which considers how multiple groups of people with varying identities affect each other, specifically in the organization/structure of households and communities. Cultural interaction creates unique settings for the development and evolution of new social and cultural identities (Lewis 2006). Changes in some of these aspects should be visible archaeologically, especially in contexts of interaction, as each cultural group will likely leave a distinct archaeological signature. As these groups interact for an extended time period, these signatures should continue to separate or potentially merge into something different and new, which will be further addressed in the following two sections.

2.3.2. Cultural Identity

One of the key themes of the previous section was the idea of cultural interaction leading to the remolding of identity or even the creation of a new identity and how groups involved in interaction express or alter their identities. In this section, identity will first be defined followed by discussions of the multiple ways of creating identity.

Identity is defined as the expression of a real or assumed shared culture and common descent, and membership in these culturally distinct units is integral to an individual's social persona and their interactions with others (Sullivan and Harle 2010). Identity is a multidimensional and fluid aspect of humanity, and can shift depending on the temporal, spatial, and circumstantial context, making it difficult to recognize in the archaeological record (Geller 2009; Sullivan and Harle 2010). Everyone has a number of social identities, which entail constant negotiation and organize relationships with other individuals and groups within our social world, yet we often forget about the subjective, inner world of the individual (Meskell 2001). Identity operates at two levels, the broader social level in which identities are defined by formal associations or mores, and the individual or personal level, where a person experiences many aspects of identity subjectively, and fluidly over their lifetimes (Meskell 2001). Identifying the distinctions that prehistoric peoples used to segregate themselves from others is difficult. When there is direct cultural interaction and some shared technologies, ideologies, or symbolism, it can be more difficult to recognize significant differences in cultural identity.

Identity studies in archaeology have focused on the multiple components of identity, including, ethnicity, gender, class, kinship, and age. The specific characteristics that a group used to mark its identity within the broader cultural milieu need to be recognized (Emerson and Hargrave 2000). However, there does not seem to be any particular class of material objects or behavioral traits that are consistently associated with ethnic identity.

When examining the identity of past populations, archaeologists investigate material items left behind; these objects were used in daily activities and became imbued with the individual's identity. The term 'entanglement' is used in multiple ways to examine the interaction between people and objects. Thomas (1991) identified entanglement as the inter-connections between people resulting from the exchange of things. According to Thomas (1991), researchers need to get rid of generalizing types when discussing material culture, especially when analyzing exchange. The focus should not be on material objects, rather understanding the local cultural, political, and exchange systems in order to recognize the effects of human agency on those systems. Societies appear to be made up of humans interacting with each other, forming groups and associations, entering into various forms of relationships with each other leading to changes in social and cultural identity; material things are involved in this process, assisting in exchanges of information.

Identity can be a means through which social subjects are constructed into relationships of taxonomic similarity and difference in comparison with other subjects (Voss 2008). There is a tendency to study identities by isolating specific aspects without considering the ways that these social identities are experienced holistically (Voss 2008). Ethnic groups develop not in isolation but through intense ongoing interaction and ethnic boundaries are inherently permeable and constantly in flux (Voss 2008). Ethnic identity is the belief in a group's affinity that is based on subjective beliefs or shared common ancestry (Hu 2013). A careful consideration of ethnicity reveals at least three components: how insider's view membership, how outsiders relate to and interact with insiders, how and why institutions such as state bureaucracies and academia draw boundaries around and classify people (Hu 2013). In archaeology, it is not merely a matter of finding material correlates for these identities, it also involves considering how artifacts and other evidence operate within identity-making processes and how meanings and material culture become associated with social groups (Welk 2014). Hu (2013) discusses how the boundaries of archaeological cultures, based on material culture traits, do not neatly agree with how the people themselves perceived social, cultural, and ethnic boundaries. In archaeology, the viewing of identity as fluid, contested, and constructed has made comparative studies difficult, because the character of identities cannot be directly inferred from material culture (Hu 2013). Archaeologists have often treated identities as stable categories that can be used to sort people and the artifacts they leave behind into groups for comparative analysis (Voss 2008). Voss (2008) emphasizes the need to discover ways to talk about social identities that embrace change as well as stability, permeability as well as bounded-ness, fluidity as well as fixity, and social agency as well as social structure (Voss 2008).

Social groups alter the material world to express their social identities. Different social groups may occupy different locations or use the same location differently (Lightfoot and Simmons 1998; Meskell 2002). When social groups occupy the same space, new social identities may be formed. Various terms have been used to describe this pattern of communities coming together to form a social aggregate, including agglomeration (Hodder and Cessford 2004), aggregation (Kuijt 2000; Rautman 2000), convergence (Bradley 1987; Tuck 1971), hybridity (Alt 2006; Bhabha 1994; Deagan 2013; Peterson 2011; Silliman 2013; Stockhammer 2012; Yao 2012) nucleation (Gerritsen 2004), and coalescence (Birch 2012:646; Clark et al. 2019; Ethridge and Hudson 2002; Kowalewski 2006). The ever-changing nature of identity is often most clear in these contexts of interaction. The exchange of ideas and objects can create new iterations of an individual and society's cultural and social identity. Of all the above-mentioned terms, 'coalescence' best encompasses this idea of the exchange of ideas and objects creating new iterations of an individual and society's cultural and social identity. Due to its archaeological correlates that can be assessed, coalescence will be the concept used in this dissertation to address how cultural interaction effects identify and is detailed in the following section.

2.3.3. Coalescence

Coalescence is defined as the cultural reorganization and formation of aggregated, multiethnic, and multilingual communities (Birch 2012; Hill et al. 2004; Kowalewski 2006). According to Clark et al. (2019) the first use of the term coalescence by archaeologists was to describe how aggregation of groups of people affected regional settlement patterns (in Lehmer

1954). In the last 20 years, the term has been used as a conceptual framework for understanding how entire cultural systems are reshaped, most often in contexts of migration and the resultant cultural interaction (Clark et al. 2019, citing Hill et al. 2004). Coalescence brings about transformations in the social, political, ideological, and economic fabric of societies and brings individuals together in new locations where specific social strategies are adopted to quell tensions that might arise. At different times and spaces, small village communities came together to form larger and more complex social groups (Birch 2012; Hornbeck Tanner 1987). The strategies of coalescence are visible archaeologically and include changes in the built environment including transformations in the size or organization of settlements and changes in the structure of domestic and public spaces; these changes help archaeologists understand social and historical processes over time (Birch 2012; Gerritsen 2004:151; Hodder 1986:7-8; Thomas 2004:34). Kowalewski (2006) defined 12 traits of coalescent societies but noted that not all societies will demonstrate every feature.

Coalescent communities form when people create and recreate identities and traditions during periods of dramatic social, political, and cultural realignment (Birch 2012). The processes of small-scale movement and community reorganization associated with coalescence results in a blending of previously separate cultural traditions (Hill et al. 2004). These changes can be observed in material culture preserved in the archaeological record and represent the result of changing ideas about "how to do things" (Shennan 1989:12). Analysis is not merely a matter of finding material correlates for the separate cultural identities, it also involves considering how artifacts and other evidence operate within identity-making processes and how meanings and material culture become associated with social groups (Weik 2014:294). Identities are multidimensional, contested, and negotiated and no one class or set of material categories is always chosen in emblematic expressions of identity (Alt 2002, 2006; Weik 2014:295). By examining small-scale changes in community-based practices, researchers can better understand how large-scale social and political transformations unfolded relative to everyday human lives.

According to Birch (2012), there are two scales of study in coalescence; one that is regional in scale and focuses on identifying and explaining population movement over long periods of time across broad areas, and those that focus on intrasite analyses of individual settlements, including the history of occupation and the social, spatial, and temporal dynamics of these communities. Multiple scholars have emphasized a need for a multiscalar approach that moves between multiple temporal and spatial scales of analysis (Birch 2010; Blakney-Bailey 2007; Pauketat and Alt 2005; Wylie 1989).

Clark et al. (2019) examine multiple dimensions of migration and focus on two case studies, one of which is of Kayenta in southern Arizona, interpreted as an example of a location where people migrated into an area with their own cultural identity and held onto some traditions when they integrated with locals in their new environment, thereby creating a coalescent society. Clark et al. (2019) cite Homi Bhabha's third-space theory, where migrants and locals come together in a new space on equal footing, creating new ideas and tolerance of each other. Coalescence is essentially a framework through which to study the creation and maintenance of multicultural communities (Clark et al. 2019). Coalescence is more likely to occur when power can be distributed more evenly and those coalescent societies that succeed are built through integrative institutions, inclusive ideologies, and new identities that transcend social boundaries (Clark et al. 2013; Clark et al. 2019). Changes to these societies involve a redesign of the built environment and religious and cultural mixing (Clark et al. 2019; Liebmann 2013). This mixing may ultimately lead to ethnogenesis or the creation of new ethnic groups, however, because coalescence brings groups together rapidly, it is seldom as easy as forming completely new ethnic identities and traditions with deep histories will persist (Clark et al. 2019; Cordell and Yannie 1991; Hill 2013).

If coalescence is incomplete by the time an archaeologist recovers the evidence of the built environment, there may be a fragmented settlement structure with traces of these persistent group traditions reflected in subtle nuances in technological style, spatial organization, and cuisine (Clark et al. 2019). Clark et al. (2019) emphasize the need for archaeologists studying coalescence to focus on institutions and practices that developed in post-migration communities and how these communities were reshaped in ways that accommodated migrants and locals over many generations (Clark et al. 2019).

2.4. Conclusion

According to archaeologists studying cultural integration, there should be visible alterations of the built environment and of the spatial organization of communities if coalescence has occurred (Birch 2012; Clark et al. 2019; Gerritsen 2004:151; Hodder 1986:7-8; Thomas 2004:34). Kowalewski (2006) defined 12 traits of coalescent societies, of these, only some apply archaeologically and will be important in my analysis of how spatial organization can be used to identify shifts in cultural identity. Because coalescence is a shift in 'how to do things' for a society, as described by Shennan (1989), there should be visible evidence in the material record left behind by communities involved in interaction that indicate strategies of coalescence/integration. This should include changes in the architecture/built environment, size or organization of communities, and changes in domestic and community spaces (Birch 2012; Clark et al. 2019; Gerritsen 2004:151; Hodder 1986:7-8; Liebmann 2013; Thomas 2004:34).

Utilizing a multiscalar approach in my analysis will allow me to examine small-scale changes in intra-site community practices, which will help me identify how interaction affects those people living within a community and whether integration/coalescence is present (Birch 2010; Birch 2012; Blakney-Bailey 2007; Pauketat and Alt 2005; Wylie 1989), and to examine the larger landscape/regional scale that Birch (2012) uses as a scale of analyzing coalescence. These changes will be explored in detail in three analysis chapters, corresponding to the spatial scales being analyzed (landscape/region, community, and household), which will detail the specific research questions, theories, and methods being used to explore coalescence at the varying scales of space.

If groups involved in interaction (say locals or migrant populations) have not integrated enough to use new or innovative cultural practices of how to do things, this should also be visible in the archaeological record (Clark et al. 2019; Shennan 1989). It is also possible that the case study site chosen for this analysis will not have any evidence of integration or will have evidence of only minimal integration, these variations will be evident in the traces of slight changes in technological style and spatial organization (Clark et al. 2019). By examining the spatial organization of the two populations involved in the interaction at my case study site, prior to their interaction, I will identify whether cultural traits have changed at a landscape/regional scale (Clark et al. 2019; Weik 2014). By examining shifts in the built environment and architecture, I will identify whether cultural traits have changed at the community level and within household contexts (Birch 2012; Clark et al. 2019; Gerritsen 2004:151; Hodder 1986:7-8; Liebmann 2013; Thomas 2004:34). By looking at the spatial organization or how space was used at these three scales (landscape/region, community, and household) I will understand whether coalescence or cultural reorganization has occurred and to what degree it has occurred at my case study site.

CHAPTER 3: GEOGRAPHICAL BACKGROUND OF CASE STUDY SITE

3.1. Introduction

This chapter presents the geographic and cultural background for the case study site, which will be examined for how its inhabitants' use of space reflects whether coalescence has occurred within a community. The site chosen for this analysis is the prehistoric Morton Village site located in the central Illinois River Valley (CIRV). This site has evidence of two cultural groups inhabiting the location, however the degree and nature of their integration is unknown. This site exists at the boundaries of these two cultural groups, the Oneota to the north and Middle Mississippian populations to the south. I will identify whether the interactions between Bold Counselor Phase Oneota and Middle Mississippian groups at Morton Village moved from a coexistent or interdependent interaction to full coalescence or integration into a merged, single social system. Before this analysis can take place, the geographic region, the cultures that inhabited it, and the village itself must be contextualized as to why it presents a suitable case study for examining coalescence.

3.2. Contextualizing the Mississippian Period in the Midcontinent

Lightfoot and Martinez (1995) emphasize the need to understand the variety of backgrounds, interests, and motivations of all parties involved in cultural change. As there are two cultural groups, the Mississippians and the Oneota, involved in the interaction seen at the case study site, I will describe the development, social organization, subsistence strategies, and settlement systems for these cultural traditions before discussing the Morton Village site itself.

Prior to the Mississippian period, there were Late Woodland populations living in the midcontinent. Previously, the term 'Mississippianization' was used to refer to cultural changes that transformed these Late Woodland cultures into Mississippian period cultures around AD 900/1000 (Blitz 2010; Griffin 1985; Schroeder 2004). However, several recent explorations of 'Mississippianization' have found that there is no single process of the emergence of Mississippian cultural traits, and it is clear that Mississippian traits did not "emerge" from Late Woodland cultures (Wilson and Sullivan 2017:2). The spread was the result of a variety of new traditions and cosmologies that developed across the midcontinent as the result of interactions between diverse groups of people, which were influenced by a variety of processes such as migration and trade (Blitz 2010; Pauketat et al. 2015; Wilson and Sullivan 2017).

The Mississippian period lasted from about AD 900-1000 to AD 1600-1700 and is associated with the widespread development of interacting societies with significant variation in their hierarchical, social, political, and religious structure (Wilson and Sullivan 2017). Mississippian sites in the northern Midcontinent are referred to as 'Upper Mississippian' and are more often found in the upper Mississippi River valley, while Mississippian sites to the south and southeast are referred to as 'Middle Mississippian' and are more often found in the lower Mississippi and Illinois River valleys, in the Southeast, and elsewhere (McKern 1939) (Figure 3.1). While recognizing the normative construct of this terminology, the Upper and Middle Mississippian differentiation remains a useful nomenclature as the sites attributed to each differ from each other and also have regional variations in their cultural characteristics across the midcontinent. The prehistoric inhabitants of Middle Mississippian and Upper Mississippian sites are treated and referred to by archaeologists as members of separate cultural formations, the characteristics of which will be discussed in the following sections.

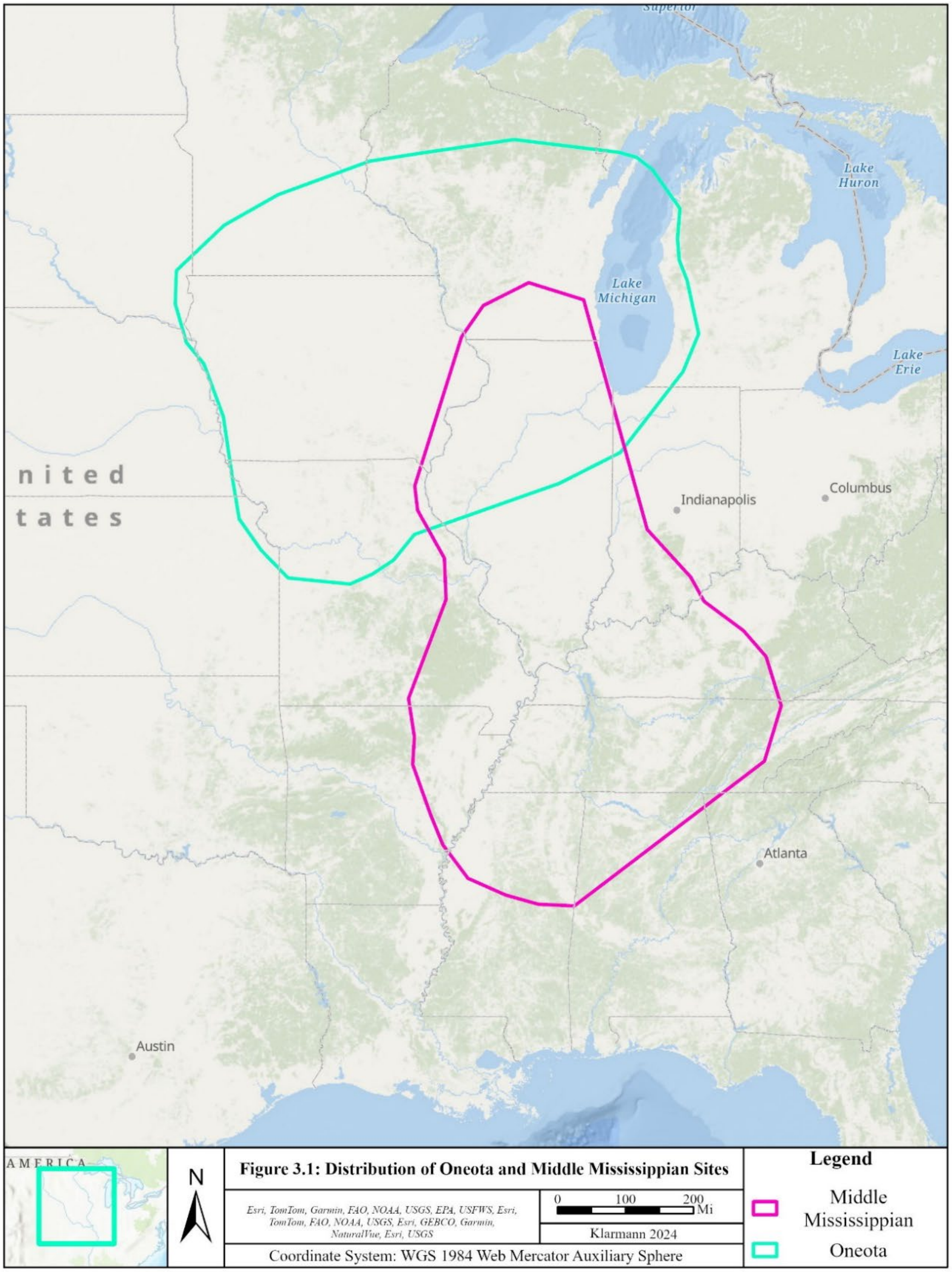

Figure 3.1: Distribution of Oneota and Middle Mississippian Sites

3.3. Middle Mississippian

The Mississippian period in the southern Midwest is referred to as 'Middle Mississippian' and is made up of a variety of a cultural developments found in segments of the Mississippi and Illinois River valleys and the southeast from around AD 1000 to 1600 (Blitz 2010; Conrad et al. 2019; Goldstein 1980; Griffin 1985; Schroeder 2004; Wilson and Sullivan 2017). Middle Mississippian civilizations reached a cultural peak between AD 1200 and 1400 with the trade and exchange of ceremonial and status items, the largest populations, and significant increases in mound and fortification construction (Blitz 2010; Goldstein 1980; Griffin 1985; Emerson et al. 2016; Kelly 2006, 2007; Kelly, Brown, and Kelly 2008; Pauketat and Emerson 2000; Pauketat et al. 2015b; Schroeder 2004; Tainter 2019; Wilson and Sullivan 2017).

3.3.1. Middle Mississippian Social Organization, Settlement System, and Cultural Characteristics

Middle Mississippian societies had complex social organizations, seen in the presence of a hierarchical settlement pattern composed of multi-mound ceremonial centers, single-mound village sites, and smaller hamlets and farmsteads that all interacted with one another (Conrad et al. 2019; Wilson and Sullivan 2017). There is evidence for the spread of Middle Mississippian cultures across the midcontinent's river valleys, and social changes within this interconnected regional system likely affected local-level change within the smaller sites (Goldstein 1980; King 2003; Milner 2004; Wilson 2008). Many Middle Mississippian sites have been found where resources were the most abundant, along major rivers and streams, which offered a diversified habitat for both terrestrial and aquatic resources (Bowne 2013; Byers 2013; Milner 2004). There was a common suite of architectural elements used to build and organize these communities, including mounds, plazas, courtyards, palisades, and cemeteries (Blitz and Lorenz 2006; Cole and Deuel 1937; Deuel 1935; Griffin 1943). According to Goldstein (1980), there was a hierarchy of social statuses and ranks involved in the mortuary practices of Middle Mississippian populations. Larger multi-mound sites typically have more forms of interment and more exotic grave goods included with burials than smaller single-mound or village sites (Bowne 2013; Milner 2004).

Middle Mississippian pottery is diverse in form, however there are generally both utilitarian and ceremonial wares (Blitz and Lorenz 2006; Bowne 2013; Goldstein 1980). Utilitarian pottery is usually smooth, plain/undecorated, or decorated with simple incised lines, cordmarking, or handles (Goldstein 1980). Ceremonial pottery is more elaborate in form, style, and technique than utilitarian wares (Goldstein 1980). These items include bowls, jars, beakers, bottles, shallow bowls, and plates, which vary by the addition of handles, the shape of the rim and base, and the addition of human and animal motifs (Bowne 2013). These wares are usually polished, painted, engraved, trailed, incised, punctated, fabric-impressed, or stamped. Generally, most Middle Mississippian pottery is tempered with shell, which allowed potters to create a variety of shapes with thin but strong walls that were better at conducting heat (Bardolph 2014; Bowne 2013; Pauketat et al. 2002; Wilson 1999).

During the Middle Mississippian period, groups began to trade and import exotic raw materials and export manufactured items and new ideas through what is referred to as the Southeastern Ceremonial Complex (Bowne 2013). The Southeastern Ceremonial Complex or SECC is defined as a set of ritual paraphernalia, associated symbols, and related iconography seen in elite contexts from distantly separated sites (Brown and Kelly 2000; King 2007; Knight Jr. 2006). The presence of SECC related material goods across the Mississippian southeast indicates that long distance trade occurred and at least elites were able to gain access to valuable materials and/or goods.

3.3.2. Cahokia and Its Influence on the Midcontinent

Cahokia, the largest and most well-known Middle Mississippian site, is located in Illinois, east of modern-day St Louis, in the broad, alluvial floodplain of the Mississippi River, called the American Bottom. Based on the tremendous number and size of the earthworks constructed (over 100), the presence of a palisade wall, a large central plaza, and the estimated population size (approximately 10-15K), Cahokia is interpreted as the ceremonial, political, and urban center of this area between about AD 1100 and 1250 (Alt and Pauketat 2017; Betzenhauser and Pauketat 2019; Blitz 2010; Bowne 2013; Emerson 2010; Emerson et al. 2020; Koldehoff and Pauketat 2018; Pauketat 2003, 2009; Pauketat and Alt 2008; Pauketat et al. 2015a, 2017; Pauketat et al. 2015b; Tainter 2019). There is often a 'Cahokia-centric' model of how the origin and spread of Middle Mississippian traditions is viewed, because there are widely distributed sites that possibly served as outposts or resettlements of Cahokia (Birmingham and Goldstein 2006; Blitz 2010; Bowne 2013; Emerson 2010; Goldstein 1980; Pauketat 2003, 2009; Pauketat et al. 2015b). Timothy R. Pauketat and others have extensively investigated the religiosity of Cahokia and define Cahokia as the source of a shared religious ideology in the midcontinent (Alt and Pauketat 2017; Emerson et al. 2016; Koldehoff and Pauketat 2018; Pauketat 2012; Pauketat and Alt 2008; Pauketat et al. 2015a, 2017; Pauketat et al. 2015b).

Cahokia was founded through the convergence of diverse peoples, formalization of religious practices, and a transformation of the landscape (Pauketat et al. 2015a). It is unlikely that politics were the only cause of the emergence of Cahokia and the spread of Mississippian culture, rather Cahokia and other Mississippian complexes were religious centers where people could experience and engage with the cosmos in their daily lives (Alt and Pauketat 2017; Pauketat et al. 2015b). Religion at Cahokia was dynamic and altered the political, social, and economic lives of people in the American Bottom and elsewhere in the midcontinent (Pauketat et al. 2015a). Occupants at Cahokia traded and shared resources with other ceremonial centers in the southeast and likely controlled trade and interaction in the river valleys where other mound sites and smaller villages were located (Pauketat et al. 2015b). Evidence for interaction is found in similarities of architectural and settlement organization between the Middle Mississippian and later Upper Mississippian groups, the similarities in artifacts found throughout the eastern woodlands, and the presence of palisaded settlements, indicative of conflict and the need for defense (Bowne 2013).

3.3.3. Middle Mississippian Groups Encountering Conflict

The Mississippian period overall brought increased levels of violence across the Midwest. When considering Middle Mississippian development, the increase in violence was accompanied by larger population sizes, increased reliance on maize agriculture, and the development of ranked societies (Dale Spencer 2014 citing Milner 2004, 2007; Milner et al. 2013). Middle Mississippian people encountered violence throughout their time in the Midwest. Regionally, there is evidence for cultural interaction and conflict for Middle Mississippians living in the CIRV between AD 1000-1500, including with Late Woodland and eventually Oneota populations (Buikstra and Milner, 1989; Dale Spencer 2014; Goodman et al., 1984; Hatch 2012, 2015; Strezewski 2006; Wilson 2010). Warfare was particularly intense in the CIRV when compared to many other regions (Emerson 2007; Hatch 2012, 2015; VanDerwarker and Wilson 2016).

Several recent articles have investigated deteriorating regional subsistence success and have concluded that an intensification of intergroup conflict is evident in the caloric and nutritional inadequacy of skeletal populations associated with CIRV sites (Conrad et al. 2019; Dale Spencer 2014; VanDerwarker and Wilson 2016; Wilson 2012; Wilson and VanDerwarker 2015). Fortifications are present at multiple larger village sites dating to the Orendorf phase, including Lawrenz Gun Club and Orendorf, evidence that conflict was taking place in the CIRV during the Middle Mississippian period (Conrad et al. 2019; Milner et al. 2013; VanDerwarker and Wilson 2016). Additional evidence of violent encounters is present in bioarchaeological analysis of skeletal remains in several locations, but most notably in the CIRV at the Norris Farms 36 cemetery, Dickson Mounds site, and within Orendorf's burial population (Harn 1980; Milner et al. 1991a; Milner et al. 1991b; Steadman 2008; Wilson 2010). Orendorf itself had a higher adult rate of violence-related skeletal trauma than any other Mississippian site in the entire Eastern Woodlands (VanDerwarker and Wilson 2016 citing Steadman 2008). The threat of violence and death in the CIRV led to increased nucleation of settlements and a decreased amount of time spent away from defended villages (Conrad et al. 2019; Milner et al. 1991a; Milner et al. 1991b; VanDerwarker and Wilson 2016). By AD 1300, much of the CIRV's population was living in fortified towns, further proof that it was not safe to live without such protection (Conrad 1989, 1991; VanDerwarker and Wilson 2016).

Wilson (2010) proposes that with the levels of violence in the upper Midwest (see earlier discussion of violence for Oneota) encountered by the Oneota could have led some groups to move south, eventually into the CIRV, where they were met with antagonistic relations with local Mississippian groups (Wilson 2010). Recent work in the CIRV has sought to expand upon the nature of this interaction between Middle Mississippian populations with migrant Oneota groups coming into the region (Bengtson and O'Gorman 2016, 2017a, 2017b; Nordine 2020; O'Gorman et al. 2020; Painter 2021; Painter 2022; Painter and O'Gorman 2019; Upton 2019).

3.3.4. Middle Mississippian Societies in the CIRV

Middle Mississippian societies are most well-known for the large multi-mound site of Cahokia in the American Bottom region and other multi-mound ceremonial centers in the Eastern Woodlands. However, the focus of this dissertation are those Middle Mississippian mound and village sites, and smaller villages, hamlets, and farmsteads found in the central Illinois River valley (CIRV), the 210-km valley section of the Illinois River between modern towns of Hennepin (to the north) and Meredosia, Illinois (to the south) (Harn 1978). This area includes sections of the central Illinois and adjoining Mississippi River valleys, portions with a slow current and expansive floodplain which distinguishes the CIRV from the upper and lower portions of the Illinois River valley (Wilson 2010). Conrad (1991) considers there to be two geographical variants of Middle Mississippian cultures (referred to as central Illinois Mississippians) in the CIRV, the Spoon River Culture to the north, and the La Moine River Culture to the south, each associated with the river basin of its namesake. Within each of these geographical variants the Middle Mississippian occupation is divided into multiple phases, however, this temporal division of the Middle Mississippian period in the CIRV was later revised by Esarey and Conrad (1998). I follow Esarey and Conrad's generalized subdivision of the Middle Mississippian period across the CIRV into four periods/phases: Eveland (AD 1100-

1200), Orendorf (AD 1200-1250), Larson (AD 1250-1300), and Crable/Bold Counselor (AD 1300-1450).

The earliest archaeological explorations in the CIRV occurred in the late 1800s, however, well known explorations by the University of Chicago in 1930, directed by Fay-Cooper Cole (see Bennett 1945; Cole and Deuel 1937) led to the identification of over 900 sites (Conrad et al. 2019; Wilson 2010). The development of Middle Mississippian cultures in the CIRV likely occurred because of an influx of people from the American Bottom between AD 1050-1150, which was followed by a regional change where Late Woodland populations began to model some aspects of a Cahokian way of life, including maize agriculture (Buikstra 1984; Conrad 1991; Conrad et al. 2019; Cook 1984; Emerson 1999; Wilson et al. 2017; Wilson et al. 2019). The shift for Late Woodland populations into adapting Middle Mississippian traditions was modeled by Steadman (1998) and Droessler (1991), who found evidence for biological continuity between Late Woodland and Mississippian period skeletal samples in the CIRV. The population movement from the south into the central valley led to a simultaneous introduction of new ceramic, artifactual, and architectural complexes (Bardolph 2014).

The settlement pattern in the CIRV differs from the complexly interrelated sociopolitical organization found at Cahokia, but there is evidence of a hierarchical social structure and participation in the Mississippian religious system, with evidence of high-status burials, platform mounds, large public buildings, and exotic religious/status artifacts (Conrad 1989; Conrad et al. 2019). Rather than large multi-mound ceremonial centers, there were typically ‘central towns’, which would typically have clusters of buildings and a temple or charnel mound with a central plaza and fortifications (Conrad et al. 2019). These towns would often cover 10-20 acres and would be associated with smaller villages, hamlets, and farmsteads. Mound and village sites were situated near each other along the river valley and include Eveland, Dickson Mounds, Orendorf, Larson, Lawrenz Gun Club, and Crable, among others (Figure 3.2).

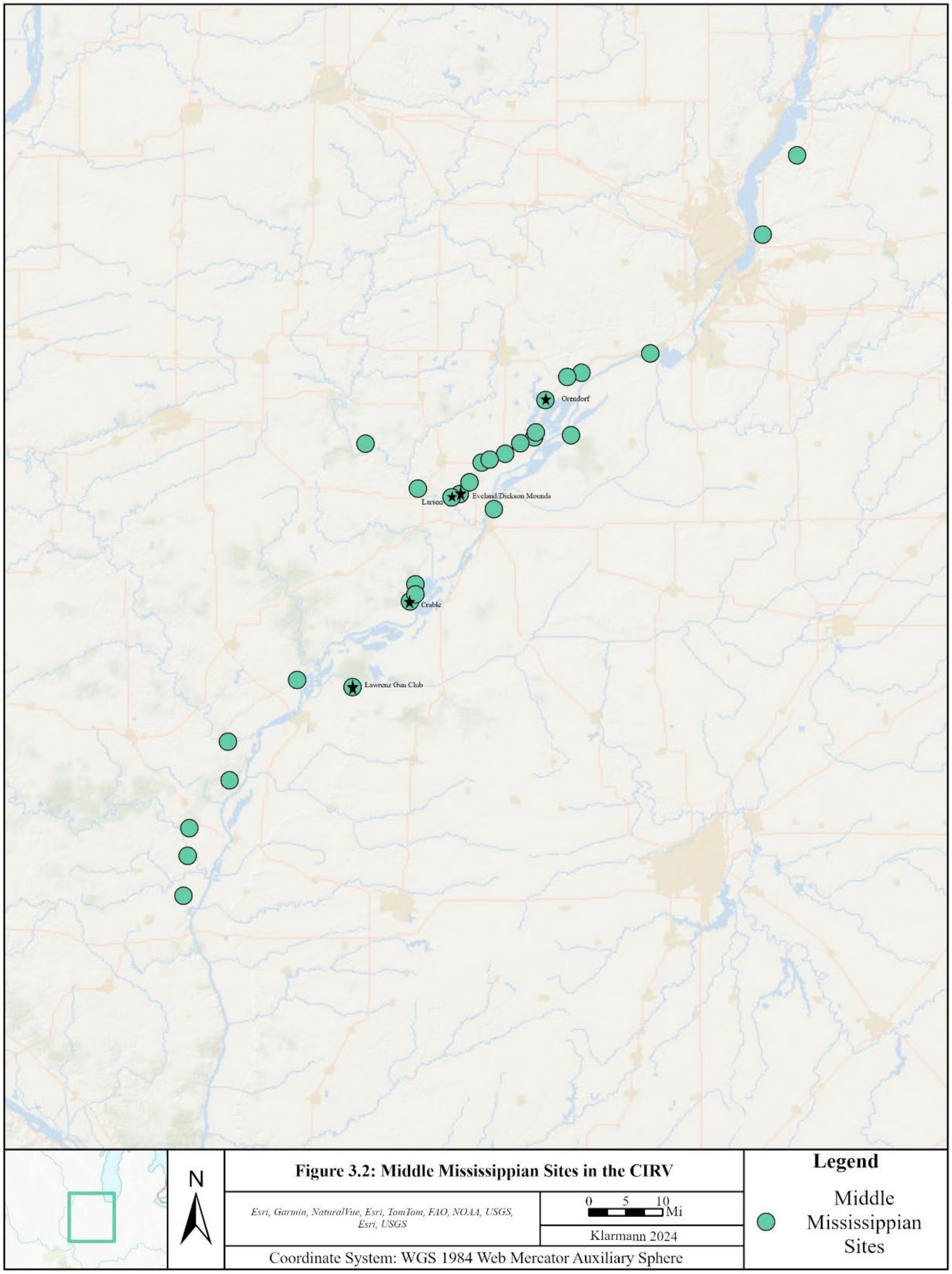

Figure 3.2: Middle Mississippian Sites in the CIRV

In the earliest phase, Eveland (AD 1100-1200), there is an abrupt increase in the intensification of maize production and a decrease in wild nut consumption, one of the major differences between Late Woodland sites and those attributed to Middle Mississippian sites in the American Bottom (VanDerwarker et al. 2013; VanDerwarker and Wilson 2016). The namesake of this earliest Middle Mississippian phase in the CIRV, the Eveland site, is located at the base of the western bluffs of the Illinois River, upstream from the mouth of the Spoon River. Three burned Mississippian ceremonial structures, a circular, rectangular, and cross-shaped building, each with wall trench construction, were excavated between 1958 and 1960 (Esarey 1996). The cross-shaped building is unique for the area, as it has no local precedent, but is similar to a structure found at Cahokia (Bardolph 2014; Conrad 1991). There are likely other structures in the surrounding area that could have been used as dwellings and there is evidence for a plaza (Byers 2013; Conrad 1991). Eveland has been interpreted as a location of contact between Late Woodland people and people from Cahokia because ceramics at the site are similar in style to those found in the American Bottom at Cahokia, but made with local pastes (Conrad 1989, 1991; Harn 1975, 1978, 1991). Conrad (1991) interprets the site as the location for an in-migration of Middle Mississippians from the American Bottom who came in contact with local Late Woodland populations in the CIRV, leading to an adaptation of many Middle Mississippian characteristics and a transition in cultural practices, leading to the development of Middle Mississippian cultures in the CIRV.

About 300 meters northeast of the Eveland site is Dickson Mounds, a large burial mound containing over 1,000 individuals, possibly as many as 3,000 (Conrad 1972; Harn 1991). Excavations in the 1960s showed that multiple smaller burial mounds and a pre-mound cemetery were incorporated into the larger mound, creating distinct burial areas, which were added at different times (Conrad 1972; Harn 1991). The mound has been interpreted as a central cemetery for villages in the area, with individuals interred at the site over a span of 150 to 200 years (Conner 2016; Conrad 1989; Harn 1991). Radiocarbon dates show that burials at Dickson Mounds began at the beginning of the Middle Mississippian period in the CIRV and went into the late AD 1200s (Conner 2016; Harn 1980, 1991). Surrounding the burial mound is the habitation site Myer-Dickson, which has Late Woodland and Larson Phase Middle Mississippian components, detailed by Conner (2009, 2010, 2013, 2016). The Late Woodland habitation areas predate the use of Dickson Mounds as a burial site by several centuries (Conner 2013, 2016).

The Orendorf phase (AD 1200-1250) is named after the Orendorf site, a large, fortified town with at least five sequentially occupied settlements and at least nine mounds of various sizes (Conrad et al. 2019). The Orendorf site is an example of a central town, containing a plaza, platform mound, and public structures (Byers 2013). Orendorf also had a palisade, suggesting the threat of violence from the outside was felt at some point during the approximately century-long occupation of the town (Conrad 1991; Milner 1999; Santure 1981; Steadman 2008). The presence of fortifications is not the only evidence for conflict in the area, two pipes decorated with warrior portraits were recovered from excavations at the site, as well as skeletal evidence for traumatic injuries on multiple adults (Conrad 2005; Conrad et al. 2019; Steadman 2008; Tubbs 2013; Wilson 2010). The population size is estimated to have been around 400-500 people and although moderate in size, population-dependent diseases flourished there (Hanson 2000; Santure 1981). Isolation, periodic inability to procure food, and forced nucleation behind fortifications likely all influenced the health of the community that lived at the Orendorf site (Steadman 2008).

The Larson phase (AD 1250-1300) is defined by what Harn (1978) refers to as the Larson community, later called the Larson settlement system (1994), a clustering of Middle Mississippian sites that appear to have a hierarchical settlement model. The settlement system consists of a central core site or central town, the Larson site, a mound and village site located on a bluff about two kilometers southeast of Dickson Mounds (Byers 2013; Harn 1978). Around this central town are smaller lower-level sites, or subsidiary sites, which are distinguished by size and perceived function (Harn 1978). Harn suggests that this clustering of sites represents a Middle Mississippian polity in the CIRV that appeared after the earlier Eveland and Orendorf phases (Byers 2013; Harn 1978). Although these central towns are largely accepted as the heads of polities, there is disagreement over the hierarchical structure of the polities, their number, and development (Byers 2013). Conrad (1991) sees Larson as one site in a series of potentially contemporaneous polities within the CIRV, including the southern LaMoine River site, Lawrenz Gun Club. The Larson phase likely ended with many of the valley's inhabitants leaving the Spoon River area to join these southern LaMoine River polities before the arrival of Oneota people in the area (Conrad et al. 2019).

Lawrenz Gun Club is a large village containing at least ten mounds, a central plaza, and dozens of structures enclosed within a bastioned palisade, and includes several structures outside the village's fortification (Krus et al. 2019). Nineteen radiocarbon samples taken from work conducted there between 2010 and 2016 indicate that the village was occupied from circa AD 990-1165 to AD 1295-1450, throughout much of the Middle Mississippian period in the CIRV (Krus et al. 2019). The palisade was built circa AD 1150-1230, with continuous repairs and reconstruction for generations after its construction, evidence that the threat of conflict was ongoing for these inhabitants (Krus et al. 2019). Extensive geophysical survey of the site indicates that Lawrenz Gun Club is likely the largest Mississippian period village in the CIRV (Krus et al. 2019).

The Crable phase (AD 1300-1450) of the Middle Mississippian period in the CIRV is often assessed by the relationship between local Middle Mississippians and migrant Bold Counselor phase Oneota. The Crable site and namesake of this phase is a distinctive mound and village center with ceramic evidence of two groups living within its borders (Conrad and Esarey 1985; Esarey and Conrad 1998). Harn (1978) and Conrad (1991) agree that the Crable site was likely the final expression of the central Illinois Mississippian settlement system, as CIRV sites were mostly abandoned towards the end of the Crable phase (see Cobb and Butler 2002; Ethridge 1999). Crable is located in the extreme southeast portion of Fulton County, on a plateau of the western bluff of the Illinois River valley (Smith 1951). Crable covers between 10-25 acres, and contains a cemetery, multiple conical mounds, and a pyramidal mound, which are all considered contemporaneous (McDonald 1952; Morse 1960; Smith 1951). In his 1951 report, Smith views Crable as different from other Middle Mississippian sites in the Spoon River area, referencing the variation in ceramic artifacts from other Middle Mississippian sites in the region, and what he refers to as Middle Mississippian ceramic types with Oneota 'elements'. Conrad and Esarey (1985) tabulated ceramics from features excavated in the 1960s, 14% of which were Oneota style ceramics. Vessels unique to the Crable site are deep rimmed plates with Oneota style incised designs on the interior rim (Conrad and Esarey 1985). The interior rim is where one would usually find Mississippian incised designs, so these unique vessels were interpreted as a hybrid between Middle Mississippian and Oneota designs, hallmarks of what is known as the Bold Counselor phase Oneota for the CIRV (Conrad and Esarey 1985). However, ceramic evidence interpreted as Bold Counselor phase is considered a 'minority admixture' to Crable's mostly Middle Mississippian population, which Esarey and Conrad (1998) interpret as some level of social integration between the two groups, a relationship that will be expanded upon in the following section.

3.4. Upper Mississippian Oneota

As previously described, Upper Mississippian refers to those Mississippian sites found along the northern Mississippi River valley. The Upper Mississippian cultural formation focused on here is the Oneota culture, dating circa AD 900/1000 to the mid-1700s and is known mainly for its presence in Wisconsin, Illinois, and Iowa, but sites are also found in Minnesota, Missouri, Nebraska, Kansas, Indiana, and Michigan (Benn 1995; Brown and Sasso 2001; Gibbon 2001; Henning and Thiesson 2004; Hollinger 1995; Jackson 1998; Overstreet 1978, 1997; Ritterbush 2006). Henning (1998) refers to the Oneota culture as a bridge between cultural formations in the Plains (Kansas and Nebraska) and the eastern Woodlands (Minnesota, Missouri, Indiana, Wisconsin, Illinois, Iowa, and Michigan) via the Prairie Peninsula, which is a section of prairie that extends from western Iowa to western Indiana. The name 'Oneota' comes from the Oneota River valley in Iowa and was first used by Ellison Orr in 1914 and later by Charles R. Keyes and Will C. McKern in the 1920s-30s to describe pottery from northeastern Iowa (Berres 2001; Keyes 1927; McKern 1939). The Oneota cultural tradition was present along the margins of major lakes and rivers of southern and eastern Wisconsin by ca. AD 900-1100 and expanded between ca. AD 1300 and 1500, into the Dakotas, western Iowa, Minnesota, and the Illinois River valley (Brown and Sasso 2001; Gibbon 2001; Henning 1998).

3.4.1. Oneota Social Organization, Settlement System, and Cultural Characteristics

Oneota societies are described as having an egalitarian, tribal level of sociopolitical organization, which lacked the complexity of Middle Mississippian cultures of the south, in terms of settlement hierarchies, complex sociopolitical organization, and status indicators in mortuary practices (Gibbon 2001; Henning 1998; O'Gorman 1996; O'Gorman 2001). The Oneota were not building the large, complex burials mounds that are iconic components of the Middle Mississippian south, instead they buried their dead in cemeteries, small mounds, isolated pits, and within or around domestic structures (O'Gorman 1996). Oneota sites are usually found near rivers, lakes, or marshes, with villages comprised of storage pits, processing pits, hearths, midden areas, refuse pits, and structures (Berres 2001; Henning 1998; Hollinger 1995; Overstreet 1997). These village farming communities were likely more sedentary than the preceding Late Woodland populations, although smaller camps for hunting were likely used (Hollinger 1995).

There is heterogeneity among architectural features found at Oneota sites, including domestic structures; some were extensive, and others small (Gibbon 2001; Hollinger 1993, 1995, 2005; O'Gorman 2001, 2010). Palisades were also present in some villages, while others lacked any protective measures (Gibbon 2001; O'Gorman 2001). Domestic structures were small, single-family pit houses, mat/pole wigwam-style dwellings, or longhouses, which could accommodate multiple families (O'Gorman 2010). Despite this heterogeneity, one common element to all Oneota villages is the presence of numerous circular pits, likely used for the storage of horticultural products (Henning 1998; Hollinger 1995; O'Gorman 2001; Overstreet 1997). Brown and Sasso (2001) suggest a 'core-hinterlands' pattern of Oneota settlement, where major habitation sites, palisaded villages with enclosures, agricultural sites, and cemeteries are constricted to core settlements, with smaller settlements restricted to areas around the core.

The location of rivers and wetland resources influenced where the Oneota people lived. Gallagher and Arzigian (1994), refer to Oneota subsistence strategies as intensification through diversification, where they practiced a diverse and mixed economy that included growing maize, beans, squash, and other cultigens, along with hunting, gathering, and fishing. This strategy of intensification focused on utilizing multiple types of subsistence, which could therefore reduce the risk of food shortages and improve the society's welfare (Gallagher and Arzigian 1994). The economy was stabilized by efficient corn agriculture using a ridged field system, which is constructed by plowing parallel channels and piling the dirt between the channels to form long, low ridges thus increasing soil fertility and improving drainage (Gallagher and Arzigian 1994).

An early criterion for establishing the presence of an Oneota site was the occurrence of ceramics tempered with crushed shell (Holmes 1903) and has been referred to as a "pottery culture" (Hall 1962; Wedel 1959). Ceramics are relied upon heavily for categorizing a site as being part of the Oneota cultural formation (Henning 1998). Each new site brings variations in these pottery styles, making categorizing ceramics slightly more difficult (Henning 1998). There are however broad temporal trends in ceramic attributes, like shape and size of vessels, and decorative motifs, including trailing width, lip notching, and handle shape, which characterize sites throughout the region (Benn 1995; Gibbon 2001; Henning 1998; Overstreet 1978, 1997). Typically, Oneota ceramics are tempered with shell, and jars are globular in shape with constricted, outward-flaring rims, rounded bottoms, and trailed line and punctate decorations (Gibbon 2001; Henning 1998). For jars, decorations, if applied, are usually found on the lip or from the inner to outer lip-rim juncture to the upper body or shoulder (Henning 1998). Almost all sites classified as Oneota have been designated as such by looking at ceramic characteristics.

3.4.2. Oneota Temporal Considerations

Archaeologists debate the origins of those groups recognized as within the Oneota tradition, but there seems to be a shift from Late Woodland to Oneota across many areas of the Midwest (Benn 1995; Brown and Sasso 2001). Later Oneota populations are historically associated with northern Dhegihan Siouan speaking populations, while Middle Mississippians are linked to southern and southeastern historic populations (Bengtson and O'Gorman 2016; Henning and Thiesson 2004; Overstreet 1997). No matter where the Oneota Tradition originated, there has been increased recognition that Oneota cultural groups had their own, independent history separate from Middle Mississippian cultures to the south (Henning 1998). It is possible that the Oneota cultural formation developed out of some of the same socio-economic situations as ranked Middle Mississippian social formations, but with variations in the resulting cultural systems (Brown and Sasso 2001).

Overstreet (1997) divided Oneota occupations into four periods, referred to as Horizons (see Willey and Phillips 1958), Emergent (AD 900-1000), Developmental (AD 1000-1350), Classic (AD 1350-1650), and Historic (AD 1650-1775). These designations have been used to describe an Oneota presence in the Eastern Woodlands and reflects what Hall (1962) calls 'group continuity', where within a specific locality or region, consistent traits are maintained through time, with only minor changes. During the Emergent Horizon (AD 900-1000) communities consisted of wigwam style houses and small semi-subterranean pit houses, while burials are found beneath house floors, in pits, and in cemeteries (Overstreet 1997). In the Developmental Horizon (AD 1000/1150-1350), there does not appear to be major changes in life ways of Oneota people beyond new elements of material culture and minor modifications in subsistence with beans being added to a mostly corn diet (Overstreet 1997). The Classic Horizon (AD 1350-1650) is characterized by more population clustering and changes in material culture. Villages and settlements became densely clustered around prominent landscape features, with burials in multiple cemeteries within villages or associated with domestic structures (Overstreet 1997). Towards the end of this period fortifications were common and villages were often settled in defensible positions (Overstreet 1997). The Historic Horizon (AD 1650-1775) has been difficult to define due to a lack of archaeological evidence, but traditionally Historic period Oneota groups are linked with the Ho-Chunk Tribe (Winnebago) among others (Overstreet 1997; Staeck 1995). Due to the extent of the Oneota occupation in the Midwest (AD 900-1775), there are certain characteristics that change through time no matter where Oneota cultural remains are found.

3.4.3. Oneota Groups Encountering Conflict

As Oneota populations spread across the Midwest, they inevitably interacted with other groups, and the range of outcomes for these interactions include instances of violence and conflict. These conflicts, which occurred throughout the Oneota presence in the Midwest, are believed to be the result of conflict with non-Oneota groups (Hollinger 2005; 2018; McTavish 2019; Wilson 2010). This conflict appears to be spread across the various regions of Oneota settlement, including evidence in the Oneota occupied south-central Wisconsin (Birmingham and Goldstein 2006). The use of fortifications at the northern Middle Mississippian outpost site Aztalan make it clear that defense was a priority for these inhabitants (Birmingham and Goldstein 2006; Hollinger 2018). Violence is also evident in other regions, including the CIRV, as seen on the skeletal populations in the region (Milner et al. 1991a; Milner et al. 1991b; Steadman 2008).

There is limited evidence of Oneota settlement in the southern Mississippi and Illinois River valleys, known as the American Bottom, however, it is clear that Oneota populations were in the area when terminal Middle Mississippian populations were still inhabiting the region (Farnsworth and O'Gorman 1998; Henning 1998; Jackson 1998; Jackson and Emerson 2014). It is possible that the Oneota moved into this area to enable interactions with local Middle Mississippian populations or the Oneota moved in after the area had been almost completely abandoned by Middle Mississippian populations. The Oneota did not migrate to the American Bottom in high numbers, and it appears to have remained a periphery or southern frontier of the Oneota Tradition (Farnsworth and O'Gorman 1998). There are a series of sites found in the central Illinois River valley that appear to have had a great effect on the Middle Mississippian inhabitants that lived there when migrant Oneota groups arrived, known as Bold Counselor phase Oneota.

3.4.4.1. Bold Counselor Phase Oneota Cultures in the CIRV

The migration of Oneota people into the CIRV first occurred around AD 1300 (O'Gorman and Conner 2023). Known as the Bold Counselor Oneota phase, this period is defined according to ceramic vessel forms and a mixing of Oneota and Mississippian traits (Esarey and Conrad 1998). Ceramic forms include jars, bowls, and deep-rimmed plates with decorative traits such as trailed lines with punctate borders, and stab-and-drag vertical decorations (Esarey and Conrad 1998). The presence of bowl and plate forms is unique to Bold Counselor sites in the central Illinois River valley and although these vessels are sometimes found in other Oneota sites outside the CIRV, it is rare, but they are typical of Mississippian-Oneota contexts in the CIRV (Painter and O'Gorman 2019). Ceramic artifacts found at sites attributed to the Bold Counselor phase provide evidence that the Bold Counselor Oneota in the central Illinois River valley interacted with nearby Middle Mississippian populations (Conrad 1973; Conrad and Esarey 1983; Esarey and Conrad 1998; Hollinger 1993; Henning 1995; Painter and O'Gorman 2019; Santure et al. 1990). The Bold Counselor Phase can only be defined as the result of interaction between local Middle Mississippian populations and migrant Oneota groups. Oneota groups came into the Illinois River valley and interacted with Middle Mississippian populations, reconfiguring local social networks (Upton 2019), and creating the suite of material culture we refer to as Bold Counselor (Esarey and Conrad 1998). Five sites, located within 35 km of each other on blufftops overlooking the Illinois River—Crable, C.W. Cooper, Sleeth, Otter Creek, and Morton Village/Norris Farms 36—have been identified as belonging to this phase (Figure 3.3) along with several smaller surface finds near Crable that are not considered further here (Esarey and Conrad 1998). Varying degrees of cultural interactions between Middle Mississippian and Oneota populations were inferred based on how prevalent Oneota or Middle Mississippian ceramic artifacts were at the five sites (Esarey and Conrad, 1998:43). Of the five sites, only three have had excavations conducted at them, while the other two have only had surface collections recovered from them.

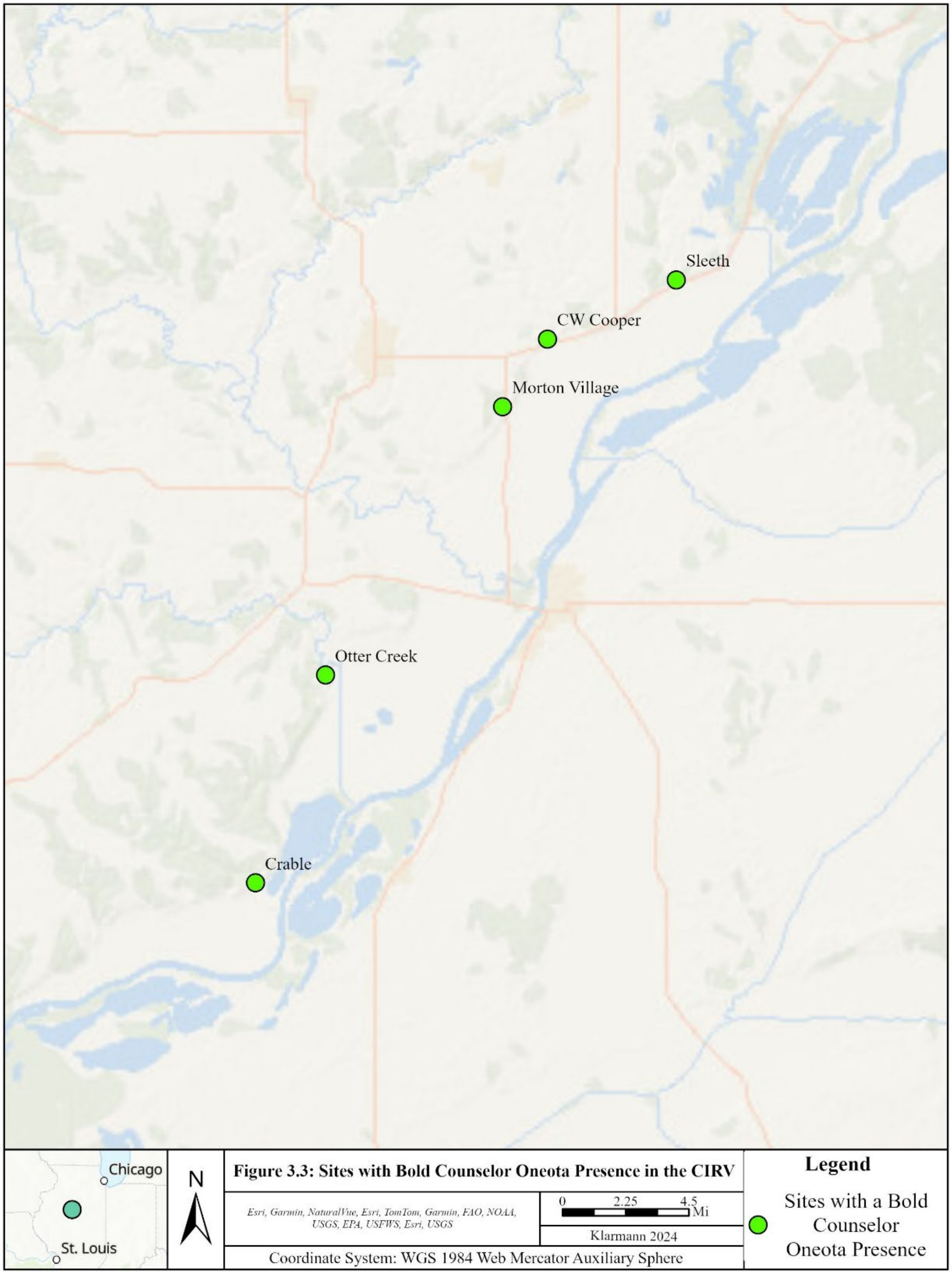

Figure 3.3: Sites with Bold Counselor Oneota Presence in the CIRV

As described previously, the Crable site has evidence of the presence of both Middle Mississippian and Bold Counselor Oneota groups residing within the village. Conrad and Esarey (1985) determined that 14% of the site's ceramics are Bold Counselor and Smith (1951) referred to Crable as a mixed site of roughly contemporaneous Oneota and Middle Mississippian ceramics, suggesting a simultaneous occupation of the site by the two groups. Despite Bold Counselor ceramics being less prevalent than Middle Mississippian ceramics, there was likely some social integration within households (Esarey and Conrad 1998). Painter (2014) examined ceramic types recovered during a 1969 surface collection and found that Mississippian and Oneota ceramics were found together across the entire survey area. However, Oneota material was concentrated to the northern part of the study area and Mississippian material was concentrated to the southern part of the study area (Painter 2014). Painter interprets the commingling of ceramic styles across the site as evidence that there were no rigid rules governing residential life and that if there were clear distinctions between the Oneota and Mississippians living at the site, this pattern would not be present (2014).

The C.W. Cooper site was excavated in the 1960s, '70s, and '80s, uncovering burned Oneota structures, pit features, and burials. This small village site was well preserved and at the time there was no evidence recovered of Middle Mississippian presence at the site, and it was considered the archetype of Bold Counselor ceramic traits (Esarey and Conrad 1998). Excavations by Greg Wilson in the 2010s has uncovered evidence of early Mississippian occupations at the site dating to AD 1150 to 1200, prior to the Oneota occupations which date to the early 1300s (Wilson and VanDerwarker 2015).

Based on aerial photographs and surface collections of artifacts, the Sleeth site has been identified as a possible densely populated village that covers less than two hectares (Esarey and

Conrad 1998). Aerial photography showed possible evidence for fortification, but no ground truthing has been conducted to confirm this (Esarey and Conrad 1998). Both Bold Counselor and Middle Mississippian ceramics were found in a balanced frequency on the surface of the site, with evidence of the typically 'hybridized' ceramic forms and decorations (Esarey and Conrad 1998). Almost all of the deep rimmed plates recovered from the surface are decorated in a Mississippian style rather than with the trailing and punctuation that are associated with Oneota ceramics (Esarey and Conrad 1998). The site has never been formally excavated, so not much is known about who occupied the village (Oneota, Mississippians, or both) and their relationship to other communities in the area. Similarly, the Otter Creek site is only represented by two surface collected Bold Counselor phase jar shoulders, two bird effigy bowl fragments, and a 1930s aerial photograph showing a number of house outlines (Esarey and Conrad 1998). Due to the lack of investigation at Sleeth and Otter Creek, it is impossible to infer who their inhabitants were (Oneota or Middle Mississippian) and what their relationship was to other residents in the CIRV.

The fifth Bold Counselor phase site, Morton Village (and associated Norris Farms 36 Cemetery) was initially interpreted as a mostly Bold Counselor phase Oneota village, whose inhabitants interacted or integrated with Middle Mississippian people on some level, making it a counterpart to Crable, which is interpreted as a Middle Mississippian village, whose inhabitants interacted or integrated with Bold Counselor Oneota people on some level (Esarey and Conrad 1998). The Morton Village site and associated Norris Farms 36 Cemetery are being investigated in this dissertation and will be discussed in the following section.

3.5. Morton Village and Norris Farms 36 Cemetery

The Morton Village site and associated Norris Farms 36 cemetery were discovered during a 1983 Phase I analysis for an expansion of highway 97/78 in Fulton County, Illinois, on a bluff-top overlooking Thompson Lake and the Illinois River. After cultural remains were recovered during this survey, Phase II investigations were recommended and showed the existence of a cemetery and at least portions of a village (Harn 1990). The cemetery and a potentially earlier structure within it could not be avoided by the project and was excavated in the resulting Phase III salvage project between 1984 and 1985, while only portions of the village, including portions of 11 domestic structures, some of which were rebuilding episodes of the same structure, were excavated. Geophysical surveys in the 2000s indicate the presence of at least 144 possible structures across approximately 18 acres of the site that has been surveyed (Horsley et al. 2015). Based on radiocarbon dates taken during the 1980s and 2000s from both the village and the cemetery, the site dates between ca. AD 1200 to 1400 (O'Gorman and Conner 2023; Santure et al. 1990; Silva et al. 2014). There was a significant admixture of ceramic vessels and artifacts associated with both Bold Counselor and Middle Mississippian groups recovered from the 1980s excavations at the Morton Village site and associated Norris Farms 36 cemetery (Esarey and Conrad 1998). Of the five documented Bold Counselor Oneota Phase sites, Morton Village/Norris Farms 36 provides the best documented evidence for interaction between the Oneota and Middle Mississippians in the central Illinois River valley.

Ceramics have been classified as Oneota or Middle Mississippian based on particular ceramic designs and vessel forms, including the presence of trailed lines imprinted on wet paste sometimes found with punctations and lip decorations for the Oneota, and cordmarking on jars and bowls, thin lines incised on dry paste (usually plates), and the presence of water bottle forms for Middle Mississippians (Bengtson and O'Gorman 2016; O'Gorman and Conner 2023; Yann et al. 2013). Previous analysis showed some correspondence between Oneota and Mississippian ceramics with certain architectural styles, but this interpretation requires further statistical and spatial analysis to determine the significance of this correlation (Yann et al. 2013). Painter and O'Gorman (2019) found that Middle Mississippian and Bold Counselor ceramics are found together across the village, including on the floors of domestic structures, with a mix of pottery styles occurring across the site.

The Norris Farms 36 cemetery contained 264 individuals, with most ceramic artifacts recovered classified as Bold Counselor, and based on genetic evidence from the skeletal data, investigators infer that these individuals are all Oneota people (Harn 1990; Milner et al. 1991a; Milner et al. 1991b; Milner 1999; Santure et al. 1990; Steadman 1998; Stone 1996; Stone and Stoneking 1993, 1998, 1999). Steadman (1998) uses a population genetics method to analyze skeletal remains to determine the level of biocultural interaction between populations in the central Illinois River valley. Analysis of cranial measurements from the burials at Norris Farms 36 determined that individuals interred there are morphologically distinct from Middle Mississippian populations at the Orendorf site located further up the river valley, which Steadman interpreted as evidence of little biological interaction between Bold Counselor and Middle Mississippian groups.

Minimal faunal and botanical evidence from the 1980s village excavations and the instances of trauma and disease within the cemetery are interpreted as the result of conflict between local Middle Mississippian populations and the migrant Oneota populations living at the village (Milner et al. 1991a; Milner et al. 1991b). According to Milner et al. (1991a), conflict likely restricted the village inhabitants to the bluff-top, restricting access to resources, which was substantiated by the limited faunal evidence available at the time. These early interpretations of the habitation site are based on limited village data, as the 1980s salvage excavations focused mainly on the cemetery and less on examining the extent of the village. Countering this idea of residents being restricted in their movements, Painter (2022) found that based on the variety and habitat of animal species being consumed at Morton Village, including diverse dietary options like fish and bivalve species, as well as deer and wapiti, circumscription appears to be less of a factor for the residents of Morton Village than was interpreted initially.

Interestingly, no evidence for a protective palisade has been identified at the site, a defensive method used at other sites within the valley (e.g., Lawrenz Gun Club and Orendorf) and by some Oneota elsewhere (e.g., Valley View site), although the site's position on the bluff top is itself a defensive method (Hollinger 2005). As mentioned above, Hollinger (2018) suggests that Oneota used their numbers elsewhere in the Midwest as a defensive mechanism. With the possibility of a smaller presence in the CIRV, the strategy may be different.

It is important to contextualize the evidence of traumatic injuries on individuals within the cemetery and how this relates to the village occupation. Silva et al. (2014) separate radiocarbon dates from the site and the cemetery and found that dates from the cemetery indicate that it was likely used early on in the village occupation. The cemetery was a low-lying mound that was eventually capped in a red clay signifying an end to its use (Santure et al. 1990). The potential that the cemetery was filled early in the village's occupation and that it ceased to be used at some point provides context for Steadman's (1998) findings of minimal biological interaction (as indicated by cranial morphology) and provides evidence that violent conflict was not the only form of interaction between the two groups. Foley (2016) questions whether violence was endemic to the CIRV and instead argues that the conflict was inconsistently distributed across the valley, emphasizing the evidence of trauma at Norris Farms 36 as an exception rather than the norm in the valley. Whatever the nature of violence elsewhere in the valley, it is clear that it was a part of life at least for a time for the inhabitants at Morton Village based on the skeletal population buried at Norris Farms 36.

Although there is clear evidence of extensive violence against Oneota people during their time in the CIRV, as seen in trauma on skeletal remains in the associated Norris Farms 36 cemetery, there is also evidence of social negotiation taking place at Morton Village. It is important to recognize that a variety of outcomes, including conflict, are always possible when two groups of people interact and cohabitate. It is also important to understand that through time differing groups that interacted often integrated into one community, sometimes as a means of defense against other groups (Arkush 2017). Conflict is not the only result of interaction that is possible and when it occurs, it may not endure, or it may lead to a shift in relationships between people. Conflict can and does occur, but post-conflict may come a time of understanding, a time of people getting to know each other and a mutual support of survival (Arkush 2017; Clark et al. 2019). Conflict occurred at Morton Village (Milner et al. 1991a; Milner et al. 1991b), but this is not the entire story.

Current research has focused on reexamining the interpretation of a restricted population at Morton Village and has attempted to better understand the relationship between the Bold Counselor Oneota and the Middle Mississippian populations in the river valley (e.g., Bengtson and O'Gorman 2016; O'Gorman and Conner 2023; O'Gorman et al. 2015; O'Gorman et al. 2020; Painter and O'Gorman 2019; Upton 2019).

Bengtson and O'Gorman (2016) reexamined the artifacts buried with children at Norris Farms 36 to see if they could identify whether these Oneota children might display some evidence of interaction between the Oneota and Middle Mississippians in the village. The mortuary population at Norris Farms 36 was dominated by grave goods with Oneota styles. However, the residents of the village integrated certain Mississippian symbols into the graves of infants and children. Bengtson and O'Gorman suggest that children were active participants in the interaction between Oneota and Mississippian residents at Morton Village and likely helped bring the two groups together.

O'Gorman et al. (2020) use the concept of necrogeography, or the study of spaces associated with death and dying (citing Muzaini 2017) specifically through a sense of migration and how mortuary practices help create a sense of place within a new environment. The Oneota migrants that lived at Morton Village used the location of their dead as a way of connecting themselves to their new landscape and also to their past experiences (O'Gorman et al. 2020). The small mound where the cemetery was constructed, although similar to their Middle Mississippian neighbors, was also used to mark their new environment in a new way and paid homage to how Late Woodland and Middle Mississippian people used the landscape (i.e., mound building) prior to the Oneota people's arrival (O'Gorman et al. 2020). The authors find that mortuary space at Norris Farms 36 was used by village inhabitants to link the landscape they were inhabiting but also to link their past, present, and future (O'Gorman et al. 2020).

Upton (2019) includes Morton Village ceramics in his investigation of how migration alters the structure of human social networks in the CIRV from about AD 1200 to 1450. Specifically, Upton investigates how the ceramic industry influenced those networks of interaction via culture contact during this period. Using this approach, it is hypothesized that Oneota migrations into the CIRV likely created "a period of accommodative intercultural communal coexistence", meaning that the Middle Mississippians and Oneota people were possibly able to create social transformations within their groups through social relationships with each other (Upton 2019: 383).

The Morton Village site provides clear evidence for Middle Mississippian and Oneota groups coming together (Conrad 1973; Conrad and Esarey 1983; Esarey and Santure 1990; Henning 1995; Hollinger 1993), however, prior to recent work by Bengtson and O'Gorman (2016), Nordine (2020), O'Gorman and Conner (2023), O'Gorman et al. (2020), Painter and O'Gorman (2019), Upton (2019), and various conference presentations, the level of cultural integration at the village was under-explored. Ceramic attributes and architectural styles have typically been used to differentiate between Oneota and Mississippian contexts at the village. Domestic structures or houses built using single posts are typically associated with Oneota contexts, while structures built using wall trenches are typically associated with Mississippian contexts (Alt and Pauketat 2011; Griffin 1967). While material culture provides a valuable line of evidence for examining coalescence or cultural reorganization, the spatial arrangement of the village and its households can also be used to investigate the degree of integration present.

Excavations, as part of a collaborative research project between the Dickson Mounds Museum and Michigan State University from 2008-2017, have provided substantially more village data and enabled reassessment of Milner et al.'s (1991a) findings, including evidence for over 144 structures identified through magnetometer survey, 38 of which have been at least partially excavated. Evidence from these contexts indicate that the village inhabitants exploited a rich variety of resources, including a variety of faunal remains and botanical remains. Three complex ceremonial structures at the site have been identified. These structures include a large circular wall trench structure (STR 34), large ritual wall trench structure (STR16), and a small single-post structure, that is possibly a sweat lodge (STR 20) (O'Gorman and Conner 2016, 2023). Possible evidence of cohabitation exists in the presence of previously defined Oneota and Mississippian ceramic styles in 15 of the 24 identified domestic structures and presence of both styles of architecture in domestic structures. Of these domestic structures, 11 were built using wall trench construction, six using the single-post method, four structures utilized both construction methods, and three were of indeterminate construction (Conner and O'Gorman 2012; Conner et al. 2014; Lieto and O'Gorman 2012; Yann et al. 2013). The finding of both ceramic styles within a variety of structures, could provide evidence for cohabitation. These characteristics will be considered in an analysis of whether the spatial organization of Morton Village reflects the degree of coalescence between the two communities, Middle Mississippian and Oneota, detailed in the next section.

3.6. Investigating Coalescence at Morton Village

Exploring cultural interaction and its effect on populations living within the central Illinois River valley is not new. Since the first discovery of archeological materials distinctive from local material culture, archaeologists have focused on how the migrant Oneota people bringing in this material culture and the local Middle Mississippian people interacted (Conrad 1973; Conrad and Esarey 1983; Esarey and Conrad 1998; Hollinger 1993; Henning 1995; Painter and O'Gorman 2019; Santure et al. 1990; Smith 1951). Particular focus has been paid on the negative results of this cultural interaction (Harn 1990; Milner et al. 1991a; Milner et al. 1991b; Milner 1999; Santure et al. 1990). These interpretations were made based on evidence available at the time, specifically evidence of traumatic injury on skeletal remains and limited village data. These prior interpretations need to be reconsidered as additional evidence is uncovered at Bold Counselor Oneota sites like Morton Village, new questions arise as to the entire scope of the relationship between the Oneota and Middle Mississippian peoples. This dissertation explores whether the spatial organization of the community of Morton Village provides evidence of cultural reorganization or coalescence between Oneota and Middle Mississippian people that inhabited the central Illinois River valley in the late prehistoric period.

3.6.1. Reintroducing Coalescence

As defined in chapter 2, coalescence is the cultural reorganization and creation of new, aggregated communities (Birch 2012; Hill et al. 2004; Kowalewski 2006). When societies coalesce, they are transformed socially, politically, ideologically, and economically (Birch 2012). Coalescence is a tool used by communities to create a stronger society and by bringing groups together, can quell inter-cultural tensions (Birch 2012). Recognizing coalescence in a prehistoric archaeological setting is difficult, but it has been shown to be possible (Birch 2012; Kowalewski 2006) by examining architectural, technological, and stylistic changes within and between communities. Kowalewski (2006) provides a conceptual framework to investigate coalescence and defined 12 criteria for classifying a society as ‘coalesced’. These criteria are, an increase in the size of a settlement; new inhabitants moving to the area; migration to new locations for protection and subsistence success; use of a defensive structures; an increase in local production; an increase in trade; elaborate community and ceremonial organization (rituals of intensification); changes in domestic architecture and village layout to promote integration; an egalitarian social organization; belief in migration myths; collective leadership; and a macro-regional basis of coalescence (Kowalewski 2006). Several of these criteria are not visible archaeologically (migration myths), but others can be investigated through the archaeological record and material culture (increased settlement size, defensive structures, intensified ritual, domestic architecture changes, etc.). There are also instances where groups may not have integrated to a point of using new or innovative cultural practices or have evidence of only minimal integration, which should also be visible archaeologically in slight changes to technological style and spatial organization (Clark et al. 2019; Shennan 1989).

I will incorporate several of the criteria defined by Kowalewski (2006), including the presence of new inhabitants in an area (in this case Oneota moving to the CIRV), potential defensive measures taken, an exploration of community and ceremonial system organization, and investigating domestic architecture and village layout. Oneota communities in the northern Mississippi valley have been interpreted as having an egalitarian social organization (Gibbon 2001; Henning 1998; O'Gorman 1996, 2001) and have been shown to have migrated into other locations, including the American Bottom and the CIRV (Gibbon 2001; Henning 1998). Egalitarianism is a sharp contrast to the hierarchical social organization of Middle Mississippians in the American Bottom. The smaller mound and village settlements of the CIRV display aspects of a hierarchical social organization but appear not to be as influenced by Cahokia's economic system at the time Oneota people first appeared in the central valley circa AD 1200 (Conrad 1989; Conrad et al. 2019).

3.6.2. Potential for Coalescence at Morton Village

The suite of artifact attributes described as Bold Counselor Oneota is unique to the CIRV, although some sites have been identified in the American Bottom (Esarey and Conrad 1998; Jackson et al. 1992). As one of only five Bold Counselor sites identified in the valley, and one that was originally classified by researchers as "primarily Oneota in identity but shows a significant admixture in vessels…and other artifacts…that are typically associated with Late

Mississippian manifestations (Esarey and Conrad 1998:41)", it is a prime candidate to explore the nature of the relationship between the two groups. The site's proximity to Middle Mississippian towns, the complex ceremonial architecture, ceramic variability detailed by Esarey and Conrad (1998) and Painter and O'Gorman (2019), and the presence of a variety of architectural forms provides material remains through which to further explore the full results of interaction at Morton Village.

Other researchers have recently been exploring the nature and extent of cultural interaction in the CIRV, specifically at Morton Village (Nordine 2020; Painter 2021; Painter 2022; Painter and O'Gorman 2019; O'Gorman et al. 2015; Upton 2019). This research focuses on how foodways can provide evidence of cultural integration by examining ceramic vessels and faunal remains, but also by investigating technological and stylistic changes within the ceramic industry in the CIRV. All of these analyses have considered some aspect of the site's spatial organization, but a full consideration of the spatial organization of Morton Village at a regional, community, and household level has not been undertaken.

In this case, I hypothesize that coalescence or cultural reorganization is taking place at Morton Village between Middle Mississippian and Oneota people. My analysis is set up as a dichotomy between total separation (cohabitation of site, but no coalescence) and total integration (integration of both groups at every level, i.e., in households, intermarrying and ethnogenesis). I do this as a heuristic model to develop some measure of coalescence and expect that there is actually a range of social arrangements within the village. This hypothesis will be explored at several different spatial scales in order to look at the nuances of how coalescence may be affecting spatial relationships at a regional, community, and household level. The use of a multiscalar approach considers the views of scholars who suggest that an investigation of coalescence should occur at multiple temporal and spatial scales of analysis (Birch 2010; Blakney-Bailey 2007; Pauketat and Alt 2005; Wylie 1989). Examining only one spatial scale will make differentiating the mechanisms of cultural change difficult to interpret, but incorporating regional and local and community levels, can reveal how social practices of everyday life are changed (Birch 2012 citing Hally 2008; Hodder and Cessford 2004; Kintigh et al. 2005; Kuijt 2000; Pauketat 2007: 107).

A major assumption of this analysis is the idea of Morton Village representing a 'mixture' of Oneota and Mississippian groups and cultural identities. It is important to look at different spatial scales when analyzing integration and acknowledge that each scale might indicate that there is something beyond 'mixing' that is occurring at Morton Village, i.e., analyzing whether coalescence is an 'all or nothing' phenomenon or if there is a range of social arrangements possible for a coalesced community. Clark et al. (2019) recognizes that the likelihood of coalescence being an 'all or nothing' situation is unlikely and that if coalescence of the two cultural formations is incomplete, settlement structures may present evidence of persistent group traditions. I recognize that evidence for some degree of integration or separation will be most informative on the degree of coalescence present.

The spatial organization of a coalesced society should exhibit differences to how sites attributed to each cultural formation involved are organized at a regional/landscape, community, and household scale (Clark et al. 2019; Weik 2014). Investigating shifts in the built environment and architecture contextualized by the distinctive technological and stylistic differences between Middle Mississippian and Oneota material culture (mainly ceramics), I will identify whether cultural traits have changed at a regional/landscape, community, and household scale (Clark et al. 2019; Weik 2014). The built environment as material culture is a valuable way to investigate how social relationships are produced and reproduced and variation in social organization can be interpreted from the structure of the built environment (Birch 2012 citing Bourdieu 1970 and Hegmon 1989). The spatial organization or how space is used at these three scales (landscape/region, community, and household) will provide evidence as to whether coalescence has occurred and to what degree at the Morton Village site.

In chapter two, I introduced the overarching research question guiding this dissertation, which focuses on examining what spatial relationships can tell archeologists about how community social identity and organization is affected from interaction with other groups. I will use those theories outlined in chapter two to investigate various spatial relationships at the Morton Village site, including the sites relationship to its environment and to other sites, of domestic and ceremonial architecture to each other, and the variety seen within domestic structures themselves. The site should show distinct signs of coalescence in its spatial organization if a new cultural system was created by the migrant Oneota inhabitants of Morton Village and the local Middle Mississippian populations. These spatial signatures will be discussed in the following three chapters, which focus on outlining case study specific research questions at each scale of space (landscape, community, and household), and detailing the methods, analysis, and results in addressing these questions.

CHAPTER 4: LANDSCAPE SCALE

4.1. Research Question 1: Are there differences or similarities in the positioning of Morton Village on the landscape compared to the positioning of earlier or contemporary Oneota sites in other areas and Middle Mississippian sites in the CIRV and in other areas?

Instances of coalescence lead to distinctive social and community changes, which should be visible archaeologically (Kowalewski 2006). These changes often include a transformation in the size and/or organization of settlements (Birch 2012; Gerritsen 2004; Hodder 1986; Thomas 2004). Because coalesced communities are gathering points of multiple groups of people, migrant and local, new ideas are shared creating distinctive differences from how the two groups lived prior to this integration (Clark et al. 2019). In this case, a regional approach is taken to characterize large-scale spatial relationships between archaeological remains and the physical environment (Kantner 2008). Kantner (2008) describes archaeological regions as spaces where the interrelated aspects of past human behavior, material signatures people left behind, and/or the physical and social context where human activity took place can be explored.

The term landscape not only describes a physical location but is also used to describe how people negotiate with their physical surroundings (Branton 2009; Clark and Scheiber 2008). Natural spaces influence humans prior to the construction of communities, and settlement choices are often made based on a variety of factors, including the way a space makes people feel (Steadman 2015). Investigations of landscape focus on how individuals inhabit and utilize their natural environment to meet their day-today needs (Kozlowski 2011). Within this space, all of a group's activities take place and their experiences are shaped by and shape this space, creating a sense of place (Binford 1982). Landscape is not just space, but a subjective social formation, created by its inhabitants (Anschuetz et al. 2001; Ingold 1993). By studying the landscape that people inhabited, the social experiences of these inhabitants can be interpreted. The use of a landscape has continuity in its structure and organization throughout an occupation, creating visible landscape use patterns in the archaeological record (Anschuetz et al. 2001; Rossignol 1992). In this chapter, I gathered data on several related landscape use attributes; however, this list is not an exhaustive view of landscape, and I recognize that landscape is more complex than these characteristics alone.

By examining the spatial organization of Oneota and Middle Mississippian communities prior to their interaction in the CIRV, changes in cultural traits at a landscape/regional scale at Morton Village can be identified (Clark et al. 2019; Weik 2014). By analyzing the characteristics of multiple sites, I will identify and understand regional differences in the relationship between people and their environment. At this broadest scale I compare how people inhabit the landscape and interact with their environment by looking at aspects of resource selection, site location, and variation in how people inhabit landscapes within the same or different regions, I refer to these choices as ‘landscape use’.

How a group chooses to inhabit their environment is important, as that location serves to reproduce the existing social order (Dommelen 1999; Steadman 2015). Changes in these choices post migration can reveal whether two groups are exchanging or integrating the specific social mores for settlement location. A comparative analysis will be especially important to first establish if there are differences between CIRV Middle Mississippian choice of landscape and Oneota choice of landscape in other areas. Because origins of the Oneota group or groups that migrated to Morton Village is unknown, this analysis will include multiple regions where this cultural tradition is documented. Expected distinctions between Middle Mississippian and

Oneota will be used to help understand the post-migration negotiations at Morton Village. The landscape choices made by Morton Village inhabitants will be compared to other Oneota and Middle Mississippian sites to determine whether landscape choice was more aligned with an Oneota or Middle Mississippian pattern of landscape use. Hybridity theory at this level suggests that the selection of a completely new location is possible, however due to potential confounding factors, this may not make sense for the CIRV. Namely, that the region was already settled by Middle Mississippian populations at the time, which would affect how the Bold Counselor Oneota would settle there. Perhaps Morton Village was already there when the Oneota arrived in the area, either actively inhabited by Middle Mississippian populations or abandoned from an earlier occupation.

This part of the analysis will have limitations as existing data from previously excavated and identified archaeological sites vary due to differences in collection and reporting methods. Middle Mississippian sites from the CIRV and LIRV will be the focus here. Sites in the American Bottom were not included in the analysis due to their distinctiveness when compared to the CIRV and their characteristics related to the urbanization of Cahokia (Betzenhauser 2017; Schroeder 2004). Further, Middle Mississippian sites in northern Illinois and in Wisconsin were not included because they are isolated from other Middle Mississippian sites and different in their characteristics. Because Oneota sites are less abundant in the CIRV and LIRV, sites will be included from northern Illinois, Iowa, and Wisconsin. There will be variability in the landscape use characteristics for Oneota and Middle Mississippian communities across the three states and clear patterns for Oneota or Middle Mississippian landscape use may be difficult to assess, however, it is likely that broad patterns can discerned from the data.

By investigating these patterns through the physical nature of the landscape, the social perceptions of its inhabitants and how populations elsewhere differ can be explored. In a best-case scenario, the place of origin for the Oneota group(s) that migrated to the CIRV would be known. This is not the case, so this study will also need to assess the variation within Oneota landscape choice. Rather than a hinderance, this exploration counteracts normative thinking about settlement patterns. My research seeks to understand the overall picture of how Oneota and Middle Mississippian people established their settlements prior to interacting and cohabitating at Morton Village.

4.1.1. Structure of Chapter

Descriptions of landscape use by either Oneota and Middle Mississippian populations have been reported previously (Gallagher and Stevenson 1982; Harn 1978, 1994; Jackson 1998; Overstreet 1978; Rodell 1983, 2000; Smith (ed.) 1978). Here, I approach landscape choice by using a quantitative spatial and statistical comparison of landscape use for both Oneota and Middle Mississippian sites by examining a sample of characteristics for each community to allow for easier comparison between populations. Spatial data were collected so that various methods, including spatial analysis and nearest neighbor calculations, variable frequency and percentages, and statistical comparisons including chi-square, Fisher's exact test, and correspondence analysis could be employed. These methods are used to quantify the landscape choices of Oneota and Middle Mississippian sites. Once defined for each type of site, they are compared to each other. Finally, the landscape use patterns of the five distinctive Bold Counselor sites in the CIRV, including Morton Village, are explored and compared to the landscape use patterns for Oneota and Middle Mississippian sites elsewhere.

4.1.2. Methods of Comparing Landscape Use

I now explore the methods used to quantify the landscape choices of Oneota and Middle Mississippian sites, which can be explored quantitatively using variable frequencies, chi-square, Fisher's exact test, and correspondence analysis.

4.1.2.1. Landscape Use Variables

In this analysis, five landscape use categories have been identified through which to compare Oneota and Middle Mississippian communities: distance to nearest perennial drainage, perennial drainage type, river valley location, soil type, and topographic location. Distance to water is an important consideration for any residential site, as easy access would be beneficial when considering both Oneota and Middle Mississippian people were agriculturalists, not to mention for other day-to-day needs. Differences in this characteristic could inform the discussion of Oneota vs. Middle Mississippian landscape use, and how each community prioritized access to water amongst other considerations of landscape use. These distances were measured in ArcGIS Pro, using Euclidean distance, i.e., a planar measurement using two-dimensional Cartesian mathematics (ESRI 2022). The measurement was taken from the site points, i.e., the estimated center of the site, to the nearest perennial drainage. Once calculated, the distances were reduced into three groups for ease of comparison: less than 0.5 mile, 0.5 to 1 mile, and greater than 1 mile.

The type of nearest perennial drainage is related to the distance of the nearest perennial drainage, but differentiates these drainages as either rivers, creeks, or lakes. This variable addresses whether communities settled nearest to river valleys or along smaller perennial drainages, seeking to address whether there is differentiation between the type of drainage sought out by communities. Past research has shown that Middle Mississippian sites tend to be found along rivers and streams, seeking a diversified habitat for resources (Bowne 2013; Byers 2013; Milner 2004), and Oneota sites tend to be found along rivers, lakes, or marshes (Berres 2001; Henning 1998; Hollinger 1995; Overstreet 1997). Does a quantification of Middle Mississippian and Oneota site locations confirm this characterization of settlement patterns?

One limitation of identifying the nearest perennial drainage type, is that it does not consider the locations of flow through lakes. Rodell (1983) identifies the importance of eutrophic flow through lakes for Oneota settlement in Eastern Wisconsin. These lakes were slow moving, with shallow waters that had an abundance of vegetation communities, including wild rice (Rodell 1983). Many of these lakes once existed along the Fox, Wolf, and Rock Rivers, but have been obscured by modern damming (Rodell 1983). The assessment of landscape here did not account for locations flow through lakes, as I identified the nearest perennial drainage type using modern topographic maps. The landscape modifications that have occurred since the time of occupation have obscured these locations and I was only able to identify a site's proximity to existing, perennial lakes as I did not have access to a source that distinguished between different types of lakes. Despite these limitations, my focus is on a general exploration of Oneota landscape use, and although I do not incorporate information on flow through lakes in this work, I hope to further consider the importance of these locations to Oneota people in future research.

Soil type can be used as a proxy to understand cultivation potential, and to see if different conditions linked to particular soils were preferred. Soil information was gathered using the USDA Natural Resources Conservation Service's Web Soil Survey, which provides soil data and information for the United States (USDA 2022). This data comes from modern soil types, which are related to past landscapes, which is affected by land cover such as timber or prairie, position on the landscape, how disturbed it is by human activities, erosion/deposition, and other factors. Archaeologists can use this information as an indicator of past soil condition. Soil types have been reduced to loam, sand, silt loam, silty clay loam, and other, which includes miscellaneous categories of soil that only had one or two sites with that soil type (e.g., orthents loamy, pebbles and gravel, etc.).

River valley locations provides a generalized regional classification of sites, which differs between Oneota and Middle Mississippian sites. River valley locations for Middle Mississippian sites included the central Illinois River valley (CIRV), the lower Illinois River valley (LIRV), and the Mississippi River valley (MRV). For Oneota sites, the river valley options are, upper Mississippi River valley (UMRV), upper Illinois River valley (UIRV), central Mississippi River valley (CMRV), Sioux River valleys (SIOUX), Des Moines (DMOIN), Fox (FOX), Rock (ROCK), and those near the lakes of central and eastern Wisconsin (LAKE). This variable is used to identify groupings of sites along river valleys and any differentiations between these regions in other landscape use characteristics.

Topographic location separates sites based on their location on the landscape, either flood plain, terrace, and bluff top, to identify any difference between Oneota and Middle Mississippian sites in settlement location. Understanding how each community selected for their topographic location can provide information on differences between the two groups. Where did each groups prefer to place their settlements and how do these compare to one another? Like soil type, the topographic locations of today are related to the past landscapes, and the assumption here is that the topography of these site locations are the same as they were at the time they were occupied or similar enough to the time of occupation, despite several being located in areas heavily modified by anthropogenic and natural forces.

I acknowledge that these criteria are not representative of all the ways the inhabitants of these spaces would have selected locations for settlement. I also acknowledge that there are additional, social and cultural reasons to choose specific settlement areas. However, these criteria present general landscape selection characteristics, which can be used to compare Oneota and Middle Mississippian sites within their areas of influence.

4.1.2.2. Site Selection and Identifying Spatial Relationships

To identify landscape choice of Oneota and Middle Mississippian populations, I first gathered archaeological site information across the Midwest with evidence of Oneota and Middle Mississippian habitation. Site information from state site files in Illinois, Iowa, and Wisconsin is reviewed and then compiled into a GIS document, which allows for the visualization of all sites together. With Oneota and Middle Mississippian sites selected, patterns of landscape choice can be quantified. For site locations, a central point, rather than polygon, is added to a corresponding layer to represent each site, which reduces visual clutter by simplifying site locations (Dempsey 2022). Only Oneota and Middle Mississippian sites classified as villages were selected, rather than camps or smaller farmsteads, which do not have the level of habitation of interest for comparison, i.e., settled communities.

First, Oneota and Middle Mississippian sites are examined to identify any dispersion or clustering across the landscape. Then, to quantify any patterning, the Average Nearest Neighbor tool in ArcGIS is performed to identify the proximity of sites to one another, which calculates an index ratio based on the average distance between each site point (IBM 2022). This index ratio is used to identify whether the sites trend toward clustering or toward dispersion, if the ratio is less than one, the pattern exhibits clustering, if the ratio is greater than one, the trend is toward dispersion.

Additionally, this tool provides z-scores and p-values, which are measures of statistical significance. The p-value is a probability value that the spatial pattern observed was created randomly, when this value is small (<.05), it is unlikely that the spatial pattern is the result of random processes, therefore the null hypothesis can be rejected (IBM 2022). The z-score is a standard deviation, if there is a small p-value and either a high or low z-score (<-1.96 or >1.96), it is unlikely that the spatial pattern reflects a random pattern, allowing a rejection of the null hypothesis, i.e., that features are randomly distributed (IBM 2022).

4.1.2.3. Landscape Use Characteristics: Variables and Frequencies

Based on the results of the spatial analysis, descriptive statistical techniques are used to explore whether the samples of sites (Oneota or Middle Mississippian) have distinctive patterns in their landscape use. For both data sets, basic statistical information, including frequencies and percentages of specific characteristics, is gathered. These statistics are useful, as they provide information about the variables in our sample and highlight relationships between the sites.

4.1.2.4. Landscape Use Comparisons: Chi-Square and Correspondence Analysis

Landscape use characteristics are compared to identify whether groupings are statistically related to each other by using a crosstabs/chi-square analysis, which compares the variables within each data set, looking for correlations (i.e., does topographic location correlate with what drainage system type is closest). This tool incorporates the inferential statistical test, chi-square test for independence, to measure the association between two nominal variables by comparing the observed values to the expected values, identifying departures from the average (Drennan 2009). The comparison of the five landscape use variables for Oneota and Middle Mississippian sites results in ten separate comparisons.

Each categorical variable is compared, and I hypothesize that there is a statistically significant relationship between each set of variables being compared. Chi-square (X^2) provides a significance test that sums up its comparisons with a single probability value, ‘p’, used to determine the likelihood that an observed outcome is the result of chance (Drennan 2009). For the chi-square, any p-value less than 0.05 (the standard value used, meaning 95% confidence), indicates a statistically significant relationship between the two variables, thus rejecting the null hypothesis (Drennan 2009). If the p-value is more than 0.05, there is not enough evidence to suggest an association between variables and the null hypothesis cannot be rejected.

When the sample size is small or produces several instances of expected values less than five, reliance on the chi-square statistic as the sole indicator of association is problematic because of its reliance on approximations (Drennan 2009). Another statistical measure, Fisher’s exact test, is used with chi-square test to provide an exact comparison of significance probabilities. When chi-square and Fisher’s exact test are similar, the null hypothesis can be rejected or accepted with more certainty.

Initially, many of the chi-square analyses performed had options where cells had expected values less than five. The fewer expected values under five, the more accurate the p-value will be. To address this issue, several variables were recoded to reduce the options used in the comparison. For Oneota sites, two variables were reduced: river valley location and soil type. Soil type was reduced by combining silt loam and silty clay loam into the loam category. River valley locations combined the upper and central Mississippi River valleys into Mississippi River valley, and “Other”, which combined river classifications for Des Moines, Fox, Rock, and Sioux. The upper Illinois River valley was renamed Illinois River valley for ease of interpretation. For Middle Mississippian sites, soil type was reduced, which had silt loam and silty clay loam combined into a loam category. After reducing the options, several comparisons continued to produce expected values less than five. At this point, the categories cannot be reduced further without losing aspects of the information they represent for later interpretation.

Based on the results of the chi-square/fisher’s exact analysis, additional statistical techniques can be used to compare how habitation locations may have been selected based on landscape characteristics. Correspondence analysis provides a method for easily identifying statistically significant associations between variables by reducing the comparisons into a simplified graphical representation of the relationship (Alberti 2022; IBM 2022; Sterry 2018). This technique reduces the data dimensions to maximize the representation of correspondence between rows and columns by creating biplots, which offer a graphical representation of how the data compares to identify patterns (Alberti 2022). Variables plotted in close proximity to each other are similar, showing correspondence/association between the categories (Alberti 2022).

4.2. Oneota Landscape Use

Do Oneota sites have a specific pattern in their landscape use characteristics? The following sections address this by first identifying Oneota sites and their landscape use characteristics, then exploring their spatial distribution across the landscape, quantifying their landscape use characteristics, and statistically comparing these characteristics. If patterns exist, they should be discernable within the spatial and statistical characteristics.

4.2.1. Identifying Oneota Sites

Oneota sites are dispersed across multiple states, dating from between AD 900/1000 to the mid-1700s. A "core area" of Oneota settlement is defined by Theler and Boszhardt (2006), which dates from AD 1150 to 1700, and encompasses all of Iowa, the southern two-thirds of Wisconsin, the northern half of Illinois, the southern quarter of Minnesota, the northern quarter of Missouri, and the northeast corner of Kansas (2006: 435). Because Oneota sites are spread across such a vast area, ranging from a variety of different time periods, specific states were selected to identify sites and landscape use for Oneota communities: Illinois (north of the CIRV), Iowa, and Wisconsin. Iowa and Wisconsin were selected because of the extensive amount of Oneota research in these areas, which increases the likelihood of having a large sample of sites for comparison. Illinois north of the CIRV was included to identify Oneota landscape use in close proximity to the Bold Counselor Oneota sites, i.e., the potential precursors to these CIRV communities. Sites in southeast Iowa are geographically close as well. Sites in Kansas, Minnesota, Missouri, and Nebraska were not included due to their locations far to the southwest and north of the Oneota core area, and their later occupation periods, i.e., historic occupations with potential influence from Euro-American interaction, which would alter landscape use characteristics. Sites in these areas could be incorporated in future explorations to address later Oneota landscape use through time, but are not appropriate to include here, which focuses on identifying Oneota landscape use prior to Bold Counselor Oneota occupations in the CIRV.

Despite reducing the locations to search, gathering archaeological site data from three different state GIS databases, each with differing ways of recording and presenting information, creates potential problems. To account for these potential differences, site records were systematically searched for each of the three states. Sites were identified using the Illinois

Inventory of Archaeological Sites (IIAS), the Iowa online archaeological site inventory, 'I-Sites', and the Wisconsin Archaeological Site Inventory system.

To identify Oneota sites in Illinois, all areas north of the CIRV were searched. This includes all areas north of Hennepin along an arbitrary east/west boundary. There are two local variants of Oneota in northeastern Illinois that are included here: Fisher and Huber (see section 3.4.3, which discusses Oneota regional variation) (Schroeder 2004). An additional Upper Mississippian tradition Langford is also found in northeastern Illinois and is therefore considered here to provide an additional view of settlement in the upper Midwest and to identify any potential precursors to Bold Counselor sites (Schroeder 2004).

These specific phase/tradition names are not options when searching the IIAS, only 'Upper Mississippian' is a search option. I selected all sites that indicated there were Upper Mississippian artifacts present in their assemblages by using various filter functions and excluded sites that consisted of only an isolated artifact find. The remaining site polygons and their associated information were used to identify sites for comparison. The map viewer is then positioned on the northwestern corner of the state and moved west to east and then back east to west, selecting each site polygon and their associated site forms along the way. Those sites with limited information in the site file or those that were listed as 'open habitation' or 'camp' were not selected as comparative sites, as there was not enough information available to adequately classify them as a village. In total, 13 sites classified as Upper Mississippian, either Oneota, Langford, and Huber/Fisher, were identified in northern Illinois.

To identify Oneota sites in Iowa, I used I-Sites Pro, the state's online map viewer, and the Iowa Archaeological Site File (ISF). Oneota sites in Iowa date from approximately AD 1000 to 1650, with a variety of phases based on location, including Orr, Correctionville, Moingona, and

Burlington (Green 1995). Sites were identified in the database portion of the I-Sites Pro system, which is searchable by cultural affiliation. To identify sites classified as Oneota, each of the 99 Iowa counties was systematically searched by cultural affiliation. Sites labeled as 'Historic Oneota' were not investigated due to their late occupation and potential influence from European interaction post-colonization. The rest were further investigated by examining individual site files, looking specifically for key words like 'village' and 'village and cemetery' to see if there was sufficient archaeological site information available. After each county was investigated, a total of 32 Oneota village sites were identified as having enough information for comparison. Of these sites, 12 are located along the western and central portions of Iowa, while the other 20 are along the eastern border within the Mississippi River valley.

To identify Oneota sites in Wisconsin, I utilized the Wisconsin Archaeological Site Inventory. Of all three states, Wisconsin's system is the easiest to search based on site type and culture, but its GIS capability is limited, and maps can only be accessed through individual site files. I selected 'campsite/village' for site type, 'Oneota' for culture, and selected Wisconsin Oneota archaeological phases as described by Gibbon (2001) and Overstreet (1997): Adams phase, Blue Earth, Brice Prairie, Classic Horizon Oneota, Developmental Horizon Oneota, Emergent Horizon Oneota, Grand River Oneota, Koshkonong phase Oneota, Lake Winnebago phase Oneota, Lohmann phase, Orr, and Pammel Creek phase. With these search criteria selected, each site record was reviewed, if sufficient information was available, it was included. In Wisconsin, 42 sites were identified, of these, 20 are along the western border with Iowa and Minnesota and 22 are located centrally and along the eastern border with the Great Lakes. From the three states, a total of 87 Oneota village sites were identified for comparison at a landscape/regional scale (Figure 4.1; Table A.1).

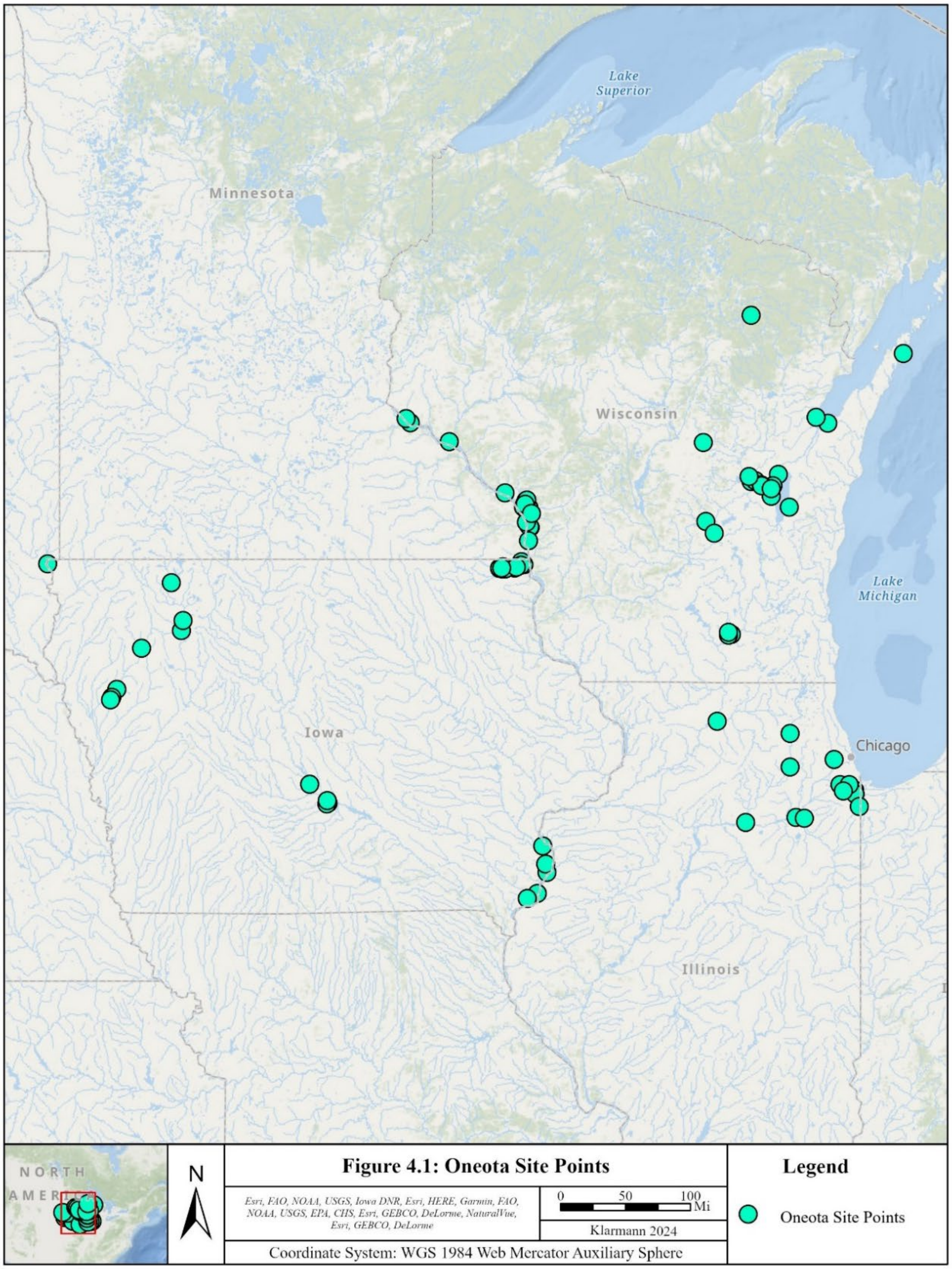

Figure 4.1: Oneota Site Points

4.2.2. Oneota Site Distribution and Spatial Patterns

Oneota researchers have long recognized that Oneota sites are positioned in a non-continuous, patchy manner (Henning 1998; Henning and Benn 1998; Overstreet 1997). These patches of sites are called localities, a term that originates from Willey and Phillips (1958), defined as "…a geographical space small enough to permit the working assumption of complete cultural homogeneity at any given time." (1958: 18). Further definitions describe localities as areas where populations of Oneota people nucleated with cultural continuity (Boszhardt 1998, 2004; Henning 1998) and is common nomenclature within Oneota studies. Archaeological work in Wisconsin, Iowa, and northern Illinois has found that Oneota material culture clusters into distinct geographic areas starting around AD 1150, with groups of sites physically separated from others with large portions of vacant landscape between them (Alexander 2013; Gibbon 1969, Henning 1998; Henning and Benn 1998; Jeske et al. 2020; Overstreet 1976; Rodell 1983; Theler and Boszhardt 2000, 2006).

When Oneota sites were identified for this analysis using the archaeological site databases from Illinois, Iowa, and Wisconsin, the concept of regions or locality was not considered. When examining the map of Oneota sites created from this search, it is clear that the method of systematic review and selection of recorded archaeological sites in these areas demonstrates that there are clear geographic regions where Oneota sites tend to cluster. This serves to further quantify the spatial absence of Oneota sites between localities, allowing for a clearer differentiation of these sites into specific regions. Oneota sites can be grouped into seven generalized geographic clusters, corresponding closely to regions and localities defined in the literature (Figure 4.2; Table 4.1).

Table 4.1: Oneota Regions, Localities, and Sites

Region	Locality	Sites	Citation
Central Des Moines	None	Christenson; Clarkson; Cribbs Crib/Leftwick; Goodhue Farm (5)	Henning 1998
Northwest Iowa	Lower Little Sioux River Locality, Iowa's Great Lakes Locality, Big Sioux River Locality	Bastian; Blood Run; Correctionville; Cross Valley/Dixon; Gillet Grove; Gothier; Harriman Hill; Milford (8)	Henning 1998
Central Wisconsin	Lake Koshkonong	Blue Heron; Carcajou Point; Crescent Bay Hunt Club; Koshkonong Creek (4)	Henning 1998; Jeske, Sterner, and Edwards 2020; Overstreet 1997
Eastern Wisconsin	Door Peninsula Grand River Green Bay Middle Fox River Waupaca	Bornick; Burley Brew; Entire Road; Furman; Grignon; Karow; Lasley's Point; Mary Nichols; McCauley; Mero; Overton Meadow; Pipe; Point Sauble; Sauer Resort; Sensiba; Sherman; Walker Hooper; Zarling Lake (16)	Gibbon 2001; Henning 1998; Jeske, Sterner, and Edwards 2020; Overstreet 1997
Lower Lake Michigan	Chicago Lake Plain Fox/Des Plaines Upper Illinois River	Anker; Feltes; Fisher; Forest Home Cemetery; Gentleman Farm; Grant Creek; Hoxie Farm; Huber; Joe Louis; Langford; Oak Forest; Rinkenberger; Washington Irving (13)	Gibbon 2001; Henning 1998; Jeske, Sterner, and Edwards 2020
La Crosse and Red Wing	La Crosse Lake Pepin Lower Root River Valley Red Wing Upper Iowa River Valley	Adams; Armstrong; Burkes; Diamond Bluff; Filler; Fish Farm; Fisher Mounds; Flatiron Terrace; Gang Village; Grant Village; Hays Farm; Hester's Place; Jim Braun; Lee; Malone Terrace; Midway; New Road/Meier Farm; O'Regan Buhlman Terrace; Old Bockus Place; Old Flynn Place; Olson; Sand Cove; Onalaska Village; OT; Overhead; Pammel Creek; Sand Lake; Sanford; Swennes; Tremaine; Shrake Gillies; Valley View; Weymiller Village; Woolstrom Village; Zieman's Farm Site 1 (35)	Basso 1993; Henning 1998; Jeske, Sterner, and Edwards 2020; Overstreet 1997; Theler and Boszhardt 2000
Mississippi Alluvial Plain	Lima Lake Lost Creek Spring Creek Kingston Toolesboro	Kelley; Kingston; McKinney; Patterson Cornell; Wever Terrace (6)	Gibbon 2001; Henning 1998; Jeske, Sterner, and Edwards 2020

When considered as a whole, the 87 Oneota site points show statistically significant values for the average nearest neighbor calculations. The index ratio value of 0.37 indicates that the sites are clustered. The p-value is less than 0.05 and z-score is -11.2, indicating that the null hypothesis can be rejected, and it is unlikely that Oneota sites are randomly distributed, i.e., the clustering of sites is not random. The average distance between sites is 10.2 miles, which is quite close when considering the immense area that is included in this analysis. When considered as one population, Oneota sites produce a statistically significant nearest neighbor value, indicating that they cluster in a non-random pattern, what then will the separation of these sites into regions/localities indicate in terms of clustering within these smaller geographic differentiations?

The seven geographic clusters are defined as follows, Eastern Wisconsin, Lake Koshkonong, Lower Lake Michigan, Lima Lake, La Crosse, Northwest Iowa, and Central Des Moines. These differentiations correspond to regions and localities defined in the literature. Each region/locality is defined, and spatial characteristics are assessed, including the average nearest neighbor statistic and identification of spatial outliers (Table 4.2). I will describe any deviations between the literature defined localities/regions and my own groupings in the following discussion of the geographic differentiations used in this analysis.

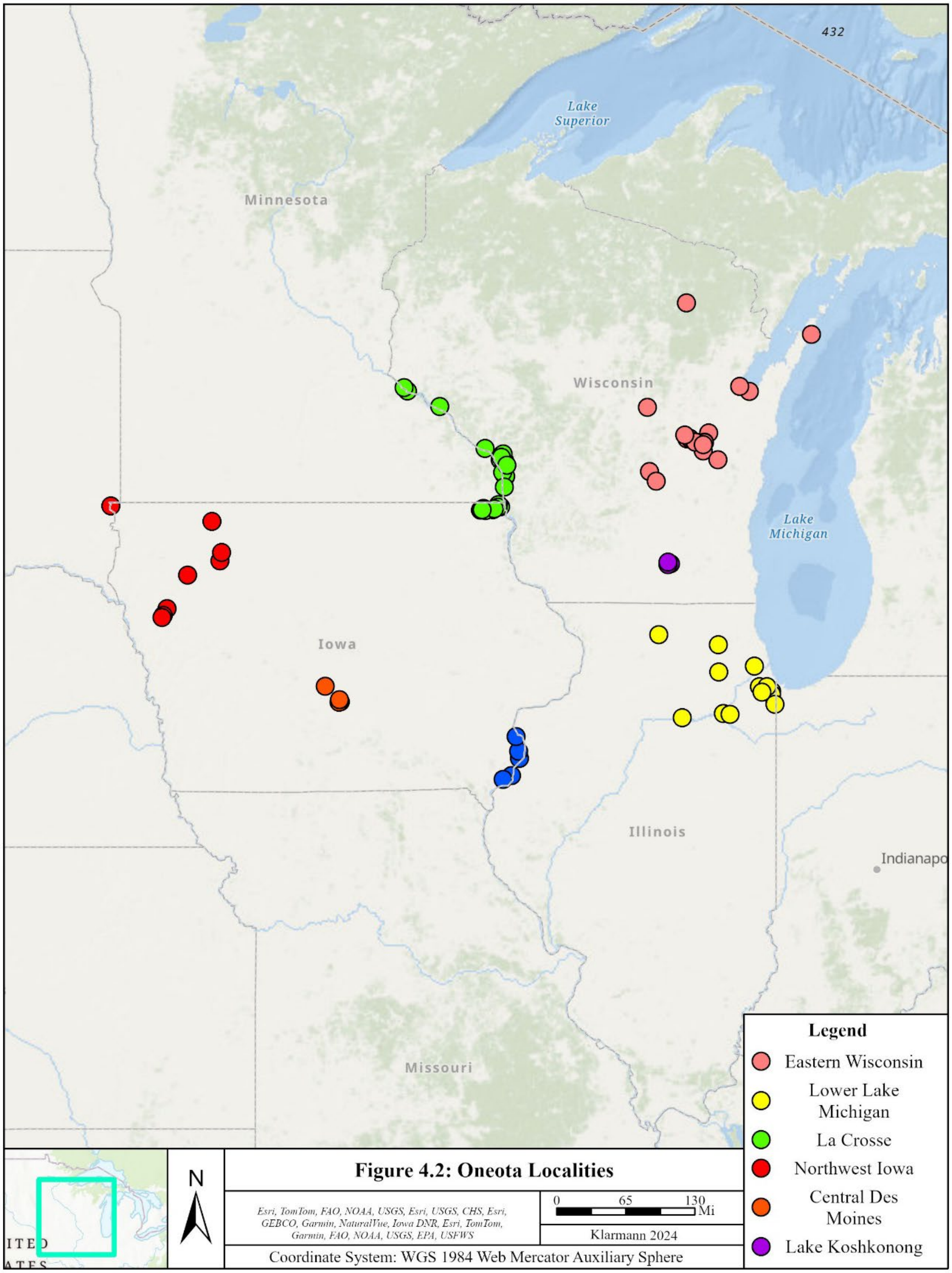

Figure 4.2: Oneota Localities

Table 4.2: Nearest Neighbor Results for Oneota Sites by Region

Region/Locality	Number of Sites	Avg. Distance (mi)	Index Ratio	P-Value	Z-Score
Central Des Moines	5	5.82	3.8	0.00	10.7
Eastern Wisconsin	16	16.93	0.97	0.83	-0.2
Lake Koshkonong	4	1.24	2.15	0.00	2.15
La Crosse/Red Wing	35	3.01	0.44	0.00	-6.34
Mississippi Alluvial/Lima Lake	6	8.99	2.05	0.00	4.5
Lower Lake Michigan	13	16.4	1.31	0.03	2.16
Northwest Iowa	8	23.46	1.38	0.04	2.04

The Central Des Moines region in central Iowa does not have any localities defined in the literature, so will be referred to by its regional name (Henning 1998). For this analysis, this region consists of four sites, all clustered around modern-day Des Moines (Table 4.1). Three of the sites are southeast of the city, while Christenson, sits northwest of the city. The index ratio indicates dispersion of sites, with the p-value and z-score indicating a non-random distribution, with an average distance between sites of 5.82 miles.

The Eastern Wisconsin region has six localities defined, Door Peninsula, Grand River, Green Bay, Lake Koshkonong, Middle Fox River, and Waupaca (Gibbon 2001; Henning 1998; Jeske et al. 2020; Overstreet 1997). The Door peninsula and Green Bay localities can be grouped under the Wolf River Tradition, which covers the northeast corner of Wisconsin around Green Bay and into the Upper Peninsula of Michigan. (Jeske et al. 2020). For this analysis, the sites in the Lake Koshkonong Locality are spatially separate from these more northern localities and is therefore treated on its own, while the other five localities (Door Peninsula, Grand River, Green

Bay, Middle Fox River, and Waupaca) are grouped under the Eastern Wisconsin region (Table 4.1).

The Eastern Wisconsin grouping consists of 18 sites around Lake Winnebago and Green Bay, with the majority located around the major lakes in the area, Winnebago, Butte Des Morts, Winneconne, and Poygan (11), two sites to the southwest of the lakes (Bornick and Walker Hooper), one to the northwest of the lakes (Burley Brew), two to the Northeast of the lakes (Point Sauble and Sensiba), and two far to the north (Zarling Lake and Mero) (Table 4.1). These final two sites appear as spatial outliers on the map. The index value for this region, however, indicates clustering of sites, with an average distance between sites of 16.93 miles.

The Lake Koshkonong Locality consists of four sites, three grouped around the lake and one a little over two miles upstream from Koshkonong (Table 4.1). The sites included in this locality in this analysis correspond to sites defined for the locality in the literature (Henning 1998; Jeske et al. 2020; Overstreet 1997). The index ratio for this region indicates dispersion of sites, with an average distance between sites of 1.24 miles.

The Mississippi Alluvial Plain region consists of three localities, one east of the Mississippi River, Lima Lake, and four west of the Mississippi River, Lost Creek, Spring Creek, Kingston, and Toolesboro (Henning 2004; Tiffany 1979). Lima Lake is used here for ease of description and includes six sites, all located along the Mississippi River valley on the Illinois or Iowa sides of the river, with no apparent spatial outliers (Table 4.1). Henning (1998) describes this region as having over 25 Oneota sites on the Iowa side and several on the Illinois side (1998: 374). It is clear that the many of the over 25 sites Henning references in this region were not selected, perhaps a result of site files with minimal information. The Wever Terrace site is proposed as the beginning of the Oneota occupation in this region, while the McKinney site is proposed as the end of these occupations (Henning 1998: 374). For this analysis, I refer to the six sites in this region by the singular locality, Lima Lake, for ease of description. The index ratio for this region, indicates dispersion of sites, with an average distance between sites of 8.99 miles.

In western Wisconsin, there are two regions, La Crosse, and Red Wing, which together consist of five localities and have the largest number of sites (Table 4.1). Although these regions have been treated separately in prior works (Henning 1998; Overstreet 1995; Theler and Boszhardt 2000), they are grouped together as La Crosse/Red Wing due the general spatial proximity of sites in the region (35). The Red Wing locality sites include Adams, Armstrong, and Diamond Bluff (Henning 1998), with the other 32 sites from the La Crosse locality (Henning 1998; Jeske et al. 2020). Of the 35 sites, 16 are directly within or around La Crosse, four are further north up the river valley (Adams, Armstrong, Diamond Bluff, and Shrake Gillies), the remaining 11 sites are within the boundaries of northeast Iowa, along the upper Iowa River. The index ratio for this region indicates clustering, with an average distance between sites of 3.01 miles (Table 4.2).

The Lower Lake Michigan region outside Chicago and within the upper Illinois River valley, consists of three localities as described by Jeske et al. (2020), Fox/Des Plaines, Chicago Lake Plain, and Upper Illinois River valley, and is referred to in this analysis by its regional name described by Henning (1998) and Gibbon (2001). Henning (1998) further differentiates sites in this region as belonging to one of two localized traditions: Langford and Fisher and Huber. The Langford phase sites are concentrated in the upper Illinois River valley, while the Fisher and Huber phases are concentrated in the lower lake Michigan area. Schroeder (2004) describes Fisher and Huber as a localized tradition of Oneota, while Langford represents a separate Upper Mississippian tradition, which even if separate from Oneota, provides an additional view of settlement in the upper Midwest and a view of potential precursors to Bold Counselor sites (Schroeder 2004). In this analysis, Fisher, Huber, and Langford sites are considered as part of the Lower Lake Michigan region based on descriptions used by Henning (1998) and Gibbon (2001). This region is represented by 13 sites, with seven clustered around Lake Michigan within 10 miles of the Lake, three far west outside of Chicago (Feltes, Gentleman Farm, and Langford), two southwest of the lake (Fisher and Grant Creek), and one northwest of the main cluster of sites (Washington Irving) (Table 4.1). The index value for this region indicates dispersion of sites, with an average distance between them of 16.4 miles.

Henning (1998) describes four localities in Northwest Iowa, the lower Little Sioux River (Dixon, Gothier, Correctionville), around Iowa's Great Lakes (Gillette Grove, Milford, Harriman), on the Big Sioux River east of Sioux Falls (Blood Run), and the Bastian site serves as its own locality just north of Cherokee on the Little Sioux River. The Northwest Iowa region is represented here by eight sites located along the Little Sioux River and one along the Big Sioux River valley (Blood Run). The index ratio for this region indicates dispersion, with an average distance between them of 23.46 miles. Blood run is located over 95 miles away from the other seven sites, potentially skewing the results of the nearest neighbor calculation for this region.

Within these geographical differentiations, the p-value and z-score provide information as to the 'randomness' of the data. All regions except Eastern Wisconsin have values that indicate a non-random distribution of sites (p-value <.05 and z-score <-1.96 or >1.96). The index ratio and average distance also provide important information on the distribution of sites. Only two regions have values that indicate clustering of sites: Eastern Wisconsin and La Crosse/Red Wing. Using nearest neighbor calculations, I found that the majority of the regional distributions are non-random, indicating some sort of organization of the pattern of sites. When considering

Oneota sites in the upper Midwest, it is clear from the map that Oneota sites cluster in distinctive geographic regions, further confirming the distribution of Oneota 'localities' across the upper Midwest, though it should be noted that this spatial distribution cannot speak to cultural continuity within each of these areas. It is also clear that even within regions and localities, site distribution varies, no two regions are dispersed the same across the landscape. Future work could explore the question of landscape use from a more regional perspective for localities, to address why there are so many localities so close together and what this may mean culturally.

4.2.3. Oneota Landscape Use Characteristics

In the following sections, the landscape use characteristics of all Oneota sites are quantified to identify overall patterns within the sample of sites (see Tables B.1 through B.5). There are distinctive patterns to the landscape choice variables within the full sample of 87 Oneota sites. For river valley location, the majority of sites are located in the upper Mississippi River valley (42.5%), with the next highest number near lakes (19.5%), followed by the upper Illinois River valley (11.5%). The closest perennial drainage types are creeks and rivers, which share similar percentages/frequencies, 40.2% and 42.5%, respectively, while sites near lakes make up 17.3% of the sample. When considering distance to these perennial drainages, sites are 74.7% likely to be within 0.5 mile of the nearest perennial drainage, 16.1% of sites are located between 0.5-1 mile away from perennial drainage, and 9.2% are located over 1 mile away from a perennial drainage. For topographic location, Oneota sites considered as a whole are most frequently located on terraces (56.3%), or flood plains (28.8%), with very few located on bluff tops (14.9%). When considering soil type, 39.3% of Oneota sites are on silty loam soils and

32.1% are on sandy soils. When considering the other loam-based soils, sites with straight loam soils make up 14.3% of the sample and silty clay loam soils make up 8.3% of the site sample.

Based on the frequencies of these characteristics, a generalized Oneota landscape use pattern emerges. Oneota sites appear to be most often located on terraces, with silty loam or sandy soils, often less than 0.5 miles from either creeks or rivers, with the majority of the sample in the Mississippi River valley (particularly the upper valley) (Table 4.3). It should be noted that because this river valley has the largest number of sites from the sample, it impacts the percentages of landscapes represented, which is why it is important to also consider each of the regions separately. All of these characteristics make sense for communities focused on mixed agriculture as well as hunting, gathering, and fishing. As described in Chapter 3, Oneota communities utilized a subsistence strategy known as intensification through diversification, growing a variety of crops, along with hunting, gathering, and fishing (Gallagher and Arzigian 1994). This focus on agriculture influenced settlement patterns of Oneota communities, as they would need easy access to rivers and wetland resources nearby to help irrigate their ridged field agricultural system (Gallagher and Arzigian 1994: 181, citing Gallagher and Stevenson 1982). It was known that Oneota village sites tend to be found near rivers, lakes, or marshes, however, this analysis further quantifies landscape choice for Oneota settlement (Berres 2001; Henning 1998; Hollinger 1995; Overstreet 1997).

Table 4.3: Overall Variable Frequencies for Oneota Sites

Variable	**Highest Frequency Trait(s)**	**Percentage**
River Valley Location	Upper Mississippi River Valley	42.5%
Perennial Drainage Distance	<0.5 mile	74.7%
Perennial Drainage Type	River & Creek	42.5% & 40.2%
Soil Type	Silt Loam & Sand	39.3% & 32.1%
Topographic Location	Terrace	56.3%

4.2.4. Oneota Landscape Use Comparisons: Chi-Square and Correspondence Analysis

The landscape use variables for Oneota sites can now be compared to each other to identify relationships between the variables, for example, do Oneota sites on terraces tend to be a certain distance away from the nearest perennial drainage? Exploring these relationships may illuminate patterns not seen in the descriptions of the variable frequencies completed in the previous section. This is accomplished using chi-square/crosstabs as well as correspondence analysis, techniques defined earlier in the chapter.

4.2.4.1. Landscape Use Comparisons for Oneota Sites: Chi-Square

A chi-square test of independence and Fisher's exact test were performed to assess the association/relationship between each of the variables. Both values are almost identical for the Oneota comparisons, meaning the resulting p-values can be used to accept or reject whether any two variables are statistically associated with each other with more certainty. Of the ten chi-square comparisons for Oneota sites, only two had statistically significant p-values ($< .05$), indicating an association between the two variables: perennial drainage type vs. river valley location and soil type vs. river valley location (Table 4.4). The other eight comparisons can be found in Tables C.1 through C.10. In this instance, the river valley locations are only a reduced version of the regions/localities previously defined for Oneota sites.

Table 4.4: Oneota Sites Chi-Square Analysis and Fisher's Exact Test

Comparison	Chi-Square P-Value	Fisher's Exact P-Value	Statistical Association (Y or N)?
Perennial Drainage vs. Perennial Type*[4]	.155	.157	N
Perennial Drainage vs. River Valley*[7]	.146	.112	N

Table 4.4 (cont'd)

Comparison	Chi-Square P-Value	Fisher's Exact P-Value	Statistical Association (Y or N)?
Perennial Distance vs. Topographic Location*[5]	.562	.531	N
Perennial Type vs. River Valley*[5]	<.001	<.001	Y
Soil Type vs. Perennial Drainage*[5]	.494	.439	N
Soil Type vs. Perennial Type*[4]	.541	.589	N
Soil Type vs. River Valley*[5]	.015	.016	Y
Soil Type vs. Topographic Location*[4]	.183	.164	N
Topographic Locations vs. Perennial Type*[2]	.448	.427	N
Topographic Location vs. River valley*[5]	.146	.161	N

**Number of comparisons where expected value is less than 5.*

The results of the chi-square test show that there is a statistically significant association between the river valley location of Oneota sites and its type of nearest perennial drainage (X^2 (6, N = 87) = 56.57, $p < .001$), a result confirmed by the Fisher's exact test results ($p < .001$). Sites in the Mississippi River valley are almost equally likely to be near creeks as they are to rivers, sites in the Illinois River valley are equally likely to be found near creeks and rivers, sites near the "Other" river valley category (Des Plaines, Fox, Rock, and Sioux) are twice as likely to be found near rivers as they are to creeks, and finally sites near the lakes in eastern Wisconsin are confirmed to be primarily near lakes.

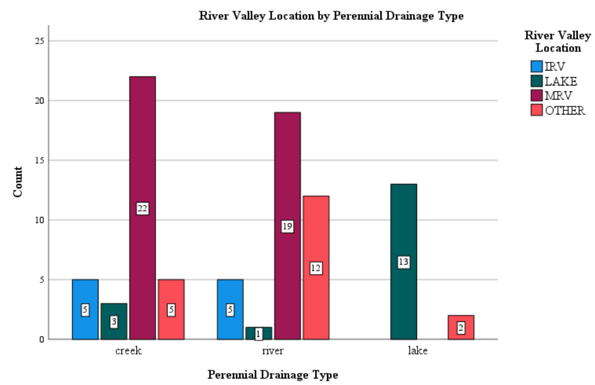

Figure 4.3: Oneota Sites, River Valley Location by Perennial Drainage Type

The result of the chi-square statistic shows that there is a statistically significant association between an Oneota site's river valley location and its soil type (X^2 (6, 87) = 15.86, p = .014), a result confirmed by the Fisher's exact test results (p = .016). This relationship can be further explored by examining its visual representation, the bar chart (Figure 4.9). Oneota sites in the Mississippi River valley are equally likely to have loam soils as they are to have sandy soils, sites in the Illinois River valley and near Lakes are more than twice as likely to have sites on loam soils than on sandy soils, and finally, sites in the "Other" river valley category (Des Plaines, Fox, Rock, and Sioux) are eight times as likely to have sites on loam soils than sandy soils.

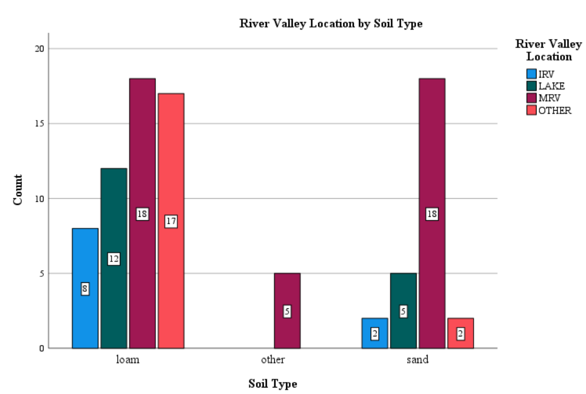

Figure 4.4: Oneota Sites, River Valley Location by Soil Type

The variable frequencies showed that Oneota sites are most often found on terraces, in the Mississippi River valleys, in areas with silty loam or sandy soils, less than 0.5 mile away from creeks or rivers. With these frequencies in mind, chi-square analysis and Fisher's exact test were conducted on the five Oneota site variables, comparing each variable to the next for a total of 10 comparisons. The goal of this comparison was to identify any potential relationships between the five landscape choice variables. For Oneota sites, there are only two statistically significant comparisons, both of which include the river valley location. An Oneota site's river valley location is statistically associated with its nearest perennial drainage type and its soil type. Meaning, the river valley location where a site is located influences what type of perennial drainage a site is closest to and what soil type the site will be located on. Soil type is always closely tied to position on the landscape due to the way soils form and we do not know the predominant reason a location on the landscape is selected, was it because of soil or because of proximity to water, and/or position on the landscape? All characteristics are closely intertwined.

Additionally, the river valley location variable is a somewhat reduced version of the concept of Oneota regions/localities. I argue that the spatial separation of Oneota sites into these regions/localities is an important factor in determining how Oneota people chose to make their home upon the landscape. How then do these broader localities relate to each of the landscape choice variables based on region?

4.2.4.2. Landscape Use Comparisons for Oneota Sites: Correspondence Analysis

Although the river valley location was part of both statistically significant chi-square comparisons, its four options are only a reduced version of the seven regions/localities identified in the spatial analysis section. The value of correspondence analysis here, is that it can be used with the larger locality/regional differentiations to better visualize regional patterns of landscape use. I use these differentiations to perform a correspondence analysis against each of the other four landscape choice variables to identify patterns, to gain a nuanced understanding of Oneota regional variation.

When comparing region/locality to perennial drainage distance, sites in the three Wisconsin regions as well as Lower Lake Michigan tend to be located less than .5 miles from the nearest drainage (Figure 4.10). Sites in the Central Des Moines and Northwest Iowa regions are almost equally likely to be less than .5 miles away from the nearest drainage as they are to be .5-1 mile away. Sites in the Lima Lake Locality are slightly more likely to be greater than 1 mile than between .5 and 1 mile from the nearest perennial drainage.

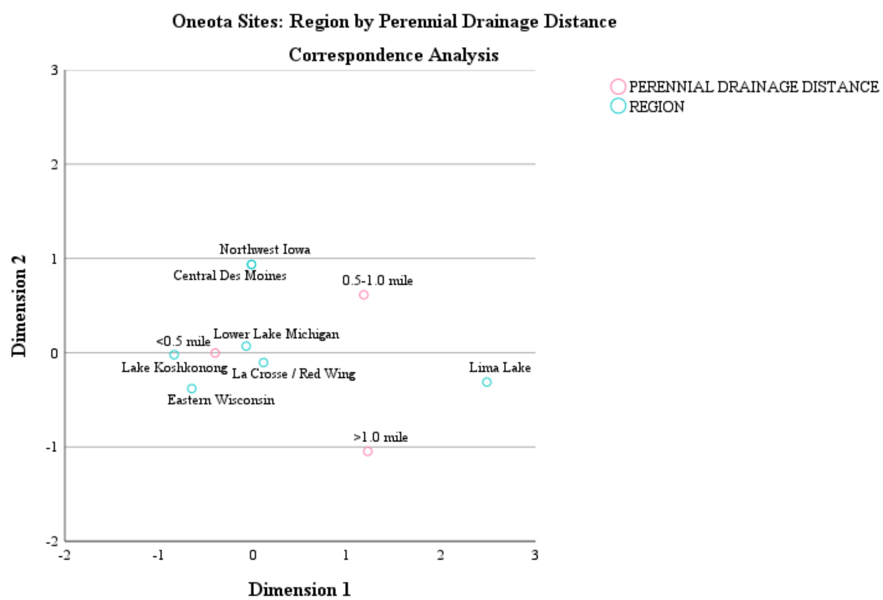

Figure 4.5: Oneota Correspondence Analysis, Region by Perennial Drainage Distance

When examining regions in relation to perennial drainage type, sites in the Eastern Wisconsin region and Lake Koshkonong Locality are more likely to be near lakes, sites in the Northwest Iowa and Lower Lake Michigan regions are more likely to closer to rivers, and sites in the Lima Lake Locality and La Crosse/Red Wing Region are more likely to be near creeks (Figure 4.11). The Central Des Moines regions does not have a clear correspondence but does lie nearer to rivers than creeks or lakes.

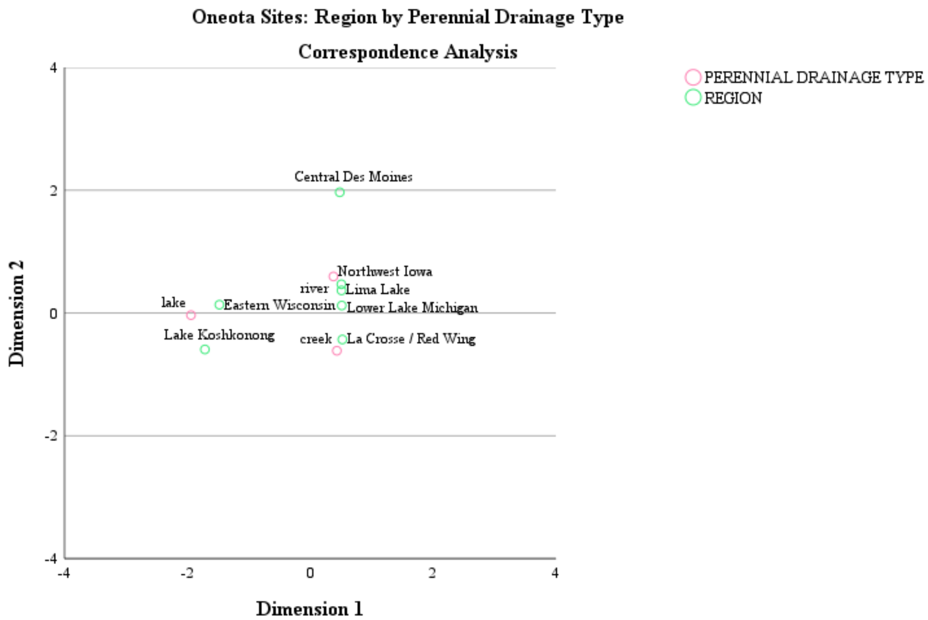

Figure 4.6: Oneota Correspondence Analysis, Region by Perennial Drainage Type

When comparing region by soil type, the La Crosse/Red Wing region is more likely to have sites on sandy soils, while the Eastern Wisconsin region is equally likely to have sandy or loam soils, and the other five regions are most likely to have loam soils (Figure 4.12). The Lower Lake Michigan region and Lima Lake locality are more likely to have silty loam soils, while the Iowa regions, Central Des Moines and Northwest Iowa are more likely to have silty clay loams. Lake Koshkonong does not have a clear soil type preference but is closer to loam or silty loam than sand or silty clay loam.

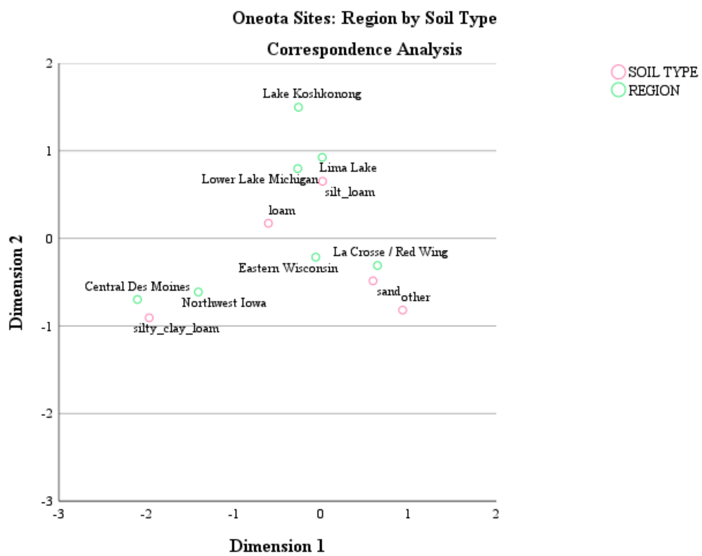

Figure 4.7: Oneota Correspondence Analysis, Region by Soil Type

When comparing region by topographic location, sites in the La Crosse/Red Wing region are more likely to be found on terraces, sites in the Lake Koshkonong locality are more likely to be found on bluff tops, sites in the Central Des Moines, Eastern Wisconsin, and Lower Lake Michigan regions are more likely to be on flood plains, and sites in the Lima Lake Locality and the Northwest Iowa region are equally likely to be on bluff tops or terraces (Figure 4.13).

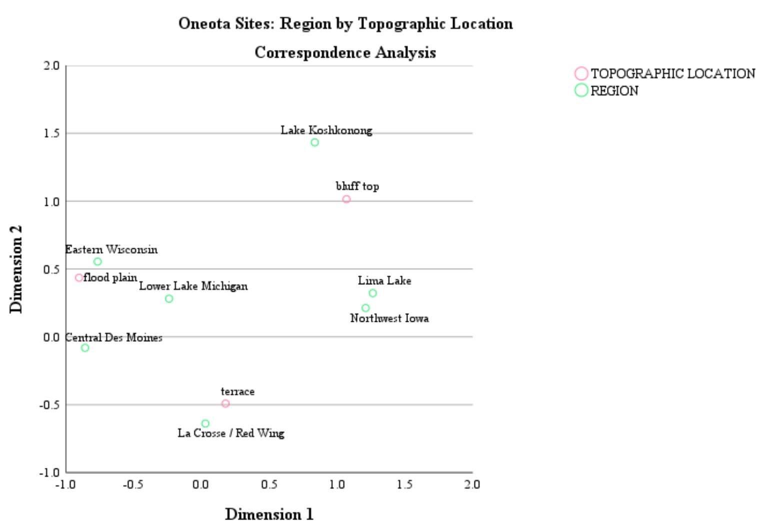

Figure 4.8: Oneota Correspondence Analysis, Region by Topographic Location

4.2.5. Oneota Landscape Use Summary

Based on the frequencies/counts of the landscape use variables, there are general patterns that emerge for Oneota sites, which appear mostly on terraces, with silty loam or sandy soils, often less than 0.5 miles from either creeks or rivers, with the majority of the sample in the Mississippi River valley (particularly the upper valley). However, it is clear that additional complexity is present for how Oneota site locations are selected. To investigate the complexities of these landscape use characteristics, the chi-square/Fisher's exact test was used to compare the variables to each other. For Oneota sites, there are only two comparisons with statistically significant p-values (< .05) indicating an association: perennial drainage type vs. river valley location and soil type vs. river valley location. Based on the presence of river valley location in both statistically significant comparisons, it is likely that river valley location has an effect on landscape choice by Oneota people. Further, the river valley variable is a reduced version of the locality/regional variable used to differentiate Oneota sites. It is clear that there is too much variation in how Oneota people selected specific settlement locations on the landscape to define one generalized way landscape use was selected; choice of settlement location depends on the region where the site is located.

Using seven Oneota regions/localities, I used correspondence analysis to identify landscape use characteristics based on these differentiations. What I found is that no two localities have the same set of landscape use characteristics (Table 4.5).

For the Central Des Moines region, sites are equally likely to be found on flood plains with loam soils, either less than .5 mile or .5-1 mile from rivers. For the Eastern Wisconsin region, sites are mostly on flood plains with either sandy or loam soils, less than .5 mile from lakes. For the Northwest Iowa region, sites equally likely to be found on bluff tops and terraces with loam soils, either <.5 mile or .5-1 mile away from rivers. For the La Crosse/Red Wing region, sites found mostly on terraces with sandy soils, less than .5 mile away from creeks. For the Lake Koshkonong locality, sites are most likely to be found on bluff tops with loam soils, less than .5 mile away from lakes. For the Lime Lake locality, sites are equally likely to be found on bluff tops and terraces with loam soils, over 1 mile away from rivers. For the Lower Lake Michigan region, sites are found mostly on flood plains with loam soil less than .5 mile away from creeks.

Table 4.5: Oneota Localities/Regional Landscape Use Characteristics

Locality/Region	Perennial Drainage Distance	Perennial Drainage Type	Soil Type	Topographic Location
Central Des Moines	Equal between <.5 or .5-1	Slightly close to river	loam	Flood plain
Eastern Wisconsin	<.5	lake	Equal between sand and loam	Flood plain
Northwest Iowa	Equal between <.5 or .5-1	river	loam	Equal between bluff top and terrace
La Crosse/Red Wing	<.5	creek	sand	terrace
Lake Koshkonong	<.5	lake	loam	Bluff top
Lima Lake	>1	river	loam	Equal between bluff top and terrace
Lower Lake Michigan	<.5	creek	loam	Flood plain

The spatial differentiation of Oneota sites across the landscape and the corresponding variation in landscape choice indicates how dynamic landscape use can be. For Oneota people, each locality offers differing options, leading to differing uses of the landscape by the different groups of people who inhabited them. There does not appear to be a larger Oneota pattern of landscape use that is driving settlement decisions, instead, each locality and those people living in them create their own unique sense of place within these spaces (Prohansky, Fabian, and

Kaminoff 1983). Because each group has different senses of place, they will each have different experiences within the space, which are reflected in the landscape use variation that is seen between localities/regions. Do Middle Mississippian sites outside the Cahokia area also show variation in landscape use from region to region? How different are landscape choices made by Mississippian groups from those made by Oneota? These questions will be explored in the following sections.

4.3. Middle Mississippian Landscape Use

Do Middle Mississippian landscape characteristics have a specific pattern? The following sections address this question by first identifying Middle Mississippian sites and their landscape use characteristics, then explores their spatial distribution across the landscape, quantifying their landscape use characteristics, and statistically comparing these characteristics. If patterns exist, they should be discernable within the spatial and statistical characteristics of the sites.

4.3.1. Identifying Middle Mississippian Sites

To identify comparable Middle Mississippian sites at a landscape/regional scale, I collected information on temple towns and smaller villages in the Illinois River valley from just west of Grafton at the confluence of the Mississippi and Illinois River, north to Hennepin (Dale Spencer 2014; Friberg et al. 2021; VanDerwarker et al. 2017). The Illinois River valley can be further subdivided into the lower and central valleys. The lower Illinois River valley is where the Illinois River and Mississippi River converge just west of Grafton, Illinois, north to Meredosia, Illinois (VanDerwarker et al. 2017). The central Illinois River valley (CIRV) is the 210-km valley section of the Illinois River between Meredosia, Illinois (to the south), and Hennepin (to the north) (Harn 1978). This area includes sections of the central Illinois and adjoining Mississippi River valleys, portions with a slow current and expansive floodplain which distinguishes the CIRV from the upper and lower portions of the Illinois River valley (Wilson 2010). Sites from both Illinois and Iowa along the Mississippi River valley were also added (n = 10) from just west of Grafton, Illinois, north to Dubuque. In total, information has been collected on landscape choice on 48 Middle Mississippian sites. These three river valleys have distinctive landscape/topographic differences, which could be reflected in how settlements were selected by the populations in habiting this area.

Sites in the alluvial floodplain of the Mississippi River, called the American Bottom were not considered as comparative sites due to the distinctiveness of sites in the region when compared to the CIRV (Schroeder 2004). Middle Mississippian sites in the American Bottom are associated with the complex chiefdom, Cahokia (detailed in chapter 3.3.2.), the social, political, and religious center of the region. The sites in this area have characteristics that are related to the urbanization of Cahokia (Betzenhauser 2017), with distinctly different settlement patterns than the CIRV Mississippian occupations, which consisted of central towns instead of the large, multi-mound ceremonial centers found in Cahokia (Brown and Kelly 2000; Emerson 2010; Kelly 2006; Pauketat 1998, 2003, 2009).

In order to systematically identify sites to include in this comparative landscape analysis, I requested and was granted access to the Illinois Inventory of Archaeological Sites (IIAS), and the associated CRM Database that is hosted and maintained by the Illinois State Archaeological Survey (ISAS). The IIAS system is GIS based, showing archaeological site polygons and the boundaries of previously conducted archaeological surveys across Illinois. Because of the sheer number of sites from varying time periods across the search area, various filters were used within the site inventory was used to show only those sites that are classified as Middle Mississippian in the CIRV. Through the filter tool, particular characteristics were selected to search for Mississippian habitation sites and remove sites consisting of isolated finds. These expressions significantly reduced the number of site polygons that appeared along the CIRV, however a large sample size remained. No other filters were appropriate to restrict the sample size. Therefore, each site polygon and its associated information is examined to identify comparable sites.

Starting at Grafton, Illinois, all sites within the central and lower Illinois River valleys and all sites at a distance of approximately one mile west and east of the valley were selected, moving north toward Hennepin. Those sites with limited information in the site file or those that were listed as 'open habitation' or 'camp' were not selected as comparative sites, as there was not enough information available to adequately classify them as a village. Sites labeled as 'village' and 'village/mounds' were selected and added to a spreadsheet with the geographic locations added as points to a GIS document. Through this systematic searching, 48 Middle Mississippian village sites in the CIRV and LIRV were identified for comparison at a landscape/regional scale (Figure 4.9; Table A.2).

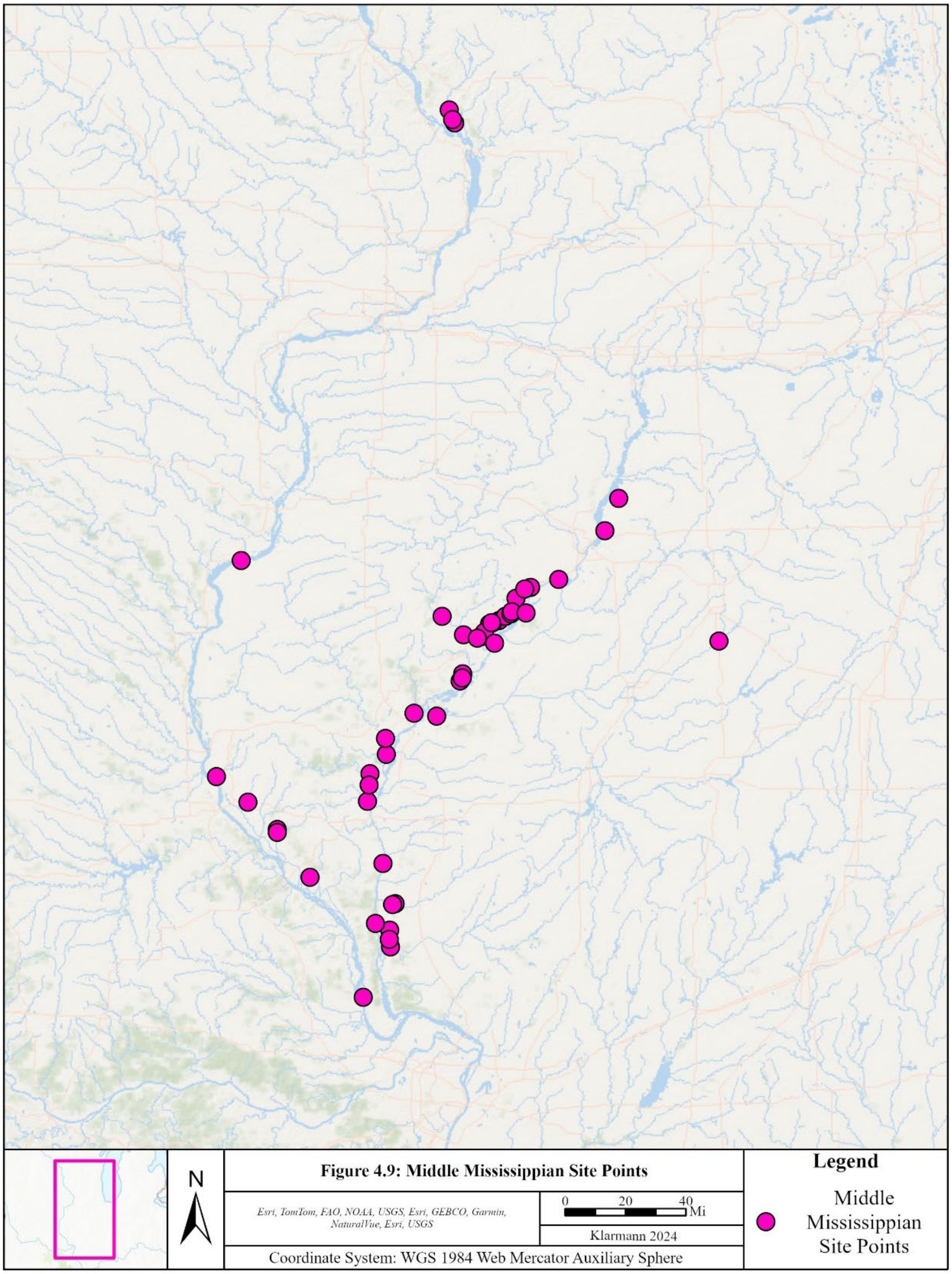

Figure 4.9: Middle Mississippian Site Points

4.3.2. Middle Mississippian Site Distribution and Spatial Patterns

When the nearest neighbor statistic is calculated for all 48 Middle Mississippian site points, the index ratio is 0.48, the p-value is less than 0.05, and the z-score is -6.87, indicating that the null hypothesis can be rejected, and it is unlikely that these features are randomly distributed. The index value indicates clustering of the site points, and the p-value and z-score indicate that it is unlikely these features are randomly distributed. The average distance between the 48 Middle Mississippian sites is 7.1 miles. One way to further explore the average distance between sites is to split them into their specific regions or groupings of sites. Of the 48 Middle Mississippian sites selected for analysis, 30 are found within the central Illinois River valley, seven in the lower Illinois River valley, five in the lower-central Mississippi River valley, and three in the upper Mississippi River valley (Figure 4.10; Table 4.6). The three sites in the upper Mississippi River valley, Mills Group, John Chapman, and Mark Seeman, are located in close proximity to each other in far northern Illinois along the Mississippi River valley. These three sites are the only Middle Mississippian sites this far north with enough information to be included in the analysis.

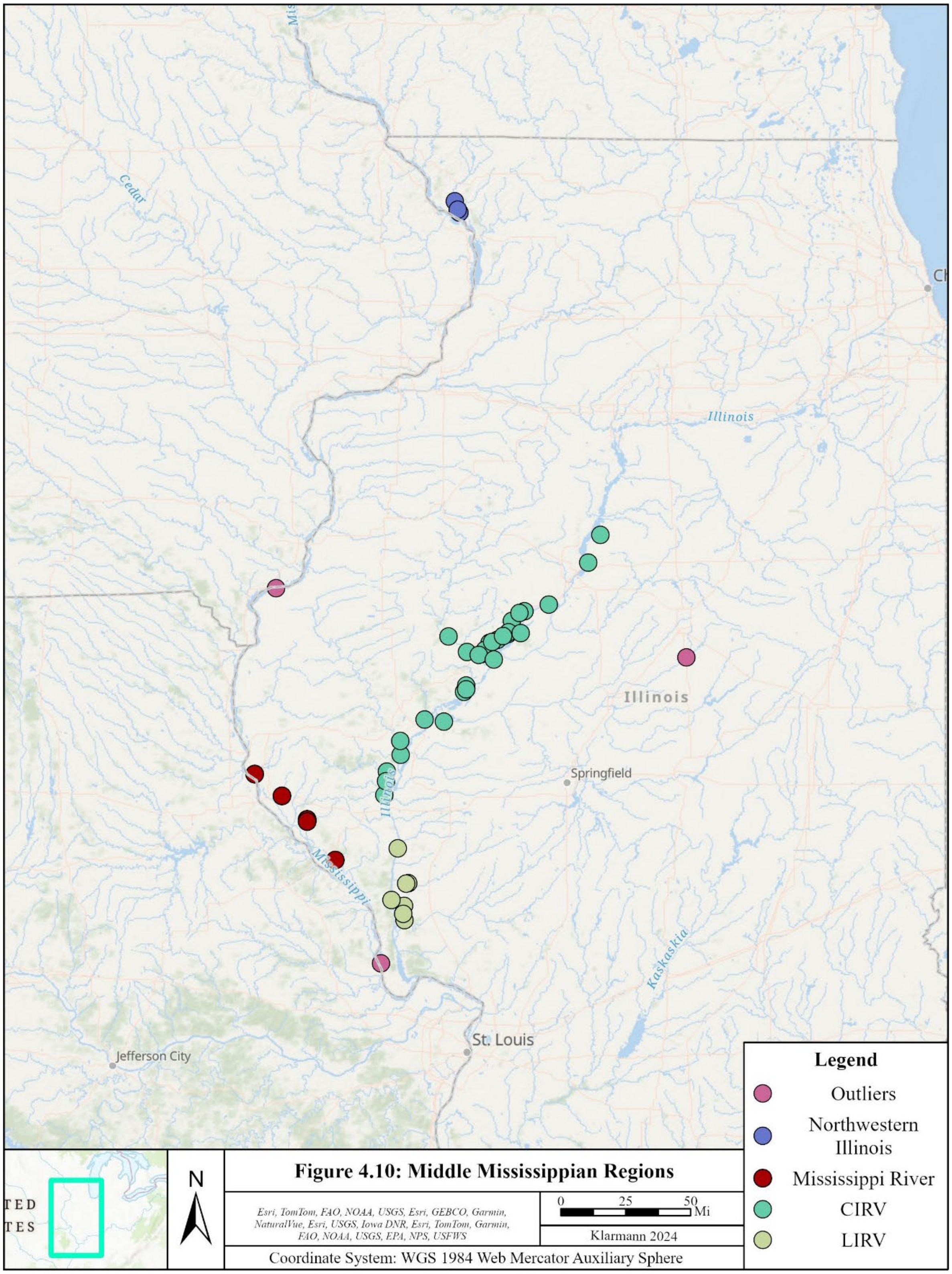

Figure 4.10: Middle Mississippian Regions

Table 4.6: Middle Mississippian Regions and Sites

Region	Sites
Central Illinois River Valley	Anderson; Baker Preston; Buckeye Bend; Clear Lake; Crab Tree; Crable; CW Cooper; Emmons; Ester Berry; Eveland; Fandel; Fiedler; Fouts; Frederick; Golarte; Hildenmeyer/Ten Mile Creek; Houston Shyrock; Larson; Lawrenz Gun Club; McKinley; Orendorf; PCWD1; Raskamp Group; Sister Creeks; Sleeth; Star Bridge; Sybl Walsh; Tree Row; Weaver; Williams/Kingston Lake (30)
Lower Illinois River Valley	Audrey; Bushnell Hollow; Closser; Housing Unit; Lyons; Koster; Whiteside (7)
Lower-Central Mississippi River Valley	Albert Young; Coultas; Brammael; Booker Mound; Oetting (5)
Upper Mississippi River Valley	John Chapman; Mark Seeman; Mills Group (3)
Spatial Outliers	Floyds; Noble Wieting; Phantom (3)

The remaining three sites do not fit into one of these regions and exist as spatial outliers when compared to the others: Floyds, Noble Wieting, and Phantom. The Floyds site is located in far western Illinois in the central Mississippi River valley, just south of modern-day Burlington, Illinois. While five Oneota sites are located nearby, no Middle Mississippian sites were identified in the immediate vicinity. The Noble Wieting site is east of the central Illinois River valley, just south of modern-day Normal, Illinois, with no other sites in the proximity. And finally, the Phantom site, is the first site along the Mississippi River valley west of the split between Mississippi and Illinois rivers, about 45 miles south of the next site found in this valley, along the eastern bluff. There are a number of potential reasons these outliers exist: 1. Uneven survey coverage, 2. The strict site selection method used in this analysis potentially excluding sites that would fill in the spatial gaps, 3. Preservation bias, i.e., that if there was a habitation in the areas between these outliers, the sites were not preserved, or 4. That these areas were not heavily inhabited by Middle Mississippian people and therefore only a few sites are found there.

The relationship between sites within the distinct spatial regions can be further investigated using the nearest neighbor statistic (Table 4.7). There are 48 Middle Mississippian sites overall, but only 45 included in the regional differentiation. The three outlier Middle Mississippian sites (Floyds, Noble Wieting, and Phantom) are not included in a more focused use of the nearest neighbor statistic by region.

Table 4.7: Middle Mississippian Nearest Neighbor Results by Region

Region	Number of Sites	Avg. Distance (mi)	Index Ratio	P-Value	Z-Score
Central Illinois	30	4.0	0.82	0.057	-1.89
Lower Illinois	7	4.1	1.75	0.00	3.78
Lower Central Mississippi River	5	9.4	3.66	0.00	11.39
Upper Mississippi River	3	2.0	7.46	0.00	21.4

In terms of general positioning, most sites in the central Illinois River valley are located on the western side of the river valley (25 of 30 sites). Additionally, sites in this region appear well distributed across the 130-mile stretch of the CIRV, with the majority of sites clustered between Havana and Banner, Illinois. For the central Illinois valley region, the nearest neighbor index ratio indicates a trend toward clustering of the sites, at an average approximate distance of 4.0 miles apart.

Sites in the lower Illinois River valley are found mostly on the eastern bluff edge (5 of 7) and appear to be dispersed across the region. This dispersion is confirmed by the nearest neighbor index ratio, with an average approximate distance of 4.1 miles apart.

All sites along the Mississippi River valley are located on the eastern bluff, including sites in the lower-central and upper valleys, including outlier sites Floyds and Phantom (10). Sites in the lower-central Mississippi River valley region appear to be spaced equidistant across the region, except for two sites located 1.8 miles away from each other (Booker Mound and Brammael). The nearest neighbor index ratio for this region indicates dispersion of sites, at an average approximate distance of 9.4 miles apart.

Sites in the upper Mississippi River valley appear to be grouped near each other on the eastern bluff edge of the river. The nearest neighbor index ratio for this region indicates dispersion of sites, at an average approximate distance of 2.0 miles apart. Sites in this region are themselves an outlier group, as the majority of the Middle Mississippian sites included in this discussion are along the central Illinois or lower Mississippi River valleys.

Only the central Illinois valley sites indicate clustering of the site points, while the other regions indicate a dispersed pattern of sites. This result potentially relates to the central Illinois region having the most sites included in the nearest neighbor calculations, with the other regions having much less. It is likely that the sample size is affecting the index ratio, the more sites, the more chances there are for the average to display a clustered distribution. The average distance calculation also quantifies the spread of these sites across each region. The 30 sites in the central Illinois valley all average a distance of 4.0 miles apart, meaning sites are spread across approximately 120 miles, which is quite interesting considering the fact that the central Illinois River valley is only 130 miles long. The seven sites in the lower Illinois River valley all average a distance of 9.4 miles apart, meaning sites are spread across approximately 28.7 miles. The five sites in the lower-central Mississippi River valley average a distance of 9.4 miles apart, meaning sites are spread across approximately 47 miles. And finally, the three sites in the upper Mississippi River valley average a distance of 2.0 miles apart, meaning sites are spread across approximately 6 miles. It will be interesting to see if sites within regions display variability in the characteristics of landscape choice in the following sections.

4.3.3. Middle Mississippian Landscape Use Characteristics

There are distinctive patterns to the landscape choice variables within the sample of 48 Middle Mississippian sites (see Tables B.6 through B.10). For river valley location, the majority of sites (60.4%) are located in the central Illinois River valley. The closest perennial drainage types for Middle Mississippian sites are creeks and rivers, which share similar percentages/frequencies. When considering distance to the nearest perennial drainage, 50% of Middle Mississippian sites are found within 0.5 mile of the nearest perennial drainage, while the rest of the sites are almost evenly split between 0.5 to 1 and over 1 mile away. For topographic location, 37.5% of Middle Mississippian sites in the sample are found on both bluff tops and flood plains, while only 25% are found on terraces. When considering soil type, 75% of Middle Mississippian sites are located on silty loam soils, while only 8.3% of sites are on sandy soils, which is the 3rd most popular soil type when also straight loam soils (10.4%) and silty clay loam soils (6.3%).

Based on the frequencies of these characteristics, a generalized Middle Mississippian landscape use pattern emerges. Middle Mississippian sites are most often found on bluff tops or floodplains, with silt loam soils, often less than 0.5 miles from either creeks or rivers, with the majority of the sites found in the central Illinois River valley (Table 4.8). Although it is known that Middle Mississippian town and village sites north of the American Bottom tend to be found along rivers and streams, this analysis shows that sites appear to be fairly well distributed along the Illinois River up to Banner in the north, which differs from the Mississippi River valley where sites are fairly evenly spaced in the south up to Quincy and then cluster in the north of the study region starting at Blackhawk with only one site in between.

Table 4.8: Overall Variable Frequencies for Middle Mississippian Sites

Variable	Highest Frequency Trait(s)	Percentage
River Valley Location	Central Illinois River Valley	60.4%
Perennial Drainage Distance	<0.5 mile	50%
Perennial Drainage Type	Creek & River	56.25% & 43.75%
Soil Type	Silt Loam	75%
Topographic Location	Bluff Top & Flood Plain	Both 37.5%

Middle Mississippian sites differ from Oneota sites in one major area, topographic location. Oneota sites in the La Crosse region (the largest region) are found mostly on terraces, while Middle Mississippian sites are overall found equally on bluff tops and flood plains. Additionally, Middle Mississippian sites are less likely to be found in locations with mainly sandy soils (8.3%), while 32.1% of Oneota sites have sandy soils. Next each of the site variables will be compared to each other using crosstabs/chi-square analysis to identify potential relationships between landscape choice characteristics.

4.3.4. Middle Mississippian Landscape Use Comparisons: Chi-Square and Correspondence Analysis

The landscape use variables for Middle Mississippian sites can now be compared to identify relationships between the variables, for example, do Middle Mississippian sites on the bluff tops tend to be a certain distance away from the nearest perennial drainage? Exploring these relationships may illuminate patterns not seen in the descriptions of the variable frequencies completed in the previous section. This is accomplished using chi-square/crosstabs as well as correspondence analysis, techniques defined earlier in the chapter.

4.3.4.1. Landscape Use Comparisons for Middle Mississippian Sites: Chi-Square

The chi-square and Fisher's exact values are almost identical for the Middle Mississippian site variable comparisons, meaning the resulting p-values can be used to accept or reject whether any two variables are statistically associated with each other with more certainty. Of the ten chi-square comparisons for Middle Mississippian sites, only two had statistically significant p-values (less than .05), indicating an association between the two variables; perennial drainage distance vs. topographic location and topographic location vs. river valley location (Table 4.9). The other eight comparisons without a statistically significant relationship can be found in Tables C.11 through C.20.

Table 4.9: Middle Mississippian Chi Square Analysis and Fisher's Exact Test

Comparison	Chi-Square P-Value	Fisher's Exact P-Value	Statistical Association (Y or N)?
Perennial Distance vs. Perennial Type*[1]	0.683	0.692	N
Perennial Distance vs. River Valley*[5]	0.1	0.133	N
Perennial Distance vs. Topographic Location*[4]	0.057	0.038	Y
Perennial Type vs. River Valley*[2]	0.752	0.846	N
Soil Type vs. Perennial Distance*[3]	0.459	0.656	N
Soil Type vs. Perennial Type*[2]	0.188	0.306	N
Soil Type vs. River Valley*[3]	0.562	0.624	N
Soil Type vs. Topographic Location*[3]	0.483	0.540	N
Topographic Location vs. Perennial Type*[0]	0.832	0.932	N
Topographic Location vs. River Valley*[6]	0.037	0.028	Y

**Number of comparisons where expected value is less than 5.*

The chi-square comparison between topographic location and perennial drainage distance and for Middle Mississippian sites indicates an association between the two variables (X2 (4, 48) = 9.17, p = .056). Despite the p-value for this comparison being slightly >.05 with the chi-square statistic, results of the Fisher's exact test (p = .038), supports rejecting the null hypothesis and accepting that the two variables are associated. The majority of Middle Mississippian sites are less than .5 mile from the nearest perennial drainage, but when examining each topographic location type, the pattern varies (Figure 4.11). There are double the amount of Middle Mississippian flood plain sites within .5 miles of the nearest perennial drainage (n = 10) than flood plain sites between .5 and 1 mile away (n = 5), and over three times the number of flood plain sites more than 1 mile away from the nearest drainage (n = 3). This make sense, when considering that sites on flood plains should naturally be closer to a perennial drainage. No terrace sites are located between .5 and 1 mile from the nearest perennial drainage; although some are located over 1 mile away (n = 3), the majority less are than .5 miles away (n = 8). Bluff tops are the only topographic location type to be mostly further away from perennial drainages, which are more likely to be .5 to 1 mile away from the nearest perennial drainage, however, this is only slightly more than the number of bluff top sites less than .5 mile away (n = 6) but triple the number of bluff top sites over 1 mile away (n =3).

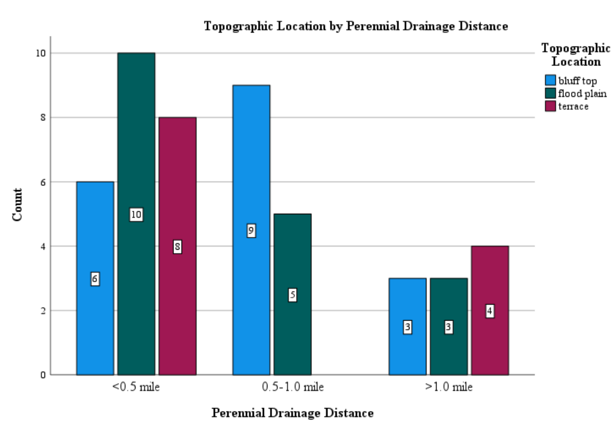

Figure 4.11: Middle Mississippian Sites, Topographic Location by Perennial Drainage Distance

The chi-square comparison between a Middle Mississippian site's topographic location and its river valley location indicates an association between the two variables (X2 (4, 48) = 10.18, p = .036), a result confirmed by the Fisher's exact test results (p = .031). The three river valley locations display clear patterns for where sites are located topographically. Over 55% of central Illinois River valley sites are located on bluff tops (n = 16), while only one site from both the lower Illinois River valley and Mississippi River valley were found on bluff tops. It is clear from this that sites in the lower Illinois River valley and Mississippi River valley are generally unlikely to be found on bluff tops (Figure 4.12). Flood plain sites were almost evenly dispersed between the central Illinois, lower Illinois, and Mississippi River valleys (n = 7, 5, 6, respectively), while sites on terraces were mostly found in the central Illinois valley (n = 6), with half as many found in either the lower Illinois valley or the Mississippi valley (n = 3).

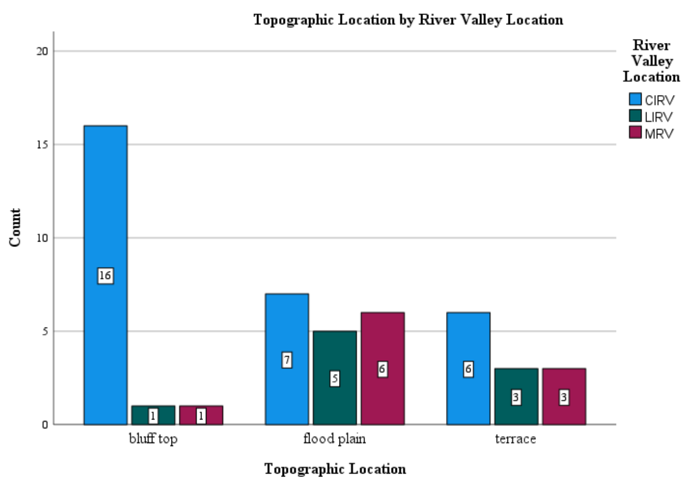

Figure 4.12: Middle Mississippian Sites, Topographic Location by River Valley Location

The variable frequency calculations showed that Middle Mississippian sites are most often found on bluff tops or floodplains, with silt loam soils, often less than .5 miles from either creeks or rivers, with the majority of the sites found in the central Illinois River valley. With these frequencies in mind, chi-square analysis and Fisher's exact test were conducted on the five Middle Mississippian site variables, comparing each variable to the next for a total of 10 comparisons. For Middle Mississippian sites, there are only two statistically significant comparisons, both of which include topographic location. A Middle Mississippian site's topographic region is statistically associated with its distance to the nearest perennial drainage and its river valley location, meaning a Middle Mississippian site's topographic location is related to how far the nearest perennial drainage will be and also to its location within one of the three river valleys.

I argue that topographic location is an important determining factor in how Middle Mississippian people chose to make their home upon the landscape. In Middle Mississippian research, there has been a generalization that village sites are found on bluff tops, perhaps this use of topographic location to differentiate these communities is reflective of reality, with slightly more complexity, as sites are equally likely to be found on flood plains. One option for further exploring how the topographic location of a site is related to the other characteristics is to reduce the number of dimensions present to make relationships between the variables clearer, which can be done using correspondence analysis, a multivariate statistical technique described in the following section.

4.3.4.2. Landscape Use Comparisons for Middle Mississippian Sites: Correspondence Analysis

Unlike Oneota sites, Middle Mississippian sites do not necessarily have clear regional differentiations beyond their river valley locations, but as found in the chi-square analysis, the topographic location of Middle Mississippian sites does provide two statistically significant comparisons. How do the key characteristic used to define Middle Mississippian sites, topographic location, compare to the other variables? If there is a distinctive pattern to how

Middle Mississippian people selected their settlement locations based on topographic location, the following section's correspondence analysis should make them clear. Topographic location of Middle Mississippian sites will be compared to each of the other four variables using correspondence analysis, to identify specific settlement patterns for these landscape features.

When topographic location is compared to perennial drainage distance, flood plain sites are typically less than .5 mile from the nearest drainage, bluff top sites are .5-1 mile away, and terrace sites are greater than 1 mile away from the nearest perennial drainage (Figure 4.13).

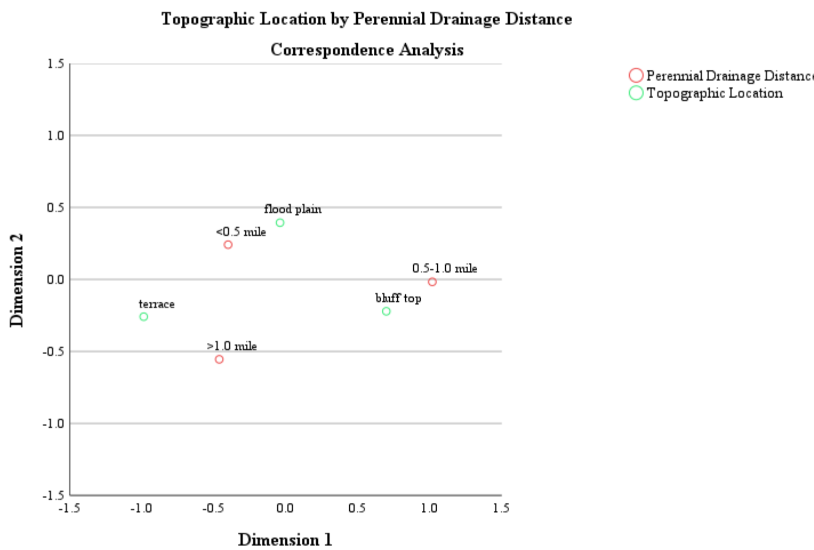

Figure 4.13: Middle Mississippian (MM) Correspondence Analysis, Topographic Location by Perennial Drainage Distance

For the correspondence analysis of Middle Mississippian (MM) sites, one variable, perennial drainage type, did not have enough dimensions to reduce, with only creek and river as options. To account for this, the variable had to be further subdivided, with river being split into three options: Illinois, Mississippi, or Spoon. This allowed the correspondence analysis to reduce the dimensions of this variable and compare it to the others. When this variable is compared to topographic location, Illinois River sites are typically on terraces, bluff top sites appear to be equally between the Illinois River and creeks, while flood plain sites are typically near creeks (Figure 4.14).

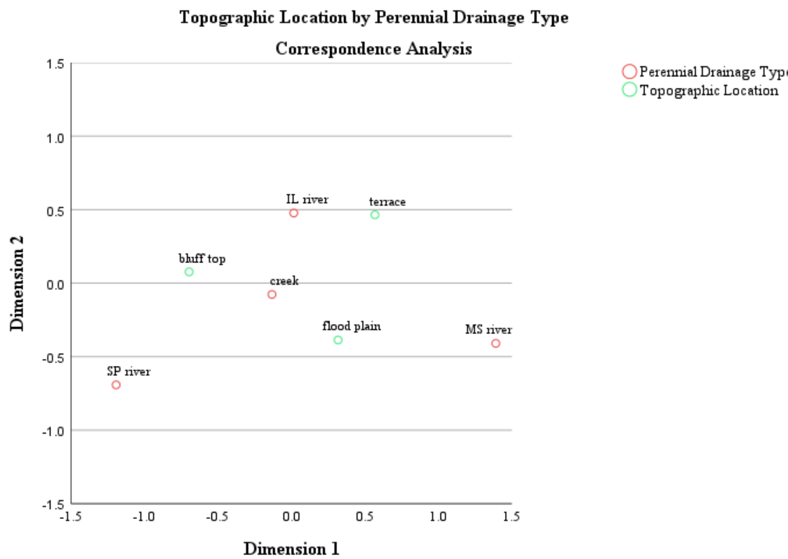

Figure 4.14: MM Correspondence Analysis, Topographic Location by Perennial Drainage Type

When topographic location is compared to river valley location, there appear to be clear differentiations. Bluff top sites are typically in the central Illinois River valley, flood plain sites are typically found in the Mississippi River valley, and terrace sites are typically in the lower Illinois River valley (Figure 4.15).

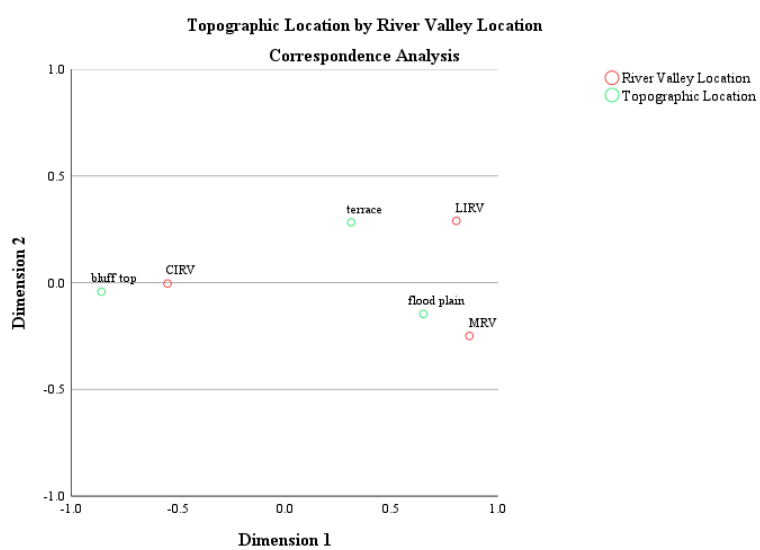

Figure 4.15: MM Correspondence Analysis, Topographic Location by River Valley Location

When comparing topographic location and soil type, bluff top sites are typically located in areas with silt loam soil, terrace sites are split between sandy and silt loam soils, and flood plains sites are split evenly between loam, silt loam, and silty clay loam soils (Figure 4.16).

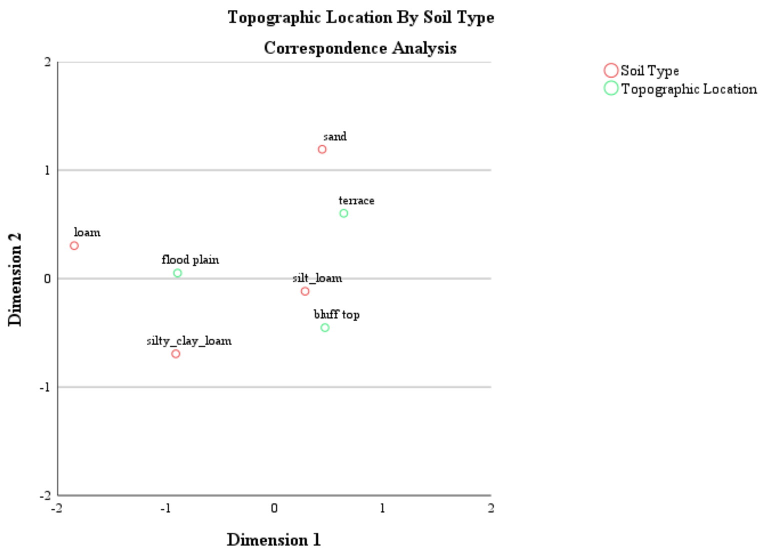

Figure 4.16: MM Correspondence Analysis, Topographic Location by Soil Type

4.3.5. Middle Mississippian Landscape Use Summary

Each topographic location where Middle Mississippian sites are located has varying correlations with the other landscape use characteristics (Table 4.10). The correspondence analysis shows that Middle Mississippian sites are very closely correlated with specific river valley locations and the distance to perennial drainages. Sites on bluff tops are located in the central Illinois River valley, between .5-1 mile away from creeks or the Illinois River itself, on silt loam soils. Flood plain sites are located in the Mississippi River valley, less than .5 mile from creeks with loam, silt loam, or silty clay loam soils. Sites on terraces are found in the lower Illinois River valley over 1 mile from the Illinois River with sand or silt loam soils.

Table 4.10: Middle Mississippian Site Topographic Region Characteristics

Topography Location	Perennial Distance	Perennial Type	River Valley Location	Soil Type
Bluff Top	.5-1	Creek or Illinois River	Central Illinois River valley	Silt loam
Flood Plain	<.5	Creek	Mississippi River valley	Loam, silt loam, silty clay loam
Terrace	>1	Illinois River	Lower Illinois River valley	Sand or silt loam

Based on the frequencies/counts of the landscape use variables, Middle Mississippian sites appear to be most often found on bluff tops or floodplains, with silt loam soils, often less than 0.5 miles from either creeks or rivers, with the majority of the sites found in the central Illinois River valley. To investigate the complexities of these landscape use characteristics, the chi-square/Fisher's exact test was used to compare the variables to each other. For Middle Mississippian sites, only had two comparisons with statistically significant p-values (less than .05), indicating an association: perennial drainage distance vs. topographic location and topographic location vs. river valley location.

Based on the presence of topographic location in both statistically significant comparisons, it is likely that this characteristic has an effect on landscape choice by Middle Mississippian people. Correspondence analysis was used to better visualize these relationships between topographic location and the other variables. Sites found on the three topographic locations closely correlate with specific river valley locations and specific distances to the nearest perennial drainage, matching the statistically significant association found in the chi-square/Fisher's exact between these variables. Sites on bluff tops are found in the central Illinois River valley between .5-1 mile away from the nearest drainage, sites on flood plains in the Mississippi River valley are less than .5 miles away, and sites on terraces in the lower Illinois River valley are over 1 mile from the nearest drainage. Middle Mississippian site characteristics will vary depending on the topographic location where it is located, which is closely related to its river valley location and distance to perennial drainage.

Like Oneota sites, positioning of a Middle Mississippian site on the landscape depends on the site's regional location. There are real landscape/topographic differences between the CIRV, LIRV, and MRV, and Middle Mississippian landscape use reflects these differences. For example, CIRV blufftops are very different than LIRV and MRV blufftops in terms of accessibility. CIRV bluff faces generally have less of a slope, which makes them easier to traverse while lower Illinois valley and lower Mississippi River valley bluff faces tend to be limestone faced and steep with a wide floodplain. Similarly, the topography around La Crosse in areas of Oneota settlement consists of many terraces with smaller streams running through them. Perhaps in each case, the determining factor really is the local conditions.

4.4. Answering Research Question 1: Coalescence in Landscape Use

This analysis initially sought to generalize Oneota and Middle Mississippian landscape use, but it is clear that generalizing the settlement characteristics reduces the complexity of how these groups may have selected their settlement locations and the complexity of the landscapes themselves. There is no set "Oneota landscape use pattern" or "Middle Mississippian landscape use pattern". Both cultural groups adapted to the specific environments they settled in, selecting landscapes based on what each location offered. Landscape use although a potential connecting point between communities, shifts based on environment and interactions with communities in new spaces. Oneota landscape use is dependent on the locality/region within which a site is located, each offers different landscape options for settlement. Middle Mississippian landscape use is intrinsically tied to topography and the local landscape of each region. How then do the landscape use variables for the five sites in the CIRV with Bold Counselor Oneota presence compare to the characteristics of Oneota sites cluster and to those of Middle Mississippian sites (Figure 4.17; Table 4.11)?

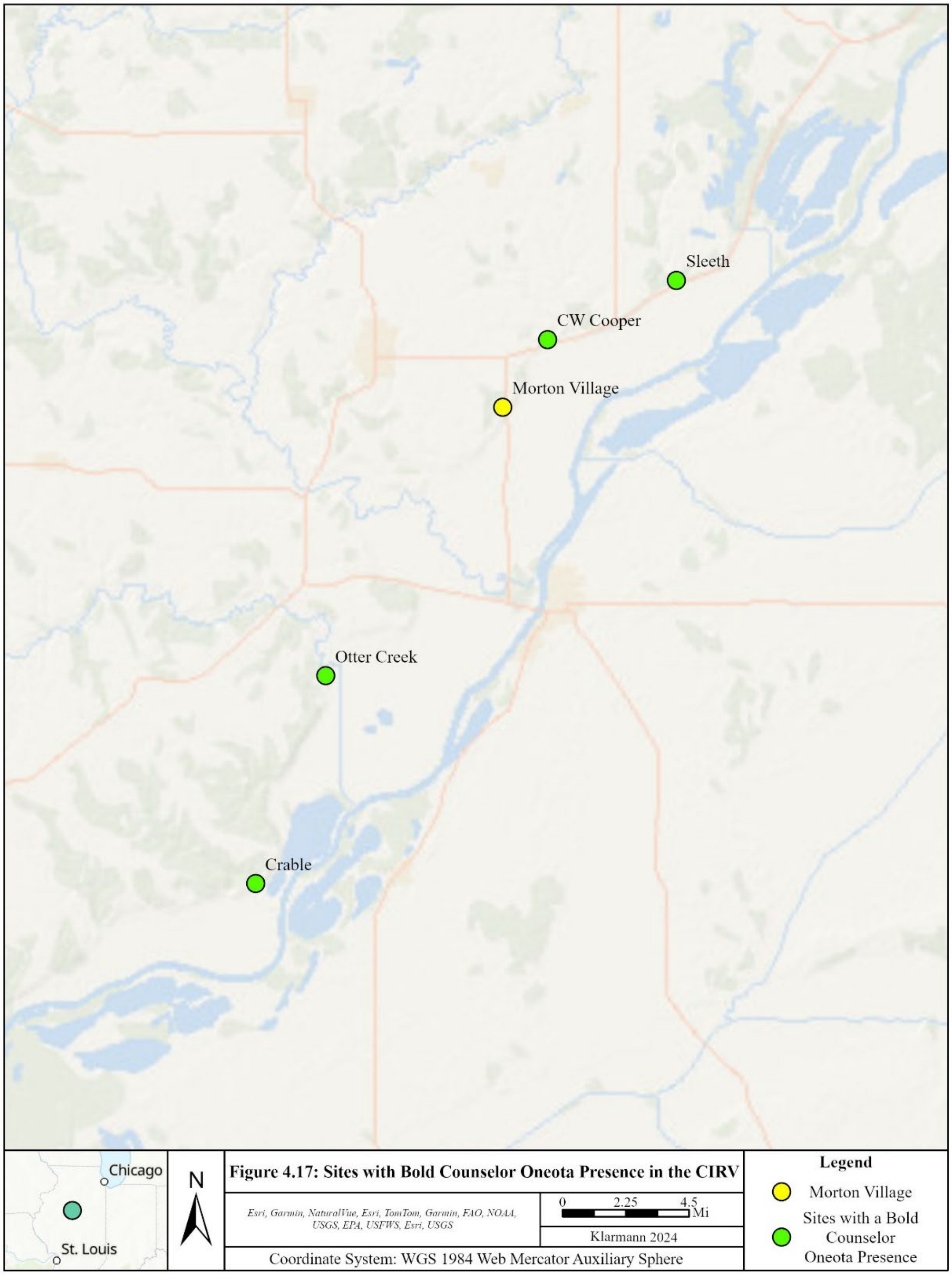

Figure 4.17: Sites with Bold Counselor Oneota Presence in the CIRV

Table 4.11: Sites with Bold Counselor Oneota Presence Landscape Characteristics

Site Name	Perennial Drainage Type	Perennial Drainage Distance	River Valley Location	Soil Type	Topographic Location
Crable	creek	.5-1	CIRV	Silt loam	Bluff top
CW Cooper	creek	<.5	CIRV	Silt loam	Bluff top
Morton Village	creek	<.5	CIRV	Silt loam	Bluff top
Otter Creek	creek	<.5	CIRV	Silt loam	Bluff top
Sleeth	creek	.5-1	CIRV	Silt loam	Bluff top

The five sites with Bold Counselor Oneota characteristics are similar, with sites all located on the western bluff tops of the CIRV, 0-1 mile from creeks. These characteristics can be compared to patterns for the Oneota localities and Middle Mississippian topographies to identify which it resembles. The nearest neighbor analysis shows that Bold Counselor sites, on average, are 5.28 miles apart, with the index ratio (2.89) indicating a trend toward dispersion, and the low p-value (p = 0.00) and z-score (z = 8.09) indicating a non-random spatial pattern. The average distance is greater than those average distances found for the Middle Mississippian sites in the different river valleys, however, the nearest neighbor values are closest to the Middle Mississippian sites in the lower central Mississippi River valley (5 sites, 9.4 miles, index ratio 3.66, p-value 0.00, z-score 11.39) and Oneota sites in the lower Lake Michigan region (13 sites, 16.4 miles, index ratio 1.31, p-value 0.03, z-score 2.16). When looking at the landscape use characteristics themselves, the sites with a Bold Counselor Oneota presence compare closest to Middle Mississippian sites found on bluff tops. This is not a pattern identified in any of the other regions/localities examined for Oneota sites.

As this analysis has shown, it is difficult to generalize the characteristics of Morton Village and the other Bold Counselor Oneota sites based on landscape characteristics of either Oneota or Middle Mississippians sites. There are generalizations that can be made about sites with Bold Counselor Oneota presence when compared to the more northern Oneota sites (mostly on terraces) and Middle Mississippian sites in the CIRV (mostly on bluff tops). The Morton Village site itself and the other four sites with a Bold Counselor Oneota presence are deep in Middle Mississippian territory, and the group of sites here are some of the most southern Oneota sites in the Midwest, (not considering those contemporaneous and later historic period Oneota sites in the American Bottom). The five sites with a Bold Counselor Oneota presence have an almost identical set of landscape characteristics, which differ from the more northern regions of Oneota settlement and are most aligned with those Middle Mississippian sites in the central Illinois River valley.

The Bold Counselor Oneota phase is defined as the result of interaction between local Middle Mississippian populations and migrant Oneota groups (Esarey and Conrad 1998). Although this interaction clearly reconfigured local social networks (Upton 2019), the Oneota populations coming into the CIRV are likely not just transferring their preferred ideas about village location wholesale into this new area, which may have to do with factors other than coalescence, such as strategic placement on the landscape to “fit in” for safety purposes or to familiarize them with the people and cultures already in the area. Previous Bold Counselor Oneota research has questioned whether Oneota people coming into the CIRV would live where they lived elsewhere (Esarey and Conrad 1998; O’Gorman and Conner 2023), potentially bringing characteristics from these locations to the central Illinois River valley. This explanation does not necessarily account for an already inhabited CIRV, where Middle Mississippian communities were well established (see Chapter 3.3.4) by the time the Bold Counselor Oneota arrived in the area. As summarized in Chapter 3, it is unknown whether all sites identified with a Bold Counselor Oneota component are associated with an earlier or contemporary Middle Mississippian site. It is possible that the Oneota people coming into the central Illinois River valley moved into actively inhabited Middle Mississippian villages, which would provide social benefits (protection, trade, intermarriage) to a migrant group in a new, foreign space. With Morton Village serving as the representative Bold Counselor Oneota site, a finer scale investigation of how these Oneota people created and adapted to these communities in this predominantly Middle Mississippian area will be further explored at a community level.

CHAPTER 5: COMMUNITY SCALE

5.1. Research Question 2: How is the Morton Village community organized? Are there differences or similarities when compared to the organization of Oneota and Middle Mississippian sites?

In the preceding chapter, the way Morton Village is situated on the landscape was found to most closely resemble the landscape choices utilized by Middle Mississippian populations inhabiting the CIRV. Specifically, Bold Counselor Oneota sites compare closest to Middle Mississippian sites found on bluff tops, a pattern not identified in any of the regions/localities examined for Oneota sites. Radiocarbon dates and structural evidence indicate that Morton Village has an earlier Middle Mississippian occupation. As the occupation of Morton Village continued, there was a migration of Oneota people into the area. This resulted in a cohabitation and cultural integration of Oneota and Middle Mississippian people within the Morton Village community (O'Gorman and Conner 2023). What does this Oneota integration into a Middle Mississippian village look like at the community level? Does it appear that the process of coalescence, or creation of a new integrated community, appear to be occurring here? The community is the next scale of space that is used to explore the overarching research question, i.e., how socio-spatial relationships are influenced and altered by instances of cultural interaction and integration.

As defined in Chapter 2, community is the largest group of people whose day-to-day life is bound together into a self-conscious corporate entity that is economically and politically independent (Beardsley et al. 1956). Understanding the spatial organization at the community level is important because people often built their houses near their kin groups, who were those they interacted with on a day-to-day basis and can reflect how people organized themselves in their daily lives (Gargett and Hayden 1987; O'Connell et al. 1987). Comparisons of the spatial characteristics of community organization to both Oneota and Middle Mississippian sites can assist in better understanding how integration affected the community of Morton Village. How then does the community organization at Morton Village compare to the community organization found at the Oneota and Middle Mississippian sites in the regions found to be comparable in the landscape chapter?

5.1.1. Revisiting the Space of Community

Although it cannot be known exactly how an archaeological society organized itself, clues are left behind in the physical occupation of space that can be used to infer some aspects of this organization. Archaeologists can visualize how a space was occupied through the architecture or built environment (Parker Pearson and Richards 1994). The creation of these structures is governed by social mores or community identity, which dictate appropriate construction methods, locations, and layout, and are built by people in response to their needs (Bourdieu 1977; Hegmon 1989; Parker Pearson and Richards 1994; Steadman 2015). Once constructed, these structures help to either reinforce and maintain social order or modify and transform the social order (Hegmon 1989).

Architecture can also be used within a community to define groups of individuals, thereby constraining and restricting social relationships (Hegmon 1989). Within non-hierarchical societies the social order depends on cooperation and integration between these groups (Hegmon 1989). Spatial structure is informative about the way a society was organized and interpreting spatial patterns in the form of architecture and artifacts is informative about how people inhabited that space and created a sense of place within it (Bourdieu 1977; Gillings et al. 2020; Goldstein 1981; Trigger 1989; Willey and Sabloff 1993). This is similar to the previously discussed concept of 'sense of place.' As people inhabit a space and imbue it with their identity, beliefs, and customs, a sense of place or connection to that space is created. Understanding the variety of different spaces used within communities provides insight on an individual's experiences in various social spheres (Gillings et al. 2020).

Community consists of two parts, one physical (the architecture of community) and one social (the thoughts and ideas that bind people together) (Yaeger and Canuto 2000). The physical equates to the concept of geographic community (people sharing physical space) and the social equates to the concept of imagined community (people sharing interests and identity) (Marsh 2016; O'Gorman 2010). Community is dynamic and is shaped by our behavior, sense of belonging in the world, and our morality (O'Gorman 2010). Community also shapes our experiences and how we engage in relationships with others (O'Gorman 2010).

O'Gorman (2010) uses the concept of imagined community to investigate how the creation of meaningful spaces is a dynamic force in shaping communities. The physical community is created when families or households share a level of physical space, which is shaped by their life experiences (O'Gorman 2010). In this physical community, the material record is interpreted as the reflection of the community's behavior (O'Gorman 2010). However, O'Gorman argues that only investigating the physical community ignores important aspects of community that can be better investigated by using the concept of imagined communities to reorient the community as the object of study rather than the spatial unit of analysis (O'Gorman 2010). In this case, the material culture is not a reflection of the nature of the community but of the way in which the social aspects of community are reproduced (O'Gorman 2010).

Additionally, community may reflect linkages to other people and places that are not present at a given "physical" location (O'Gorman 2010). It is unknown what connections there might have been between Oneota people in the CIRV and Oneota people elsewhere, or for the Morton Village Middle Mississippian population to groups elsewhere. Oneota and Middle Mississippian inhabitants of Morton Village are each dealing with the other physically present group, but also those social and emotional linkages these individuals carry from elsewhere. Within a physical community, those that consider themselves members create an imagined community which unites them socially (Gillings et al. 2020; Anderson 1991). This location is imbued with the social and imagined aspects of community, thereby creating that sense of place or connection to that physical space.

One concept applicable to this discussion of the built environment is hybridity, defined by Card (2013), as "the production of material objects incorporating elements of multiple existing stylistic or technological traditions (2013:1)". This concept was briefly mentioned in Chapter 2, but its discussion is most applicable here. This creation of new cultural forms out of pre-existing and novel elements is a complex, multi-agent process (Card 2013). According to Card (2013), significant and notable spatial or cultural divisions often separate these pre-existing elements. Silliman (2013) emphasizes the need to consider hybridity and human agency simultaneously, because social/cultural change and reproduction are active processes. People possess the quality of hybridity at certain moments, but there is no state of being "hybrid" (Silliman 2013). Alt (2006) defines hybridity as the innovation and invention of a new cultural form that is the unification of two original cultural forms. Encounters between populations leads to the creation of third spaces of identity, which do not belong to one group, but are new spaces occupied by both groups. This is similar to Homi Bhabha's (1994) work on hybridity, where the idea of ‘third spaces’ originates. Naum (2010) expands on this, by using the concept of frontiers from culture contact studies as a metaphor for Bhabha’s third spaces in cultural hybridity theory.

Frontiers in this way function as third spaces, landscapes in between, where there is a reshaping of identity and the creation of new personhoods (Naum 2010). According to Petersson (2011:175), hybridity functions as a “bridge between the binaries that create cultural difference in a traditional modern discourse,” challenging notions of groups of people as natural opposites. The CIRV serves as a frontier space between the northern Oneota regions and the Middle Mississippian epicenter in the American Bottom, where this migrant population of Bold Counselor Oneota people navigated interactions with local Middle Mississippian people, creating distinctive communities where both Oneota and Middle Mississippian uses of space are found, or where they have created a new third-space, combining attributes from both cultural groups into a new distinctive form.

One of the tenets of coalescence that Kowalewski (2006) defined was the promotion of community integration between the coalescing groups using the layout of domestic architecture and creation of public spaces. How buildings are organized within a community can provide insights into changes in public and private space over time (Foster 1989; Moore 1992; Tabor 1976). According to Cook (2007), if more than one group is present at a site, public contexts will likely be controlled by the dominant group. The presence of ritual spaces within a community shows that it is inclusive enough to incorporate such spaces into its organization. Where ritual structures are located in relation to the groupings of domestic architecture can show how the village inhabitants interacted with public structures on a day-to-day basis. How does understanding the organization of these spaces help in the assessment of social identity and integration at Morton Village?

As discussed previously, Bold Counselor Oneota and Middle Mississippian populations generally differed in the construction method of domestic architecture. Domestic structures built using single posts are typically associated with Oneota contexts, while structures built using wall trenches are typically associated with Mississippian contexts (Alt and Pauketat 2011; Griffin 1967). Single-post construction consists of wall posts set into individual holes, while wall-trench construction consists of wall posts set into a long trench; each method leaves a distinct archaeological pattern. Middle Mississippian populations also tend to have multiple kinds of structures within a community of varying shapes, sizes, and purposes (Bowne 2013; Conner 2016; Conrad 1991; Harn 1978; Oetelaar 1993; Rogers 1995). It is important to contextualize the architecture of domestic structures depending on the organization of the village (i.e., clusters, rows, etc.) in order to address whether the architectural styles typically used by one group, or the other were separated or integrated at Morton Village.

By analyzing where communal/public spaces and domestic/private spaces are and their relationship to one another, the specific social connections between domestic groupings within the village can be understood. Using Kowalewski's (2006) model of coalescence, there should be an elaboration of community integration and a universalizing of collective ritual practices in contexts of coalescence, making these activities available for everyone. Evidence of new forms of communal architecture, aggregation centered on the communal architecture, and continued focus on communal ritual should be present in coalesced communities (Stone 2008).

What is considered communal or public space here are those locations that host special events, feasts, and rituals (Kent 1990). Domestic or private space is host to smaller scale events, mainly day-to-day activities that only involve a small kinship group (Kent 1990). It is possible to differentiate between public and private spaces archaeologically, as shown by Oetelaar (1993) in an analysis of a Late Mississippian site in south-central Illinois, where change in spatial patterns was indicative of social and economic organization of the community. Despite issues with the dichotomy between communal/public and domestic/private potentially creating predetermined boundaries within a community or the emphasis that these spaces serve one distinctive purpose rather than a multitude of functions within the community (Adler and Wilshusen 1990), this generalization is appropriate in the case of Morton Village, where public/communal architecture is generally distinctive in its form and apparent function when compared to private/domestic architecture (O'Gorman and Conner 2023). If there is integration between Oneota and Mississippian groups, communal/public structures were likely created through new communal practices, with spatial contexts that will be informative about the way the community engages in public activities (see Kowalewski 2006).

5.1.2. Methods of Analysis: Exploratory Multivariate (K-Means) Cluster Analysis and Qualitative Assessment of Patterns

A quantitative approach using spatial statistics is used to explore whether quantifiable patterns exist within the community organization of Morton Village. Spatial statistics are statistical descriptions of spatial data and a spatial pattern or process (Sankey 2017). The observed data represent the spatial arrangements and organization of archaeological features across space and the causes for these patterns can be understood as implicated in social, political, and economic systems (Ervin 2014).

One quantitative, spatial statistical method, K-means cluster analysis, has been utilized in archaeological spatial analyses since Kintigh and Ammerman (1982) popularized the technique. Kintigh and Ammerman (1982) distinguish between spatial patterning and spatial structure, the first being the spatial distribution of items and the latter being related to abstract organizing principles that are responsible for the creation of patterns. They assume that cultural processes create the spatial distributions that can be examined for patterns and emphasize the importance of having prior theoretical ideas of how to link spatial patterns to cultural structures. Kintigh and Ammerman found that K-means proved capable of identifying obvious patterning and provided analytical insight when no patterning was observed (1982).

K-means presents a non-hierarchical cluster analysis that minimizes intra-cluster variances while maximizing inter-cluster distances, by separating points (*n* observations) into groups (*k* clusters) starting with a single cluster, which is then subdivided to identify more clusters (Kintigh and Ammerman 1982). K-means analysis looks for cluster configurations based on a user specified number of clusters (Kintigh and Ammerman 1982; Wilson and Geiger 2019).

Within ArcGIS Pro, a K-means analysis is incorporated into the multivariate clustering tool within the geoprocessing package. This tool finds the natural clusters of features based solely on feature attribute values (ESRI 2023). The tool works well with spatial data using x- and y-coordinates as its variables (Wilson and Geiger 2019). To use this tool, the center point of each polygon is first calculated, then "calculate geometry attributes" was used to find the x- and y-coordinates of these points. When the number of clusters is provided, the tool identifies clusters where all features within a cluster are as similar as possible, and all clusters are as different as possible, which is done by using the K-means algorithm for comparison (ESRI 2023). The K-means algorithm identifies seeds used to grow each cluster, which matches the number of clusters (ESRI 2023). The default option, optimized seed locations, is used here, as it randomly selects the first seed and adds features that are far away from each other in data space as additional seeds (ESRI 2023).

To identify the most appropriate number of clusters to split the data into, the tool is first run without defining the number of clusters, which automatically evaluates the optimal number of clusters using a pseudo-F statistic based on solutions from 2 to 30 clusters, with the optimal number of clusters having the highest pseudo-F statistic value (ESRI 2023). This statistic is also known as the Calinski-Harabasz pseudo-F statistic, which is a ratio of between cluster variance to within cluster variance (Calinksi and Harabasz 1974; ESRI 2023). When the multivariate analysis is first run without defining the number of clusters it produces a pseudo-F statistic; however, the statistic result varies each time the analysis is run. To minimize bias, the analysis is run 10 times to identify an average number of clusters that the pseudo-F statistic indicates the data should be split into. The tool is then run again using the average cluster value. When the multivariate clustering tool is run using a K-means algorithm comparison, it creates a new layer with those features belonging to specific clusters differentiated by color.

Once quantifiable patterns are identified, several questions need to be asked: what do the clusters look like? do they appear randomly or uniformly spaced? what is the size and shape of these clusters? Although the tool identifies cluster patterning, it cannot identify meaning behind the patterning. A dilemma with the multivariate clustering analysis is its selection of a random seed to start dividing the data; therefore, the clusters vary slightly each time the analysis is run. Therefore, this method should be used to explore the mathematical patterns in the data, using a heuristically defined analysis (Wilson and Geiger 2019). As Wilson and Geiger (2019) noted in their K-means cluster analysis of the Middle Mississippian comparative site Orendorf (see section 5.3 of this chapter), it is difficult to evaluate which clustering combination represents real patterns in the archaeological record and one must be careful not to force the data to reflect a subjective goal.

Those statistical clusters identified with the multivariate clustering analysis can be assessed qualitatively to identify distinctive patterns (i.e., rows, clusters, or other patterns) within these spaces. Kroll and Price (1991) emphasize the importance of scrutinizing a map to identify the presence of an overall structure or pattern of space; as Goldstein (1981) showed, people structured space in a meaningful and organized way, which should be apparent in a basic visual assessment. I acknowledge the limitations of using a spatial statistical tool to identify patterning at Morton Village and recognize that the clusters themselves are based on the tool's separation of the data and that the identification of patterning using a qualitative approach is naturally subjective and based on my own initial interpretations of the multivariate clusters. Because clustering has previously been performed for both the Mississippian comparative site, Orendorf, using K-means as described in Wilson et al. (2019) and for the Oneota comparative site, Wever, as determined by Withrow (2004a), identifying clustering at Morton Village allows for comparison between the three sites.

5.1.2.1. Structure of the Chapter

The goal of this chapter is to address how the community of Morton Village (as a representative site of Bold Counselor Oneota sites) is organized. This will involve comparing Morton Village's community organization to Oneota communities outside of the CIRV and local Middle Mississippian communities within the CIRV (Figure 5.1). For an Oneota site, Wever Terrace in the Lost Creek locality of the Mississippi Alluvial Plain region, serves as the comparative community. For a local Middle Mississippian site, the Orendorf site in the CIRV serves as the comparative community. Wever Terrace and Orendorf predate Morton Village, presenting potential precursors from which community organization attributes could have been adopted by the Bold Counselor Oneota inhabitants at Morton Village. If Morton Village represents a coalesced community, there should be clues within the community organization. The spatial organization of Morton Village will be described in detail, leading to a discussion of how Morton Village’s community organization compares to Wever Terrace and Orendorf. The use of these comparative sites will be extended into the final scale of space, household, to address how Morton Village compares to Oneota and Middle Mississippian household use.

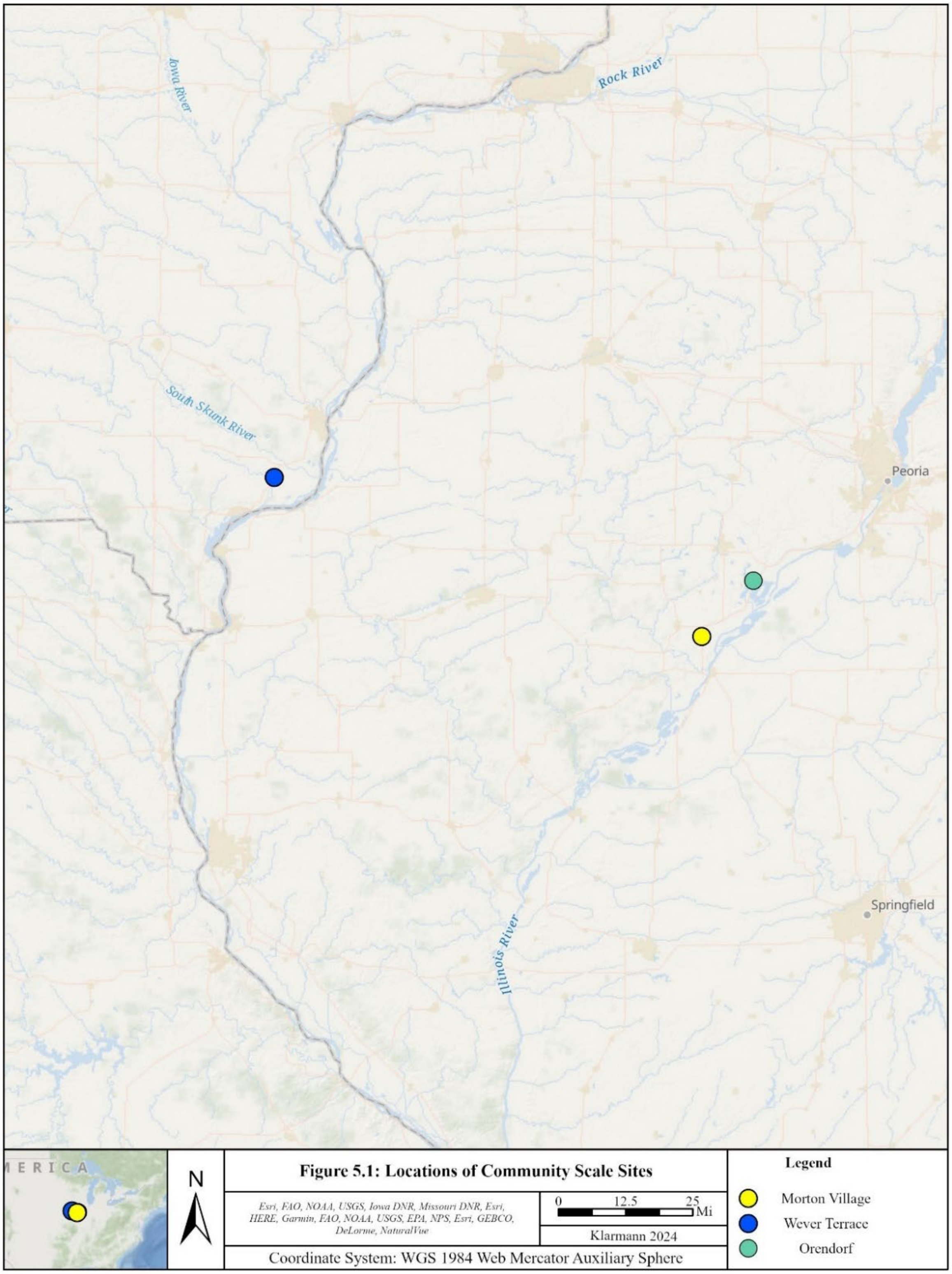

Figure 5.1: Locations of Community Scale Sites

5.2. Bold Counselor Oneota Site: Morton Village

As described in Chapter 3, there is a contingent of migrant Oneota in the central Illinois River valley (CIRV) during the Middle Mississippian Crable phase (AD 1300-1450) (Hollinger 1995, 2005; O'Gorman 2010; O'Gorman and Conner 2023). Referred to as the Bold Counselor phase, a suite of ceramic vessel forms and a mixing of Oneota and Mississippian traits represent this formation (Esarey and Conrad 1998; O'Gorman and Conner 2023). These ceramic forms are unique to sites with a Bold Counselor Oneota presence in the CIRV, with only rare instances of the forms found within Mississippian contexts outside the CIRV (Painter and O'Gorman 2019). This phase is defined as the result of interaction between local Middle Mississippian populations and migrant Oneota groups. Five main sites—Crable, C.W. Cooper, Sleeth, Otter Creek, and Morton Village/Norris Farms 36—located within 35 km of each other, all have levels of Bold Counselor presence based on their artifact assemblages (Esarey and Conrad 1998).

5.2.1. History of Excavations

Of the five Bold Counselor Oneota sites, Morton Village and Norris Farms 36 has been the most systematically explored, making it an ideal candidate as the comparative site for Bold Counselor phase Oneota occupations in the CIRV. Excavations in the 1980s and then between 2008-2017 as part of the collaborative Michigan State University-Dickson Mounds Museum, Morton Village Archaeological Project, provide an extensive dataset through which to investigate community organization.

5.2.1.1. 1980s Excavations

As described in Chapter 3, eleven structures, labeled as 'houses', were identified in the village and one structure was identified in the Norris Farms 36 cemetery in the 1980s. One structure with evidence of several rebuilding episodes, House 1-3, was labeled by Santure, Harn, and Esarey (1990) separately and named in order of discovery rather than in the sequence of rebuilding. House 3 was determined to be constructed first, then House 1, and finally House 2. This structure will be referred to as Structure 1-3 to encompass all of its iterations, which represent constructing one or more new walls for the structure. In instances where the structure number is needed for analysis, it is labeled as Structure 1 (STR 1). This was also the case with House 8-9, which had evidence of a single rebuilding episode, but given two distinct numbers. This structure will be referred to as 'Structure 8-9', except in cases where the number is needed for analysis, where it will be labeled Structure 8 (STR 8).

The cemetery structure, called Norris Farms #36 House 1, had wall trench architecture and no Bold Counselor Oneota ceramic artifacts. The structure was intruded upon by burials, leaving the 1980s excavators to conclude that the structure predated the Oneota occupation of the village. Radiocarbon dates in the 2000s were taken from short-lived species from the village and bone collagen from six burials within the cemetery and provide further contextualization of the structure. Silva et al. (2014) examined these dates alongside 11 others from features and structures within Morton Village. The cemetery dates trend toward an early occupation for the village. The cemetery structure cannot be excluded from analysis based on these dates alone, as there is a jog in the calibration curve for radiocarbon dates from this period, making it difficult to clearly interpret how the dates for the cemetery and village compare without more dates from each (Silva et al. 2014). It is important to include this structure in the current investigation of interaction between Bold Counselor Oneota and Middle Mississippian people, as no other structures are excluded for only containing artifacts belonging to one group or the other or for having a specific architectural style. Therefore, the Norris Farms #36 structure is included in the analysis of community structure and will be referred to as Structure 53 (STR 53) (Figure 5.2).

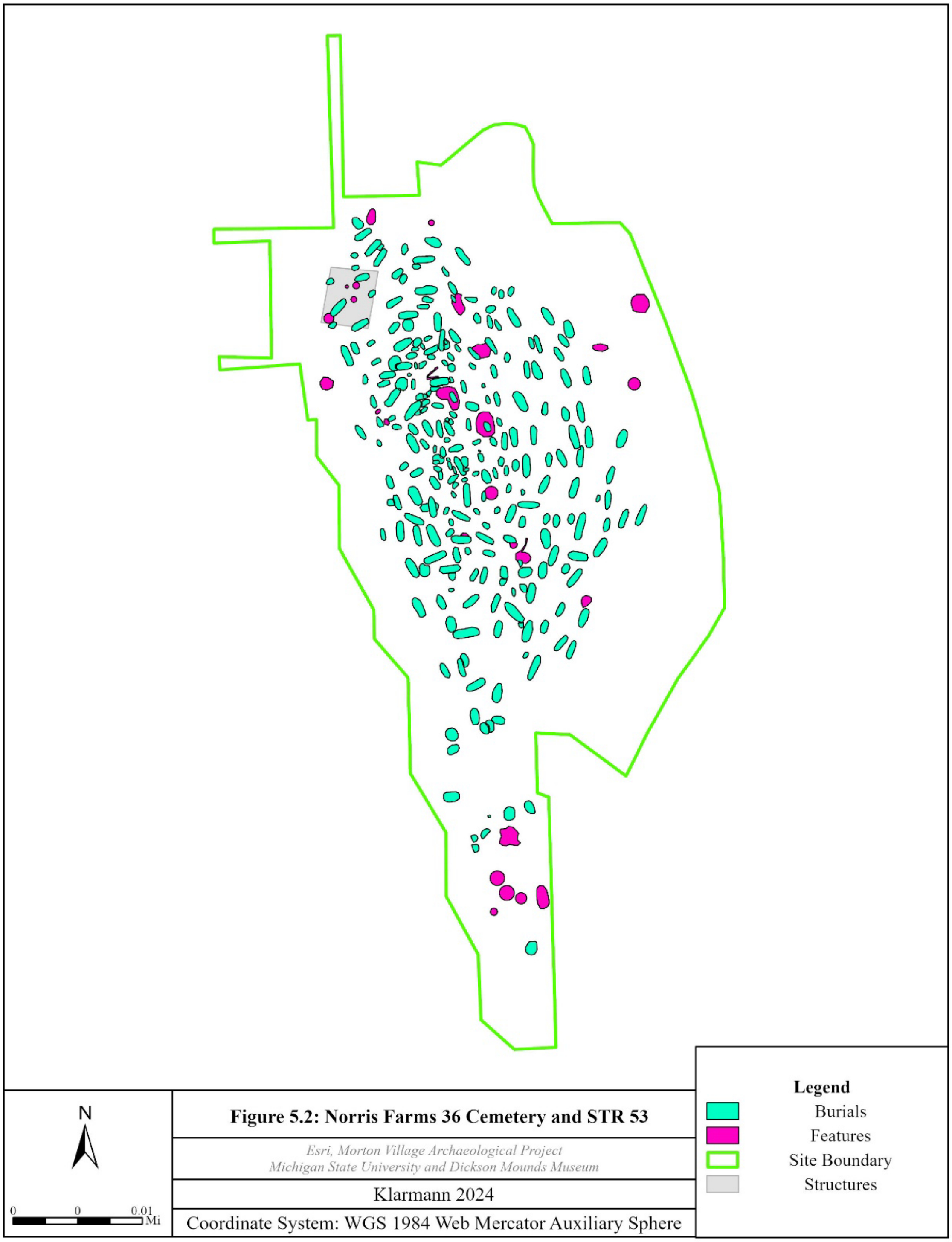

Figure 5.2: Norris Farms 36 Cemetery and STR 53

5.2.1.2. MSU-DMM Archaeological Project

Additional investigations at Morton Village did not take place until 2008 with the start of the Michigan State University and Dickson Mounds Museum Morton Village Archaeological Project (MSU-DMM). Excavations for this project are restricted to the property owned by The Nature Conservancy as part of the Emiquon Preserve, which includes the majority of the bluff top along the highway and to the west. Excavations between 2008-2016 were restricted to the northern half of the site and in 2017 excavations were allowed elsewhere on the property. Larger field schools for undergraduates took place in 2008, 2009, 2012, 2014, and 2016, while smaller research seasons were conducted in 2010, 2011, 2013, 2015, and 2017. Unlike the 1980s, the MSU-DMM project did not add additional structure numbers for instances of rebuilding.

Buildings discovered between 2008 and 2017 were referred to as structures regardless of whether they were interpreted as houses. To minimize confusion, structure numbers were continued from the 1980s excavations. Throughout this analysis the term 'structure' will be used whether referring to the 1980s excavations (Structures 1-14 and Structure 53) and those in the 2000s (Structures 15-52).

Spatial data from the 1980s and 2008-2017 excavations was provided by MSU-DMM Project Co-Director, Dr. Michael Conner. A total station was used for mapping the 2008-2017 excavations and the 1980s field maps were digitized in relation to the more recent excavations. The spatial data was projected into a site-specific orthogonal grid not related to a real-world projection. This may limit which spatial statistical methodologies are available, but all measurements within this site projection are accurate to the measurements taken in the field.

To identify potential structures and features without the need for massive excavation efforts and to guide selection of excavation areas, geophysical surveys were conducted on the main Nature Conservancy property and in an agricultural field to the northeast across the highway. The breadth and boundaries of the site are unclear beyond this property. However, topography of the surrounding area and geophysical surveys conducted at the site indicate that prevalence of structures drops off outside the main bluff area along the ridges. It is likely that those structures already identified at the site represent the main occupation area of the site, although it is possible there is some occupation along the ridges of the bluff to the north, east, south, and southwest.

The first geophysical survey at Morton Village was conducted by Dr. Timothy Horsley in May 2010. Horsley used high resolution magnetometer survey over a 2.2. hectare area, and identified anomalies for 35 possible house basins, several possible post-built structures without basins, an additional 30 potential structures with less clear signatures, and numerous pit-like anomalies (Horsley 2010; Horsley et al. 2015). Horsley also found that in the central area of the site there was a high degree of magnetic interference due to the remains of a historic building and gravel parking lot taking up an area of approximately 3,000 square meters.

Matthew Pike conducted geophysical survey in March 2013 south of the 2010 survey conducted by Horsley. This survey covered roughly 1.86 hectares and was a continuation of the 2010 survey with precautions taken to recreate the 2010 survey parameters (Pike 2013). Additional structure anomalies were identified during Pike's 2013 survey. There is a large topographic depression in the southwest of the site just before the fingers of the bluff extend out. This area was surveyed but did not show any anomalies. It is possible this location held water through parts of the year (Conner personal communication 2023).

Horsley's original magnetometer survey did not pick up the signature of a large, public structure (STR 34), which was first identified through excavation. Horsley returned to Morton

Village in 2014 to target 1500 m^2 with a high-resolution ground-penetrating radar (GPR) survey and additional areas with magnetometer survey (Horsley et al. 2015). The location of STR 34 was covered by the finer scale GPR since it was missed by the original magnetometry survey due to the historic disturbance. The results of the GPR survey showed similar features to the magnetometer results but with more detail and evidence for structures not previously detected, specifically showing the size of STR 34. Horsley et al. (2015) attribute the success of the GPR survey to the fact that it is not as affected by modern iron debris like the magnetometer survey. The magnetometer survey was conducted along the western border of the Emiquon Nature Preserve property and along the southern and southeastern ridges of the bluff. All data from these geophysical surveys at Morton Village were processed in a similar fashion to ensure consistency, therefore making the data from both Horsley and Pike nearly seamless in their coverage of the property (Horsley et al. 2015) (Figure: 5.3).

Ground truthing efforts began in 2011, with a variety of structures identified using excavation blocks placed over areas with anomalies and areas without anomalies. This work continued through 2017 (Table 5.1). In 2017, ground truthing focused on 18 possible or likely structures first identified by geophysical survey. The goal of these tests was two-fold: first to confirm that these geophysical anomalies were in fact structures and second to identify the architectural style of these structures. Once possible/likely structures were chosen, a small section of the presumed location of the wall was excavated to reveal the architecture. Of the 18 possible/likely structures identified through geophysical survey and tested in 2017, 15 were confirmed to be structures.

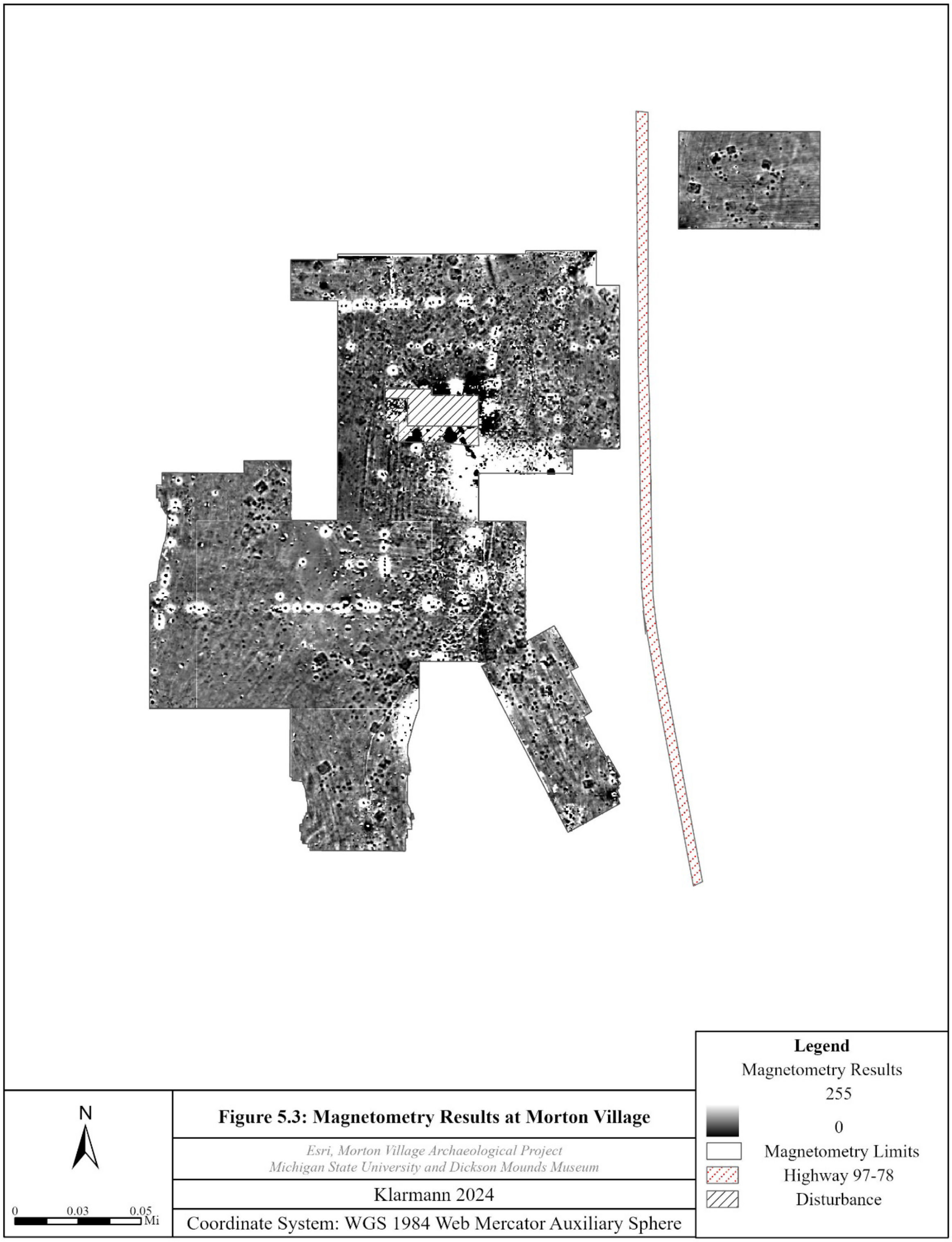

Figure 5.3: Magnetometry Results at Morton Village

Table 5.1: Structures Identified at Morton Village by Year

Year	Structures Identified	Used Geophysical?	Revisited Structures?	Total New Structures
1980s	1, 4, 5, 6, 7, 8, 10-14, 53	no	n/a	12
2008-2010	15-21, 30-32	no	n/a	10
2011	22-24	yes	n/a	3
2012	25-29	yes	n/a	5
2013	33	no	16	1
2014	34	no	33	1
2015	None	yes	n/a	0
2016	35, 36, 37	yes	26, 34	3
2017	38-52 (3 not STRs)	yes	21	15
Total number of structures identified				*50*

Structures 1, 4-8, and 10-53 have been excavated to some extent, and thus received structure numbers, while the remaining 94 structures have not been given official numbers (reminder, 2, 3, and 9 are rebuilding episodes of original structures). Because of this, Structure numbers 54-147 have been arbitrarily assigned to these structure anomalies (Figure 5.4). Some anomalies when tested turned out not to be structures, despite their appearance as such on the geophysical survey. This includes three tested during the 2017 season: two were historic in age and one was a cluster of pit features, with no evidence of a structure basin. I accept that not all of the anomalies identified by remote sensing are structure basins utilized by the inhabitants of the village and I accept that the estimations of size and shape made by Horsley and Pike may not be the exact shape and size of the structures as they once stood. For those structures that were identified using geophysical survey and then at least partially excavated, the interpreted edge of the structure varied generally between 0.2 to one meter off to the actual edge. This is slightly off but not a substantial enough difference to discredit the use of the anomaly interpretations made by Horsley and Pike.

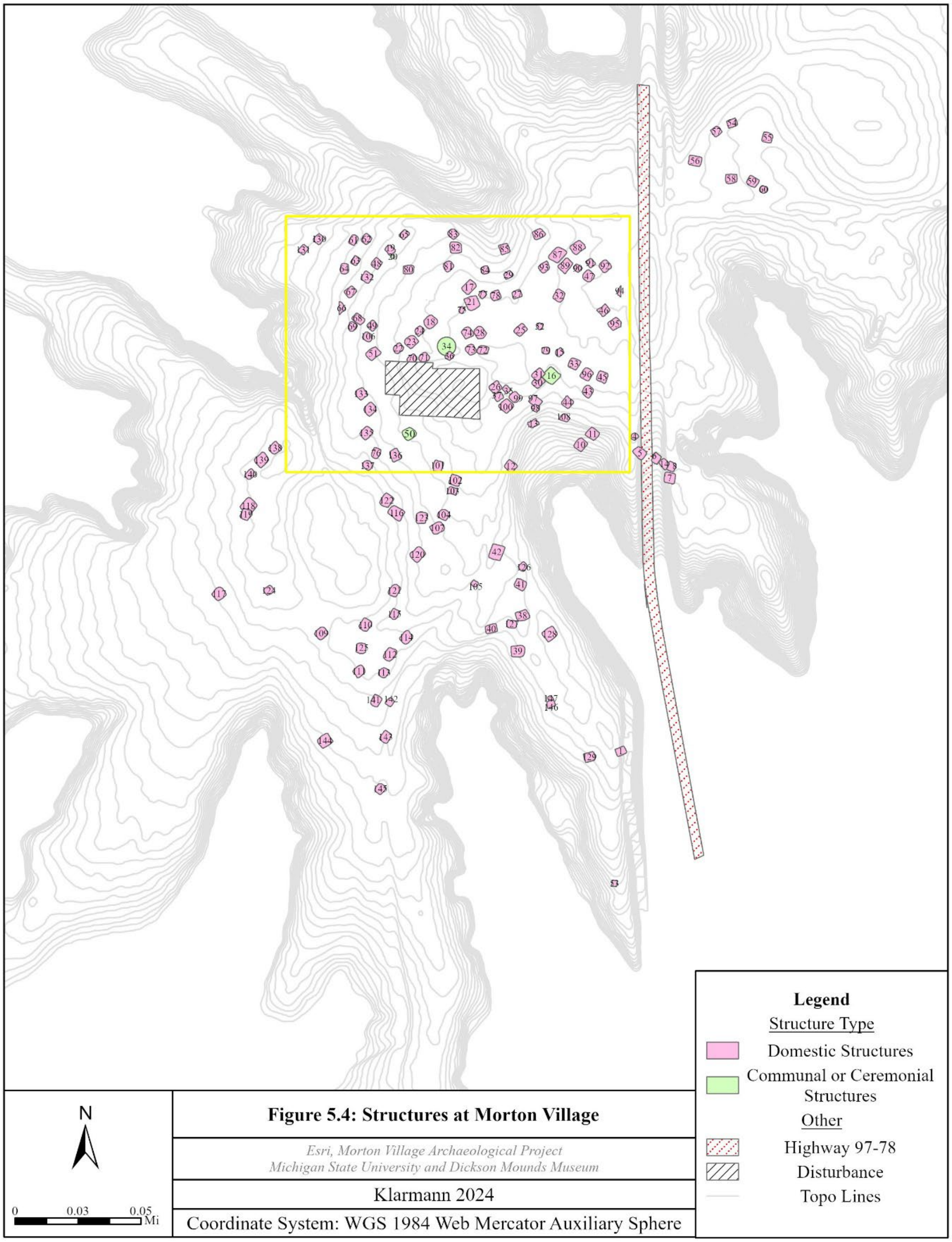

Figure 5.4: Structures at Morton Village

Based on the success rate of the ground truthing efforts conducted as part of the MSU-DMM project, I accept the interpretations made by Horsley and Pike as to the number and size of possible structures at Morton Village. I also accept that the 50 confirmed and 94 potential structure anomalies may not be all the structures that once stood at Morton Village and that the site likely extends beyond the boundaries of the Nature Conservancy property. Based on the accepted site extent, the 144 structures (50 confirmed and 94 potential) will be used as part of the assessment of spatial organization of the Morton Village community.

The average area of all structures at Morton Village is 36.6 m^2, with a standard deviation of 14.7 m^2 and a range from 5.3 m^2 (STR 20) to 107.8 m^2 (STR 34) (Table D.1; Figure 5.5). The data are slightly positively skewed (skew = 1.02) with a positive kurtosis value of 6.2, meaning the area distribution has an outlier on the right side of the distribution (STR 34). The majority of structure areas are plus or minus one standard deviation from the mean (95 of 144 structures). This distribution is calculated for all 144 structures at Morton Village, but this grouping is not reflective of the varying uses of these structures by the Morton Village inhabitants. This distribution serves to show where the vast majority of structure areas fall.

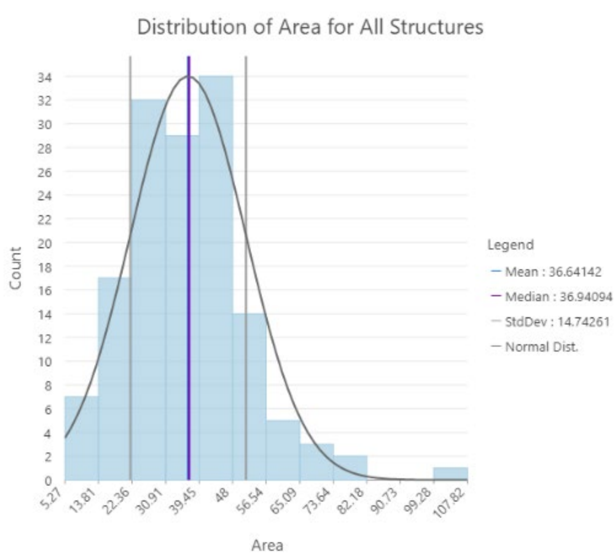

Figure 5.5: Distribution of Areas

5.2.2. Types of Spaces Used at Morton Village

There appears to be clustering of structures around the northern section of the site, where the highest number of structures are located (O'Gorman and Conner 2023). I refer to this area as the 'main occupation area' (Figure 5.4). Outside of the main occupation area, structures tend to follow the natural topography of the bluff top, distributed around the natural topographic depression to the southwest and become more dispersed along the ridges of the bluff to the south. The majority of the 144 structures appear to be either square or rectangular in shape, with the two shorter sides oriented along a northwest to southeast axis (see Structure 26), there are some structures that appear to be oriented north to south (see Structure 7). Two structures (STR 20 and 34) are circular in shape. STR 34 is interpreted as a communal/public structure, while STR 20 is a domestic ritual structure.

The people of Morton Village utilized their space in a variety of ways, both publicly for communal activities and privately in the domestic sphere as well as for domestic rituals (O'Gorman and Conner 2023). Where these structures are located can show how the village inhabitants interacted with public structures on a day-to-day basis or whether there was spatial separation from these structures based on cultural affiliation. How then are these types of spaces organized across the Morton Village community?

5.2.2.1. Communal and Ritual Spaces

Two structures have been identified as likely having public or communal use (STRs 16 and 34) (Figure 5.4). Structure 16, initially discovered in 2008, was excavated in its entirety during excavations between 2009-2011 and 2013 (Figure 5.6). This 9 by 9 meter, square, single-post structure is located in the eastern part of the main occupation area. Structure 16 has a unique architectural style, with a prepared outer bench inside the semi-subterranean structure, with the basin leveled out to natural B-horizon soil (O’Gorman and Conner 2023). The bench is about one meter wide with wall posts around the outer edge, the inner edge drops about 20 cm down sharply, forming the wall of an inner basin (O’Gorman and Conner 2016). There is an extension ramp on the east side of the structure that may have functioned as an alcove (O’Gorman and Conner 2016). O’Gorman and Conner (2023) suggest that this area could have been a space for a ritual display, visible to people in the building. There is a clay-lined hearth, set east of center with three renewal episodes located near the alcove and a nearby pavement of Oneota jar sections, each carefully placed with exterior faces downward (O’Gorman and Conner 2016). A bundle burial of an adult female and at least two subadults was found in a shallow basin in the center of the structure (O’Gorman and Conner 2023). Oneota ceramics predominate in the structure, but Mississippian pottery is also present. This structure represents an increase in ritual intensity at the site, likely serving as an integrative facility between Middle Mississippian and Oneota people (O’Gorman and Conner 2023).

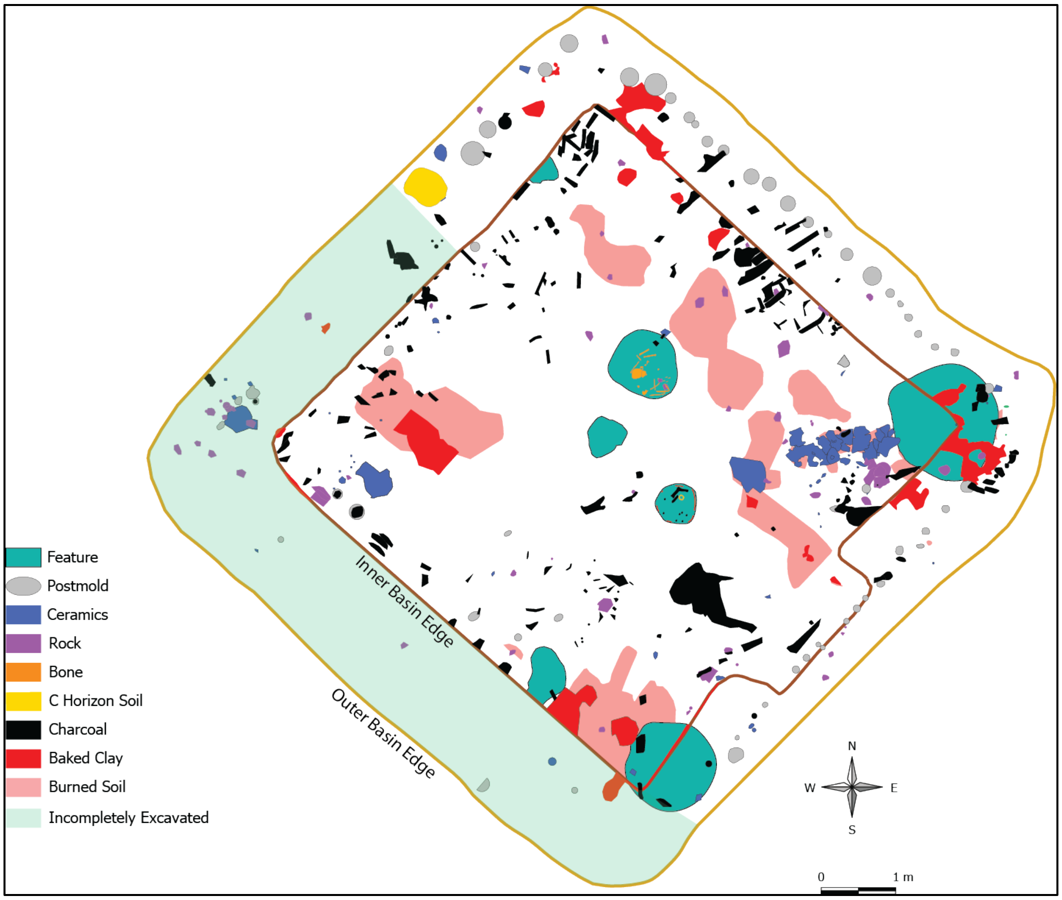

Figure 5.6: Structure 16 Colorized, Adapted from O'Gorman and Conner 2015

Structure 34 is a large, circular, wall trench structure, with a center post, associated with at least two rebuilding episodes, one concentric and the other slightly offset (Figure 5.7). The structure is approximately 11.5 meters in diameter for the at least one of the iterations of the structure. It is located amongst domestic structures in the center of the main occupation area. It crosscuts at least one domestic, wall trench structure (STR 36). Oneota and Mississippian pottery was recovered from inside the wall trenches of STR 34, with most being Mississippian in style and form. O'Gorman and Conner (2023) found that similar non-domestic, ritual structures are known from Mississippian sites elsewhere in the region. Initially this structure was not identified on magnetometer survey as it lacks an internal basin like the other structures, but later GPR successfully identified the architecture.

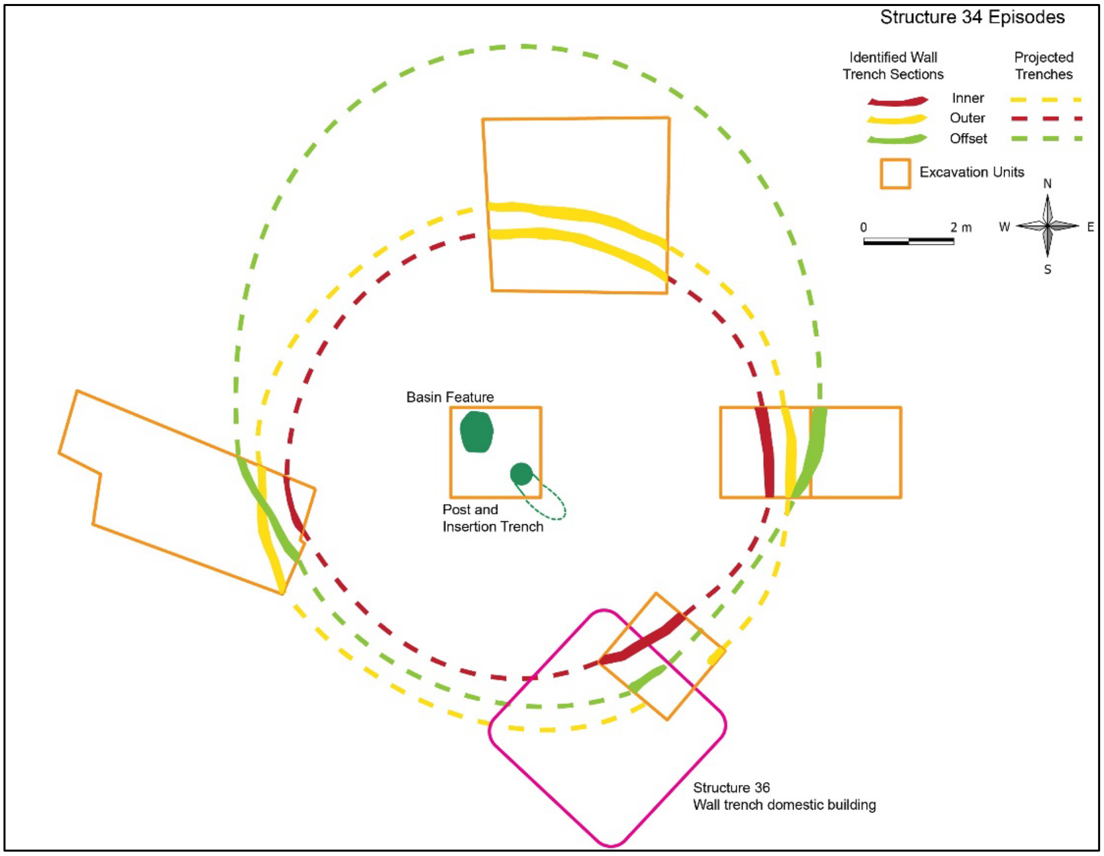

Figure 5.7: Structure 34 Colorized, Adapted from O'Gorman and Conner 2016

The two confirmed communal structures are both found within the main occupation area of the village, surrounding a naturally occurring topographic depression at the site. Interestingly, there was a general lack of super-positioning of structures and pit features within the village, except for areas of re-structuring the village to accommodate placement of the communal ritual structures (O'Gorman and Conner 2023). The structures vary in size and shape, with varying architectural styles, one having single post architecture (STR 16) and one having wall trench architecture (STR 34) (Table 5.2). If additional communal structures exist within the village, there may be ways to identify them.

Table 5.2: Morton Village Confirmed Public Architecture

Structure No.	Shape	Architecture Type	Perimeter (m)	Area (in m^2)
16	Square	Single Post	33.28	77.45

Table 5.2 (cont'd)

Structure No.	Shape	Architecture Type	Perimeter (m)	Area (in m^2)
34	Circular	Wall Trench	36.87	107.82

5.2.2.1.1. Other Potential Communal and Ritual Spaces

Due to the variability in size of the two communal structures, I examined the remaining 142 structures for similar areas/perimeters (Table D.1). The magnetometry results and structure interpretations can be inspected for similarly shaped structures. STR 34 is the largest structure found at Morton Village, and there are no comparable structures in terms of size and shape elsewhere in the village. Based on the findings of the geophysical survey, it is likely that this circular wall trench structure is unique within the community; however, since the magnetometer did not pick up STR 34, it is possible there are similar structures in unexcavated portions of the site.

STR 16 is the second largest structure found at Morton Village, and there are two structures relatively close in size (within 5 m^2): STR 42 and STR 118. STR 42 is a wall trench structure, measuring 75.5 m^2 in area and located in the southwest section of the site, just before the southwest bluff ridge. This structure was identified during the 2017 testing, but only a small portion was excavated. STR 118 is an unexcavated structure measuring 72.40 m^2 in area, on the far western edge of the site.

Although size and shape are not an exact means of identifying additional communal structures, this exercise shows that there are potentially more communal structures that have not been identified within the Morton Village community. Among these could be special use structures that are similar in size and shape to known domestic structures.

One structure with an unknown function but similar benchlike architecture to STR 16, is STR 50, a 7 by 8-meter, wall trench structure on the western edge of the site that was identified as part of the 2017 testing (Figure 5.8). Only the southwest corner of the structure has been excavated; however, several sherds within the structure have Oneota designs. The excavations of STR 50 are limited and due to remaining questions over its use, its function cannot be confirmed, therefore it is not included as a communal/public structure and is instead included in the later discussion of domestic space.

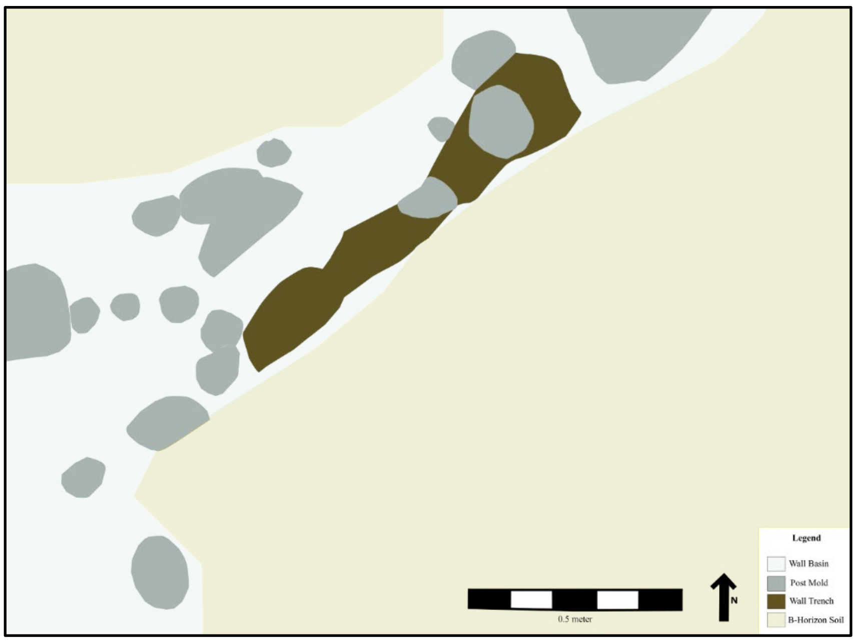

Figure 5.8: Structure 50 excavation map colorized

One structure that appears to have clear evidence of a special use is structure 25, a wall trench structure with a high number of pit features identified in the excavated portion of the structure (seven features in one 16 m^2 excavation block), which indicate that the structure likely had a special use (O'Gorman and Conner 2023). One feature, F224, has been interpreted as a multi-phased feasting event due to its sheer number of artifacts and clear depositional zones (O'Gorman and Conner 2023). These events likely brought both Middle Mississippian inhabitants and Bold Counselor Oneota inhabitants together, based on the commingling of ceramic types found within the different zones (O'Gorman and Conner 2023). The inhabitants at Morton Village had access to a variety of communal/public use structures, used for a variety of ceremonial or ritual purposes that would have been accessed by a larger portion of the community. Is there evidence for other private ceremonial practices occurring within the community?

5.2.2.1.2. Ritual at the Household Level

Morton Village also has a confirmed example of a domestic ritual space being utilized by its inhabitants, STR 20 (O'Gorman and Conner 2023). This space is unique in that it is directly associated with a single domestic structure (STR 19), likely only utilized by the inhabitants of that structure or potentially inhabitants of other nearby structures (O'Gorman and Conner 2016). This structure will be discussed as its existence and use provides insight into a finer scale of ritual or ceremonial spaces than those larger communal structures.

Structure 20 is a small, circular, single-post structure, approximately 2.5 meters in diameter, located amongst other domestic structures in the northwest village area, directly to the southeast of a larger structure (STR 19) (Table 5.3). Structure 20 contains both Oneota and Mississippian ceramics as well as grinding stones, charcoal, and rock. Based on its proximity to STR 19 and artifacts found within, it is likely that the structure was used as a sweat lodge or other restricted-use, household ancillary structure likely associated with ritual (Figure 5.9) (O'Gorman and Conner 2023).

Table 5.3: Morton Village Domestic Ritual Spaces

Structure No.	Shape	Architecture Type	Perimeter (m)	Area (in m^2)
20	Circular	Single Post	8.35	5.27

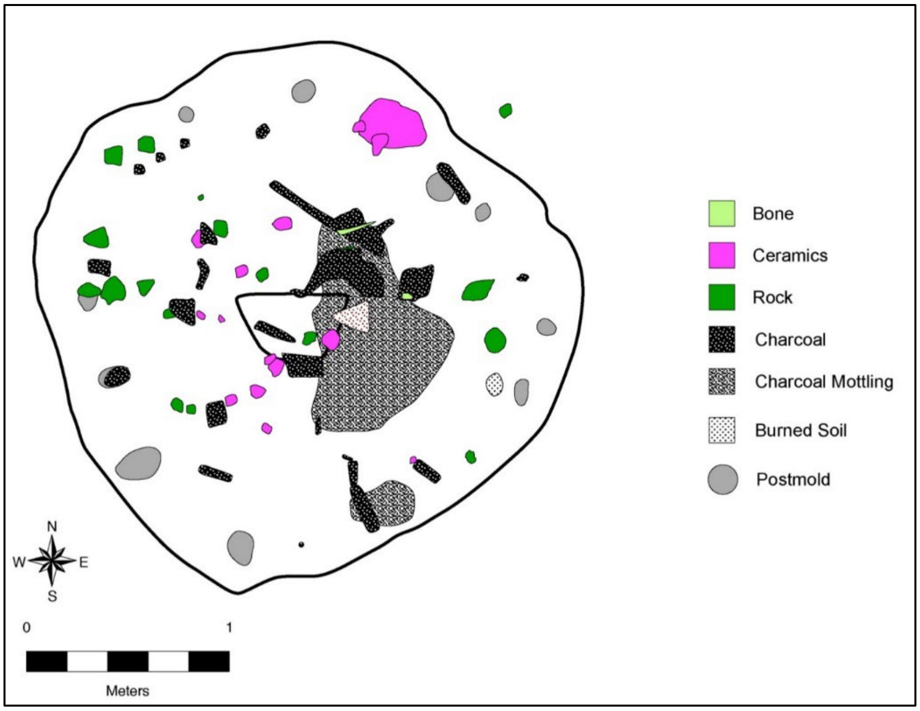

Figure 5.9: Structure 20 Colorized, Adapted from O'Gorman and Conner 2016

Interestingly, its role as a sweat lodge or ancillary structure serves to shift the dichotomy of communal/public structures vs. private. Public architecture is not the only space incorporating ritual or ceremony within Morton Village, there are also smaller spaces used for individualized household ritual within the community (O'Gorman and Conner 2023). It is clear that although there are publicly accessible ritual spaces (STR 16 and STR 34), some rituals were reserved to individual households within the village.

5.2.2.1.3. Mortuary Spaces

These structures are also not the only ways in which communal space is created and utilized in this community. The nearby Norris Farms cemetery indicates an emphasis on public mortuary ritual (see Figure 5.2). The cemetery is located approximately 350 m from the main occupation area of the site, within walking distance of the village. Burials within the cemetery were left open or covered with thatch until use of the cemetery was discontinued, indicated by a red-clay capping/mounding of the area (Santure et al. 1990). Although not the main focus of this dissertation project, the cemetery is important to acknowledge for its role in community construction at Morton Village.

Norris Farms 36 cemetery had 264 individuals buried within its boundaries. Most ceramic artifacts recovered from these burials are recognized as Bold Counselor Oneota, an inference supported by the genetic evidence of the people buried there, which investigators infer is from Oneota people and not local Middle Mississippian populations (Harn 1990; Milner et al. 1991a; Milner et al. 1991b; Milner 1999; Santure et al. 1990; Steadman 1998; Stone 1996; Stone and Stoneking 1993, 1998, 1999). However, radiocarbon dating from the cemetery and the village indicate that the burials were interred early in the village occupation (O'Gorman and Conner 2023; Silva et al. 2014). Adding to this is the fact that the low-lying mound was eventually capped in red clay signifying an end to the use of the cemetery at some point during the occupation of the village. The potential of an early use of the cemetery helps to contextualize Steadman's (1998) findings of a mostly Oneota population biologically. If the cemetery was populated early, perhaps later populations of people living within the village were buried in an alternative mortuary facility that has not been identified. It could be possible that there were separate mortuary facilities for Middle Mississippian populations that lived at Morton Village and that the Middle Mississippian people at the village were not buried at Norris Farms 36. O'Gorman et al. (2020) suggest that Norris Farms 36 served to create a new sense of place for these migrant communities, thus connecting them with their past, present, and future. The fact that such a variety of communal spaces exists within the community is interesting and shows that there was a focus on communal and ceremonial activities by the inhabitants of the village.

5.2.2.2. Domestic Spaces

The predominant structure type in the village are those domestic structures used to meet the daily needs of the people living there. When STR 16 and 34 are removed, it is likely that the majority of the remaining 142 structures served as domestic architecture. The remaining structures have an average area of 35.9 meters, with a standard deviation of 13.1 $m^{2.}$ This value includes those that have been excavated and those that have only been identified as anomalies in the geophysical surveys (Figure 5.10). These structures range from 5.27 m^2 to 75.5 m^2 in area, with a skewness indicating an almost symmetrical data set (0.31) and kurtosis value (3.22) indicating a slight chance for outliers. There is a large range between the smallest and the largest structures areas, and it is likely that some of these anomalies could have uses outside of the domestic sphere.

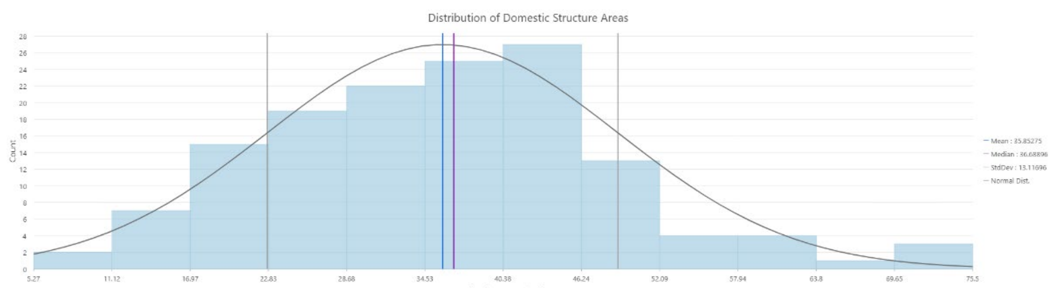

Figure 5.10: Distribution of Areas for 142 Likely Domestic Structures

When the 94 unexcavated structures are removed from the area calculations, the area, standard deviation, skewness, and kurtosis values are similar. The average area of the 48 structures that have been at least partially excavated is 36.3 m^2, with a standard deviation of 13.9 m^2 (Figure 5.11). The majority of these structures (16) are between 40.4 m^2 and 49.2 m^2 in area. When the areas are displayed, the skewness (0.19) indicates an almost symmetrical data set, and the kurtosis (3.33) value indicates a chance for outliers, which based on the graphical distribution of these areas are the smallest, STR 20 (5.27 m^2), and largest STR 42 (75.5 m^2), structures (Figure 5.11). This exercise shows that despite 94 structures being identified using geophysical survey without ground truthing, the removal of their area calculations do not significantly alter the distribution of the areas of the remaining 48 structures.

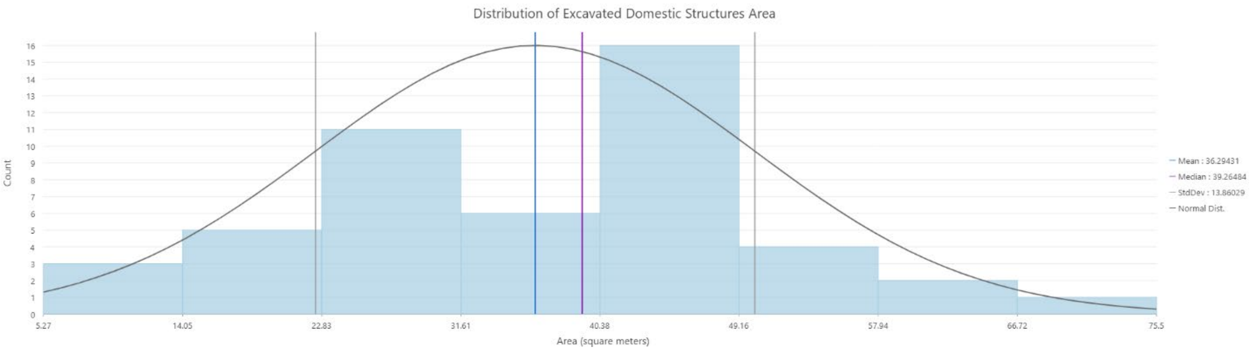

Figure 5.11: Distribution of Areas for 48 Excavated Domestic Structures

5.2.2.2.1. Incorporating Building Styles

As discussed in Chapter 3, Middle Mississippian and Oneota communities generally differed in the type of architecture used to build homes. Oneota villages typically used single-post architecture, while Middle Mississippian villages utilized wall-trench architecture (Alt and Pauketat 2011; Griffin 1967). Of the 50 structures (2 communal and 48 other) at least partially excavated at Morton Village, architecture was identified for 43 of them, with 7 indeterminate (Table 5.4). Of these 24 are wall-trench structures (48% of known structures) and 15 are single post (30% of known structures) (Figure 5.12). This number is not drastically different, but it is notable that wall-trench structures outnumber single-post structures in a space where it has been assumed that Oneota people would be the predominate residents of the community (Esarey and Conrad 1998). Four structures (STRs 10, 17, 22, and 24) incorporate both building styles. In the American Bottom region, similar patterns of two sets of architecture are present and have been interpreted as rebuilding episodes where the house basin is reused (Pauketat and Alt 2005). When the average area is considered for the differing building styles, wall-trench structures are the largest, averaging about 5 m^2 larger than single-post structures (Table 5.5).

Table 5.4: Morton Village Building Types

Architecture Type	Count	Structure Nos.
Both	4	10, 17, 22, 24
Single Post	15	6, 7, 11, 12, 19, 33, 43-45, 47-49, 51
Wall Trench	24	1, 5, 8, 15, 18, 21, 23, 25-32, 36, 38-42, 53
Indeterminate	7	4, 13, 14, 35, 37, 46, 52
Unknown	94	54-147

Table 5.5: Areas for Building Types

Architecture Type	Count	Mean (m^2)	Median (m^2)	Standard Deviation (m^2)	Kurtosis	Skewness
Both	4	37.9	37.8	12.6	1.2	0.01
Single Post	15	38.4	39.5	15.2	5.2	0.5
Wall Trench	24	43.4	41.8	20.0	5.8	1.3
Indeterminate	7	22.8	24.5	7.97	1.95	0.2
Unknown	94	35.6	35.6	12.8	3.1	0.4

The spatial distribution of the two building styles should reflect how the cultural groups arranged themselves within the village. If Bold Counselor Oneota and Middle Mississippian inhabitants were completely separated at Morton Village, then their building styles will be spatially segregated from each other (Burmeister 2000; Clark et al. 2019). If Bold Counselor Oneota and Middle Mississippian inhabitants are completely integrated, there may not be a difference in where the building styles are found; groupings of structures will be constructed using either style, or a mix of building styles.

Of those structures with architecture identified, the majority are found within the previously described main occupation area and extend south along the eastern edge of the site (Figure 5.12). The lack of architecture data or exploration of those structural anomalies on the southwestern corner of the property is due to excavation limitations while in the field (i.e., landowner restrictions).

No single-post structures exist outside of the main occupation area, while wall trench architecture extends southeast along the bluff ridge towards Norris Farms 36. Wall trench structures also outnumber single post structures in the center of the village between STR 34 and west of STR 16. Three of the four structures that utilized both building styles are found in a somewhat linear pattern intermixed with wall trench structures in the northwest of the site. These structures with both architecture appear to have been rebuilt from wall trench to single post (O'Gorman and Conner 2023). Perhaps as O'Gorman and Conner (2023) interpreted, these rebuilding episodes represent a shift in architecture by Middle Mississippian residents or a shift in the use of a structure from one group to the other. The group of structures along the highway also show a mixture of styles within the same area, but no evidence of rebuilding from wall trench to single post.

Both wall trench and single post architecture exist around STR 16 and STR 34. Both of these structures intruded upon earlier Middle Mississippian wall trench structures, which indicates that these two structures were added after the earliest Middle Mississippian occupation (O'Gorman and Conner 2023). With this in mind, there does not appear to be a preference by the two groups (Oneota and Middle Mississippian) for where their domestic structures should go in relation to their communal structures, reflecting a joint reorganization of village space. Additionally, there are areas where single-post and wall-trench structures are in proximity to each other, often interspersed between each other, likely reflecting integration of the two groups of people and a limited emphasis on separation of architectural styles. On the ridge leading to Norris Farms 36, there is a predominance of wall-trench structures, which could be a function of how the village layout shifted over time. There were Middle Mississippian people living on the bluff-top prior to the Oneota arrival, these wall-trench structures on the ridge predate this arrival (Conner personal communication 2023). Perhaps after Oneota integration, the village consolidated to the main occupation area with wall-trench and single-post structures being used simultaneously.

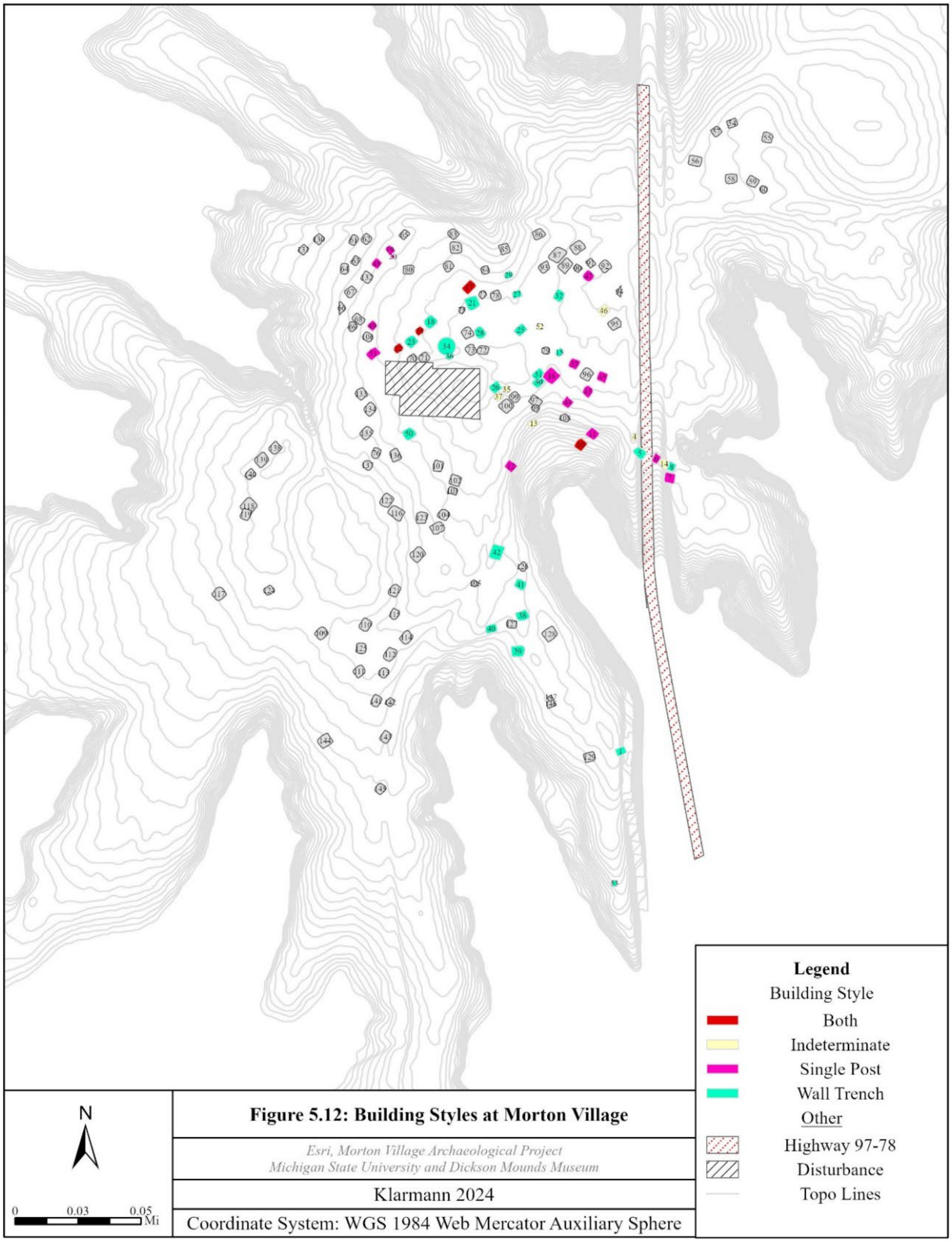

Figure 5.12: Building Styles at Morton Village

5.2.3. Spatial Patterning at Morton Village

Despite a section of the main occupation area of the site being obstructed by the historic building and former gravel parking lot, patterns can be interpreted in the layout of the structures. Across the site, structures average 12.1 meters away from each other, calculated using the Average Nearest Neighbor method, with results indicating that structures exhibit nonrandom clustering across the site (Table 5.6). Although helpful in understanding the proximity between structures across the site, this measure does not allow for an exploration of spatial organization; however, it can be used to explore proximity between structures as part of later analyses.

Table 5.6: Nearest Neighbor Calculations for Morton Village Structures

Observed Mean Distance	12.094404 m
Expected Mean Distance	15.589752 m
Nearest Neighbor Ratio	0.775792
Z-Score	-5.147109
P-value	0.000000

To further explore how the spatial organization of structures at Morton Village may reflect the level of social integration between the two groups living there, patterns within the spatial data can be assessed using a quantitative multivariate clustering (K-means) analysis. This tool is run using the x- and y-coordinates of the center point of structures and identifies statistical clustering of these points. These clusters will then be qualitatively assessed for distinctive spatial patterns. Together, a quantitative approach to define clusters and a qualitative approach to define patterns within these clusters allows for a more nuanced approach to interpreting the spatial organization of Morton Village. People organized their space in distinctive ways that should be clear to any observer, including lines of structures or clusters of structures. Parsing out these patterns within a large spatial area with 144 structures to explore can be a challenge, hence the incorporation of a quantitative approach for initial separation.

5.2.3.1. Quantitative Multivariate Clustering (K-Means) Analysis

To identify spatial statistical patterns within the village organization, multivariate clustering (K-means) analysis can be incorporated. Once run, the resulting clusters can be analyzed for distinctive patterns within them, and in turn, those patterns can be used to make observations/inferences on how the Morton Village community was structured. The multivariate analysis is first run without defining the number of clusters, which produces a pseudo-F statistic; however, the statistic result varies each time this analysis is run. To minimize bias, the analysis is run 10 times, which is used to identify an average number of clusters using the pseudo-F statistic (Table 5.7).

Table 5.7: Determining Ideal Number of Clusters

Test Number	Pseudo-F Statistic Cluster Value
1	28
2	25
3	25
4	28
5	30
6	24
7	26
8	24
9	15
10	26
Average Number of Clusters	*25.1*

This test found an average of 25 clusters is most appropriate for maximizing the ratio of between cluster variance to within cluster variance. The tool is then run again using this number of clusters using the optimized seed locations, with the resulting clusters separated by color (Figure 5.13). Seeds are the features used to grow the individual clusters (i.e., individual structures), with 25 clusters, 25 initial seeds are randomly selected by the system to optimize analysis results and performance (ESRI 2023). A potential dilemma with this analysis and its selection of initial random seeds to divide the data, is that clusters vary slightly each time the analysis is run. Again, this analysis is used to explore quantitative patterns in the data, which can then be analyzed for distinctive, intra-cluster spatial patterns. These patterns likely reflect socio-spatial relationships and can be interpreted accordingly.

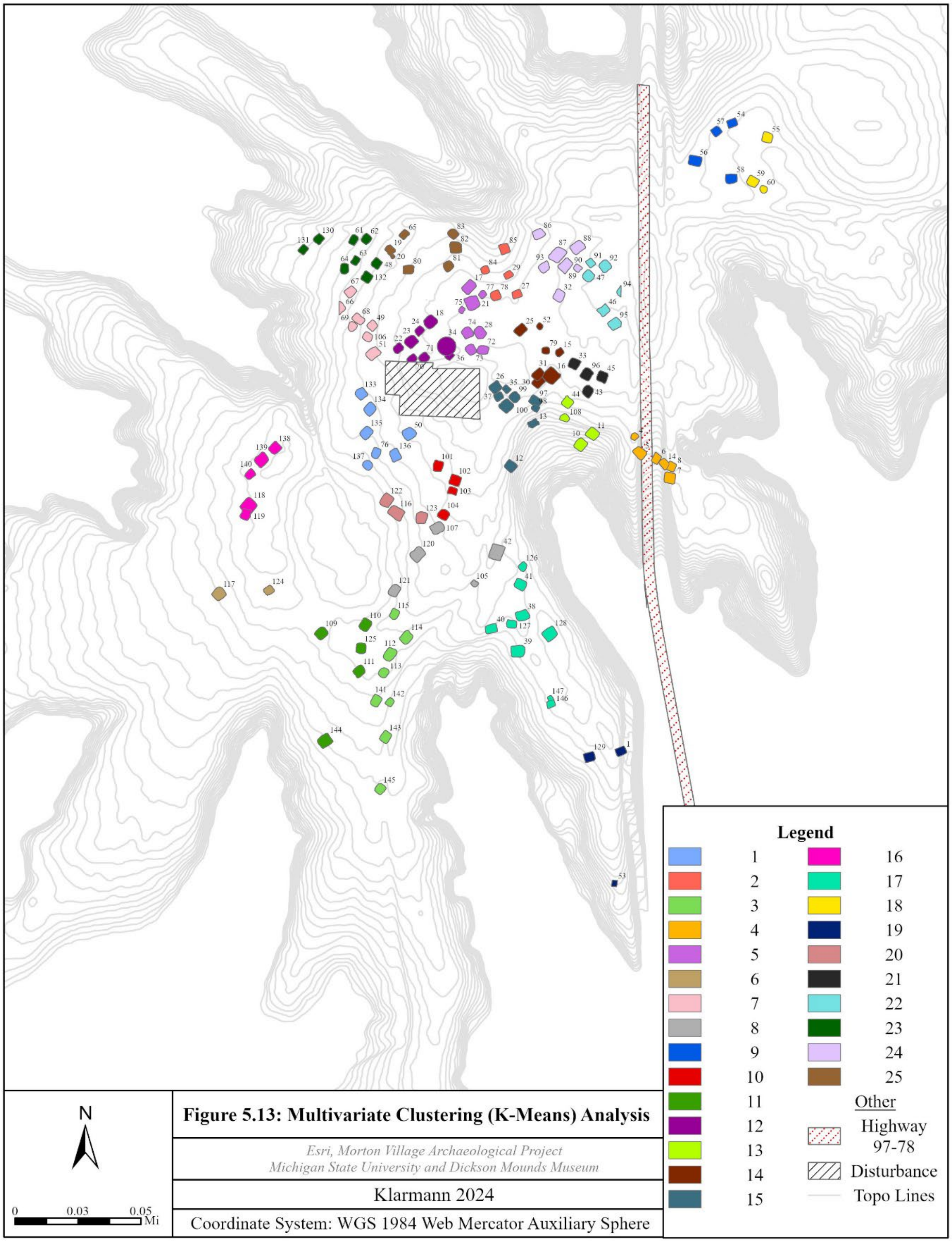

Figure 5.13: Multivariate Clustering (K-Means) Analysis

Detailed characteristics of each cluster, including number of structures, area, and average size of those structures can be found in Table E.1. The average distances between structures within 15 of clusters are less than the average for the entire site, indicating proximity between these structures within their clusters. Clusters vary in the number of structures grouped within them, the clusters with the most structures are Cluster 15 and Cluster 17, which contain 9 structures each. Meanwhile, cluster 6 has the fewest structures (n = 2) and is found in the southwest corner of the site. Within clusters, distance between structures varies; several exceed the previously calculated average distance for the entire site (12.1 m), while other clusters have a smaller average distance apart. Clusters also vary in how many structures each contains; the majority of clusters (n = 5) have 7 structures (Figure 5.14). Closeup maps of each of the clusters can be found in Appendix E (Tables E.1 through E.23).

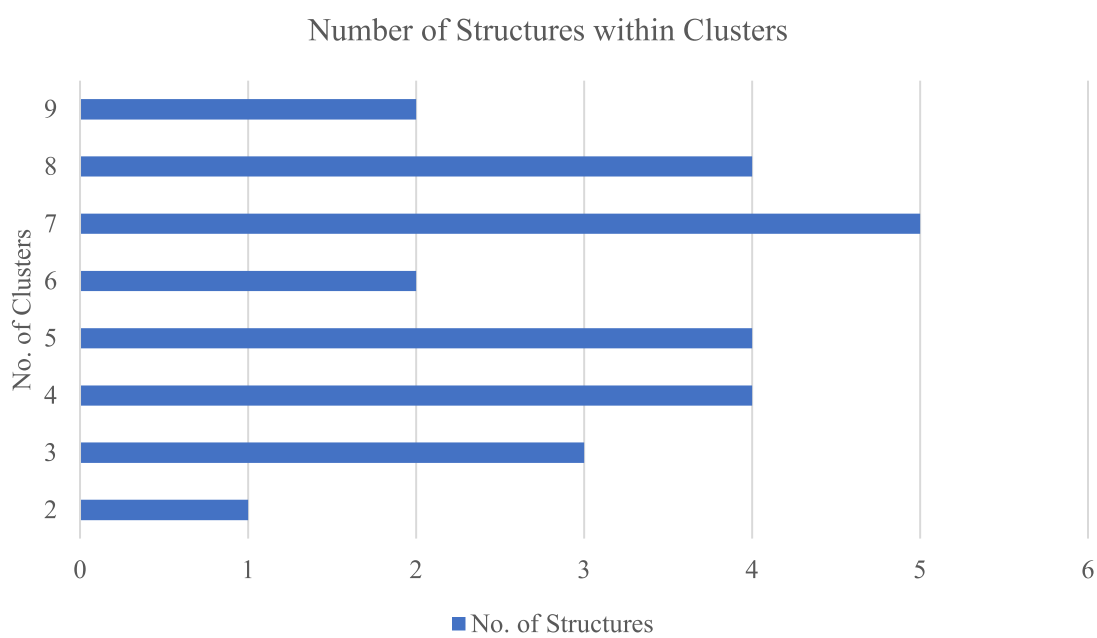

Figure 5.14: Number of structures within each K-means cluster

The majority of clusters are within the main occupation area, which makes sense given this is the densest area of structures. Several of the cluster designations are clearly appropriate given their spatial segregation from other structures (see cluster 4, 6, 9, 16, 18, and 19), with clusters 9 and 18 separated by the main site by the highway.

5.2.3.2. Qualitative Assessment of the Spatial Organization of Morton Village

Using the quantitative patterns as a guide, what then does a qualitative assessment of these clusters indicate about how the village is organized? When these clusters are analyzed qualitatively, there appear to be three ways structures are organized spatially at Morton Village: around openings, in rows, and in groupings (Figure 5.15).

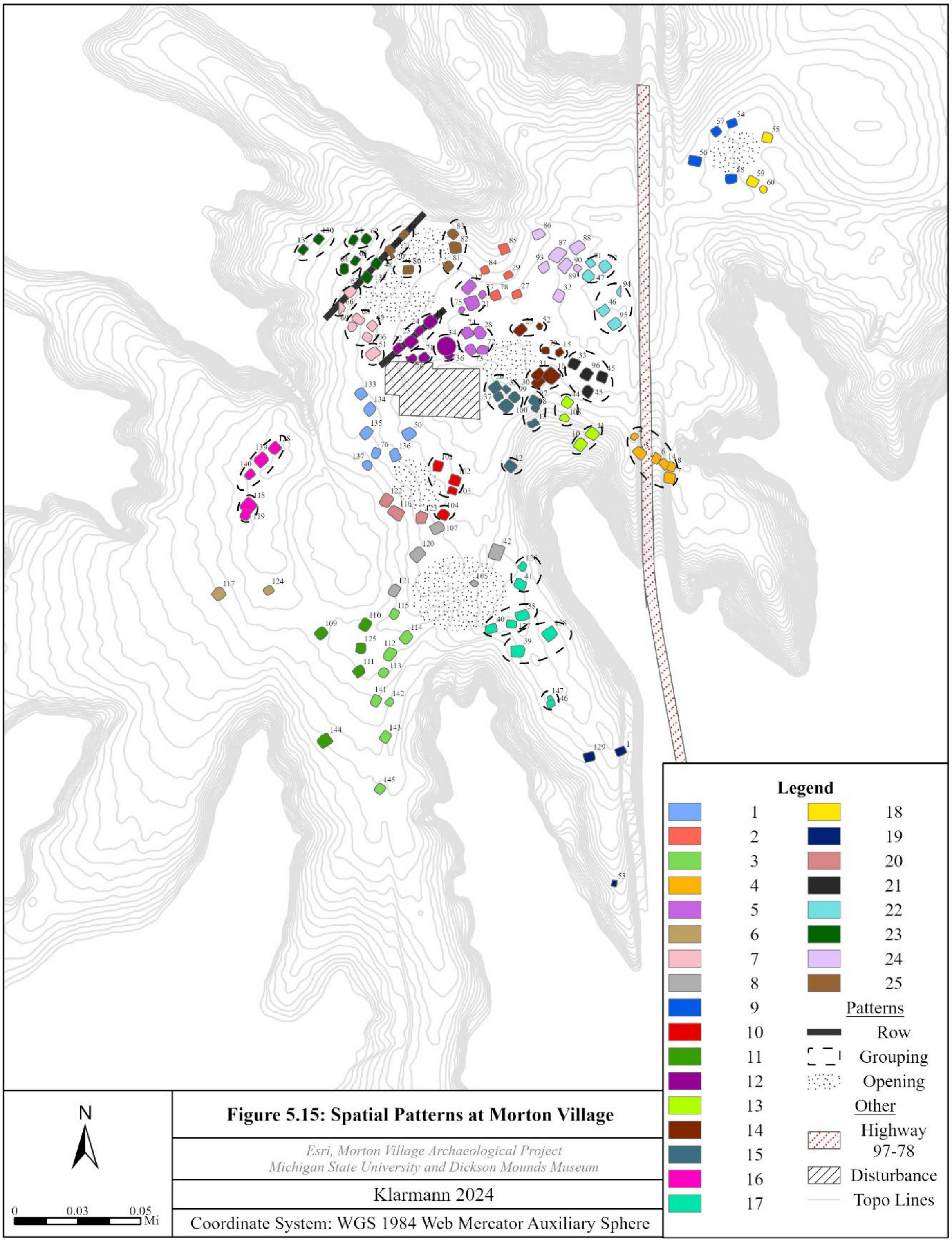

Figure 5.15: Spatial Patterns at Morton Village

First, there are clusters grouped around six open, circular areas, referred to here as openings. These open spaces are within groups of domestic structures, perhaps an incorporation of public/open spaces at the household level. The largest opening is in the southeast portion of the site, between clusters three, eight, and 17, with STR 105 centered within the open space. If no other structures were once in this area, perhaps STR 105 served some sort of special purpose. The opening in cluster 25 is the clearest example of the quantitative approach picking up on a distinctive spatial opening, as all seven structures around this opening were placed into the same cluster (Appendix F; Table 5.8).

Table 5.8: Spatial Pattern at Morton Village: Openings

Number	Structures	Clusters Involved	Approximate Area of opening (m^2)
1	54-60	9. 18	679.8
2	19, 20, 65, 80-83	25	622.6
3	18, 22, 23, 24, 48 49, 67, 68, 80, 132	7, 12, 23, 25	1023.7
4	25, 26, 28, 30, 31, 35, 72, 79	5, 14, 15	738.4
5	101-104, 116, 122, 123, 136	1, 10, 20	784.3
6	38, 40-42, 114, 115, 120, 121, 127, (105 in center)	3, 8, 17	2303.7

In those openings that have been excavated (even portions of them), the spaces are not clear of activity like those plazas found at the larger Middle Mississippian mound and village sites (like Orendorf); rather, they have evidence of various activities taking place within them, such as storage pits and processing areas. Bardolph (2014) found that at the Mississippian Lamb site, an early Mississippian site in the CIRV, households restricted their spatial organization of activities, mainly storage pits and earth ovens, into specific areas between structures. The spatial organization of these processing, cooking, and storage areas likely structured the inhabitants' movements throughout the day (Bardolph 2014). This may be a similar phenomenon to what is seen at Morton Village, and perhaps these openings are best thought of as common areas (O'Gorman and Conner 2023). One area that appears to be an opening but is the result of the large topographic depression discussed earlier, is found in the southwest corner of the site, and is not included as an opening here.

Next, there appear to be rows of structures in the northwest corner of the site (Table 5.9). These rows create a semi-rectangular opening (opening 3) in the northwest of the site, with one row of structures on each side, a pattern reminiscent of Orendorf's village organization (as discussed later) but at a much smaller scale. This area is different than the previously defined openings in how the structures are organized around the opening (rectangular vs. circular). It could represent an earlier Middle Mississippian portion of the village, which will be contextualized further with an incorporation of architectural styles in the next section. Interestingly, the multivariate analysis separated what appears to be a linear group of structures into three other clusters, cluster seven, 23, and 25. It's clear that the multivariate tool is not able to handle a complex, multi-pattern area like the one seen in the northwest edge of the site with both openings and rows. The more southern row in cluster 12 appears to have remained intact with additional structures added to the cluster.

Table 5.9: Spatial Pattern at Morton Village: Rows

Pattern	Number	Structures	Clusters Involved
Rows	1	18, 22-24	12
	2	19, 48, 65-67, 132	7, 23, 25

Finally, 15 of the K-means clusters were found to have average distances between structures that are less than the average distance between all structures (12.1). These 15 clusters can be thought of as groupings, with the structures contained within them being closer in proximity to each other than what is found in other clusters (see Table E.1 for area and distance values). Many of these clusters have smaller groupings /separation of structures within them. Perhaps the quantitative approach picked up on domestic groupings of inter-related residents, and within these clusters there are further differentiation between houses. These intra-cluster groupings were identified by examining each of the 15 clusters individually and identifying proximity to structures within the cluster, those that appear further away from other structures in the cluster were separated as these smaller groupings (Table 5.10).

Table 5.10: Spatial Patterns at Morton Village: Groupings

Cluster Number	Groupings within Cluster	Average Distance Between Structures (m)
4	1	7.5
5	2	8.24
7	3	8.89
10	2	11.08
12	3	7.97
13	2	10.17
14	3	8.64
15	3	9.33
16	2	9.14
17	3	11.08
21	1	10.4
22	2	10.66
23	4	9.91
25	2	9.43

5.2.4. Morton Village Community Organization Summary

The Morton Village community is located on a bluff top overlooking Thompson Lake in the CIRV. Domestic structures are square or rectangular in shape, oriented similarly, making up the majority of structures across the site. Communal structures with complex internal architecture are also present, with two confirmed and the potential for additional communal structures within the community. The two confirmed communal structures are different sizes, shapes, and have differing internal organization, signifying multiple types of uses for these structures across the community. Additional spaces within the village indicate an emphasis on household ritual (STR 20) and ritual feasting events (STR 25). The deceased were buried in a designated low-lying, mounded cemetery south of the main occupation area of the site, on the ridge of the bluff although other mortuary facilities could exist (Santure et al. 1990). These communal, ritual, and mortuary spaces indicate intricacies in the community organization at Morton Village. Communal spaces are located within the main occupation area, and there does not appear to be a distinction for either the single post or wall trench communal structures to be surrounded by similar architectural styles, which indicates that both Oneota and Middle Mississippian people had access to these spaces.

The inhabitants living at Morton Village organized their community in multiple patterns, including rows, groupings, and openings (i.e., around common areas). Rows in the northeast corner of the site bound what could be interpreted as a rectangular opening, slightly different from the other openings, which appear roughly circular. The two defined rows are different in their architectural styles (see Figure 5.12). The northern row has several structures utilizing single-post architecture and the southern row has structures utilizing wall trench architecture and a transition from wall trench to single post architecture.

Openings could represent areas where these smaller extended family groups are collected, creating common areas, potential extended family work and open areas, where multiple households can interact on a daily basis (O’Gorman and Conner 2023). There are three clear openings but likely others that existed within the village but likely were not detected in the magnetometry data. As mentioned previously, the space between rows in the northwest of the site is reminiscent of Orendorf's spatial organization, but at a smaller scale and with a mix of architectural styles within them. The organization of structures around open spaces is not the rule for all houses/households across the site, i.e., not all houses are associated with an opening. Although an example of how multiple households could engage across the village, it is likely that these interactions were not restricted to these common spaces, as shown by the ability to access communal activities outside of openings (e.g., STR 34, not in an opening).

Groupings are restricted to the northeast section of the site, perhaps indicating a continual investment in these smaller groups through rebuilding, through simultaneous occupation of the structures for larger family groups, or perhaps serving a different function within the community, maybe an option for only some inhabitants. Pairs, however, appear to be a pattern used by some inhabitants across the site.

It is clear that several spatial patterns were utilized by the inhabitants at Morton Village to organize their community. Overall, these patterns, groupings, rows, and openings, incorporate both wall trench and single post architecture. These patterns were utilized by both groups (as represented by architectural styles in this instance), often in the same areas, indicating minimal distinction of who had access to certain spaces. Using architecture as a proxy for cultural group, it is clear that no one group is exclusively associated with the spatial patterns seen at Morton. Both groups had access to communal spaces and placed their houses in the same areas. The inhabitants varied the spatial organization of spaces and sometimes grouped structures around common areas where a variety of activities could take place, such as storage and processing, as evidenced by the presence of storage pits across these areas.

Both groups were inhabiting the same spaces within the village, if one group was dominant at Morton Village, these spaces would likely be separated, as Cook (2007) found at

Sunwatch village in Ohio. Perhaps, at Morton Village, there was no dominant group and both groups had equal access to construct their homes in proximity to each other. When all the variations of domestic spatial patterning identified by quantitative and qualitative measures are considered, no exclusive Oneota nor Mississippian pattern emerges, likely reflecting integration within these community spaces and at the household level. The final analysis chapter will further explore the reasons for these spatial patterns through the lens of individual household structure and use of space inside and outside of these structures.

5.3. Site Comparison: Identifying Coalescence at the Community Level

In addition to examining how Morton Village was organized internally, research Question 2 seeks to identify differences or similarities in the community organization of Bold Counselor sites when compared to Oneota and Middle Mississippian sites elsewhere. This question was simplified by identifying representative sites for each of the cultural groups. Morton Village serves as the representative for Bold Counselor Oneota, Orendorf in the CIRV for Middle Mississippian, and Wever Terrace in the Mississippi alluvial plain for Oneota. When the community organization of Orendorf and Wever Terrace are compared to the community organization of Morton Village, it is clear that there are similarities and differences present among the three sites.

5.3.1. Spatial Organization of the Oneota Comparative Site, Wever Terrace

As discussed in Chapter 4, the Mississippi Alluvial Plain region is used as the Oneota comparative region, which is physically close to the Bold Counselor Oneota sites (approximately 80 miles away) and from around the same time period (Withrow 2004b). Although my analysis finds that the Mississippi Alluvial Plain region is not statistically similar to Bold Counselor landscape use, there is potential to identify comparable community organization characteristics between Morton Village and sites in this nearby region. The Wever Terrace site, a circa AD 1300s Oneota village in the Lost Creek locality on the Iowa side of the Mississippi Alluvial Plain region, has been selected as the representative site for this region. Wever Terrace is the most extensively excavated site in this region, with comprehensive spatial information available in its report (Withrow 2004a), making it the region's best option for comparison. Withrow's (2004a) interpretations are used as a guide for how the Wever Terrace community was organized.

Deep plowing of the site destroyed clear evidence of structures; however, deeper pits were still visible below the plow zone (Withrow 2004c). Almost 2,000 Oneota features and almost 200,000 artifacts were uncovered at Wever Terrace, with potentially only half the site excavated (Withrow 2004b). The distribution of these features represents a map of the Wever Terrace community as it would have appeared 70-100 cm below the surface. These deep features leave negative space where potential structures, more shallow features, or larger open spaces might have existed, allowing for a tentative discussion of community organization at the site (Figure 5.16).

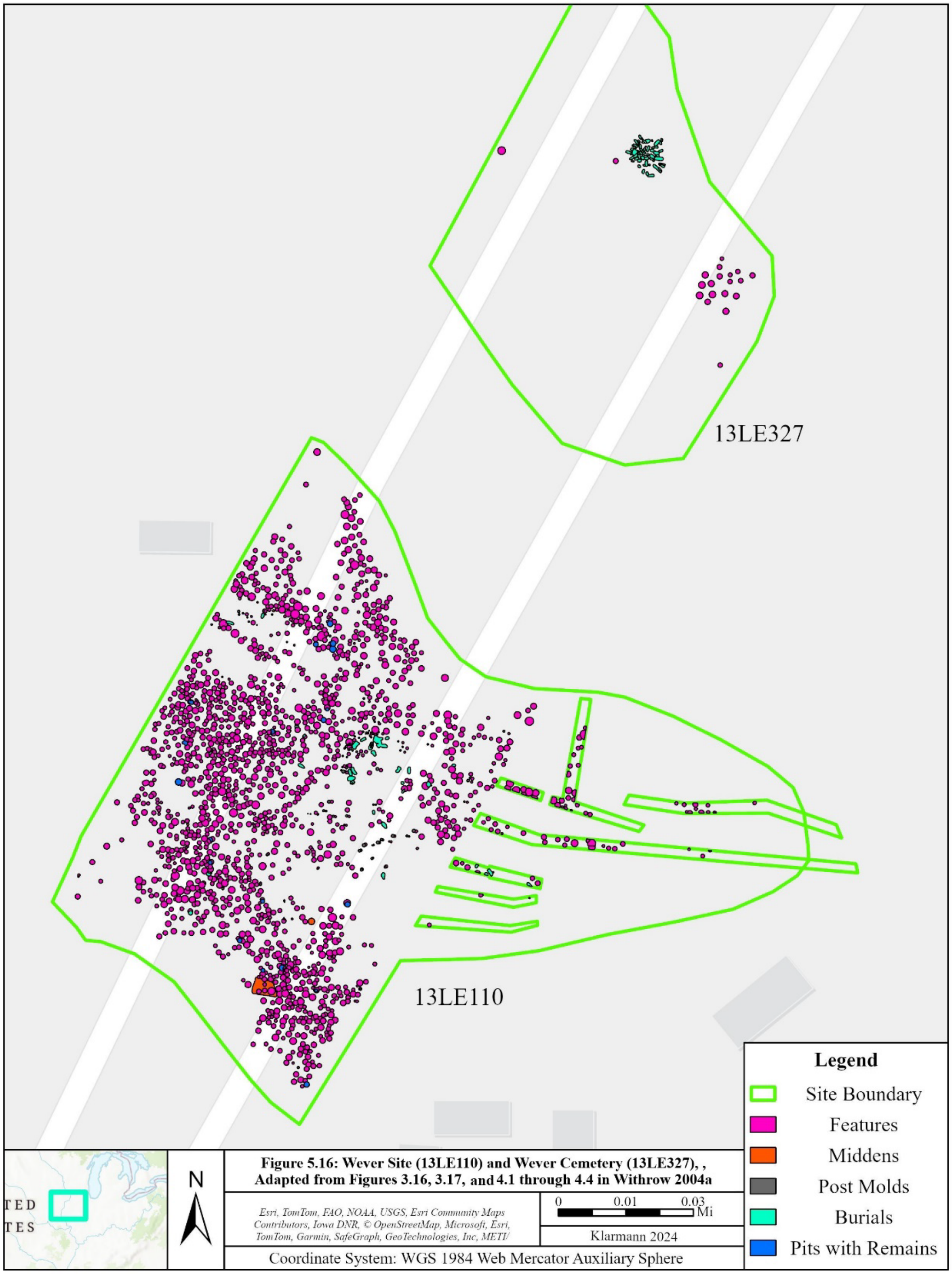

Figure 5.16: Wever Site (13LE110) and Wever Cemetery (13LE327), Adapted from Figures 3.16, 3.17, and 4.1 through 4.4 in Withrow 2004a

The village has a roughly c-shaped, semi-circular organization with a gap facing the Mississippi River bottoms, a central opening that would have been surrounded by houses and related features (Benn et al. 2004). There is no evidence of defensive structures. It is unlikely that houses were semi-subterranean, as the terrace's sandy soils make this construction style untenable (Benn et al. 2004). The most likely residential structure was the longhouse or at least linear clusters of houses, an interpretation supported by the spatial patterns of associated features (Benn et al. 2004). Some posts and hearths were identified despite the deep plowing, some of which were lined with limestone cobbles, a distinctive pattern also seen at the Tremaine Oneota site in western Wisconsin (Benn et al. 2004; O'Gorman 1995). The site is densely covered by pit features that are likely storage pits, which are potentially related to domestic spaces and above ground structures. Some pits at the village appear to be stabilized with limestone, interpreted as supports for central posts within structures (Benn et al. 2004). There are distinctive clusters of pits across the site, with at least 10 clusters identified by Benn et al. (2004) (Table 5.11; Figure 5.17).

Table 5.11: Wever Terrace Clusters as Defined in Withrow (2004a)

Cluster	Description
1	Probable house and related activity areas with one or more possible longhouse patterns on south end of site.
2	Probable house and related activity areas with one or more possible longhouse patterns on south end of site.
3	Potential community midden area
4	Pits along the south wall of a possible longhouse
5	Pits along the north border of a possible longhouse
6	Linear arrangement of 101 features
7	Group of features segregated from others on east edge of possible charnel house structure
8	Low density of features, interpreted as a public space within the community
9	Possible buffer area between residential and public spaces at the site
10	Circle of posts: charnel house or mortuary facility

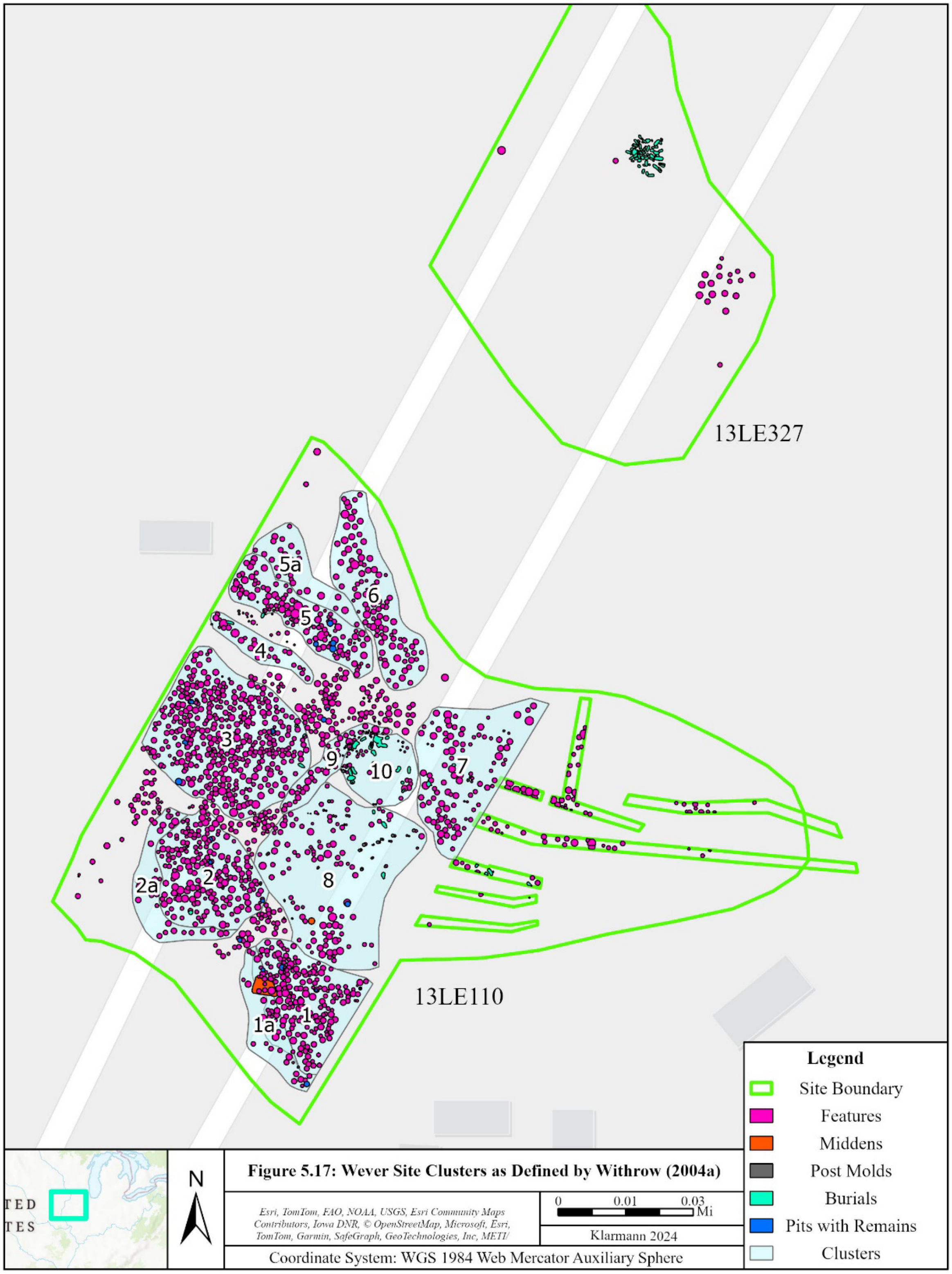

Figure 5.17: Wever Site Clusters as Defined by Withrow (2004a)

Cluster 8 represents a low density of features, which is interpreted as public space within the community by Withrow (2004b). Oneota sites that have had broad areas sufficiently mapped exhibit evidence of open areas, including the Tremaine, Fisher, Hayes, Keeshin Farm, and possibly Grant, Oak Forest, and Lane Enclosure (Withrow 2004b). While Withrow (2004b) interprets at least two distinctive structural spaces (a single longhouse between clusters 4 and 5 and the circular enclosure/charnel house of cluster 10), I argue that there are potentially more longhouses at Wever Terrace (Figure 5.18). Given Withrow's (2004b) definition of structural space, several additional areas with an absence of features have potential, but it is impossible to say that any of these open spaces are in fact longhouses (Benn et al. 2004 citing Hollinger 1993).

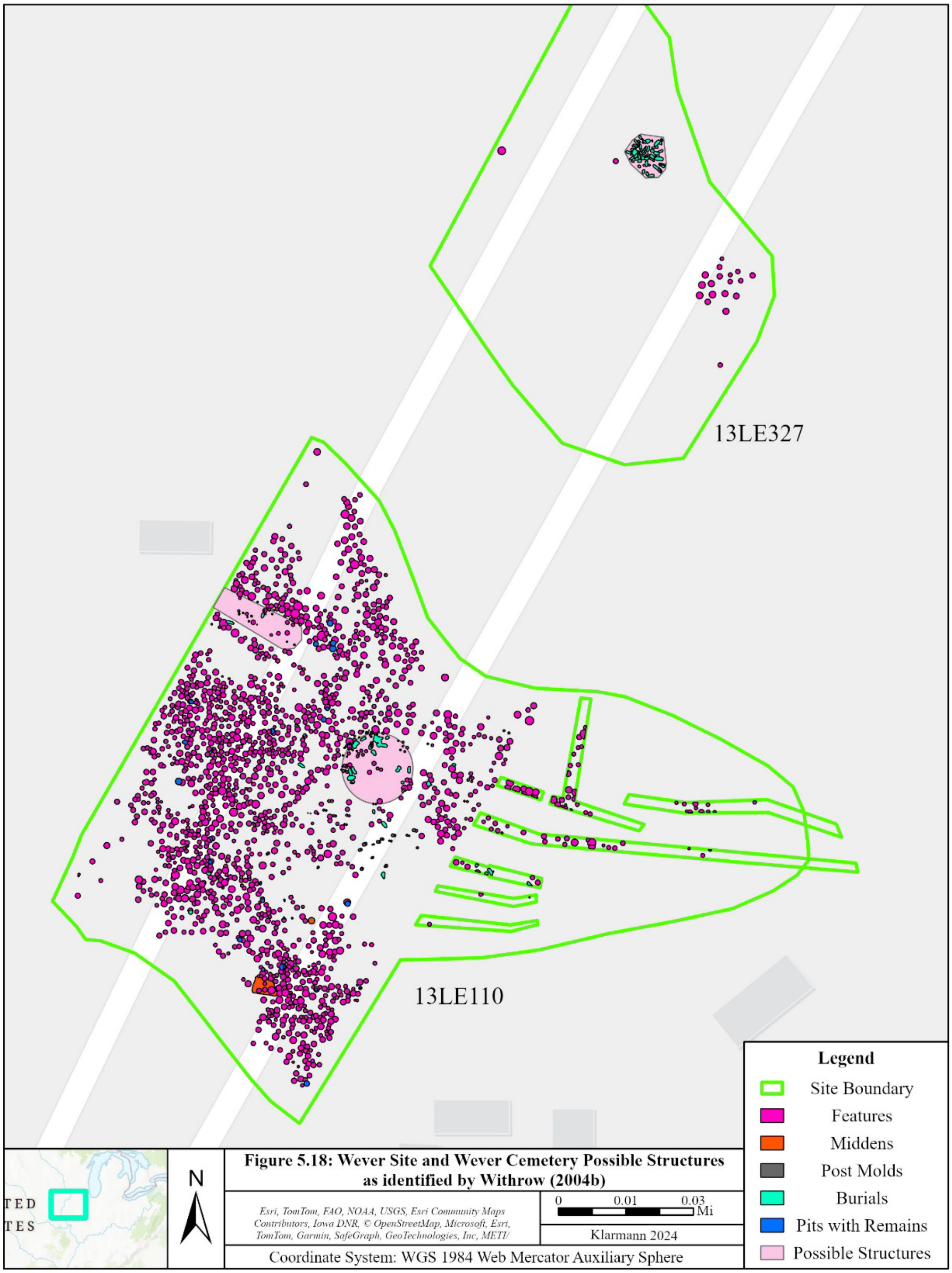

Figure 5.18: Wever Site and Wever Cemetery Possible Structures, identified by Withrow (2004b)

Burials are found in a circular cemetery area to the northeast of the village at 13LE327 and in two clusters along the edges of the central open area. One of these clusters (10) represents a specialized mortuary facility, which differs from Tremaine, where burials are within houses. Cluster 10 has approximately 20 burial features grouped in a more or less circular pattern. Withrow (2004) interprets this pattern as a probable charnel house or mortuary facility, as there is evidence of substantial structural supports (central post) and single post construction encircling the graves. When identified, burials were not excavated but were identified by size and shape and left in place (Hollinger and Vrandenburg 2004). The two circular mortuary complexes are located less than a quarter mile (0.15 miles) from each other. The third burial area is located east of the highway right-of-way (Benn et al. 2004).

There are two communal storage areas, one at Wever Terrace (cluster 6) and one within the cemetery to the northeast; these were defined by the high number of storage pits in the same area. Based on the sheer density of pits found at in the village and cemetery, it is unlikely that all were open at the same time, rather they were likely used and filled at different time periods. Density of pits in clusters 1-3, 7, and 9 suggest that there was some shifting of house positions within these clusters at various points in time. Few situations of pit super-positioning suggest a short occupation period, i.e., feature construction took place quickly, while traces of earlier features were still observable when later pits were dug.

It is difficult to fully ascertain the spatial organization at Wever Terrace with its lack of clear structural remains; however, some interpretations can be made. There is no evidence of any defensive structures and no traces of a palisade within the village. It is likely that the inhabitants lived in large, multifamily longhouses, with likely single-post architecture. The longhouses at Wever Terrace would be some of the earliest in the Oneota Tradition with the 1100-1200 occupation (within the Developmental Horizon) at the site (Withrow 2004b). It is clear the clusters of pits and longhouses represent long-term investments in the village.

5.3.2. Spatial Organization of the Middle Mississippian Comparative Site, Orendorf

In the landscape chapter, I found that bluff-top Middle Mississippian sites in the CIRV are the most similar to Morton Village's landscape organization. As previously described, the settlement pattern for Middle Mississippian sites in the CIRV differs from the complexly interrelated sociopolitical organization found at Cahokia in the American Bottom (see chapter 3). The CIRV had 'central towns', which would typically have clusters of buildings and a temple or charnel mound with a central plaza and fortifications, covering 10-20 acres (Conrad et al. 2019). Often associated with smaller villages, hamlets, and farmsteads, these mound and village sites are situated near each other along the central valley. Orendorf, a circa AD 1200-1250 village was selected as the Middle Mississippian representative site in the CIRV due to the extensive excavations performed at the site and the accessibility of spatial information, which has been reported on in an extensive 2019 site report (Conrad et al. 2019). This report is the basis for this discussion, and its conclusions will be incorporated in my own interpretation of the site organization.

Orendorf (11F1284) Settlement D is the largest and most densely occupied village in a sequence of four or five Middle Mississippian towns with associated mounds on the bluff (Conrad, Esarey, Emerson 2019). The settlement has several instances of residential expansion, increasing from about 33 structures to as many as 100 around a central plaza (Wilson and Melton 2019). The residential expansion coincides with an expansion of the palisade that surrounds the village (Wilson and Melton 2019). The final occupation, dating to the Orendorf phase (AD 1200-

1250) was destroyed by fire (Conrad 1989, 1991). The settlement's mortuary mound (11F107) was located approximately 0.5 km northeast of Settlement D.

The 93 structures within the palisaded boundaries have four different structure shapes: rectangular, circular, L-shaped, and cruciform (Wilson and Melton 2019). The majority are rectangular, likely residences with a variety of domestic activities taking place inside them. The other shapes served a variety of purposes: as ritual storage, as homes for elites, or as community buildings. The palisade was expanded several times, leading to several configurations of the settlement (Wilson and Melton 2019). The final configuration consisted of 76 structures: 72 domestic, one large circular, 1 large rectangular, and 2 small circular (Figure 5.19).

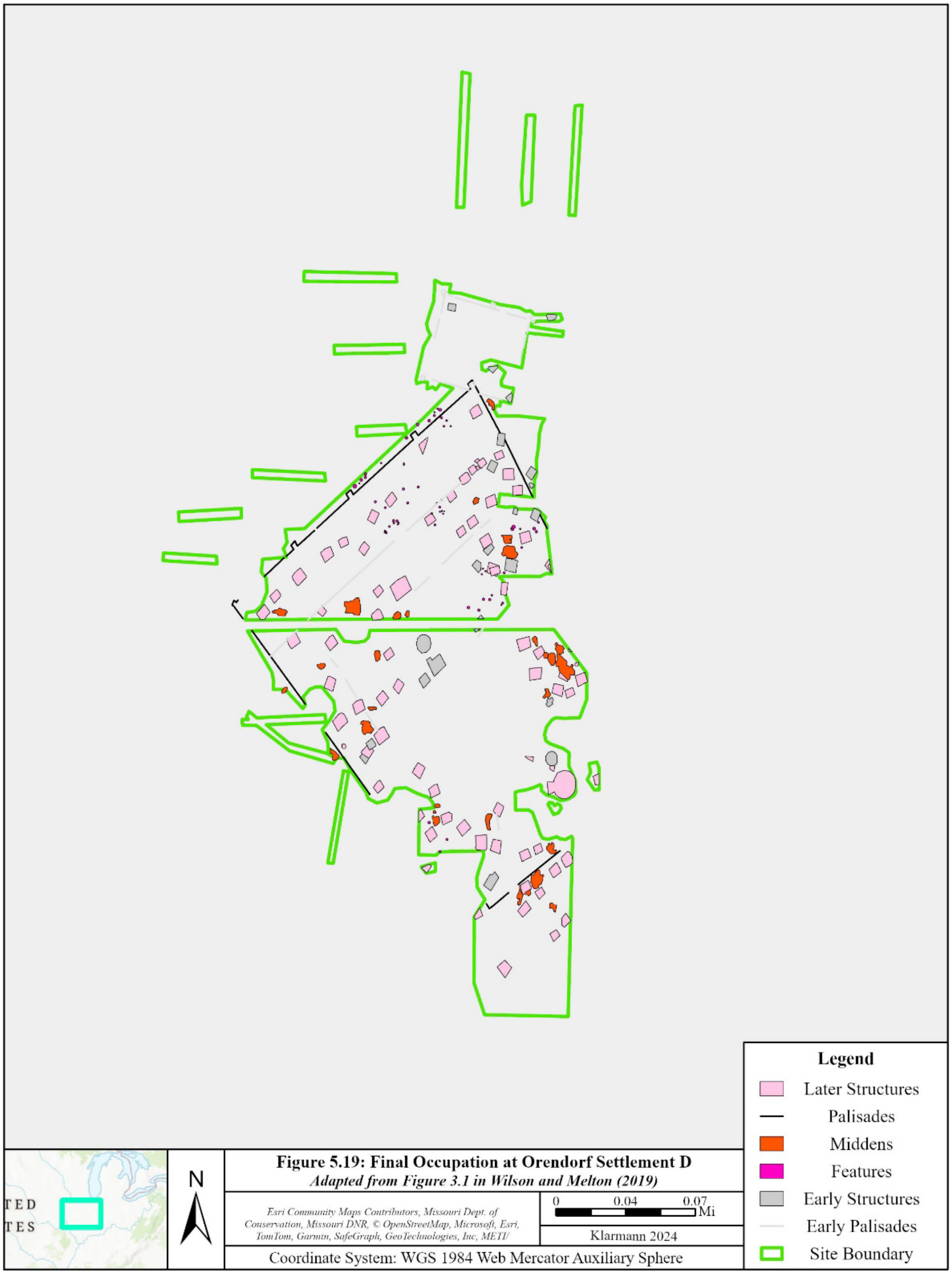

Figure 5.19: Final Occupation at Orendorf Settlement D, Adapted from Figure 3.1 in Wilson and Melton (2019)

Wilson and Geiger (2019) conducted K-means cluster analysis, which separated the 76 structures into 42 different house clusters (Figure 5.20). A common pattern across the site is the pairing of two to three small rectangular domestic structures, with discrete pits clustered around individual structures (Wilson and Geiger 2019). These structures outline the perimeter of the village with the center of the community used as a communal, plaza space. These smaller groupings of structures may have served as multifamily household clusters within the Orendorf community, separate from these communal spaces. Even the larger rectangular and circular structures, interpreted as homes for elites by Wilson and Geiger (2019), had smaller, ancillary structures within their clusters. These structures are on the edge of the plaza areas, connecting the interior, communal space to the perimeter, domestic space within the community.

Although the final occupation of Orendorf is the main community of comparison, it is important to look at the continual investment in this space and the rapid expansion. This growth is interpreted as a response to the intensification of warfare in the 13th century, correlating with violence-related skeletal trauma in the mortuary population (Emerson, et al. 2019; Steadman 2008). New members coming in enacted a similar suite of household organizational practices as the early residents in the village (Wilson and Geiger 2019). Additionally, public structures were rebuilt to expand their size, thereby incorporating new people into the community.

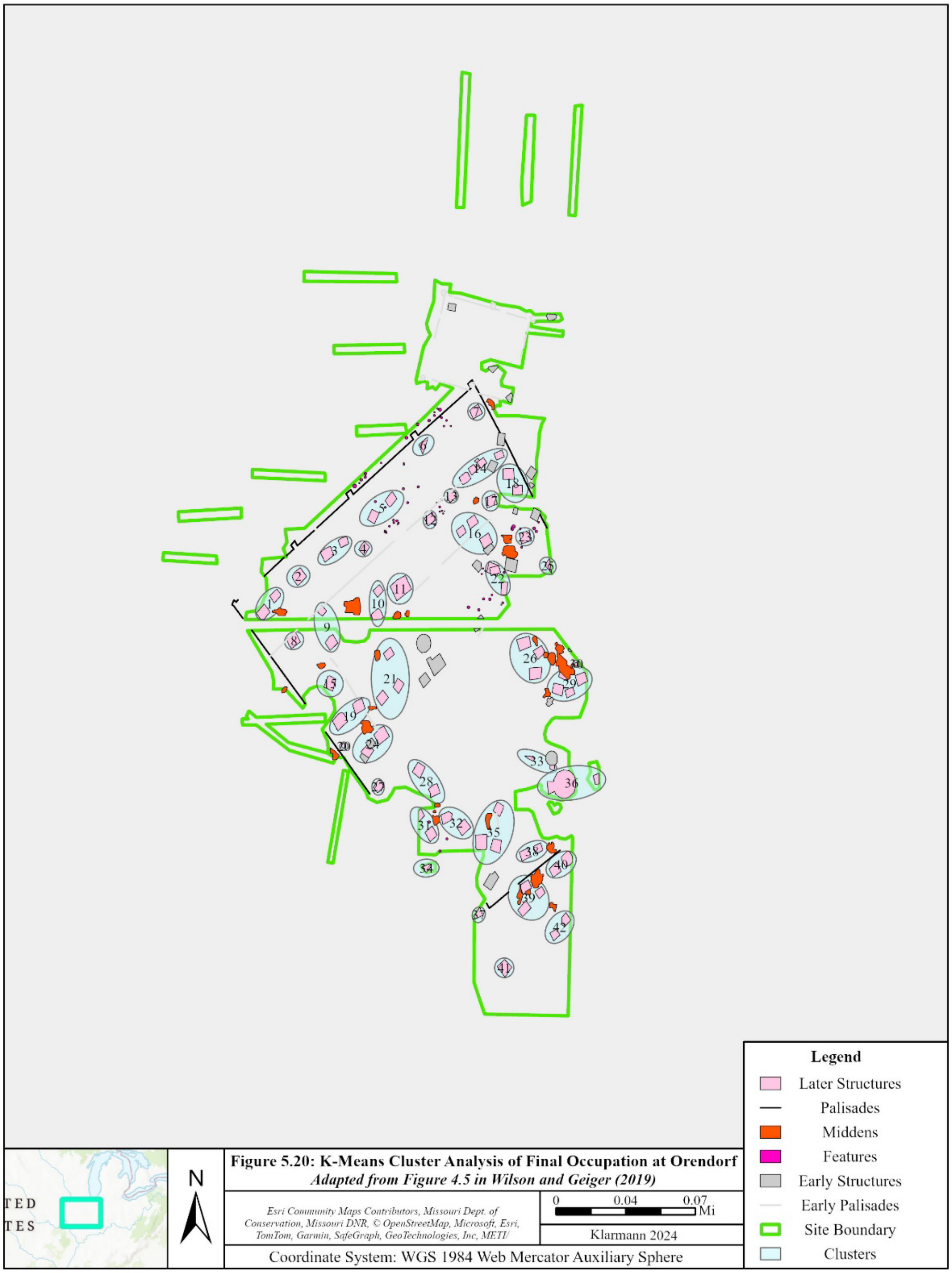

Figure 5.20: K-Means Cluster Analysis of Final Occupation at Orendorf, Adapted from Figure 4.5 in Wilson and Geiger (2019)

In each iteration of the village, structures are organized in a line around the perimeter of the village, following the palisade walls, with a central, open plaza area in the center of the community. The public space also has multiple public structures that were rebuilt and expanded multiple times as the community grew in size. The village was likely organized hierarchically, with elites living in larger homes, while other residents of the village lived in smaller, rectangular structures of a standard size. These homes all surrounded a central plaza, which likely engaged the majority of people within the community.

5.3.3. Community Organization Comparison

With the community organization of Morton Village detailed and Orendorf and Wever Terrace described, the community characteristics of the sites can be compared. One major difference is found in the domestic structure forms for Oneota vs. Middle Mississippian sites (Table 5.12). Wever Terrace domestic structures are likely multi-family longhouses, while Orendorf and Morton Village have smaller, likely single-family dwellings, many of which are grouped together into smaller, likely household units.

Table 5.12: Comparison between Morton Village, Orendorf, and Wever Terrace

Site Name	Wever Terrace	Morton Village	Orendorf
Architectural Style	Single post	Single post, wall trench, both	Wall trench
Domestic Structure Forms	Longhouses	Rectangular and square, semi-subterranean	Rectangular, semi-subterranean
Treatment of the Dead	Charnel house(s); within domestic structures	Low, mounded cemetery outside of village; some within communal structure	Burial mounds outside of village
Presence of Communal Architecture	Yes, charnel house; common area	Yes, of varying size, shape, and type; common areas	Yes, of varying size, shape, and type, likely reserved for elites; central plaza

Table 5.12 (cont'd)

Site Name	**Wever Terrace**	**Morton Village**	**Orendorf**
General Structure Size	Multi-family dwellings	Single family dwellings, grouped	Single family dwellings, grouped
Defensive Structures	None	None (bluff-top location)	Palisade and bluff-top location
Household Patterns	Single longhouses, or pairs	Groupings, Rows, around common areas	Groupings around central plaza

When compared to Orendorf, Morton Village has similar domestic-structure shapes and sizes. Although Oneota sites elsewhere do have other forms of domestic structures that would be more comparable, there are few from the same time period or in proximity that have data (Hollinger 1995). Orendorf has significantly more variety in the shape and function of its structures, but Morton Village does have complex communal and ceremonial architecture, present in STRs 16 and 34. The large, circular STR 34 is reminiscent of the large circular structure found at Orendorf. Additionally, Orendorf has several small circular sweat lodges, similar to STR 20 at Morton Village. As the spatial analysis of Morton Village showed, there are potentially other ancillary ritual structures associated with domestic structures, which may mean that STR 20 is only one instance of domestic ritual behavior that might have existed at Morton Village.

The internal architecture and organization of STR 16 is unique to Morton Village, but there is a possibility that there are other structures with similar features within the community, i.e., STR 50, indicating that perhaps what may have initially been perceived as the only structure of its type in the village could have corollaries elsewhere in the site. Additionally, Morton's STR 34 is similar to Middle Mississippian sites elsewhere, including those circular structures found at Orendorf (STR 169 and 187). Like those, STR 34 does not appear to have an internal basin, but the two congruent rebuilding episodes of the structure do have a central post. The two Orendorf structures were interpreted as meeting spaces or council houses; perhaps STR 34, as the only one of its kind at Morton, served a similar purpose. Additionally, there is evidence of household ritual at Morton Village (STR 20), which is similar to a small circular structure found at Orendorf (STR 173) and interpreted as a sweat lodge. Interestingly, Morton Village does not appear to have one open plaza, like Orendorf, but smaller common areas within household spaces, potentially similar to the open area at Wever Terrace near the charnel structure. Communal spaces at Morton Village are smaller but appear more numerous and dispersed across the site. When the lack of plaza and apparent use of these open common areas is considered, Morton Village is organized more like an Oneota village (in this case Wever Terrace), than a Middle Mississippian village.

Each of the three sites has distinctive mortuary practices. At Wever Terrace, the dead are buried in a charnel-house-like structures, at Orendorf, they are buried in mounds outside of the palisaded village, while at Morton Village they are buried in a designated cemetery (Norris Farms 36) that was eventually covered and mounded but are also found in the communal structures (STR 16). We do not know whether Norris Farms 36 was the only cemetery utilized by the Morton Village inhabitants, especially considering the high number of Oneota ceramics found. It is possible that there are additional cemetery spaces utilized by inhabitants of the village. Additionally, Wever Terrace and Morton Village appear to have no defensive architecture, while Orendorf used palisade walls around the village, which were rebuilt several times. Interestingly, this lack of defensive architecture mirrors other areas of Oneota influence, where sites do not typically have palisades, and defensive measures seem to rely instead on the density of people (Hollinger 2018).

Morton Village and Orendorf have similar community features, with similarly shaped domestic structures, groupings of two or more structures, and an emphasis on communal architecture and domestic ritual spaces (i.e., STR 20). Although different from the singular large plaza, Morton Village has distinctive openings surrounded by structures, likely common areas, although potentially similar to the open space (cluster 8) at Wever Terrace and other Oneota communities. The largest difference between Morton Village and Orendorf is its lack of a palisade or any defensive architecture, a characteristic shared with the Wever Terrace site. Additionally, Morton Village lacks an organized plaza, another characteristic shared with Wever Terrace. The open areas represent domestic work areas and are not formal plazas as are present at Middle Mississippian mound and village sites. Our understanding of the full variation within the Oneota tradition is much less understood than Middle Mississippian community organization in the CIRV. This makes it difficult to definitively say that the inhabitants at Morton Village were more influenced by Middle Mississippian community patterns over Oneota community patterns. With that in mind, the community organization at Morton Village reflects some characteristics of both Oneota and Middle Mississippian communities.

5.4. Answering Research Question 2: Coalescence in the Community

In this chapter I have explored questions of community organization at three sites: Wever Terrace as a representative of Oneota communities, Orendorf as a representative of Middle Mississippian communities, and Morton Village as a representative of Bold Counselor Oneota communities. When the three are compared, Morton Village has attributes that are reminiscent of both Wever Terrace and Orendorf; however, it has some unique attributes as well. I now turn to the question of whether the community organization of Morton Village indicates that coalescence was occurring between Middle Mississippian populations and Bold Counselor Oneota populations at Morton Village.

Within Kowalewski's (2006) model of coalescence, he emphasizes that there should be an elaboration of community integration and a universalizing of collective ritual practices in contexts of coalescence, making these activities available for everyone. This should be evident in new forms of communal architecture, aggregation centered on the communal architecture, and continued focus on communal ritual should be present in coalesced communities (Stone 2008).

The large, wall trench structure, STR 34, is similar to Orendorf's Structure 187 and both were the largest structures in the respective settlements. Morton Village does have its own unique communal architecture in the form of STR 16, used for ceremonial purposes described previously (O'Gorman and Conner 2023). Additionally, communal structures at Morton Village are within the main domestic occupation area, surrounded by likely domestic structures, not spatially separated. Based on their spatial locations and the presence of both Oneota and Middle Mississippian ceramics in these structures, it appears that these communal structures could be used by the larger community, and likely served as integrative structures between the people residing there.

An additional tenet of coalescence defined by Kowalewski (2006) is the promotion of community integration between the coalescing groups using the layout of domestic architecture and creation of public spaces. How buildings are organized within a community provides insights into changes in public and domestic space over time (Foster 1989; Moore 1992; Tabor 1976). According to Cook (2007), if more than one group is present at a site, public contexts will likely be controlled by the dominant group. Considering architectural style as a proxy for cultural group and considering the artifact styles typically associated with Mississippian vs. Oneota contexts, the two public structures at Morton Village do not indicate a preference for one group over the other accessing these public spaces. They both sit in the main occupation area and have evidence of both ceramic styles within them.

Further, if wall-trench architecture represents Middle Mississippian influence within the village, it should be noted that it is the predominant architecture for the excavated structures at the site and specifically within the main occupation area. There are also single-post structures within this area, often next to wall trench structures or in close proximity. With any archaeological site, additional information would better show differences/similarities in architectural styles across the site, but with the currently known data, it is clear that both wall trench and single post architecture is utilized within the densest occupation area of the village. Additionally, the spatial patterns identified at Morton Village—groupings, rows, openings, and pairs of structures—all incorporate both wall trench and single post architecture. I argue that based on these patterns and those seen at Oneota and Middle Mississippian sites elsewhere, both the Oneota and Middle Mississippian inhabitants at Morton Village brought aspects of their identities into this new community space, integrating architectural styles, communal/ceremonial spaces, and domestic spaces.

With Morton Village's community structure contextualized in comparison to the Middle Mississippian site (Orendorf) and Oneota site (Wever Terrace), a finer scale can be explored to see how Morton Village compares to these sites on a household level. Focusing on these domestic spaces and the artifactual differences between them can identify whether the patterns seen at the community level, i.e., the integration of architectural forms and communal spaces and increased access to communal architecture, are reflected in the individual household groups found at Morton Village.

CHAPTER 6: HOUSEHOLD SCALE

6.1. Research Question 3: How are the household spaces within the Morton Village community organized? Does one group utilize these spaces differently or is there overlap between the Oneota and Middle Mississippian spaces at the village?

At the largest spatial scale considered in this dissertation, landscape, I sought to generalize the settlement characteristics of both Oneota and Middle Mississippian sites to compare to Morton Village. What I found is that there is no set Oneota or Middle Mississippian landscape use pattern. Both groups adapted to the locations in which they settled. Oneota landscape use depends on the locality/region it is in, while Middle Mississippian landscape use is tied to topography and the local landscape. When these ideas are applied to Bold Counselor Oneota sites in the CIRV, including Morton Village, they most closely align with Middle Mississippian sites in the CIRV. This resemblance was likely the result of Oneota populations moving into a CIRV already occupied by Middle Mississippians.

Diving further into this idea of Oneota groups in a Middle Mississippian area, the second spatial scale, community, was examined. The goal of that chapter was to identify whether the organization at Morton Village most closely resembled an Oneota or Middle Mississippian community. I found that Morton Village has attributes that are reminiscent of both, with unique attributes as well. Morton Village lacks a central plaza and palisade; instead of a plaza it exhibits multiple smaller common areas (openings), where groups of structures (groupings or rows) are organized, creating household groupings. With these considerations, it is likely that Oneota and Middle Mississippian inhabitants both brought aspects of their identities into Morton Village, integrating architectural styles, artifact styles, and their communal, ceremonial, and domestic spaces. With the groupings identified in the community chapter, the smallest spatial scale, household can be explored further.

This chapter investigates this smallest scale for evidence of coalescence, using the Morton Village site as a case study. The household, as used here, is defined as the physical manifestation of a variety of societal factors that structures how people shape their residences (Coen, Meredith, and Condie 2017; Steadman 2015; Wilk and Rathje 1982). The concept can be used to investigate those smaller-scale interactions between individuals, examining how domestic structure reflects the social order or the inhabitant's creation of place through the material culture left behind.

Variations in the built environment and architecture will be examined, identifying particular cultural traits within household contexts (Birch 2012; Clark et al. 2019; Gerritsen 2004: 151; Hodder 1986: 7-8; Liebmann 2013; Thomas 2004: 34). In order to explore this, archaeological proxies for certain behaviors shall be identified and their spatial distribution assessed. Comparison of households will provide information with which to explore whether the process of coalescence was occurring at Morton Village. As discussed earlier, coalescence is essentially a framework through which to study the creation and maintenance of multicultural communities (Clark et al. 2019). The landscape and community chapter showed that Oneota people came into a Middle Mississippian space and adapted that space to maintain aspects of their Oneota identity in a Middle Mississippian world. These adaptations can be further evaluated by identifying how households used and shaped their spaces through specific behaviors.

6.2. Revisiting the Space of Households

Domestic architecture/dwellings are used by communities to meet the daily needs of their inhabitants, studied as part of the household concept (Wilk and Rathje 1982). The physical domestic structure is related to environment, household demography, and activities to form the social concept of household (Rogers 1995; Wilk and Rathe 1982). Often, the concept of household will extend beyond the boundaries of a single house, encompassing multiple structures whose inhabitants come together to meet their day-to-day needs.

An archaeology of place recognizes that how material culture is organized spatially depends on the activities and social relationships of people. Spatial patterns identified archaeologically are the result of intended and unintended consequences of these people's actions (Wheatley 2004, citing Giddens 1984). Households are actively affected by the actions of various forces within the community, including economic, social, and ideological interests of the inhabitants (Parker and Foster 2012; Matthews 2012). Households are not static; as the structures of these relationships change, so too may the components of households. This is an important point because in contexts of interaction and integration, people of different backgrounds will construct their space differently. These differences should be visible archaeologically through the items left behind by the inhabitants of these spaces. As Hillier and Hanson (1984:2) say, "the ordering of space in buildings is really about the ordering of relations between people."

One of the tenets of coalescence defined by Kowalewski (2006) is that domestic architecture and village layout will be designed to promote integration. Archaeological patterns in domestic architecture can be analyzed to determine how inhabitants constructed their day-to-day lives. Households vary over time and between cultures, and members of communities will adapt their 'sense of place' based on fluctuations of the status quo (Bermann 2014; Hirth 1993;

Prohansky et al. 1983). The introduction of new people belonging to new cultural groups alters the 'sense of place' that a community feels in relation to their space (Gillings et al. 2020). This may result in subtle shifts in the organization of space, particularly within domestic architecture (Coen et al. 2017). Patterns of house construction, repair, destruction, expansion, and movement fluctuate as household organization and community planning needs change within a society (Mehrer and Collins 1995). The archaeological patterns of domestic structures inhabited by members of a society and the variation in these patterns can be analyzed to determine how the inhabitants structured their day-to-day lives. Clark et al. (2019) acknowledge that incomplete coalescence may result in fragmented settlement structure, with traces of either group identity reflected in aspects of the technological style, domestic space organization, or foodways used by the household.

Diehl (1998) finds that households can be identified by isolating architectural and artifactual patterns among groups of structures. Households are the smallest spatial units that are repeated over a settlement, with the most obvious indicator being the spatial segregation of structures or groups of structures (Diehl 1998). These groups should have archaeological remains of various domestic activities, with patterns that should repeat in each of these architecturally defined groupings (Diehl 1998).

How then can household organization be used to identify processes of coalescence? Stanish (1989) and Diehl (1998) both hypothesize that variations in domestic architectural types correspond to ethnically distinct groups. The household is the best means of characterizing resident populations and differentiating between discrete ethnic groupings within the community (Diehl 1998). Diehl (1998) emphasizes the need to look at households without assigning kinship relationships between them, which helps to isolate the archaeological correlates of these domestic spaces. The existence of differing household types suggests different ethnic groups inhabited a site (Diehl 1998). While I do not specifically deal with ethnicity, my analysis will draw on this idea to identify physical correlates of households within the Morton Village community and ask whether the Oneota and Middle Mississippian people living there were in the process of coalescing in these household spaces (Kowalewski 2006).

One of the key functions of the household is production, defined by Wilk and Rathje (1982) as human activity that procures resources or increases their value. Many activities associated with production take place in or around household units, meaning archaeological evidence of these behaviors is often left behind. The use of space around and within households at Morton Village can be explored by identifying archaeological correlates of these production behaviors. This exercise can further be reduced to look at repetitive artifactual patterns within households, and especially within individual structures, to identify specific behaviors associated with the households (Kent 1990). Focusing on production behaviors provides insight into how the inhabitants of Morton Village were engaging with their space to perform these basic needs. Understanding these everyday interactions and where they took place within the village allows for a more nuanced approach to exploring how the process of coalescence was taking place amongst the inhabitants at Morton Village.

6.2.1. Structure Life Cycles

For this analysis, it is critical to consider the life cycle of houses and households and how that may impact what is observed archaeologically. LaMotta and Schiffer (1999) examine the life cycle of structures to assist in identifying depositional stages for archaeological resources. They define three stages in this cycle: habitation, abandonment, and post-abandonment. Within each of the stages, there are forces of accretion (addition of objects) and depletion (removal of objects) at work within the structures that will affect what items are visible in the archaeological record. Two of these stages are of interest when considering the assemblage at Morton Village, specifically the habitation and abandonment stages. In the habitation stage, artifacts are deposited in structures in several ways, through primary or accidental deposition, secondary deposition, or provisional discard (LaMotta and Schiffer 1999).

Primary deposition is the accumulation of objects in the archaeological record at their locations of use, either through discard or accidental deposition (LaMotta and Schiffer 1999). These context include where artifacts are found on floors and the spatial placement of features and artifacts within structures is applicable for the Morton Village assemblage. Diehl (1998) defines primary deposition using the floor assemblages, i.e., artifacts found within 15 cm of the structure's floor. An assumption made if using this definition of floor assemblages is that all cases were not affected by other processes (Diehl 1998; Schiffer 1987). If we accept this, floor assemblages can provide insight into patterns of household behavior; further, burned floor assemblages while occupied or just after abandonment may provide an even clearer picture of what a structure looked like at the time of occupation.

Secondary deposition, the removal of refuse from an area of activity to a spatially separate location, is applicable when considering the contents of pit features that were used for refuse by providing a snapshot of household waste products in the archaeological record. As part of the abandonment stage, it is possible for archeological evidence of the day-to-day life of the inhabitants to be preserved *in situ* (i.e., left the way its inhabitants used it) on the floors of structures (LaMotta and Schiffer 1999; Oetelaar 2000; Pfälzner 2015). This is also referred to as *de facto* refuse, or the abandonment of still usable objects on the floors of structure (Diehl 1998;

LaMotta and Schiffer 1999; Pfälzner 2015). Houses would typically be cleared out of belongings in the abandonment stage if the home was no longer a viable living space or in cases of movement or migration (Diehl 1998; LaMotta and Schiffer 1999). Sometimes forces, either natural (i.e., fire or erosion) or manmade (i.e., conflict or intentionally set fire) would destroy structures prior to removal of belongings, leaving a primary deposition of objects, a snapshot of domestic life at the moment the structure was abandoned. These instances are ideal for a comparison of intrahousehold organization, as these structures can reflect the way the space in the structure was utilized at the time of its abandonment.

Considering the life cycles of structures allows for a selection of specific archaeological contexts through which to explore household organization. I consider structure floors as instances of primary and sometimes *de facto* deposition of artifacts (depending on abandonment status). I consider the spatial organization of pits as representative of primary context in so much as these features themselves are artifacts of human behaviors and activities; contents of the pits are of secondary deposition when used for refuse (see Bardolph 2015). These depositional forces at the village provide an archaeological snapshot of how the inhabitants of the village organized and used their household spaces to meet their day-to-day needs. These concepts can be used to identify archaeological correlates of how the inhabitants at Morton Village may have structured their space similarly or differently across the village. Often there are only small sample sizes available to try and gain insight on these processes. Limited archaeological information can still be used to discern large-scale processes at work within the community by examining multiple facets of how space is organized there.

6.2.2. Indicators of Interaction

In Chapter 5, I argued that Morton Village's community structure reflects an amalgamation of cultural practices that were brought by Middle Mississippian and Oneota inhabitants to their community. Here, I further examine the household patterns identified as part of the previous community scale analysis. Groupings of structures represent likely household units, with multiple, likely related, family groups living close to each other to meet daily needs. The organization of rows and openings create smaller common areas, where multiple households can gather and utilize space for a variety of activities (O'Gorman and Conner 2023). These patterns were utilized by both groups (as represented by architectural styles in this instance), often in the same areas, indicating minimal distinction of who had access to certain spaces.

Architectural style and ceramic attributes have consistently been used in previous work to identify Middle Mississippian and Oneota spaces within Morton Village (Nordine 2020; O'Gorman and Conner 2023; Painter 2021; Painter 2022; Painter and O'Gorman 2019, 2024) while recognizing the likely fluidity of the group identities. The distribution of architectural types (single post, wall trench, both, and indeterminate/unknown) were defined in Chapter 5, where I argued that traditions of building as seen in wall construction are an important variation within and between household spaces. Ceramic attributes are restricted to pottery designs and forms, including the presence of trailed lines imprinted on wet paste sometimes found with punctations and lip decorations for the Oneota, and cordmarking on jars and bowls, thin lines incised on dry paste (usually plates), and the presence of water bottle forms for Middle Mississippians (Bengtson and O'Gorman 2016; O'Gorman and Conner 2023; Painter 2021; Yann et al. 2013). Using architecture and artifact styles as a proxy for cultural group, it is clear that no one group had sole access to the spatial pattern types seen at Morton.

As discussed previously (see Chapter 2 and Chapter 5), I recognize that architecture or pottery style is not always representative of identity and may not directly correlate with cultural groups as defined through the archaeological record (Painter 2021 citing Croucher and Wynne-Jones 2006 and Gosselain 2000). However, as Painter (2021) finds, differences in ceramic styles are an important variability seen at Morton Village. However, these variables are not simply reflections of behavior, but were actively used by inhabitants in the process of negotiating a new community. Examining how architecture and ceramic styles are used throughout the village provides clues on identity making processes going on amongst the inhabitants living there (Weik 2014). Examining small-scale differences or similarities in the expression of these behaviors archaeologically provides clues on how large-scale social and political transformations were unfolding in relation to day-to-day life (Alt 2002, 2006; Weik 2014).

6.2.3. Structure of the Analysis: Interstructure and Intrastructure

This chapter addresses whether there are differences between how different groups of people use/create space in Morton Village by examining production behaviors related to the household units defined in Chapter 5. I explore the research question at two different spatial levels—interstructure and intrastructure—which serve as the primary organizational structures.

At the interstructure level, proxies of production behaviors will be used, including building styles and placement of structures, which show construction preferences and serve as one of the indicators of interaction at the household level. Ceramic styles found within and around the households (i.e., on floors or in pits) indicate ceramic preferences (i.e., what styles are being made or otherwise acquired, used, and discarded) and serve as the second indicator of interaction at the household level. Finally, the placement of storage, cooking, and processing facilities in these household units will be explored in relation to foodway preferences. Then the repurposing of the facilities for refuse is used to explore waste disposal practices.

At the intrastructure level, I explore some of the same production behaviors as well as new ones (like caching, tool production, and craft production) but with a closer lens. Examining the proxies of behaviors related to production at multiple spatial scales provides a multidimensional view of how space is used by the inhabitants of the village. Much like the landscape comparison in Chapter 4, this examination using inter- and intrastructure comparison seeks to identify broad patterns in the organization of households at Morton Village, while also leaving space to identify finer scale patterning within individual domestic structures. Once described, the results of both the interstructure and intrastructure investigations will be used to answer the question of how space is being organized by the inhabitants of Morton Village and how this use reflects processes of coalescence occurring there.

6.3. Methods of Analysis: Defining Proxies of Production Behaviors

To identify how household space is organized at Morton Village, several proxies of production behavior will be assessed. These include construction preferences, ceramic production, and foodways (Table 6.1). To examine these variables, archaeological correlates of these behaviors can be identified and assessed using statistical and spatial measures.

Table 6.1: Variables for Production Behaviors

Production Behavior	Variables
Construction Preferences	Building Locations
	Building Style
Ceramic Use and Discard	Ceramics within structures
	Ceramics outside of structures
Foodways	Storage facilities (and caching)
	Cooking facilities

Table 6.1 (cont'd)

Production Behavior	Variables
Foodways (cont'd)	Other/Multipurpose facilities
Waste Disposal	Artifact Densities in Pits
	Pit Feature Locations

The variable information is added to an IBM SPSS Statistics table and all calculations are completed using analysis tools within SPSS. Basic statistical information, including frequencies and percentages of these characteristics, is gathered. In some cases, correspondence analysis is used to graphically display these relationships. As described in Chapter 4, correspondence analysis provides a simplified graphical representation of the relationship between variables. With basic statistical information defined, all variables will be contextualized spatially, using maps to show their distribution across the site. This approach, though mainly qualitative, provides the best way to consider spatial differences in these behaviors across the site.

6.3.1. Construction Preferences

When examining construction preferences, two variables will be explored: building location and building style. For building location, Chapter 5 identified household spaces using K-means clustering and qualitative assessment of the spatial organization at Morton Village. These analyses identified groupings of structures as constituting household units. Not all structures are found in groupings, and some are found around common areas (openings) others have no other structures nearby (Table 6.2). These organizational patterns are used to identify how the inhabitants organized their household spaces. Was the preference to place structures in household groupings or to separate structures?

Building style references the type of architecture structures exhibit: wall trenches, single posts, or both types (Table 6.3). There are also structures whose architecture could not be determined during excavations, which are classified as indeterminate. Building style is used as a proxy for how Oneota and Middle Mississippian people organized their spaces within the village. I acknowledge that individual structures are not necessarily representative of all structures within a household, but because archaeological information is not available for every structure at Morton Village, individual structures are used to describe household spaces.

Building location and building style are also used to contextualize the other behaviors being explored (i.e., ceramic production and foodways). Maps for these behaviors have the household patterns and building styles displayed, which further contextualizes the instances of interaction across the village.

Table 6.2: Building Location Types

Grouping
Opening
Multiple (i.e., in groupings around openings)
None

Table 6.3: Building Styles

Wall Trench
Single Post
Both
Indeterminate

6.3.2. Ceramic Use and Discard

When examining ceramic use and discard, the ceramic styles that are used as an indicator of interaction between the inhabitants of the village are further contextualized spatially. Ceramics are classified as one of four options: Middle Mississippian, Oneota, Both, or

Unidentifiable (Table 6.4). Middle Mississippian ceramic styles are represented by cordmarking on jars and bowls, thin lines incised on dry paste (usually plates), and the presence of water bottles. Oneota ceramic styles are represented by the presence of trailed lines imprinted on wet paste sometimes found with punctations and lip decorations. When both ceramic types are found within these archaeological contexts they are designated as both. There are some instances where no artifacts with these distinctive decorations or forms are found, and they are classified as unidentifiable.

Table 6.4: Ceramic Styles

Middle Mississippian
Oneota
Both
Unidentifiable

These assessments are done by examining artifact catalogues for structure floors and pit features. All structure proveniences were assessed as to whether they were associated with the floor or just above it (Conner personal communication 2023), and any artifacts in those proveniences were classed as floor related. Artifacts in pit features were identified by examining pit feature data sets and identifying any artifacts that correspond to these styles. Determinations were made using a presence/absence approach, i.e., if only Oneota ceramic styles are found in floor proveniences or pit features, the ceramic preference for that structure or pit was considered Oneota. Pit features included in the analysis are described further in the discussion on foodways. With determinations made, information on the prevalence of certain ceramic styles in varying contexts around the site (i.e., within vs. outside of structures), can be used to make inferences on how the people living at the village made, used, and discarded these items.

6.3.3. Foodways

When examining foodways, there are several different behaviors that can be explored: storage, food processing/multipurpose spaces, and cooking spaces (using hearths). To explore the spatial organization of these behaviors, archaeological correlates can be identified using information gathered from pit features across the site. To identify the functions of each pit, various characteristics are quantified including shape, area, depth, and volume. Only those pits that were completely excavated are included in this analysis as they provide the level of detail on these characteristics needed for comparison.

Pit feature shape is defined by examining the profiles of pits. Shape types are modeled after analyses elsewhere (Bardolph 2015; O'Gorman 1996; Wilson and Melton 2019) but are simplified based on the range of shapes seen at Morton Village (Figure 6.1). Next, areas (in square meters) of the tops of features are calculated using ArcGIS. When calculating volume, pit shape is used to select volume formulas (Table 6.5). Volume is calculated in liters using these formulas, incorporating depth, length, width, and the radius of pits. Pit depths are measured using profile maps, from the defined top of the feature to the where it transitions to natural soil.

Table 6.5: Volume Calculations Based on Pit Feature Shape

Volume Type	Volume Formula	Corresponding Shape
Basin	$.16\pi d\ (3lw + d^2)$	Basin
Cone Frustum	$d/2(\pi r^2\ [\text{base}] + \pi r^2\ [\text{surface}])$	Bell-Shaped
Cylinder	$\pi r^2 d$	Flat-Bottomed
Where r = radius, d = depth, l = surface length, w = width)		
Formulas from Pauketat (1998)		

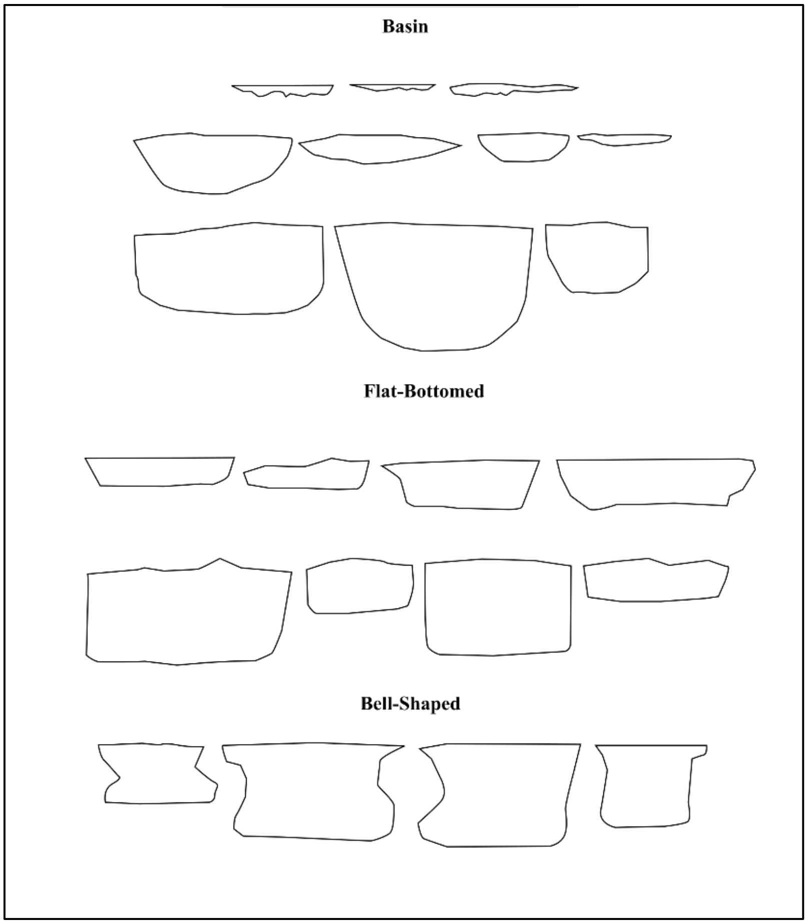

Figure 6.1: Pit Feature Profile Shapes

How then can these characteristics be used to identify the initial function of these facilities? Following Bardolph's (2015) functional analysis of pit features at the Middle Mississippian Lamb site in the CIRV, pit function is assessed using pit depth, area, volume, and evidence of in situ burning. Three functions are identified based on these distributions: cooking, storage, processing, and multipurpose (Table 6.6).

Cooking facilities are identified based on the presence of oxidization (burned soil) in features (Bardolph 2015). To identify storage facilities the ratio of volume to depth is examined. Storage facilities are considered those where goods would have been stored by inhabitants for future use. These facilities tend to have smaller openings to protect against scavengers and environmental factors and are deeper but can have larger areas when the volume is large (Bardolph 2015). Deep pit features with large volumes are classified as storage facilities.

To identify processing facilities the ratio of area to depth is examined (Bardolph 2015). Following Bardolph (2015), processing are those foodways activities that would not be considered cooking, specifically instances where the use of fire is not required. Processing facilities tend to have larger openings but shallower depths (Bardolph 2015). The distribution of areas, depth, and volume will be plotted to identify how these values are distributed for the pits at Morton Village. If pits do not meet any of these three criteria, they are considered as "Multipurpose", as their true function cannot be identified and will be discussed separately.

Table 6.6: Foodway Types and Archaeological Correlates

Type of Facilities	Archaeological Correlate
Cooking (hearths)	Evidence of soil oxidization (burning)
Storage	Large volume, Deep
Processing	Large area, Shallow
Multipurpose	Does not fit above criteria

With functions identified, pit context can be defined. This variable refers to where pit features are located in relation to structures, either internal or external, i.e., inside, or outside of the structure. External pits are further differentiated as either within 3.4 m (the average distance between pits) of other pits or more than 3.4 m from other pits. Internal pits are differentiated as either centrally located or located along the periphery of the structures. This variable is used to identify where the production behaviors associated with foodways were occurring in relation to the structures within the household groupings.

6.3.4. Waste Disposal

One final aspect of production behaviors that can be considered is the density of waste materials inside and outside of structures, i.e., instances of secondary disposal as defined by LaMotta and Schiffer (1999). Pits at Morton Village were initially utilized for one of the varying functions associated with foodways (as described in the previous section). It is unlikely that pits would be excavated solely for refuse, see Bardolph (2015:154), rather they would be repurposed from their original function for refuse disposal. Following Lightfoot et al. (1998), the densities of artifacts within these spaces can be considered, which are calculated by dividing the total weight in grams of artifacts by the volume in liters. The material densities for all pit features are examined and the distribution is quantified in relation to the other pits. Then, these pits are contextualized spatially, to identify whether waste is deposited more inside or outside of structures.

6.4. Interstructure

Using the household patterns identified in Chapter 5, the spatial organization of households can be contextualized within the village. These patterns will be displayed in all maps of the site so that each of the three production behaviors—construction preferences, ceramic production, and foodways—can be contextualized spatially in relation to these household groups. Of the 144 structures identified through geophysical survey and excavation, only 50 structures have been at least partially excavated. Of these, three are classified as ceremonial or special use structures (16, 20, 34); these are included on site maps showing building style but are not considered as part of the discussion of households. The remaining 47 structures are used throughout the interstructure investigation of these production behaviors, representing a sample of structures at Morton Village (Table D.2; Figure 6.2). I recognize that this sample may not be representative of all the ways household space is structured at Morton Village, especially with no structural information from the southwest area of the site. Many of the structures only have small areas excavated. I accept that there is potential bias when only considering such small sections of features, which could lead to misrepresentation of the ceramic types across the site. However, these structures can be used to make interpretations on general characteristics of the households within the village. This sample provides a snapshot of household spatial organization, which can be further assessed by using archaeological proxies of certain production behaviors used by the inhabitants of the village, i.e., construction preferences, ceramic production, and foodways.

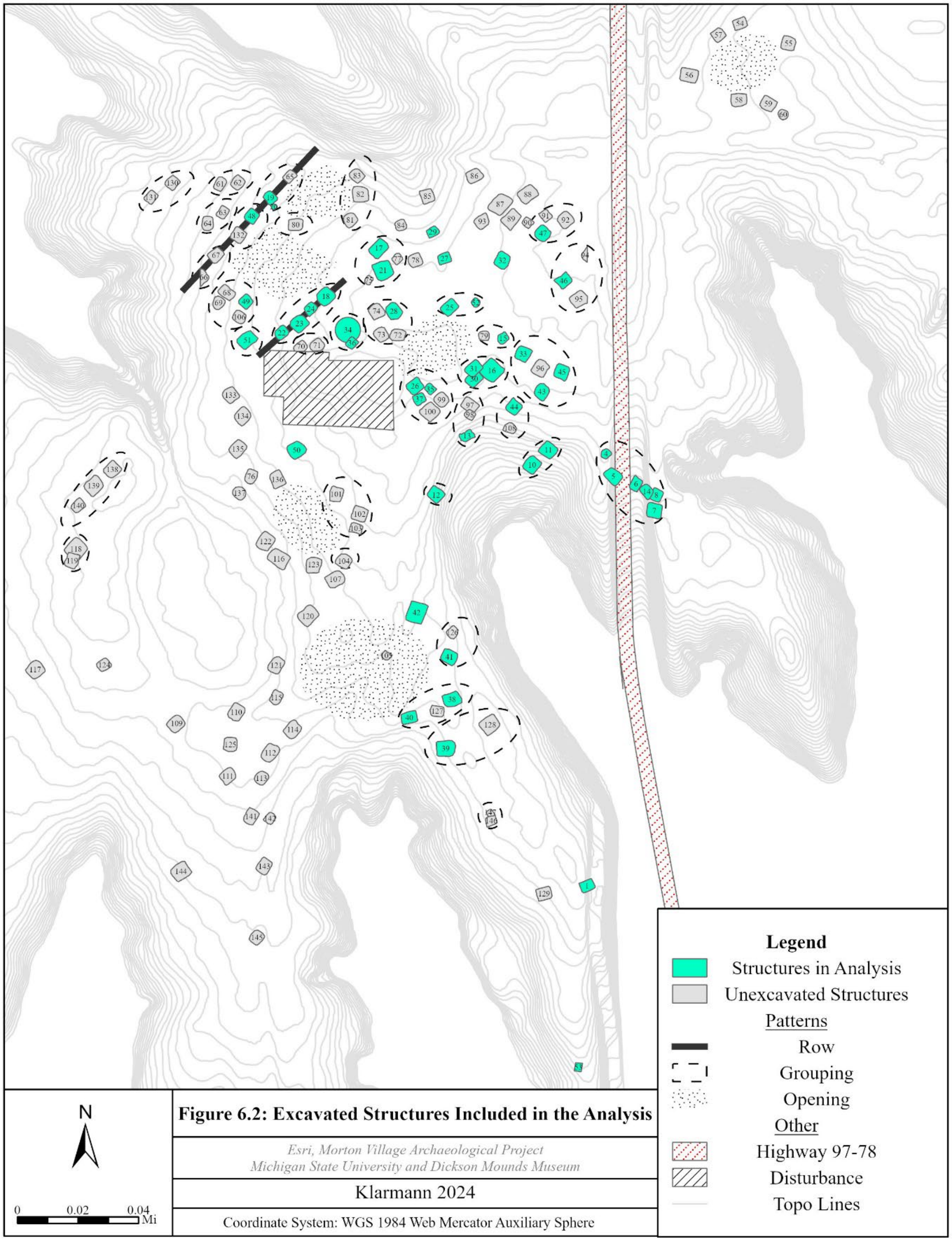

Figure 6.2: Excavated Structures Included in the Analysis

6.4.1. Construction Preferences

To examine construction preferences used by the inhabitants, two behaviors are explored archaeologically: building location and building style. When building location is examined, it is clear that the majority of structures are found in groupings (59.6%), then in groupings around openings, i.e., multiple patterns (25.5%), then by themselves (12.8%), and finally around openings (2.1%) (Figure 6.3). There is a preference in the village to place structures in proximity to other structures. These groupings were interpreted in Chapter 5 as household units, i.e., domestic groupings of inter-related residents. With these household units defined, how then are the other production behaviors expressed in relation to these spaces?

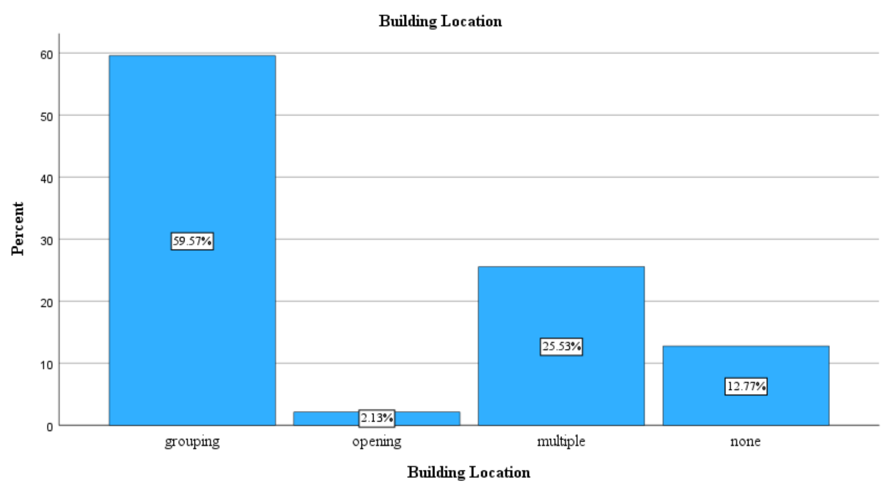

Figure 6.3: Frequencies of Building Locations

When considering building style, the majority of structures are constructed using wall-trench architecture (51.1%), then single-post architecture (25.5%), and use of both styles within a single structure is relatively infrequent (8.9%). Indeterminate building styles make up 14.9% of the sample (Figure 6.4). As one of the indicators of interaction, it is interesting that the predominate architectural style of structures is wall trench, which would suggest a Middle Mississippian influence on building style within the village. Where then are these structures in relation to one another within the village?

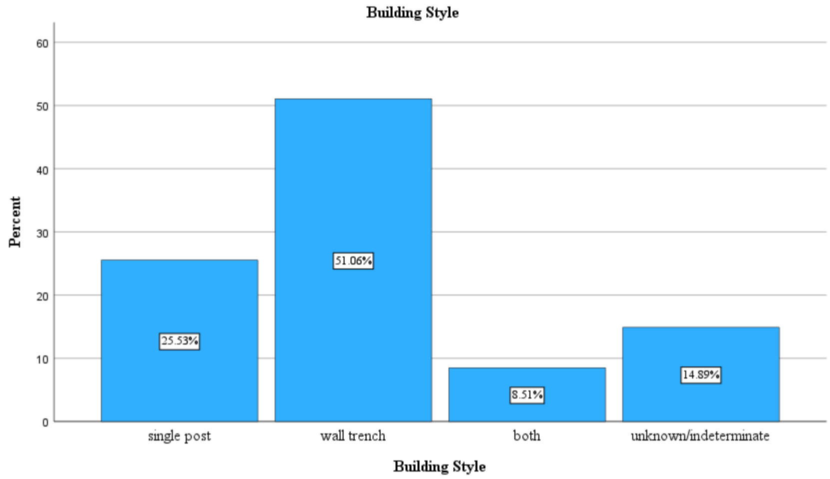

Figure 6.4: Frequencies of Building Styles

The distribution of these characteristics is best viewed spatially. I have split the site into northern and southern halves, focused over those structures where excavations have occurred. The northern half covers the main occupation area in the northeast of the site, while the southern half covers the ridge leading to Norris Farms 36 cemetery (Figure 6.5 and 6.6).

When architectural differences are incorporated with the household patterns, household groupings do not appear to be restricted by building styles, i.e., structures in groupings do not all have the same architecture. There appears to be more of a preference for inhabitants to construct structures using wall-trench architecture rather than single post architecture within the village, but there does not always appear to be preference for using only one type of architecture within household groupings. Both Middle Mississippians and Bold Counselor Oneota people organized their structures within household groups. Further, at least two groupings of structures have multiple architectural styles in use (see STRs 4-8, 14 and STRs 18, 22-24). Beyond both groups utilizing these spatial patterns to organize their households, Oneota and Middle Mississippian structures were constructed in the same household groups.

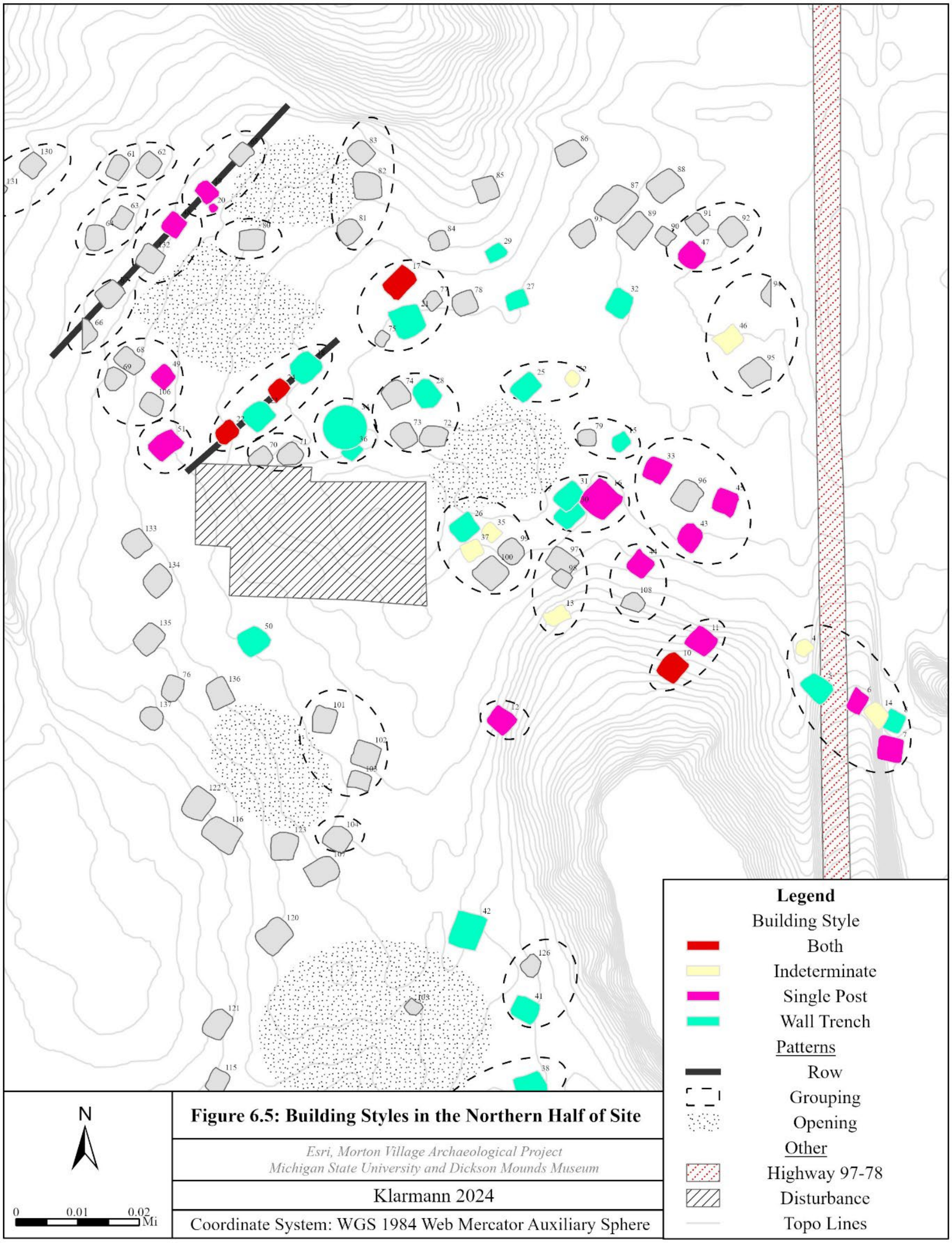

Figure 6.5: Building Styles in the Northern Half of Site

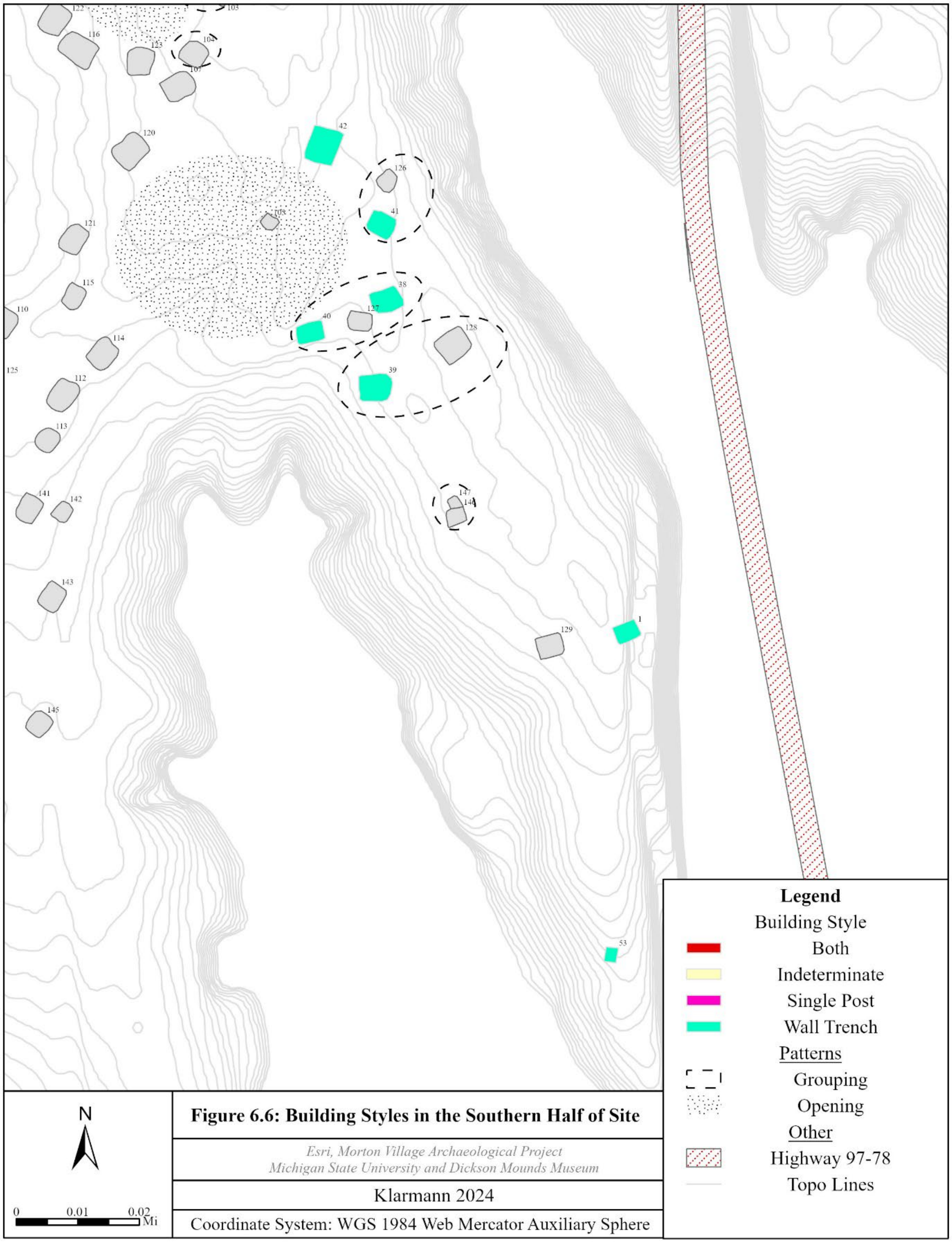

Figure 6.6: Building Styles in the Southern Half of Site

6.4.2. Ceramic Use and Discard

To explore how ceramics are used and discarded, the presence and locations of the different styles of ceramics is quantified. When considering ceramic styles found within structures, two archaeological contexts are explored, structure floors and internal pit features. When considering ceramic styles found outside structures, external pit features are explored. These contexts reflect how ceramics are used both within and outside of the home. In this instance, ceramics on structure floors represent artifacts likely deposited there by the inhabitants at the time of occupation, while ceramics found in pit features represent waste or discard of products used by inhabitants (Diehl 1998; LaMotta and Schiffer 1999).

When ceramics on structure floors are considered, these contexts are equally likely to have only Oneota ceramics or unidentifiable ceramics (36.2%) (Figure 6.7). Floors with both Mississippian and Oneota ceramics are also prevalent (23.4% of structures), whereas only 4.3% of floors have only Middle Mississippian styles. When ceramics in the 25 pits found within structures are considered, these contexts are most likely to have unidentifiable ceramics (41.18%), but an almost equal number of pits have both styles of ceramics (35.29%) (Figure 6.8). As with structure floors, few internal pits have only Middle Mississippian style ceramics (5.9% respectively). Oneota and Middle Mississippian ceramics are clearly both being used and discarded within Morton Village houses and where Middle Mississippian ceramics are used, Oneota ceramics are also being used.

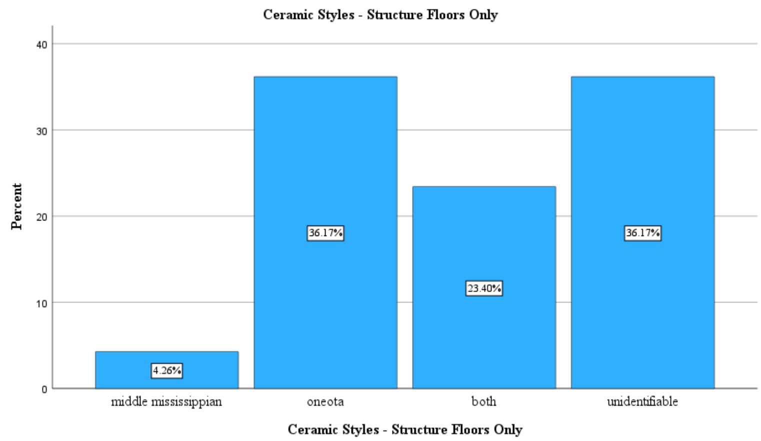

Figure 6.7: Frequencies of Ceramic Styles, Structure Floors Only

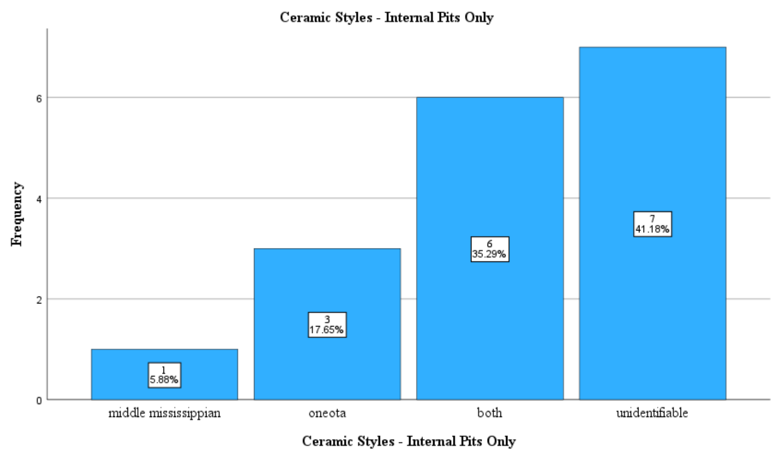

Figure 6.8: Frequencies of Ceramics Styles, Internal Pits Only

As an indicator of interaction, the structures where the styles of ceramics are known are helpful in further contextualizing relationships between Oneota and Middle Mississippian occupants. This is accomplished by using correspondence analysis to visualize the relationship between these characteristics. For ceramics on structure floors, the majority of single post structures have both styles of ceramics within them (Figure 6.9). The majority of wall trench structures or structures with indeterminate architecture tend to have only Middle Mississippian ceramics in them or unidentifiable styles of ceramics. In those four structures where both wall trench and single post architecture are found, only Oneota ceramics are identified. Oneota ceramics appear almost equally likely to be found on the floors of any kind of structure.

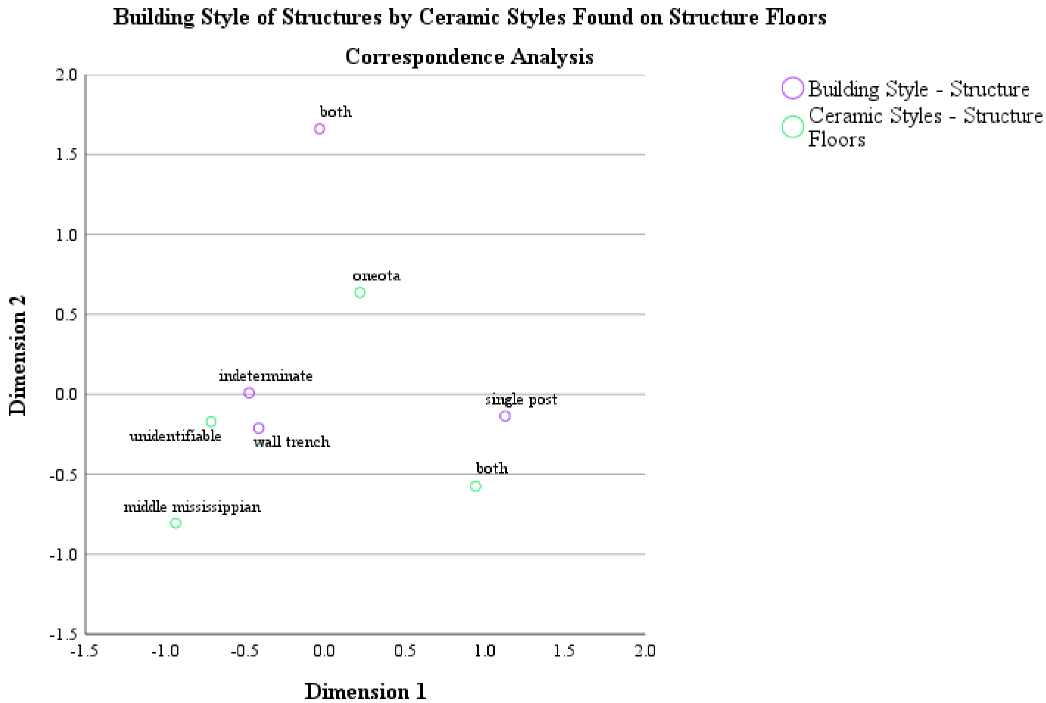

Figure 6.9: Correspondence Analysis, Building Style by Ceramic Styles, Structure Floors

A similar result is found when the ceramic styles of internal pit features are compared to building styles of the structures in which they are found (Figure 6.10). In this instance, structures with both styles of architecture do not appear to be related to any ceramic style found in pits. But Oneota ceramics are almost equally likely to be found in internal pits in any type of structure.

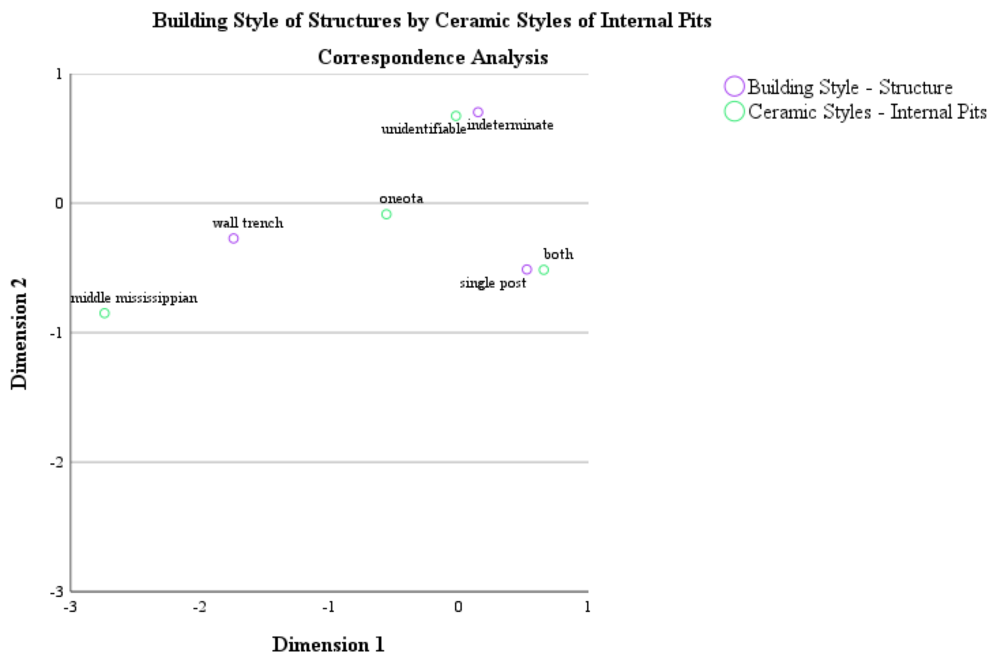

Figure 6.10: Correspondence Analysis of Building Style by Ceramic Styles, Internal Pits

When ceramics in the 122 pits found outside of structures are considered, several external pits have only Oneota ceramics in them (36.9%), however, pits with both Oneota and Middle Mississippian ceramics are also prevalent (33.6%) (Figure 6.11). Instances where pits have both styles of ceramics is double the number of pits with only Middle Mississippian style artifacts (14.8%). External pits appear to mostly contain Oneota ceramics or a combination of Oneota and Middle Mississippian ceramics. There are limited instances where only Middle Mississippian ceramics are found in pits outside of structures.

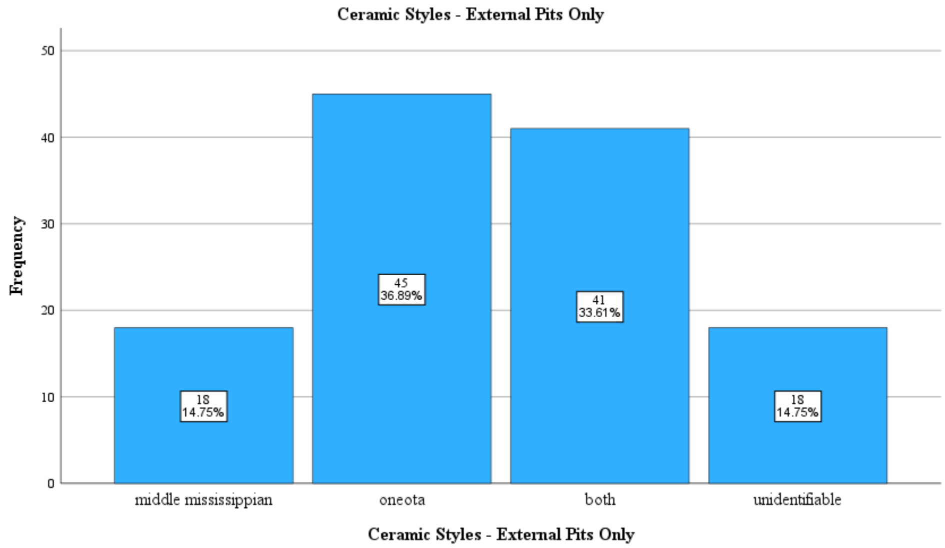

Figure 6.11: Frequencies of Ceramic Styles, External Pits

The distribution of these characteristics (i.e., building style and ceramic styles of structure floors and pit features) are best viewed spatially. This provides a clearer view of the spatial distribution of these ceramic characteristics at the site in different areas. In the maps, building styles maintain the same color scheme used in Figures 6.5 and 6.6 in the discussion of construction preferences. Ceramic styles found on structure floors are designated using two letter codes, MM for Mississippian, ON for Oneota, BT for Both, and UN for Unidentifiable.

In the northern half of the village, many of the wall trench structures have both types of ceramics on their floors, while single post structures tend to have both styles of ceramics on their floors or only Oneota styles of ceramics (Figure 6.12). Further, pits just outside of structures tend to group together, and many have both ceramic styles or just Oneota ceramics found in them. Oneota and Middle Mississippian ceramics are often used within the same contexts in the village, structures with single-post and wall-trench architecture often have both types of ceramics within them and just outside of them.

In the southern half of the village, there are only a few structures with known building style, and they are all constructed using wall trench architecture; however, there is variety in the kinds of ceramics found on their floors (Figure 6.13). One of these structures has only Oneota ceramics, two have only Middle Mississippian ceramics, and one has both styles of ceramics on their floors. There are less pit features excavated in this area, but if these wall trench structures are representative of Middle Mississippian households in the southern part of the village, these inhabitants are still including Oneota ceramics in their domestic spaces. Further, this is the only area where structures have only Middle Mississippian ceramics found on their floors.

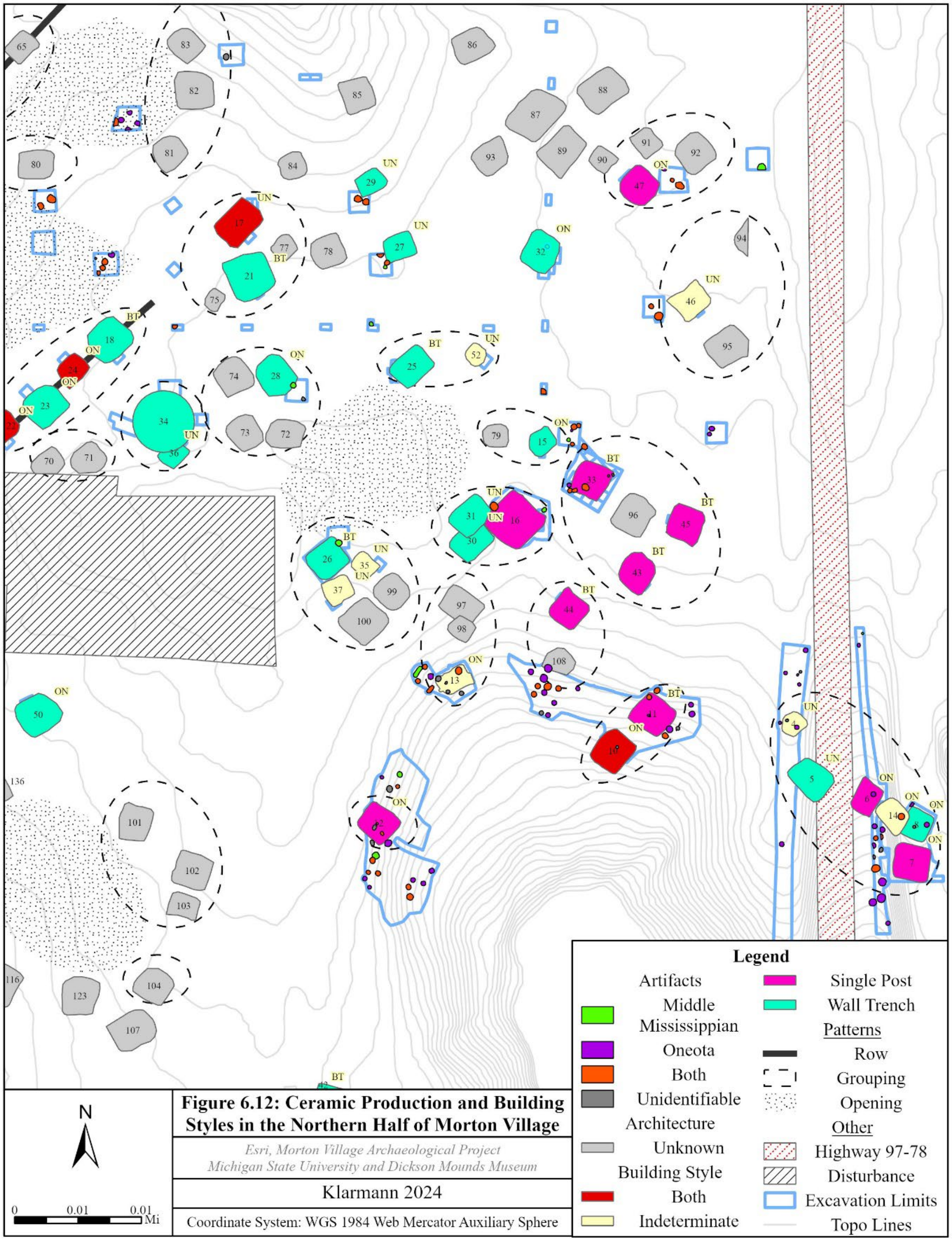

Figure 6.12: Ceramic Production and Building Styles in the Northern Half of Morton Village

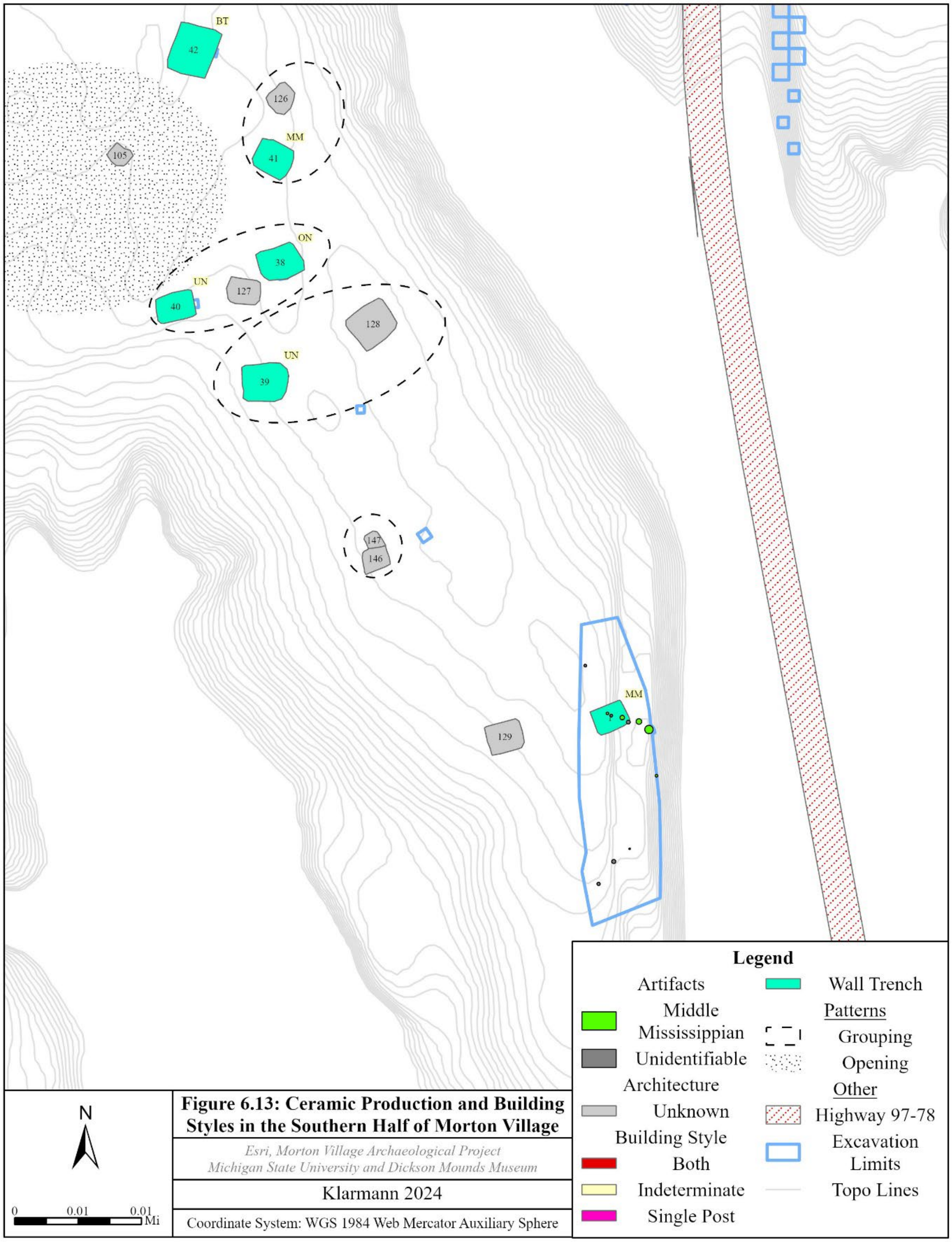

Figure 6.13: Ceramic Production and Building Styles in the Southern Half of Morton Village

Based on these maps and the statistical frequencies of these ceramic characteristics, Oneota and Middle Mississippian ceramics appear to be used in both single post and wall trench structures. There are only a few instances where only Middle Mississippian ceramics are found on structure floors or in pits both inside and outside of structures. Further, both styles of ceramics are found in pits outside of structures, or only Oneota ceramics; however, pits with these characteristics are found interspersed amongst each other across the village.

This mixing of architectural styles and ceramic styles within and outside of structures is clearest in the household grouping of STR 4-8 and 14 (Figure 6.14) and the grouping of STR 10 and 11 (Figure 6.15). There are single-post and wall-trench structures in the same groupings, with internal pits tending to have only Oneota or a combination of ceramic styles and the floors of these structures having mostly Oneota style ceramics. It is interesting that contexts where only Middle Mississippian style artifacts are found are so limited. There does not appear to be a preference to only use Middle Mississippian ceramics by households; in fact, the preference is for incorporating both Middle Mississippian and Oneota style ceramics into household spaces.

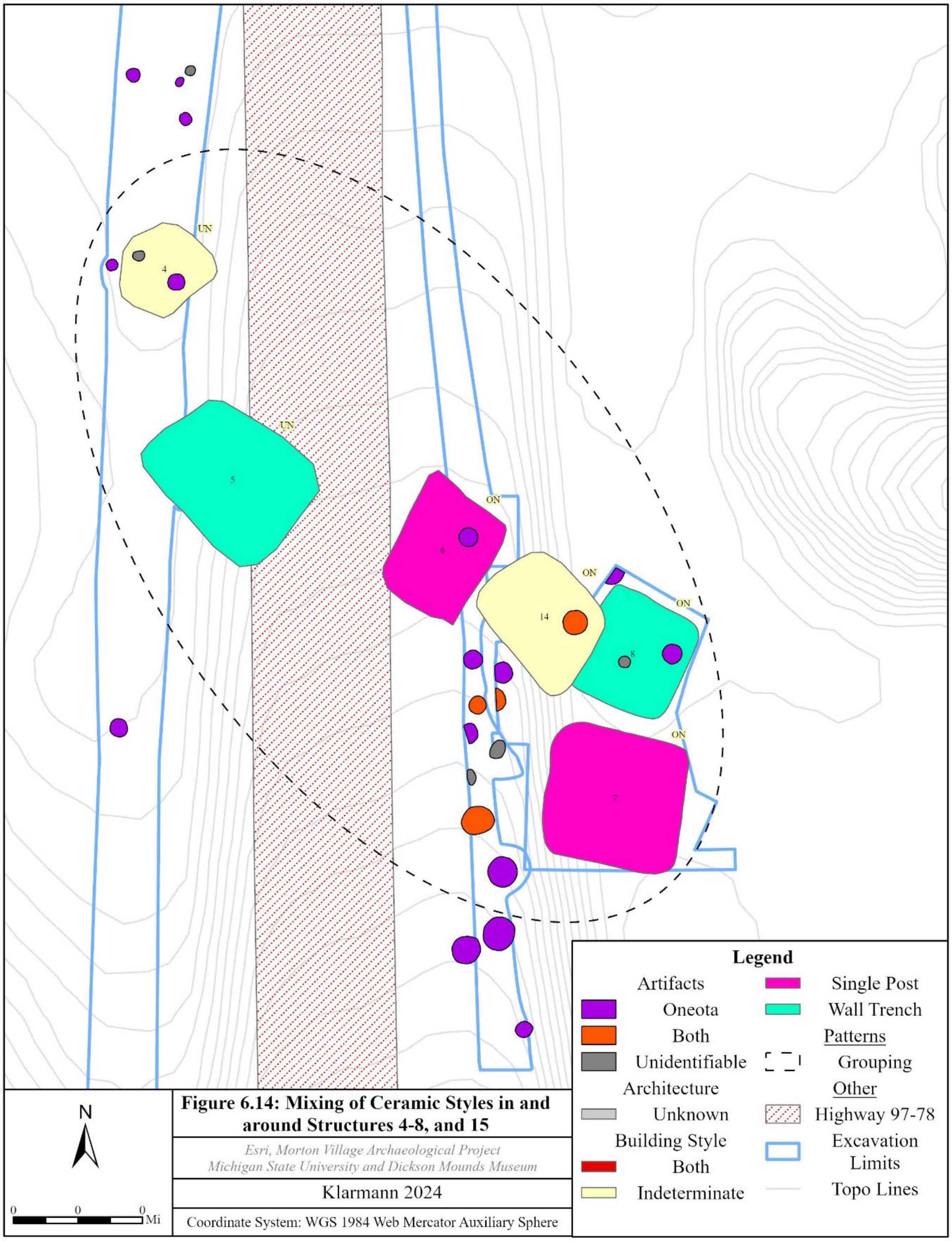

Figure 6.14: Mixing of Ceramic Styles in and around Structure 4-8, and 15

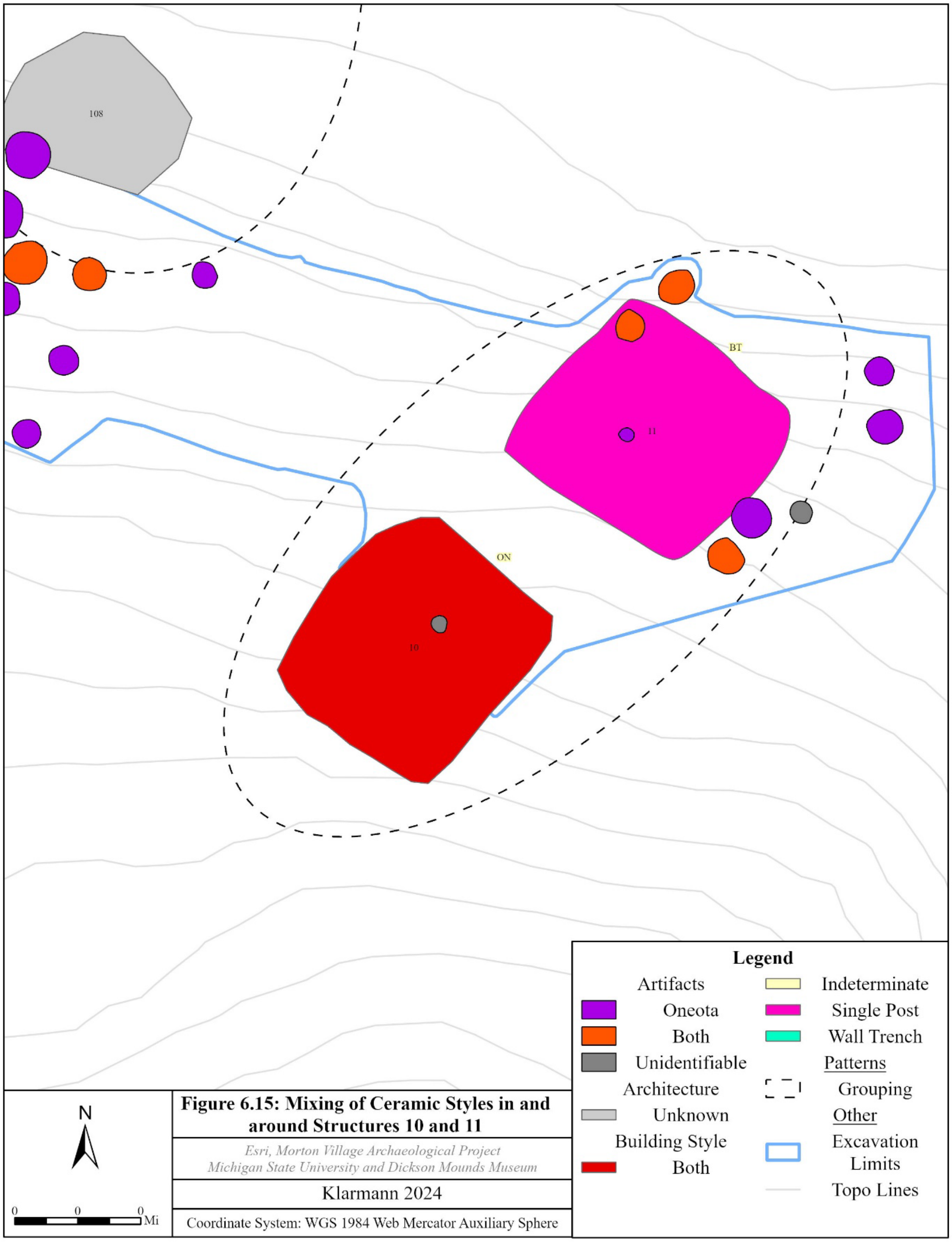

Figure 6.15: Mixing of Ceramic Styles in and around Structure 10 and 11

What does this mean when we consider how different styles of ceramics are used in Morton Village? Household spaces at Morton Village tend to have both Oneota and Middle Mississippian style artifacts within them. Structures are mostly constructed using wall trench architecture, but ceramic styles of both types are often found in structures constructed using any style of architecture. It is clear that although Oneota ceramics predominate within the village, there are still significant numbers of Middle Mississippian wares being used. There does not appear to be a preference for one style or the other, because in contexts where only Oneota ceramics or only Middle Mississippian ceramics are found, a pit or structure containing both styles of ceramics are often nearby. Based on this mixing of ceramic styles found within and outside of structures across the village, it is clear that potters at Morton Village were continuing to create both styles of wares and the inhabitants continued to use both styles across the village. Potential explanations for this distribution include a preference for using certain ceramic styles by the inhabitants of these structures, possible exchange of ceramic pots between cultural groups within the community, or perhaps inhabitants brought their own styles of ceramics into their households through marriage.

6.4.3. Foodways

To examine the spatial aspect of production behaviors through foodways, pit features from across the village are considered. There are 147 pits at Morton Village with enough information available for analysis (Table D.3). This excludes pits in the ceremonial or special use structures, STR 16, 20, and 34, as well as pits from STR 25, which also had a potential special use for a multiphased feasting event. At Morton Village there appear to be three types of pit feature shapes: basin, flat-bottomed, and bell (Figure 6.16). The majority of pits are basin shaped (59.9%), then flat bottomed (34.7%), and then bell shaped (5.4%).

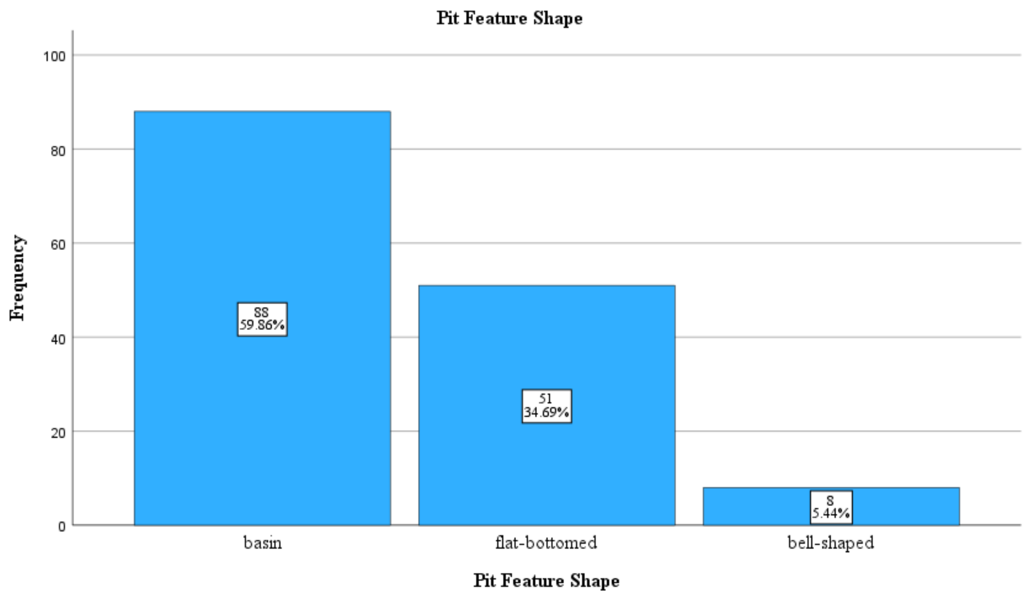

Figure 6.16: Frequencies of Pit Feature Shape

Of the pit functions, identifying those used for cooking is the most straightforward and was completed by examining feature forms and identifying evidence of in situ burning and oxidization of the soils. Twelve pits are classified as cooking pits based on this criterion. Of these, all but one is basin shaped. A single feature (280) is flat-bottomed. Cooking facilities have an average volume of 126.4 L, an average area of 0.36 m^2, and an average depth of 0.19 m. Feature 280 is larger than the other cooking pits (389 L, 0.46 m deep) but evidence of *in situ* burning was found throughout the feature, which is why it is still considered a cooking facility. Six of the cooking pits were found inside of structures, while the other six were found outside of structures, including two in the openings in the northwest area of the site, two just outside of structures in the main occupation area, and two not in proximity to structures or other pits. The spatiality of where these pits are found are discussed further in a future section.

To identify functions of storage, processing, and multipurpose pits, the distribution of areas, depths, and volumes are quantified. Feature areas range from 0.07 to 2.09 m^2 with a mean of .77 m^2, and a standard deviation of .47 m^2 (Figure 6.17). Pit depths range from .06 to 1.63 m, with a mean of .34 m, and a standard deviation of .24 m (Figure 6.18). Volume for pit features at Morton Village has a range from 10 to 2766 L, with a mean of 441.3 L, and a standard deviation of 451.5 L (Figure 6.19).

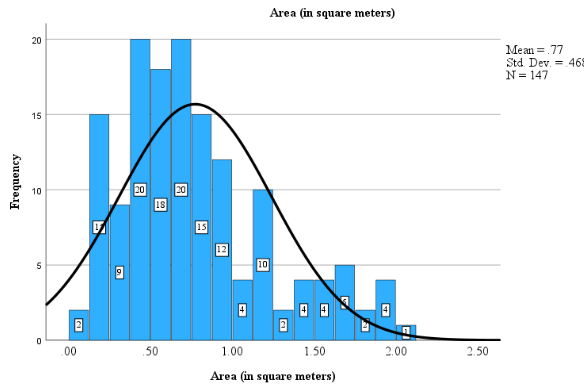

Figure 6.17: Pit Feature Areas (in square meters)

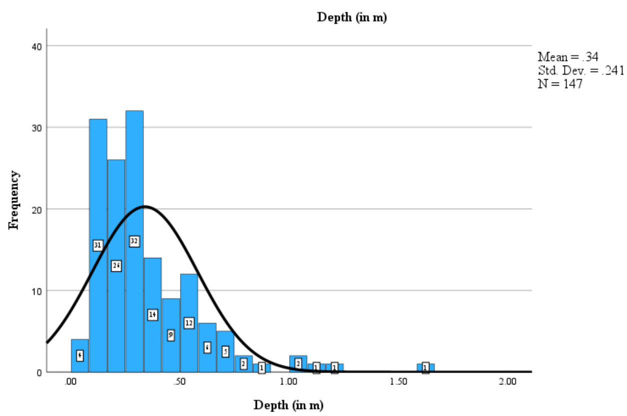

Figure 6.18: Pit Feature Depths (in meters)

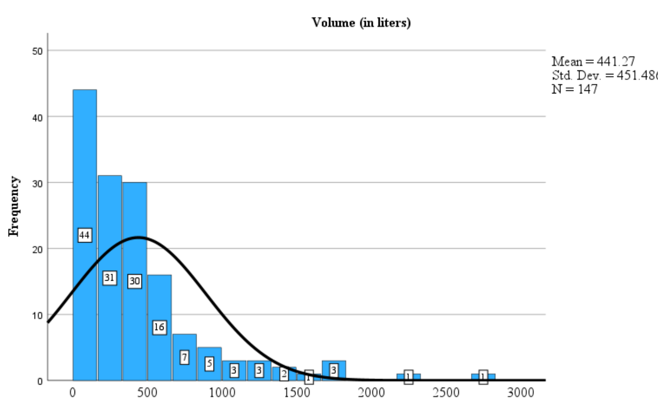

Figure 6.19: Pit Feature Volumes (in liters)

With these values quantified, they can be used to identify storage, processing, and multipurpose pits. As discussed above, storage pits will be those deep pits with large volumes, while processing pits will be those shallow pits with large areas. All other pits (low volumes, small areas, shallow depths) are classified as multipurpose. To identify storage pits, volume and depth are plotted against each other (Figure 6.20). Looking at this plot, the majority of pits cluster under 1,500 L and under 1.0 m in depth. A large volume for the pits at Morton Village is considered over 1,500 L and deep pits are those greater than 1.0 m deep. Pits matching this are considered storage facilities. Only five pits meet these criteria and will be explored further in discussions of storage behaviors at the village. Of these, two are bell-shaped and three are flat-bottomed. Storage facilities have an average volume of 1,986.2 L, an average area of 1.78 m^2, and an average depth of 1.19 m.

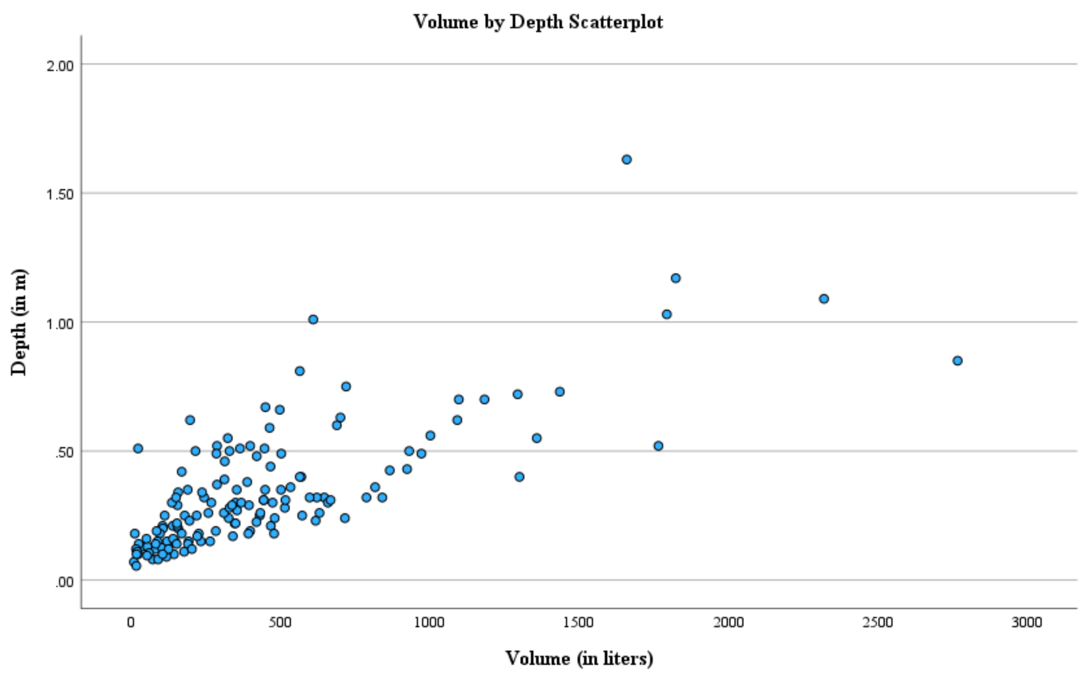

Figure 6.20: Distribution of Pit Feature Volume by Depth

To identify processing pits, area and depth are plotted against each other (Figures 6.21). Looking at this plot, the majority of pits cluster under 1.0 m^2 in area and under 1.0 m in depth.

Pits with large areas at the village are those over 1.0 m^2 and pits with shallow depths are those under 1.0 m. Pits matching these criteria are considered processing facilities. Thirty-three pits meet these criteria. Of the 33 pits classified as processing facilities, there is a mix of flat-bottomed (60.6%) and basin shaped (39.4%) pits. Processing facilities have an average volume of 795.7 L, an average area of 1.36 m^2, and an average depth of 0.44 m.

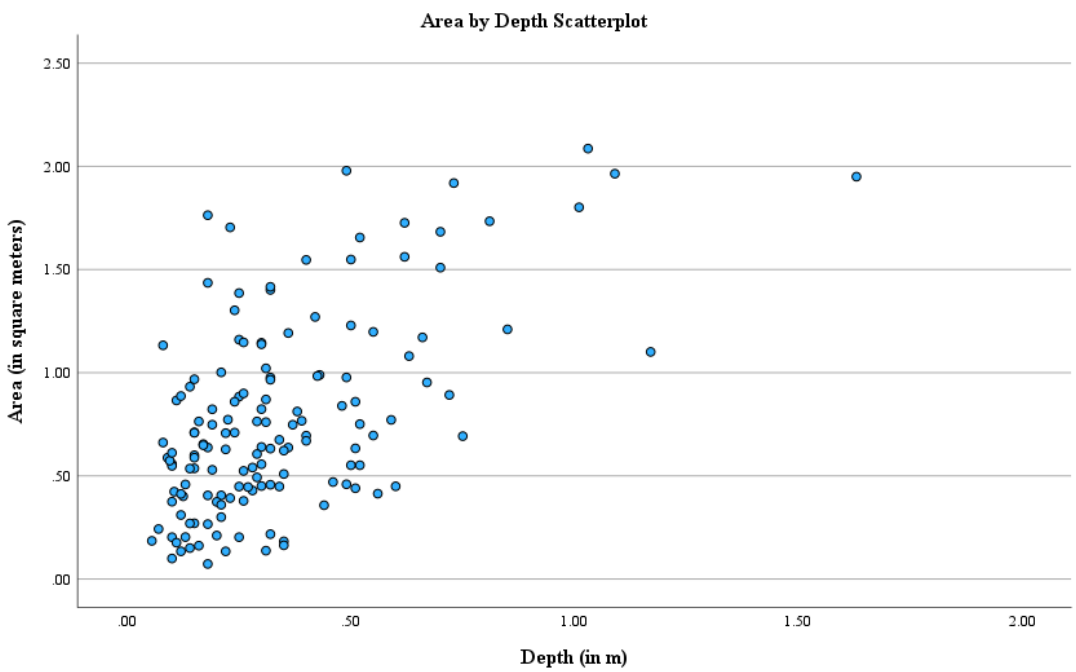

Figure 6.21: Distribution of Pit Feature Area by Depth

Finally, the remaining 97 pits, generally those with small areas, small volumes, and shallow depths are considered multipurpose facilities. These pits may have been used for storage or processing activities, but their sizes and shapes do not appear to match what is generally seen for storage and processing (Bardolph 2015). Of these, the majority are basin-shaped (66%), then flat-bottomed (27.8%), and then bell-shaped (6.2%). Multipurpose facilities have an average volume of 297.8 L, an average area of 0.58 m^2, and an average depth of 0.28 m. With the pits classified by function, the statistical and spatial characteristics for each can be discussed.

6.4.3.1. Considering the Spatiality of Foodways at Morton Village

When considering context, there are equal numbers of cooking pits found inside of structures as there are outside of structures. Of the pits, 41.7% are found outside of structures, but in proximity to other pits (Figure 6.22). Then, they are mostly found centrally within structures (33.3%) or along the walls inside of structures (16.7%). Only one cooking pit is not in proximity to other features or structures (Feature 13). All storage pits were found outside of structures in proximity to other pits. The majority of processing pits were found outside of structures in proximity to other pits (75.8%) (Figure 6.23). Some were found outside not in proximity to other pits (15.2%), and only three were found along the walls inside of structures (9.1%). The majority of multipurpose pits are found outside of structures in proximity to other pits (68%), then outside of structures away from other pits (15.5%) (Figure 6.24). There are multipurpose pits found inside of structures (n = 16), with the majority of these being found along the walls of the structure (n = 12), rather than centrally located (n = 4).

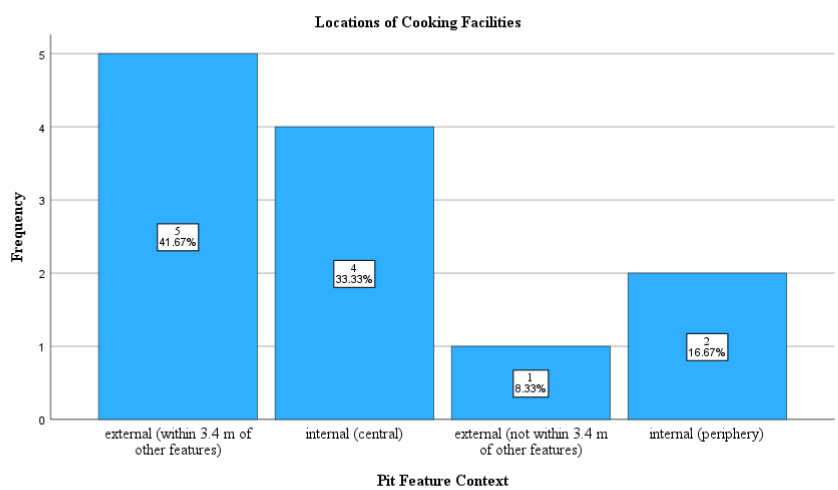

Figure 6.22: Locations of Cooking Facilities

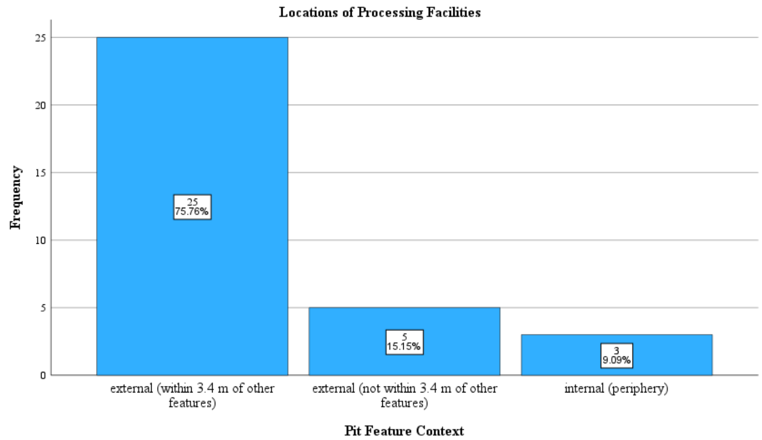

Figure 6.23: Locations of Processing Facilities

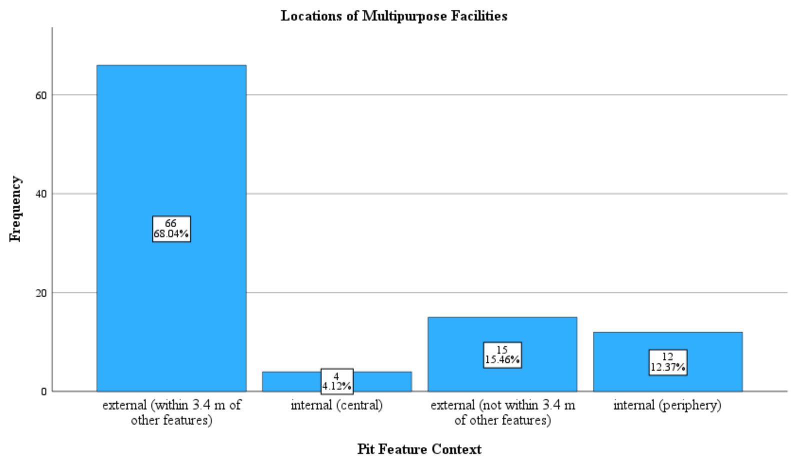

Figure 6.24: Locations of Multipurpose Facilities

With the general locations of pits of specific functions described, what do these production behaviors look like when examined spatially? Based on the spatial distribution of these pits within the site, it is clear that there are a variety of different foodways activities taking place within and around structures (Figure 6.25 through 6.30). When considering where these facilities occur in relation to the household patterns defined in Chapter 5, it is clear that the common areas (i.e., openings) in the northwest and furthest northeast part of the site display a range of activities taking place within them (Figure 6.25 and 6.30). In the northwest corner of the main occupation area, the northern opening has both storage and multipurpose facilities in the small, excavated areas, while the southern opening has processing, cooking, and multipurpose facilities in similarly sized excavation areas. In the northeastern corner of the site there are a mix of multipurpose and processing pits in the common area. It is likely that with more excavations in these common areas additional facilities of varying function would be identified. When considering the organization of foodways activities in households, there appears to be a diversity of pit types being used in the spaces between individual structures (Figure 6.26 through 6.29). In areas with more extensive excavations, see Figure 6.26 and 6.27, there are pit features of every function in the spaces between structures. Outside of Structure 7, there are storage and processing facilities in close proximity to each other, indicating that there was no spatial separation between where these two activities occur within this household. A variety of behaviors associated with foodways tend to be found outside of houses within household groupings. Cooking tends to occur inside; however, there are locations where there are cooking facilities outdoors (Figure 6.29). There does not appear to be a spatial distinction between where processing or storage can take place outside of structures.

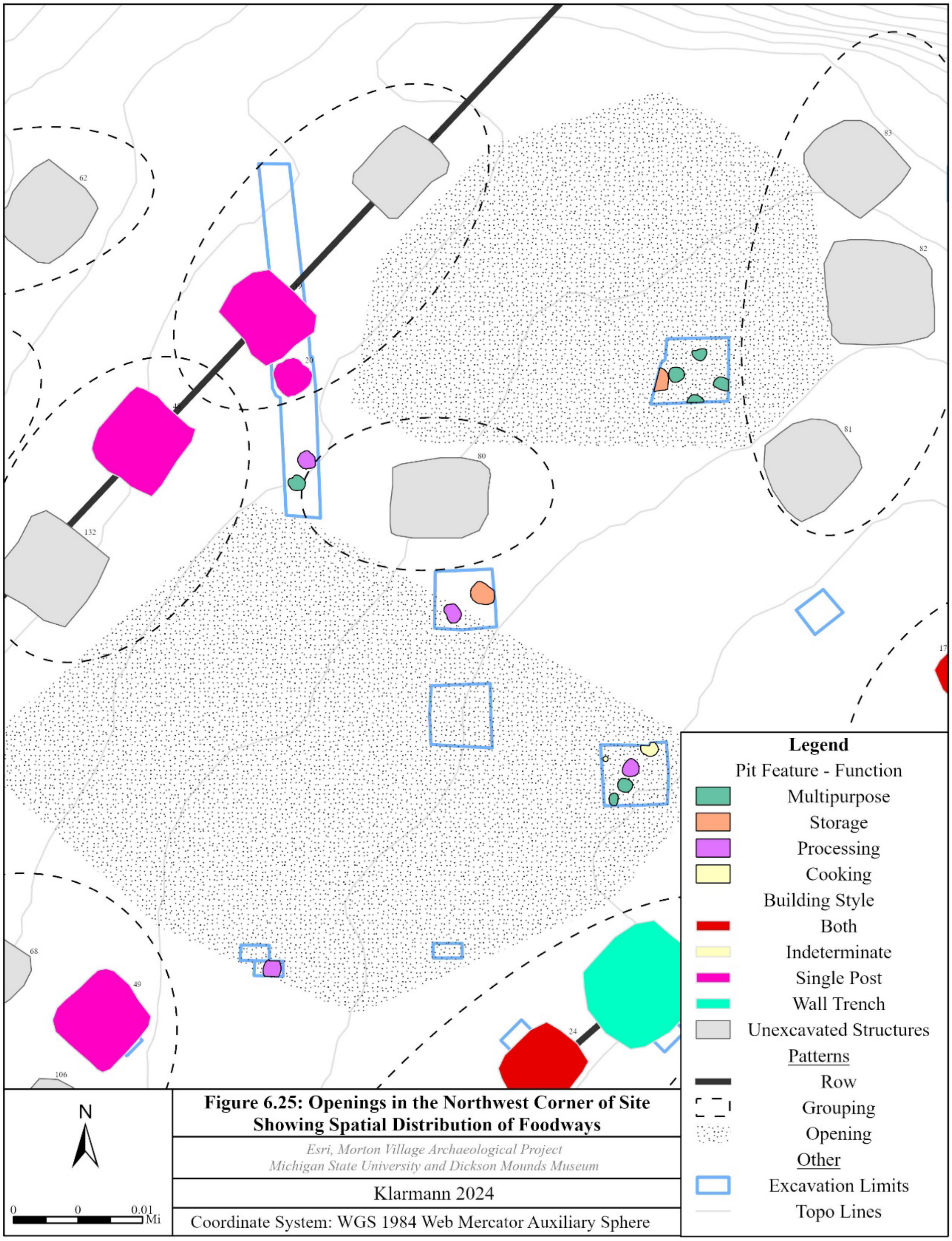

Figure 6.25: Openings in the Northwest Corner of Site Showing Spatial Distribution of Foodways

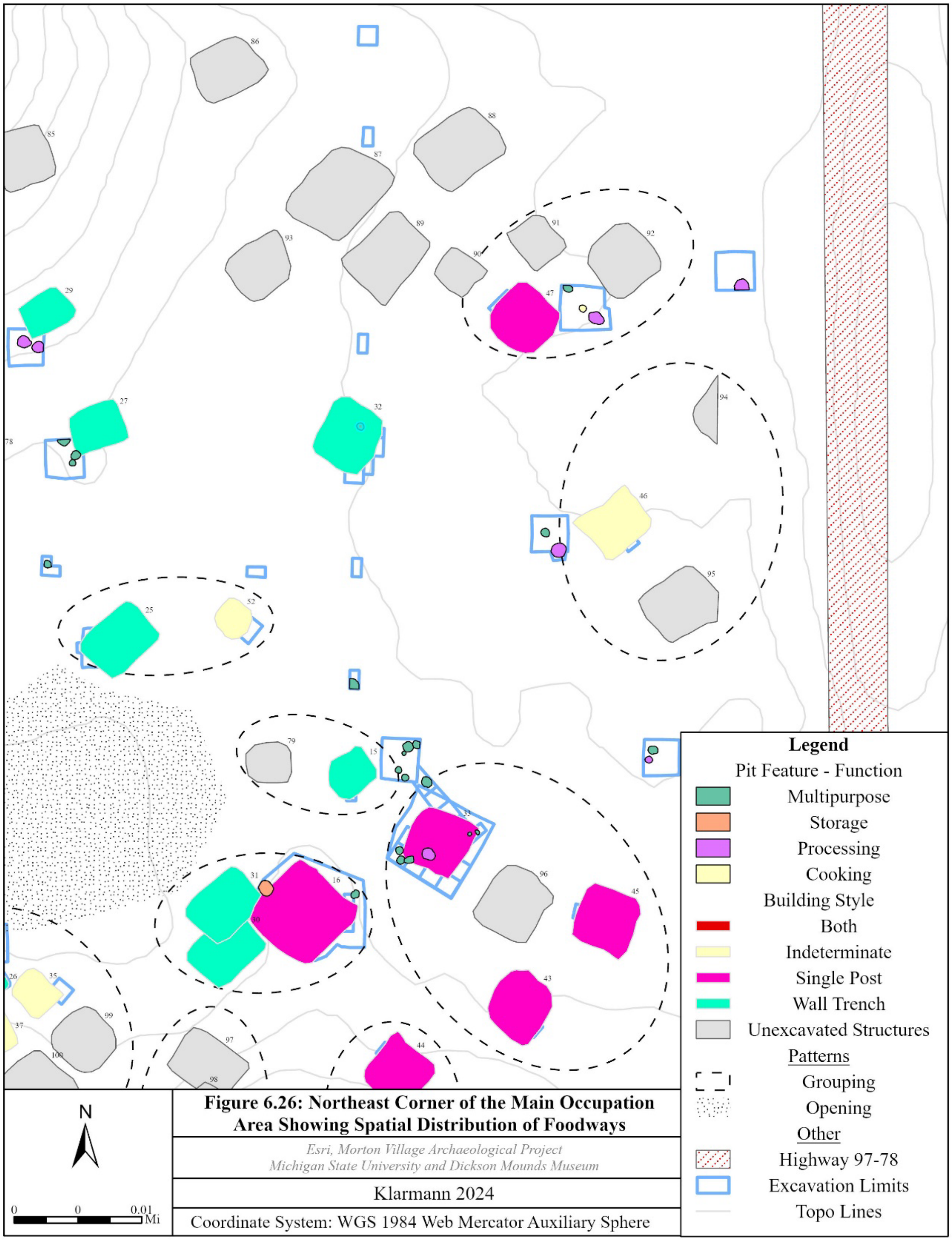

Figure 6.26: Northeast Corner of the Main Occupation Area Showing Spatial Distribution of Foodways

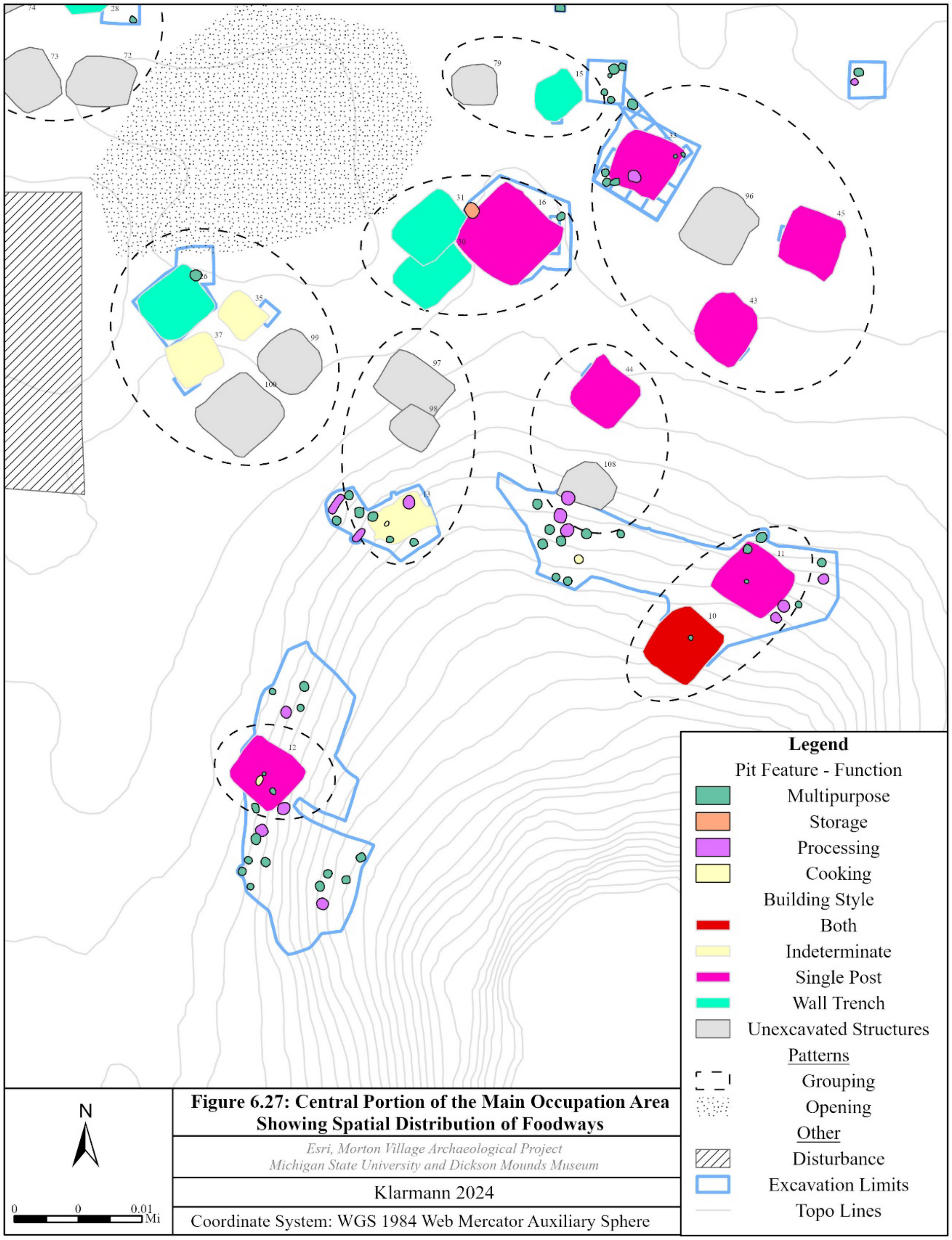

Figure 6.27: Central Portion of the Main Occupation Area Showing Spatial Distribution of Foodways

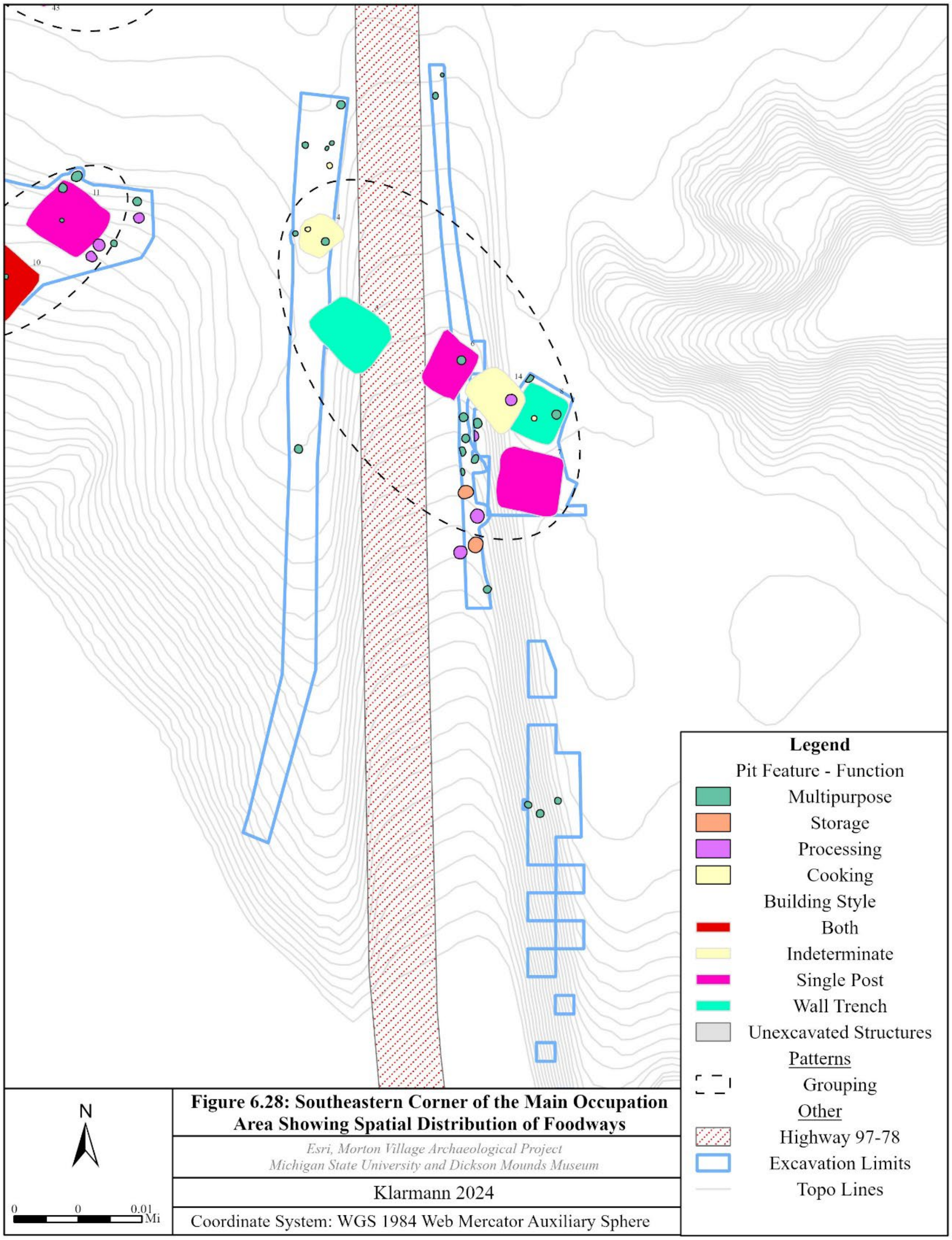

Figure 6.28: Southeastern Corner of Main Occupation Area Showing Spatial Distribution of Foodways

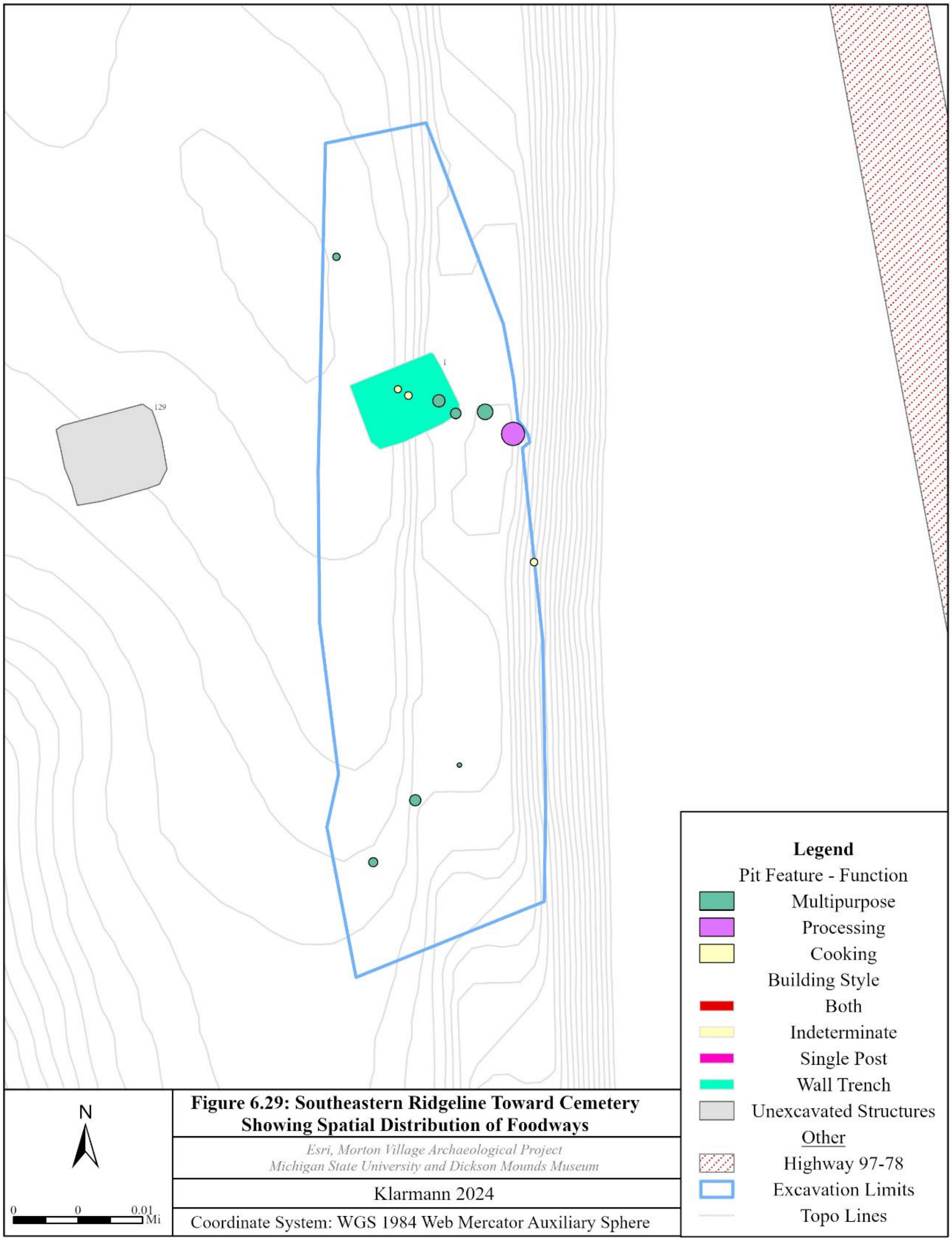

Figure 6.29: Southeastern Ridgeline Toward Cemetery Showing Spatial Distribution of Foodways

Figure 6.30: Northeastern Corner of Site Showing Spatial Distribution of Foodways

6.4.4. Considering Household Waste

To identify how waste is disposed of within the village, artifact densities of the excavated pit features are calculated. Of 138 fully excavated pits with enough information to calculate artifact weights, the average artifact density is 5.4 g/L with a standard deviation of 14.7 g/L (Figure 6.26). The majority of pits (n = 111) have artifact densities under 5 g/L with all but 4 pits having densities under 40 g/L.

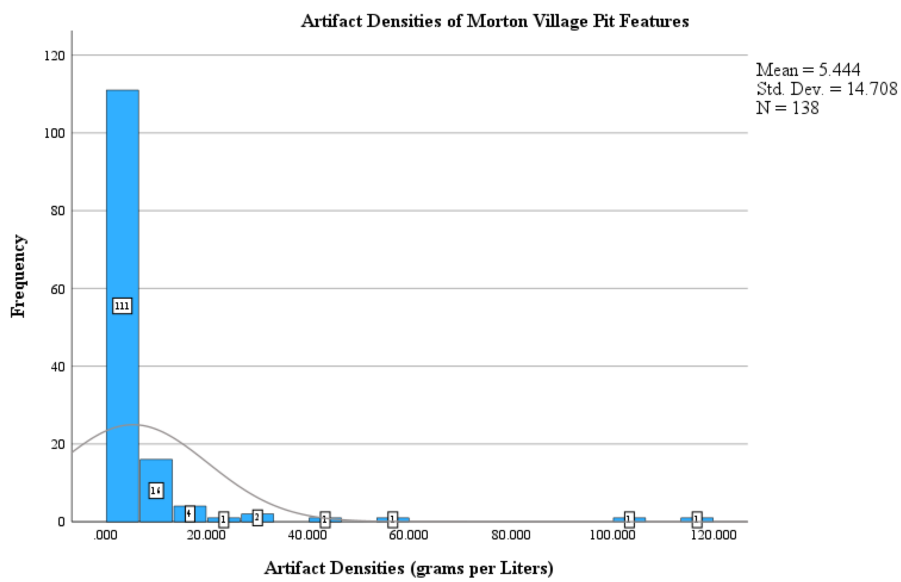

Figure 6.31: Artifact Densities of Morton Village Pit Features

When location of pits (i.e., inside, or outside of structures) and total artifact densities for these contexts are considered, pits outside of structures have double the amount of total waste in them (500.9 g/L) than pits inside of structures (250.5 g/L). When the specific contexts of these pits are considered in relation to density, external pits in proximity to other features tend to have less waste deposited in each of them (Figure 6.27). Despite this, there are still instances where a large amount of waste was discarded in pits outside of structures. Of the four pits with large densities (over 40 g/L), they are equally split between external pits and internal pits, with the two internal pits having the highest density of artifacts within the site (Features 137 and 269).

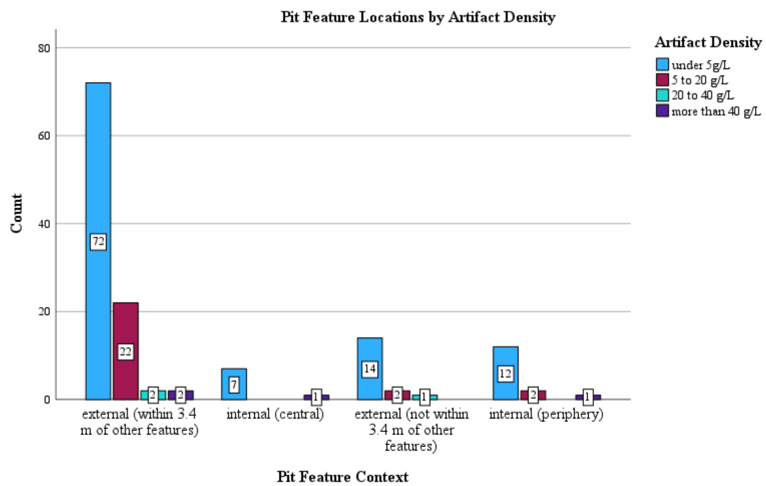

Figure 6.32: Pit Feature Locations by Artifact Density

When the number of depositional episodes of these pits are considered, (i.e., was trash deposited in this feature all at once or in multiple instances), the densely filled internal pits have multiple depositional episodes of material, suggesting inhabitants reused these waste facilities. One of the larger external pits, Feature 214, has multiple fill episodes, while the other, Feature 278, has a single fill episode representing a onetime use of the pit for refuse. When density is considered for the rest of the pits, there are equal numbers of pits that have single or multiple fill episodes, regardless of density.

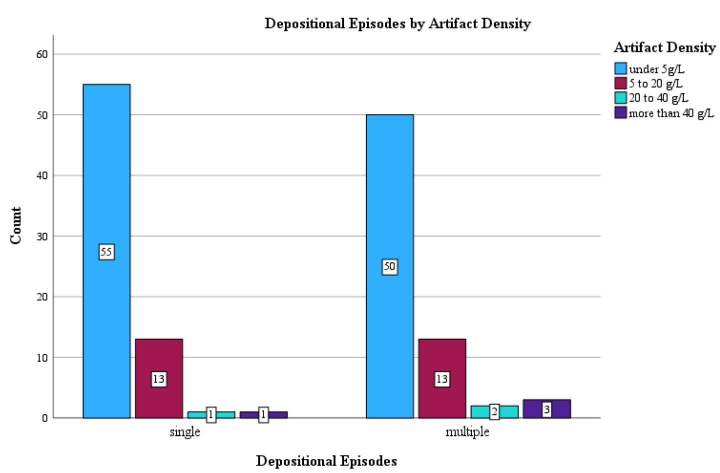

Figure 6.33: Depositional Episodes by Artifact Density

Of the two internal pits with extensive discard of waste, Feature 137 is found inside of STR 32, a wall-trench structure in the northeast part of the main occupation area and Feature 269 is found inside of Structure 33, a single-post structure in the eastern part of the main occupation area (directly south of STR 32). Feature 137 contained only Middle Mississippian style artifacts and Feature 269 had only unidentifiable ceramic styles. Both were classified as multipurpose facilities in the discussion of foodways. Feature 137, founding within STR 32, contained over 33,000 g of material (roughly 74 lbs. total) within 286 L, a mix of ceramics, burned and unburned bone, chipped-stone tools and debitage, modified ground stone, unmodified sandstone, and charcoal. STR 32 was rebuilt several times, indicating the pit was likely used for a long time. Feature 269 contained over 2,000 g of material (roughly 4.6 lbs. total) within 21 L, a mix of ceramics, bone, charcoal, chipped stone flakes, burned sandstone, and burned and unburned bone.

Once pits at Morton Village were no longer being used for their initial function (i.e., storage, processing, cooking, etc.), they served as waste facilities. Overall, it appears that households discarded their waste outside of their structures. Pits would be used for a single trash disposal event or continued disposal of waste; however, generally only small amounts of waste were discarded in each of these pits. This likely reflects regular day-to-day refuse accumulating and being dispersed in multiple pits. It is unlikely that refuse pits would have stayed open very long, but it is clear that sometimes these pits were being reused multiple times by households.

6.5. Intrastructure

For a finer-grained exploration of the use of space, individual structures of single-post and wall-trench construction are compared at an intrahousehold scale. The interstructure analysis raised several issues that can be further addressed at this scale, such as where specific activities were taking place within structures, beyond just occurring on the floors or within pits, how structures were organized internally, and how the differing ceramic styles were used within structures. At this scale I investigate many of the same production behaviors explored in the interstructure discussion, but with a finer lens. Only burned structures that have been completely excavated (i.e., potential in situ or *de facto* deposition of artifacts) are considered, which leaves two structures: Structure 7 and Structure 26. I accept that there is potential bias with this small sample size, however, these structures can be used to make interpretations on some general characteristics of the internal organization of houses at the village.

Generalized artifact maps of the structure floors were created. The artifacts included in these maps are those found on the floor or in close proximity to the floor, i.e., those likely in use when the structure was abandoned. In Structure 26, context was determined based on provenience, first the floor provenience was identified by examining structure forms and photos to identify where the floor was encountered in each provenience during the excavation. Artifacts found within the floor proveniences are assigned the context of “floor”, while items outside of this provenience were assigned the context of “basin fill” (Conner personal communication 2023).

Structure 7 is a square semi-subterranean structure constructed using single post architecture. It measures 6.2 m by 6.3 m in size to the outside of the walls, with an interior floor space of 5.7 m by 5.7 m with an area of 32.5 m^2 of livable space (Harn and Klobuchar 2000) (Figure 6.26). Charred pole and thatch roof remains found along the walls and areas of hardened baked clay are evidence of the structure burning (Harn and Klobuchar 2000). Excavators recorded the locations of 123 items on the floor of the structure (Harn and Klobuchar 2000). A version of their map is used here, and the locations of these items will be used in this discussion.

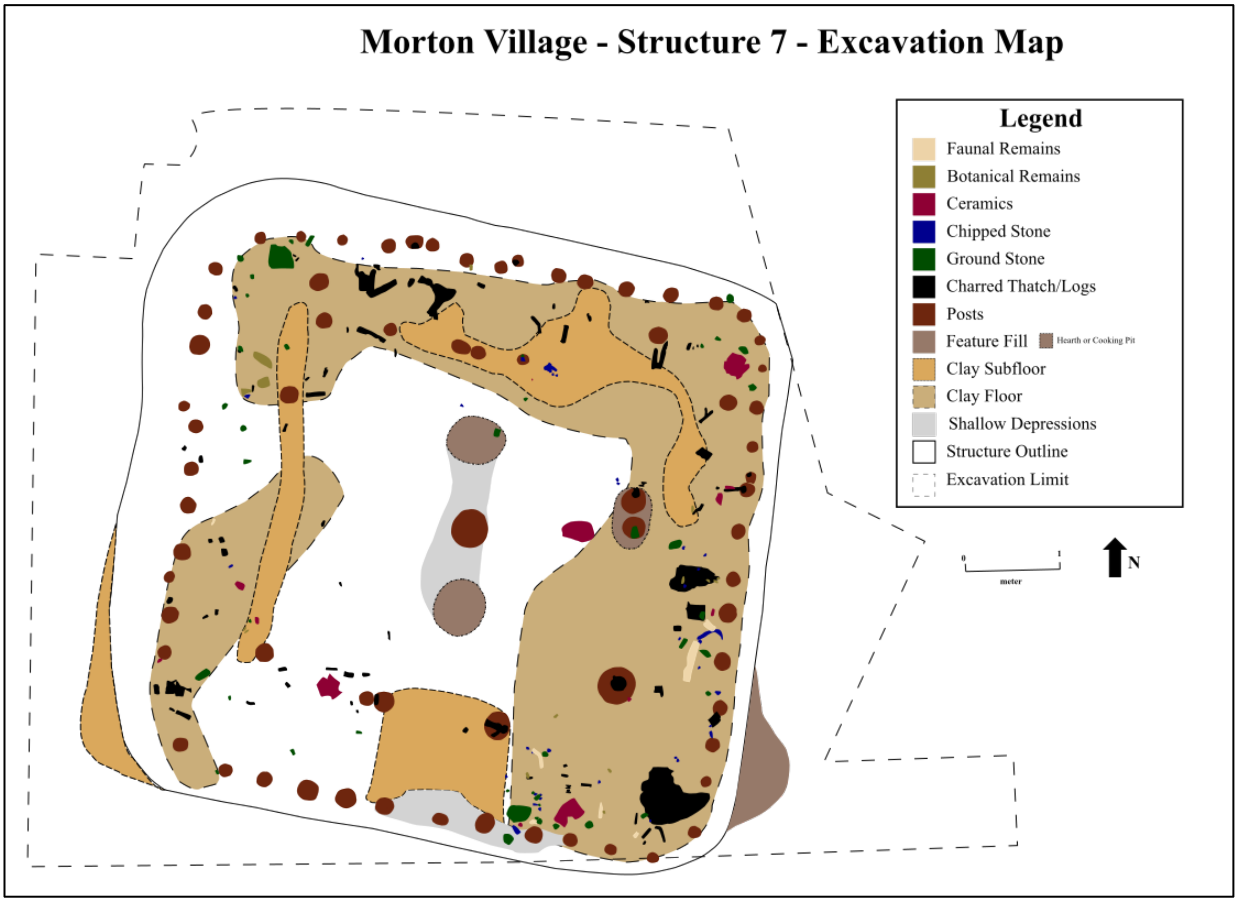

Figure 6.34: Morton Village Structure 7 Excavation Map, Adapted from Harn and Klobuchar (2000)

Structure 26 is a roughly square, semi-subterranean wall-trench structure (Figure 6.27). It was originally 4.6 m by 4.2 m to the outside of the walls, with an interior floor space of 4.3 m by 3.9 m and 16.8 m^2 of livable space. It was rebuilt once, which increased the size of the structure to 6.2 m by 5.8 m to the outside of the walls, with an interior floor space of 5.8 m by 5.2 m and area of 30.2 m^2 of livable space. The rebuilt structure had charred post and thatch roof remains along the wall, burned pots on the floor, and a baked clay floor surface, evidence of the structure burning down (Beyer et al. 2016).

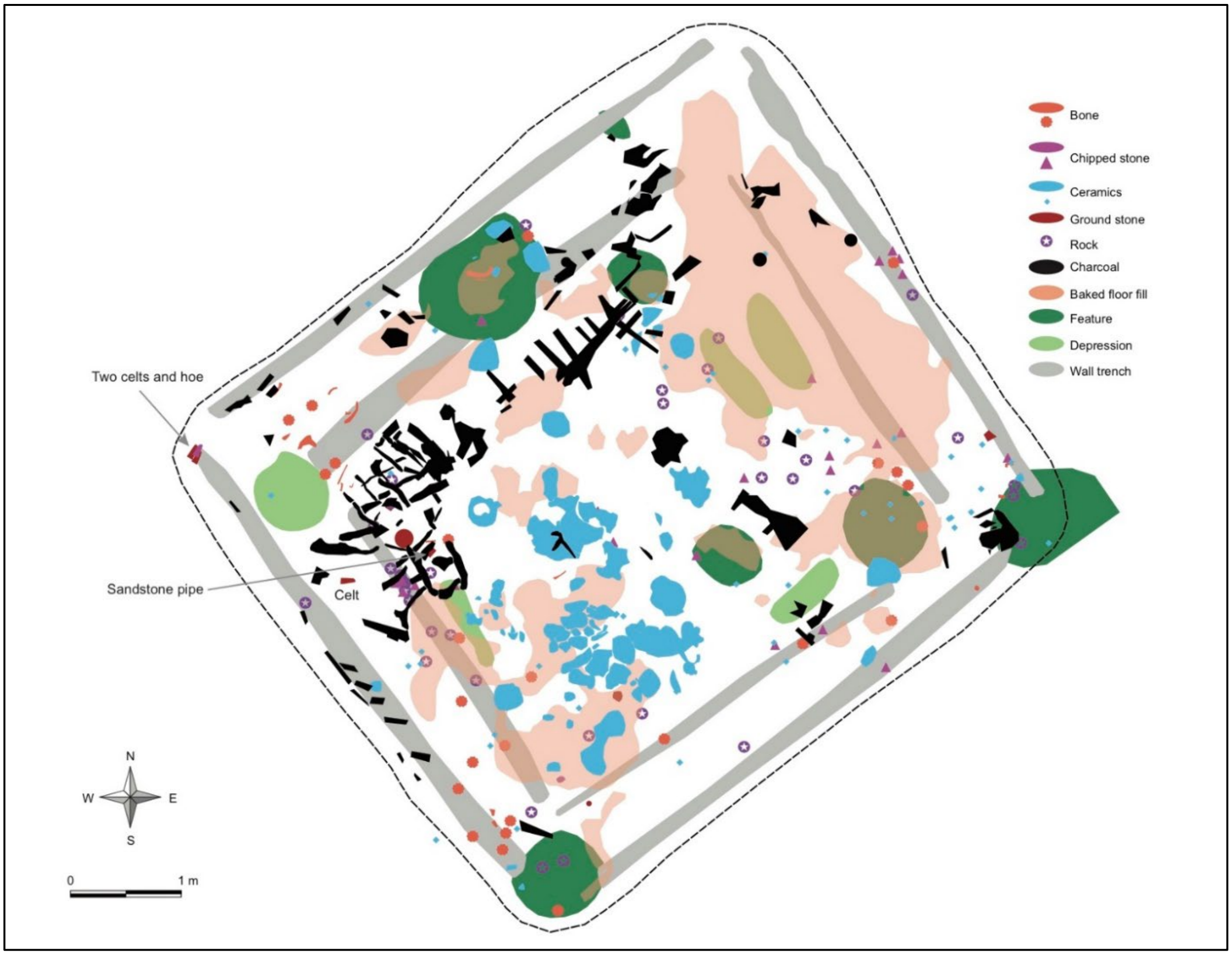

Figure 6.35: Morton Village Structure 26 Excavation Map, Adapted from Beyer et al. (2016)

Structure 26 was likely burned while occupied, while Structure 7 was likely burned after abandonment, likely the reason no complete pots or large items were left behind. Although the assemblages differ, these structures can still be compared, as the small items left behind in STR 7 present residue of activities that can be interpreted as occurring within it prior to abandonment.

6.5.1. Construction Preferences within Structures 7 and 26

When the construction preferences of each structure are considered, Structure 26 sits in the main occupation area and Structure 7 is found 125 meters to the southeast (Figure 6.28). Both are found in groupings with other structures. Structure 7 is in a grouping with five other structures (4-6, 8, 14), which are a mix of single post, wall trench, and indeterminate architectural styles. Structure 26 is in a grouping with four other structures (35, 37, 99, and 100), all with indeterminate architecture styles.

When building style is considered, Structure 7 was constructed using single post architecture and had a large central post (Feature 52) and other smaller interior posts, likely functioning as additional roof supports (Harn and Klobuchar 2000). An entryway was found in the center of the south wall, with a prepared clay ramp (Harn and Klobuchar 2000). Structure 7 has no evidence of rebuilding. Structure 26 was constructed using wall trench architecture, having been rebuilt at least once. There is no evidence for a central post or interior supports or where the entryway might be for this structure.

The second iteration of Structure 26 is only slightly larger than Structure 7 (by 2.3 m^2 of livable space). The structures appear to be oriented differently, with Structure 26 on a diagonal with its corners on the north-south axis, while Structure 7 has an almost north-south axis. The difference in orientation may be reflective of some ideological difference related to the cardinal directions, or the orientation may just be a choice made in different locations and/or relative to other nearby structures.

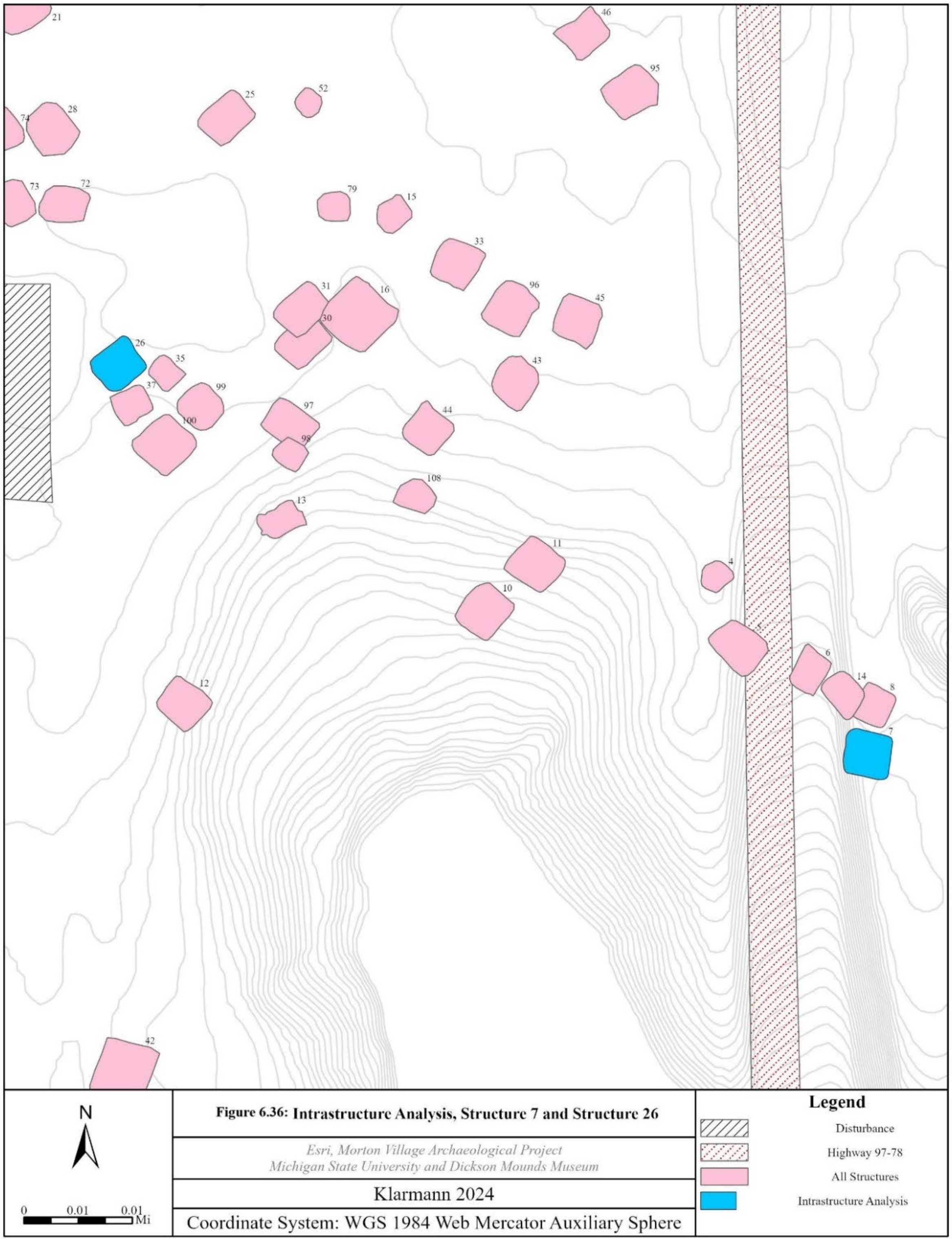

Figure 6.36: Intrastructure Analysis, Structure 7 and Structure 26

6.5.2. Ceramic Use and Discard within Structures 7 and 26

When considering ceramic use and discard within each structure, the ceramics on the floor of Structure 7 had only Oneota ceramic styles, but it is in proximity to pits with both styles of artifacts within them and is directly next to a wall trench structure (Structure 8) that had only Oneota styles within it, except for a beaker handle (see Figure 6.12 from interstructure analysis).

Vessel analysis revealed 22 ceramic vessels on the floor of Structure 26, with a mixture of Middle Mississippian (n = 14) and Oneota styles (n = 3) and some indeterminate styles (n = 5), with Middle Mississippian pots predominating these wares (O'Gorman personal communication 2024). These vessels appear to have been used simultaneously within the structure and in the same areas. An external pit on the edge of Structure 26 contained only Middle Mississippian style ceramics and does not appear to have other pits nearby. Neither of the structures had their internal features excavated, so there is no information about what ceramic types were in them.

6.5.3. Foodways and Other Production Activities within Structures 7 and 26

To consider how production behaviors of foodways occurred within these structures, the spatial organization of activities within Structure 7 and Structure 26 will be described.

6.5.3.1. Structure 7

Harn and Klobuchar (2000) infer a variety of activities were taking place inside of Structure 7; they defined six discrete areas of activity (Areas A-F) (Figure 6.29). Activities that took place within these spaces include cooking, flintknapping, bone and wood working, and paint production. Harn and Klobuchar (2000) also infer that there is evidence of activities that took place outside of the structure, with limited evidence of them found within the structure, including horticulture, hunting, and gathering based on the presence of hoes, corn, botanical food remains, animal bone and arrowpoints, and the burned thatch and a possible sickle.

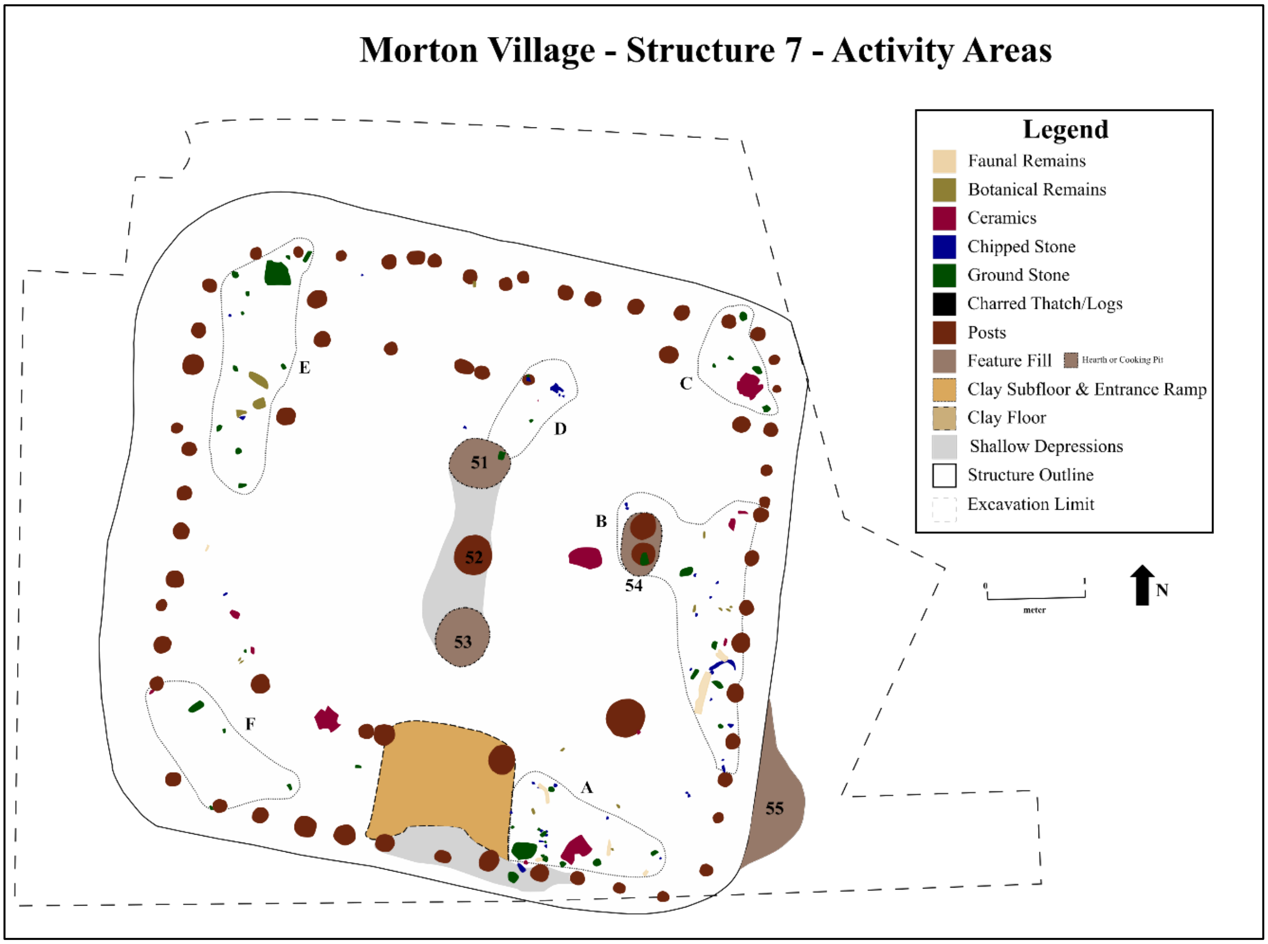

Figure 6.37: Morton Village Structure 7 Activity Areas, Adapted from Harn and Klobuchar (2000)

Cooking took place around the hearth and oven at the house center as well in the eastern hearth in Area B (Harn and Klobuchar 2000). The eastern hearth also had evidence of baked clay, which is interpreted as waste from either mud-baking or pottery making.

Locations where there is evidence of food processing (either plants or fauna) are in Area E, where a pile of burned nut or acorn meal was found, and in Area A, where corn cobs and animal bone were found. Additionally, evidence of plant processing is inferred by Harn and

Klobuchar (2000) based on the large amount of heavily burned limestone, which may indicate that it was being turned into lime, part of the process of nixtamalization, where the alkaline in lime breaks down corn making it more nutritious (Katz, Hediger, and Valleroy 1974; Upton, Lovis, and Urquhart 2015).

Stone-tool production was identified in all activity areas except Areas C and F. Of all the areas, D has the most chipped-stone debris, which Harn and Klobuchar interpret as it being a possible flintknapping waste area. Bone and woodworking evidence is present in all areas around the perimeter, but absent in Area D. I argue that with the large antlers in Area B and its evidence for several bone working tools (antler tines, sandstone abraders, etc.), that this could have been the main location for processing bone tools. Evidence of paint production is inferred from the worked hematite found in two areas (A and C) (Harn and Klobuchar 2000).

To summarize, there appear to be spatially separated groupings of artifacts associated with a few activity types, including cooking and food processing, and production. Despite a heavy distribution of activity areas along the periphery of the structure, there is no direct evidence of activity in the center or interior of the structure except for some flintknapping residue on the northern house floor (Area D). Cooking facilities are centrally located, but there do not to appear to be related artifacts around the hearths or cooking pit (Harn and Klobuchar 2000). The majority of artifacts are found in the eastern half of the structure, leading Harn and Klobuchar (2000) to interpret that the western area was not used as a work area as frequently.

6.5.3.2. Structure 26

In Structure 26, there are areas where only a few artifacts cluster and then larger areas with a higher density of artifacts. Initial analysis suggested that a variety of activities took place within this structure (Beyer et al 2016), and this is supported below with the identification of small and large clusters. To differentiate from Structure 7 activity areas (A-F), Structure 26 activity areas are numbered one through ten (1-10). These designations are subjective and represent areas where there are clear groupings of artifacts within the structure (Figure 6.30). These areas range in size from only a few artifacts to dozens. The northern half of the structure has significantly fewer artifacts, with the northern corner completely devoid of them.

Figure 6.38: Intrastructure Analysis, Structure 26 with Activity Areas

Several pit features were identified within and around Structure 26, but most remained unexcavated. Probing of the features indicates that one (Feature 330) was used as a hearth due to the presence of extensive burning. Another small pit, Feature 333, is also located centrally within the structure; however, when probed the soil had no indication of burning.

Cooking and food processing areas are found in Areas 2-7 and Area 9. Area 7 offers the clearest evidence of a cooking space with the broken jar next to the hearth. Area 3 is potentially a food processing area or location for vessel storage shown by the crushed, intact vessels found there. It is clear that most of the activity taking place within Structure 26 is related to these two activities. Evidence of stone-tool production are found on two sides of the structure, in Areas 4, 5, 8, and 9. Items representing ground-stone tool production are present in Area 4. Bone or woodworking tools were found in a separate area with tools cached in Area 1, and the activity of modifying bone is evidenced only in Area 5, where several pieces of worked bone were identified.

Other activities are indicated by only a few artifacts and not necessarily entire areas, including cloth production (two spindle whorls identified), fishing (eight net sinkers found), agriculture with the presence of a chipped-stone hoe and other botanical remains (not indicated on the map), and the gathering of foodstuffs (four nutting stones and at least eight nut fragments). Not all artifacts were directly on the floor of the structure. The hoe was found within a shallow depression with two celts in the western corner of the structure in Area 1. Three of the nutting stones are found in Areas 4, 6, and 9.

To summarize, there appear to be spatially separated groupings of artifacts associated with a few activity types, including cooking and food processing, and production of stone and bone tools. Despite a heavy distribution of activity areas in the southern half of the structure, there is no evidence of activity in the northern corner of the structure. Cooking facilities are in the north-central area with some ceramics found nearby. These findings support Beyer et al.'s (2016) interpretation that a variety of activities took place within this structure.

6.5.4. Comparing Production Activities Between Structure 7 and Structure 26

Structure 26 has significantly more artifacts within it than Structure 7. There is evidence that both Structure 7 and Structure 26 burned down (both had charred timbers found inside of them). There could be several reasons for this difference in quantity, including the likelihood that STR 26 burned while occupied, whereas STR 7 was burned after abandonment. It is clear that the remaining items within both structures represent snapshots of the activities that took place there.

Activities in Structure 7 are found in every corner of the structure but are mainly concentrated along the eastern and southern walls, with the northern wall free of debris. Structure 26 has activities in every corner except the north, with the entire northern half appearing to have fewer artifacts than the high density seen in the southern half. In Structure 7 minimal activity took place along the northern wall and the southern half of the western wall. Perhaps these areas were used as sleeping areas (Harn and Klobuchar 2000) or they were kept free of debris from activities performed there. Cooking took place in the center and eastern portion of Structure 7 and along the northwestern wall in Structure 26. More activities took place toward the center of Structure 26, while Structure 7 had most activities (besides cooking) occurring on the perimeter of the structure. Both structures have evidence of activities that took place outside of the structure, mainly fishing and agriculture/gathering. Although evidence of paint production is found in Structure 7, it does not appear in Structure 26, while evidence of cloth production only appears in Structure 26.

Cooking and food processing was taking place inside of these structures, with evidence of a variety of tool production (i.e., chipped, ground, bone, and wood) and cooking facilities. Both structures show evidence of their inhabitants participating in agriculture, hunting, and gathering of resources. It is likely that with additional complete floor assemblages from structures burned in situ, there may be clearer differences identified between wall trench and single post structures, but with only these two representative structures available, it is clear that although the architectural styles and pottery styles represented therein may differ, structures have similar activities taking place within them.

6.6. Answering Research Question 3: Coalescence in the Household

Research Question 3 seeks to identify how household spaces within Morton Village are organized, specifically asking whether the two groups living there used this space differently or similarly. As described by Kowalewski (2006), when coalescence occurs, integration will be promoted through domestic architecture and village layout. Archaeological patterns in domestic architecture were analyzed to determine how Morton Village's inhabitants constructed their day-to-day lives. Based on these analyses, it is clear that Morton Village's household organization, like its community and landscape organization, is not as straight forward as saying 'here is where Oneota people lived' and 'here is where Middle Mississippian people lived.'

The spatial organization of households at Morton Village has been explored using archaeological proxies of specific behaviors related to production within household contexts, including construction preferences, ceramic production, foodways, and waste disposal. This analysis was split into two spatial scales, an interstructure analysis, which sought to identify broad patterns across the site, and an intrastructure analysis, which sought to identify finer-grained patterns within structures.

At the interstructure level, it was determined that the people living at Morton Village organized their structures into groupings, which likely represent household units. These households do not appear to be restricted in what building styles they used for their houses as they often have a mix of building styles within them. The majority of structures in the village have wall trench architecture, but these structures are often found near single post structures or structures with evidence of walls rebuilt from wall trench to single post. When considering ceramic style, Oneota and Middle Mississippian ceramics were used in both single post and wall trench structures across the village. Further, there is often a mix of ceramic styles discarded in the pits just outside of structures. There are few instances where only Middle Mississippian ceramics have been found on the floor of structures, and these are restricted to the southeastern ridge of the site. Even in this area Oneota ceramics are found on the floors of other nearby structures.

When foodways are considered, the pits used for cooking tend to occur inside of structures, while processing and storage pits occur mainly outside of structures. There is a large subset of pits (n = 97) that could not be clearly classified as storage or processing pits and were identified as likely having multiple uses. These pits are also dispersed across the site. Common areas were used for a majority of these activities, and it is likely that even more evidence of these activities would be found if additional excavations were conducted in these spaces.

The intrastructure analysis found that within two fully excavated domestic structures in the village, there is evidence of the inhabitants participating in a variety of activities, including agriculture, hunting, and gathering of resources, all related to production. There are some slight distinctions in the ways these structures are organized internally; typically, activities cluster to one side of the structure with at least one corner clear of activity, but the location of these areas differed between the two structures. Despite these and the differences in architectural style and ceramic styles, these structures have similar activities taking place within them.

Based on these analyses, I argue that Oneota and Middle Mississippian people organized their household spaces similarly within the community of Morton Village and integrated these spaces by incorporating a variety of activities, ceramic styles, and construction styles within them. Using building style and ceramic style as indicators of interaction, it is clear that both Oneota and Middle Mississippian inhabitants constructed their buildings in the same households and utilized both Oneota and Middle Mississippian ceramic styles in their structures and discarded them in their refuse pits.

There are instances where Middle Mississippian wall-trench structures only have Middle Mississippian ceramics on their floors and instances where Oneota single-post structures have only Oneota ceramics on their floors; however, as the view is expanded to outside of these structures, there are often nearby pits with both styles of ceramics within them and structures built using a different building style. There are places where there may be only one group inhabiting a space (such as the ridgeline toward the cemetery) and people constructed specific styles of houses in the same spaces, but these households often still incorporate ceramics of the other group within them. It is possible that an earlier Middle Mississippian occupation of the blufftop may be skewing how these interactions are being interpreted. However, it is clear that Oneota ceramics are being incorporated into Middle Mississippian structures across the site and vice versa.

When processes of coalescence are considered, it is possible that the forming of these integrated households is the result of marriages between Oneota and Middle Mississippian inhabitants, where families are sharing preferences for ceramics made and used and building styles for their homes, resulting in the mix of characteristics seen at this site (Kowalewski 2006). It is likely that not all the instances of mixing are the result of intermarriage, and some households likely incorporated traded items into their communities. As I acknowledged earlier in the chapter, these distinctive architectural and ceramic styles do not represent a one-to-one relationship to the people that inhabited these spaces and used these objects. However, it is clear that if these characteristics represent instances of interaction between groups, their mixing shows that Oneota and Middle Mississippian people were sharing space within the village, evidence that the process of coalescence was ongoing within this community. Beyond sharing space, the Middle Mississippian and Oneota inhabitants of Morton Village were intimately living together and forming households together across the site.

CHAPTER 7: INTERPRETATIONS AND CONCLUSIONS

7.1. Introduction

The goal of this dissertation has been to investigate whether processes of coalescence were taking place within the Morton Village community by examining three spatial scales for evidence of integration: landscape, community, and household. I have found that after an Oneota migration into a small, likely Middle Mississippian village, there appears to be various processes of coalescence taking place within the community and household scales. By examining how space was used at these three scales, I have a better understanding of how processes of coalescence shaped the spatial organization of Morton Village. The results of this investigation at each of the three scales are summarized below and implications for future research on coalescence and in the CIRV are detailed.

7.2. Results of Addressing the Overarching Research Question: If spatial archaeology and the examination of multiple scales of space is informative on the social organization of its inhabitants, what then could the examination of spatial relationships tell us about how social identity may be influenced and altered by instances of cultural interaction and integration within archaeological communities?

This dissertation explored how spatial organization can be used to identify the level, range, or variability of cultural integration within communities following a migration episode where two distinct groups interact or cohabitate, where aspects of their social and cultural identities are likely to be shared with each other. Examining spatial relationships can tell archeologists about how community social identity and organization are affected by interaction with other groups. Interaction and integration were explored through the concept of coalescence, or cultural reorganization and formation of multiethnic and multilingual communities (Birch 2012; Kowalewski 2006). This process leaves distinctive archaeological evidence that can be ascertained through an analysis of spatial relationships within the community (Birch 2012; Clark et al. 2019; Cordell and Yannie 1991; Gerritsen 2004:151; Hill 2013; Hodder 1986:7-8; Liebmann 2013; Thomas 2004:34). This evidence includes changes in the built environment, including transformations in the size or organization of settlements and changes in the structure of domestic and public spaces. When identified, these changes help archaeologists understand social processes, including coalescence, that may have taken place within a community (Birch 2012; Clark et al. 2019; Cordell and Yannie 1991; Gerritsen 2004:151; Hill 2013; Hodder 1986: 7-8; Liebmann 2013; Thomas 2004:34).

Spatial relationships are influenced by the inhabitants of that space, thus imbuing those spaces with a sense of place (Whitridge 2004). When groups interact and cohabitate, these spatial characteristics can shift with sustained exposure to new ways of organizing their spaces. There should be visible changes to the built environment and of the spatial organization of communities if processes of integration and coalescence are taking place there (Birch 2012; Clark et al. 2019; Gerritsen 2004:151; Hodder 1986:7-8; Thomas 2004:34). These changes include shifts in the architecture styles used within the community, the size or organization of communities, changes in domestic and community spaces, and changes in behaviors associated with certain activities within the community (Birch 2012; Clark et al. 2019; Gerritsen 2004: 151; Hodder 1986: 7-8; Liebmann 2013; Thomas 2004: 34). The spatial organization of a coalesced society should exhibit differences from how other sites attributed to each cultural formation are organized (Clark et al. 2019; Weik 2014).

I used a multiscalar approach to investigate various spatial relationships at Morton Village, a Bold Counselor Oneota site in the CIRV. These spatial signatures were discussed at three spatial scales, landscape, community, and household. When considering the overarching research question through these spatial scales, I hypothesized that coalescence or cultural reorganization was taking place at Morton Village between Middle Mississippian and Oneota people. Examining only one spatial scale makes differentiating the mechanisms of cultural change difficult to interpret, but incorporating several spatial levels reveals how social practices of everyday life are changed (Birch 2012 citing Hally 2008; Hodder and Cessford 2004; Kintigh et al. 2005; Kuijt 2000; Pauketat 2007:107). When viewed holistically, these spatial scales can be used to inform our understanding of the others. For example, understanding where a settlement is on the landscape can be informative on the ways the people structured their community. Does a bluff top site offer more protection and limit the need for defensive structures within a community? Or perhaps certain types of houses were preferred in one topographic location or another, or a range of structure types were constructed when certain community systems (e.g., religious and/or political) were put into place. Considering these scales in relation to one another provides a more complete understanding of the people that inhabited a particular space and the processes of change that may have occurred there.

Each scale explored an aspect of the larger research question, incorporating varying theories and methods. Although a model of total separation (cohabitation of site, but no coalescence) and total integration (integration of both groups at every level, i.e., in households, intermarrying and ethnogenesis) was used to examine the site, I found that a range of social arrangements took place within the village. The site shows distinct signs of coalescence in its spatial organization, indicating new cultural practices were being incorporated into Morton

Village by its migrant Oneota and local Middle Mississippian inhabitants. The findings at each spatial scale are detailed in the following sections.

7.2.1. Identifying Coalescence at Morton Village through Landscape – Addressing Research Question 1: Are there differences or similarities in the positioning of Morton Village on the landscape compared to the positioning of earlier Oneota and Middle Mississippian sites?

The goal of this analysis was to generalize Oneota and Middle Mississippian landscape use, but I found that generalizing the settlement characteristics reduces the complexity of how Oneota and Middle Mississippian groups may have selected their settlement locations and the complexity of the landscapes themselves. At the landscape scale, I gathered information on five landscape use characteristics (distance to nearest perennial drainage, perennial drainage type, river valley location, soil type, and topographic location) from 87 Oneota settlements and 48 Middle Mississippian settlements in Illinois, Iowa, and Wisconsin. The initial goal was to generalize Oneota and Middle Mississippian landscape use to identify which characteristics the Bold Counselor Oneota sites most closely resemble. These characteristics were quantified separately for Oneota sites and Middle Mississippian sites. First, frequencies for each variable were calculated, then these characteristics were compared using chi-square and Fisher's exact statistical tests to identify relationships between them. These comparisons were then visualized using correspondence analysis to identify patterns in these relationships.

My analysis clearly shows there is no set "Oneota landscape use pattern" or "Middle Mississippian landscape use pattern" at an interregional level. Both cultural groups adapted to, and selected landscapes based on what each location offered. Oneota landscape use is dependent on the locality/region within which a site is located, while Middle Mississippian landscape use is intrinsically tied to topography and the local landscape of a site's region. For Oneota people, each locality offered differing options, leading to differing uses of the landscape by the people who inhabited them. There is not a larger Oneota pattern of landscape use that is driving settlement decisions; instead, those people living in a given locality created their own sense of place within these spaces (Prohansky, Fabian, and Kaminoff 1983). For Middle Mississippian people, the topography of the river valleys in which they lived offered varying settlement options due to accessibility. I have found that Oneota and Middle Mississippian people's settlement choices were affected by the local conditions of their environment.

There are generalizations that can be made about sites with Bold Counselor Oneota presence in the CIRV when compared to the more northern Oneota sites (mostly on terraces) and Middle Mississippian sites in the CIRV (mostly on bluff tops). Morton Village and the other sites with a Bold Counselor Oneota presence in the CIRV are deep within Middle Mississippian territory. Sites with a Bold Counselor Oneota presence are some of the most southern Oneota sites in the Midwest (excluding those contemporaneous and later historic period Oneota sites in the American Bottom). These five Oneota sites in the CIRV have an almost identical set of landscape characteristics, which differ from the more northern regions of Oneota settlement and are most aligned with those Middle Mississippian sites in region.

It is clear that the Oneota populations entering the CIRV were not just transferring their preferred ideas about village location into this new area. This may have been the result of factors not directly related to coalescence, such as strategic placement on the landscape to "fit in" for safety purposes or as part of familiarizing themselves with the people and cultures already in the area. Middle Mississippian communities were well established in the CIRV at the time of the

Oneota people's arrival, making it likely that the Oneota coming into the area moved into or near actively inhabited Middle Mississippian villages, which would provide social benefits (protection, trade, intermarriage) to a migrant group in a new, foreign space, rather than creating their own, new communities. The Oneota people that arrived in the CIRV do not appear to have shown up as one might assume of a group making a hostile incursion into a new territory with a pre-existing social order; rather the migration of Oneota people appears to have been much smaller, where these groups could have easily incorporated themselves within communities that were part of the pre-existing social system. To further explore how these Oneota people created and adapted to these communities in this predominantly Middle Mississippian area, a community scale analysis was then incorporated.

7.2.2. Identifying Coalescence at Morton Village through Community - Addressing Research Question 2: How is the Morton Village community organized? Are there differences or similarities when compared to the organization of Oneota and Middle Mississippian sites?

At the community scale, multivariate clustering (K-Means) analysis was used to identify spatial statistical patterns amongst the distribution of structures at Morton Village. This method separates data points (in this case structure centroids) into multiple groups or clusters. For Morton Village, the analysis found that separating structure centroids into 25 clusters maximized the ratio of between cluster variance to within cluster variance. Once created, these clusters were analyzed for distinctive patterns within them to identify how the Morton Village community was structured. I found that the community of Morton Village was organized in multiple ways: in groupings, which were interpreted as household groupings; around openings, which are interpreted as common areas; and in rows, which are similar to groupings, but structures appear in a line. The patterning seen at Morton Village was then compared to other representative sites, Wever Terrace for Oneota communities and Orendorf for Middle Mississippian communities.

These differences and similarities are outlined in Chapter 5, but in summary I found that Morton Village has attributes that are reminiscent of both Wever Terrace and Orendorf; however, it has some unique attributes as well. The largest difference between Morton Village and Orendorf is its lack of a palisade or any defensive architecture, a characteristic shared with the Wever Terrace site. Additionally, Morton Village lacks an organized plaza, also similar to Wever Terrace. The open areas represent domestic work areas and are not formal plazas like the one at Orendorf. Mortuary practices differ between the three sites, and it is likely that additional mortuary facilities existed for Morton Village that are not yet known.

When these characteristics are considered in relation to cultural integration, I argue that processes of coalescence were occurring between Middle Mississippian populations and Bold Counselor Oneota populations at Morton Village. It appears that the communal structures at Morton Village were accessible to the majority of inhabitants, as they are found within the main occupation area surrounded by domestic structures. The presence of both Oneota and Middle Mississippian ceramics in these structures further suggests the communal structures were likely used by the larger community and served an integrative function. This follows Kowalewski's (2006) criterion of an elaboration of community integration and a universalizing of collective ritual practices in contexts of coalescence, making these activities available for everyone.

Both STR 16 and STR 34 are the only instances of superpositioning of structures in the village, indicating the community appeared to be reorganized around these structures (O'Gorman and Conner 2023). STR 34 is similar to structures seen at other Middle Mississippian sites, including STR 187, a circular wall-trench structure at Orendorf, which is also the largest structure within that community (Wilson and Melton 2019). The Oneota people within this village were participating in Middle Mississippian related communal events within STR 34 based on ceramic evidence.

Meanwhile, STR 16 appears to be a brand-new style of ceremonial structure. It was constructed using completely new architecture and had completely different activities occurring within it compared to Middle Mississippian ceremonial structures elsewhere (O'Gorman and Conner 2023). O'Gorman and Conner (2023) found that STR 16 likely represents processes of hybridity being at work in Morton Village. Further, the unique architecture of STR 16 appears to meet additional coalescence criteria, including the creation of new forms of communal architecture, aggregation centered on this communal architecture, and a continued focus on communal ritual (Stone 2008). STR 16 incorporated traditional symbols from both Oneota and Middle Mississippian groups within the context of this new ceremonial space (O'Gorman and Conner 2023), likely serving to further integrate the people that used these communal spaces.

Further, if wall-trench architecture represents Middle Mississippian spaces, it is the predominant architecture for the excavated structures at the site and specifically within the main occupation area. There are also single-post structures in this area, often in proximity to wall-trench structures. Finally, the spatial patterns employed at Morton Village —groupings, rows, openings, and pairs of structures—all incorporate both wall trench and single post architecture. With these findings in mind, I argue that both the Oneota and Middle Mississippian inhabitants at Morton Village integrated their identities within this new community space through architectural styles, communal/ceremonial spaces, and domestic spaces. The community level patterns, i.e., the integration of architectural forms and communal spaces and increased access to communal architecture, are explored at the final spatial scale, household, to identify whether integration is also reflected within individual households of Morton Village.

7.2.3. How are the household spaces within the Morton Village community organized? Does one group utilize these spaces differently or is there overlap between the Oneota and Middle Mississippian spaces at the village?

At the household scale I investigated whether there were differences between how Oneota and Middle Mississippian inhabitants of the village used and created space by examining various production behaviors related to household spaces. These behaviors are construction preferences, ceramic use/discard, foodways, and waste disposal. Each behavior was investigated at a broad interstructure level and at a finer-grained intrastructure level by considering statistical frequencies and spatial context. Archaeological patterns in household spaces were analyzed to determine how Morton Village's inhabitants constructed their day-to-day lives.

Based on these analyses, it is clear that Morton Village's household organization is complex. At the interstructure level, I found that the people living at Morton Village organized their structures into household groupings which are not homogeneous in terms of architectural style. Although the majority of structures in the village have wall trench architecture, these are often found near single post structures or structures with evidence of wall rebuilding using both techniques. In terms of ceramic style, I found that Oneota and Middle Mississippian ceramics were used in both single post and wall trench structures across the village, often with a mix of ceramic styles discarded in the pits just outside these structures. Instances where only Middle Mississippian ceramics are found are restricted to the southeastern ridge of the site, although Oneota ceramics are still found on the floors of other nearby structures. In terms of foodways, cooking tends to take place inside of both kinds of structures, while processing and storage facilities are found outside of structures, with common areas containing many of these activities.

At the intrastructure level, I found that within domestic structures, there is evidence of the inhabitants participating in a variety of production activities, including agriculture, hunting, and gathering of resources. Despite some slight distinctions in the ways domestic structures are organized internally and the differences in their architectural and ceramic styles, these structures have similar activities taking place within them.

Based on the interstructure and intrastructure analyses, Oneota and Middle Mississippian people organized their household spaces similarly within the community of Morton Village and integrated these spaces by incorporating a variety of activities, ceramic styles, and construction styles within them. Using building style and ceramic style as indicators of interaction, I argue that Oneota and Middle Mississippian inhabitants shared household spaces, and used both Oneota and Middle Mississippian ceramic styles in their homes and discarded them in their refuse pits.

When processes of coalescence are considered, I argue that the forming of these integrated households is likely the result of intermarriage, where families shared preferences for various ways of doing things, resulting in the mix of characteristics seen at this site (Kowalewski 2006). Trade was likely occurring as well, with some traded items incorporated into some households. Despite not representing one-to-one relationships to the people inhabiting Morton Village, the mixing of ceramic and building styles shows that Oneota and Middle Mississippian people were sharing space within the village, intimately living together, and forming households together across the site, evidence that the process of coalescence was ongoing within this community.

7.3. Implications of Results for Coalescence at Morton Village

Space is an important part of coalescence to consider because as people shift their ideas of “how to do things”, they then shift the physical world around them. The integration of differing groups of people leads to new alterations of space, including new methods of construction and new ways of organizing communities and households. Archaeologically, residues of how people once used their space may be some of the only information we have about a past community. This spatial evidence can provide clues to how they structured their day-to-day lives as the organization of space is inherently tied to a community’s sense of place. These places shift and change as the cultural practices of each group are exchanged and new senses of place develop within these spaces.

It is clear that Oneota and Middle Mississippian inhabitants were integrating their cultural practices at Morton Village. Although we do not yet understand the sequence of Oneota migration into the CIRV, i.e., if all sites were settled at the same time or there was a sequence of migrations, it is clear that Oneota people chose to come to an area which had long been home to a Middle Mississippian population. It is also clear that the Mississippians had been engaged in violent conflict in the region for several generations prior to Oneota arrival. Trauma evident in the Norris Farms 36 cemetery makes clear that this violence persisted and perhaps even increased after the Oneota arrived in the CIRV. The Oneota people that migrated to the CIRV chose to move to an area where conflict was part of the social landscape. Despite this, there is mounting evidence that the community was engaged in processes of coalescence. My study of space as it was used and created by Morton Village residents contributes a key component to this evidence and further suggests that aspects of both cultural traditions persisted.

Looking back at the definition of coalescence, i.e., the cultural reorganization and formation of aggregated, multiethnic communities, it is clear that processes of coalescence were ongoing at Morton Village, meaning the site was not completely coalesced at the time of abandonment. However, this process was far enough along that this specific settlement does not quite match the spatial organization of Middle Mississippian or Oneota sites elsewhere. Rather, Morton Village residents developed new ways to organize and use space, while still incorporating aspects from both groups within the community.

Recent work by others supports the idea that the inhabitants of Morton Village shared ideas about foodways and about ways of interacting with sacred or ceremonial spaces within the village (Bengtson and O'Gorman 2016; Nordine 2020; O'Gorman and Conner 2023; O'Gorman et al. 2020; Painter 2021; Painter 2022; Upton 2019). The Oneota and Middle Mississippian people living at Morton Village shared more than space, they shared their homes, communal spaces, ideas of how to construct buildings, and how to organize these buildings within this space.

7.4. Future Research and Conclusions

This multiscalar approach of contextualizing material culture in space can be applied elsewhere, including other areas of Oneota settlement. Various work has identified evidence of interaction amongst an Oneota enclave in Kansas with local Central Plains tradition populations after about AD 1250 (Ritterbush 2002a, 2002b, 2006; Ritterbush and Logan 2000). Characteristics of this interaction can be further explored by incorporating a similar multiscalar lens through which to view spatial organization of these communities. This approach can also be applied to non-Oneota contexts of interaction, such as recent work in western Kansas that produced evidence of southwestern Puebloan groups entering far western Kansas as refugees who interacted with local Dismal River aspect people (ancestors of the Apache Tribe) for a period of time in the 1600s (Beck and Trabert 2014; Trabert 2015, 2017; Trabert et al. 2016, 2023). Do processes of coalescence always take place in instances where two groups of differing backgrounds come together? Further explorations of the spatial organization of integration can contextualize such instances of interaction where the groups end up cohabitating and often integrating through trade and intermarriage.

Although archaeologists ultimately do not know how these people identified themselves or how they felt about such interactions and integrations within their communities, additional knowledge could be gleaned from working with the various descendant communities linked to Oneota, including the Kaw Nation of Oklahoma and the Iowa Tribe of Kansas and Nebraska and others. Perhaps tribal histories reflect the interaction and integration seen in many of the regions where Oneota people migrated (like the CIRV and northeastern Kansas). There is more that can be gained from such a collaboration and perhaps could help contextualize the archaeological work that has been accomplished there.

Although we do not yet know why the migration into the CIRV by Oneota people occurred, or what the ultimate fate of the village was, this dissertation supports other recent work that speaks to cooperation and negotiation of Oneota and local Middle Mississippian people regardless of the threat of conflict. When considering the overall impact of this analysis, a multiscalar investigation of the spatial organization of other Bold Counselor Oneota sites in the CIRV would help contextualize how Oneota populations integrated within the valley overall. Did the integration that was occurring in Morton Village also take place in sites with a Bold Counselor Oneota presence elsewhere? Or were there a unique set of circumstances that led to processes of coalescence taking place at Morton Village? In any case, based on these analyses, coalescence was ongoing at Morton Village, with the Oneota and Middle Mississippian inhabitants sharing more than spaces within this community, as shown through the landscape, community, and household choices that they made.

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APPENDIX A: COMPARATIVE LANDSCAPE SITES

Table A.1: Oneota Site Points

Site Name	Site No.	Topographic Location	Perennial Drainage Distance	Soil Type	Perennial Drainage
Olson	47LC76	flood plain	0.88	loamy sand	creek
Grant Village	13AM201	bluff top	0.4	loam	river
Harriman/Indian Hill	13CY1	bluff top	0.48	silty clay loam	river
Burkes	13AM14	terrace	0.07	sand	creek
Fish Farm	13AM46	terrace	1.42	loamy sand	river
Flatiron Terrace	13AM1	terrace	0.1	loamy	river
Gang Village	13AM63	terrace	0.13	silt loam	creek
Hays Farm	13AM10	terrace	0.88	silt loam	river
Hesters Place	13AM2A	terrace	0.16	sand gravel	river
Malone Terrace	13AM6, 60	terrace	0.1	silt loam	creek
O'Regan Buhlman Terrace	13AM21	terrace	0.23	silt loam	river
Old Bockus Place	13AM18A	terrace	0.1	loamy sand	creek
Old Flynn Place	13AM7	terrace	0.16	silt loam	creek
Sand Cove	13AM23	terrace	0.9	loamy sand	creek
Weymiller Village	13AM42	terrace	0.6	sand	creek
Woolstrom Village	13AM61, 188	terrace	0.04	silt loam	creek
ZiemansFarmSite1	13AM12A	terrace	0.1	silt loam	creek
Correctionville	13WD6	terrace	0.21	sand gravel	river
Cross Valley/ Gothier	13WD3, 219	terrace	0.54	silt clay loam	river
Dixon	13WD8	terrace	0.14	silt clay loam	river
Bastian	13CK28	terrace	0.31	loam	creek

Table A.1 (cont'd)

Site Name	Site No.	Topographic Location	Perennial Drainage Distance	Soil Type	Perennial Drainage
Christenson	13PK407	terrace	0.05	silty clay loam	river
Clarkson	13WA2	flood plain	0.39	silt loam	river
Cribbs Crib Leftwick	13WA105	terrace	0.41	silty clay loam	river
Gillet Grove	13CY2	bluff top	0.5	silty clay loam	river
Goodhue Farm	13PK1	flood plain	0.67	loam	river
Kelley	13DM140	terrace	1.02	loam	river
Kingston	13DM3	bluff top	4.73	silt loam	river
Patterson Cornell	13DM68, 294	bluff top	0.66	silt loam	creek
McKinney	13LA1	terrace	0.95	silt loam	river
Milford	13DK1	bluff top	0.46	sandy loam	creek
Wever Terrace	13LE59, 110, 117	terrace	0.78	loamy sand	creek
Blood Run	13LO2	terrace	0.05	silt loam	creek
Anker	11CK21	terrace	0.07	silty clay loam	river
Forest Home Cemetery	11CK36	flood plain	0.22	silt loam	river
Hoxie Farm	11CK4	terrace	0.16	loamy sand	creek
Huber	11CK1	terrace	0.15	loamy sand	creek
JoeLouis	11CK284	terrace	0.07	silt loam	river
Oak Forest	11CK53	terrace	1.16	silt loam	creek
Rinkenberger	11CK142	bluff top	0.67	silt loam	creek
Feltes	11K50	bluff top	0.76	silt loam	river
Washington Irving	11K52	flood plain	0.07	silt loam	creek
Fisher	11WI5	flood plain	0.21	loamy	river
Grant Creek	11WI2739	terrace	0.25	silt loam	creek
Gentleman Farm	11LS27	flood plain	0.03	silt loam	river

Table A.1 (cont'd)

Site Name	Site No.	Topographic Location	Perennial Drainage Distance	Soil Type	Perennial Drainage
Langford	11WO23	flood plain	0.09	sandy loam	river
Filler	47LC149	flood plain	0.66	fill	creek
Jim Braun	47LC59	flood plain	0.9	sand	river
Lee	47LC390	flood plain	0.29	silt loam	creek
Midway	47LC19	terrace	0.19	loamy sand	creek
New Road Meier Farm	47LC432	flood plain	1.8	sand	creek
Onalaska Village Cemetery	47LC288	terrace	0.31	urban	creek
OT	47LC262	terrace	0.16	fill	creek
Overhead	47LC20	flood plain	0.23	loamy sand	creek
Pammel Creek	47LC61	terrace	0.07	loamy sand	creek
Sand Lake	47LC44	terrace	1.81	silt loam	creek
Sanford	47LC394	terrace	0.3	urban	river
Swennes	47LC333	terrace	0.15	silt loam	creek
Tremaine	47LC95	terrace	0.16	loamy sand	creek
Valley View	47LC34	terrace	0.09	sand	river
Entire Road	47WN562	flood plain	0.06	clay loam	lake
Furman	47WN216	terrace	0.15	silt loam	lake
Grignon	47WN118	flood plain	0.19	sand	lake
Karow	47WN57	terrace	0.06	silt loam	lake
Lasleys Point	47WN96	terrace	0.25	silt loam	lake
Mary Nichols	47WN56	terrace	0.11	silty clay loam	lake
McCauley	47WN222	terrace	0.03	silt loam	lake
Overton Meadow	47WN106	flood plain	0.09	silty clay loam	creek
Sauer Resort	47WN207	flood plain	0.1	sand	lake
Sherman	47WN228	flood plain	0.14	silt loam	lake
Blue Heron	47JE1001	terrace	0.42	silt loam	lake
Carcajou Point	47JE2	bluff top	0.31	loam	lake

Table A.1 (cont'd)

Site Name	Site No.	Topographic Location	Perennial Drainage Distance	Soil Type	Perennial Drainage
Crescent Bay Hunt Club	47JE904	bluff top	0.3	silt loam	lake
Koshkonong Creek	47JE379	flood plain	0.09	silt loam	creek
Point Sauble	47BR101	flood plain	0.09	loamy sand	lake
Sensiba	47BR163	flood plain	0.36	muck	river
Adams	47PI12	bluff top	0.28	sandy loam	river
Diamond Bluff	47PI132	terrace	0.45	silt loam	river
Armstrong	47PE12	terrace	0.96	sand	river
Burley Brew	47PT159	terrace	0.23	sandy loam	river
Bornick	47MQ65	flood plain	2.55	loamy sand	river
Fisher Mounds	47VE825	terrace	0.14	loamy sand	river
Mero	47DR83	flood plain	0.02	sand	lake
Pipe	47FD10, 13	flood plain	0.12	silt loam	creek
Shrake Gillies	47TR44	flood plain	1.03	sand	river
Walker Hooper	47GL65	bluff top	0.43	sandy loam	river
Zarling Lake	47FR186	bluff top	0.21	loamy sand	lake

Table A.2: Middle Mississippian Site Points

Site Name	**Site No.**	**Topographic Location**	**Perennial Drainage Distance**	**Soil Type**	**Perennial Drainage**
Albert Young	11A43	flood plain	0.14	silt loam	creek
Anderson	11PK1068	flood plain	1.93	silt loam	creek
Audrey	11GE20	terrace	0.09	sand	creek
Baker Preston	11F20	bluff top	1.37	silt loam	creek
Booker Mound	11PK867	terrace	0.06	silt loam	creek
Brammael	11PK120	bluff top	0.2	silt loam	creek
Buckeye Bend	11F310	flood plain	0.09	loam	river
Bushnell Hollow	11GE488	terrace	1.2	silt loam	creek
Clear Lake	11T1	bluff top	0.91	sand	river
Closser	11GE26	flood plain	0.06	silt loam	creek
Coultas	11PK74	flood plain	3.1	loam	creek
Crable	11F249	bluff top	0.74	silt loam	creek
Crabtree	11BR5	bluff top	0.31	silt loam	creek
CW Cooper	11BR10	bluff top	0.43	silt loam	creek
Emmons	11F218	flood plain	0.99	silty clay loam	creek
Ester Berry	11F13_332	bluff top	0.72	silt loam	creek
Eveland	11F353	terrace	0.24	silt loam	creek
Fandel	11WD4	flood plain	0.24	loam	creek
Fiedler	11F356	bluff top	0.89	silt loam	river
Floyds	11HA62	flood plain	0.14	silt loam	river
Fouts	11F164	bluff top	0.2	silt loam	creek
Frederick	11SC11	bluff top	0.9	silt loam	river
Golarte	11MN7	terrace	0.07	loamy sand	river
Hildenmeyer/Ten Mile Creek	11T2	flood plain	0.17	sandy loam	creek
Housing Unit Site	11C24	bluff top	0.98	silt loam	river
Houston Shyrock	11F114	bluff top	1.32	silt loam	river
John Chapman	11JD12	terrace	0.16	silt loam	river
Koster	11GE4	terrace	1.64	silt loam	creek
Larson	11F3	bluff top	0.38	silt loam	river
Lawrenz Gun Club	11CS4	flood plain	0.77	sand	river
Lyons	11PK1051	flood plain	0.27	silty clay loam	river

Table A.2 (cont'd)

Site Name	Site No.	Topographic Location	Perennial Drainage Distance	Soil Type	Perennial Drainage
Mark Seeman	11JD140	terrace	0.07	silt loam	river
McKinley	11F55	bluff top	1.2	silty clay loam	river
Mills Group	11JD11	flood plain	0.06	silt loam	river
Noble Wieting	11ML24	flood plain	0.24	silt loam	creek
Oetting	11PK1084	flood plain	0.26	silt loam	creek
Orendorf	11F1284	bluff top	0.7	silt loam	creek
PCWD1	11PK1512	flood plain	0.51	silt loam	creek
Phantom	11C85	flood plain	0.51	silt loam	river
Raskamp Group	11F110_99_100	bluff top	0.36	silt loam	creek
Sister Creeks	11F15	terrace	0.21	silt loam	creek
Sleeth	11F48	bluff top	0.72	silt loam	creek
Star Bridge	11BR17	terrace	0.42	silt loam	river
Sybl Walsh	11BR11	bluff top	0.55	silt loam	creek
Tree Row	11F53	terrace	1.56	silt loam	river
Weaver	11F61	terrace	1.85	silt loam	river
Whiteside	11GE1	flood plain	2.86	silt loam	river
Williams/Kingston Lake	11P15_11	flood plain	0.52	loamy	river

APPENDIX B: LANDSCAPE CHAPTER FREQUENCIES

Table B.1: Oneota Sites, Perennial Drainage Distance

Value	Frequency	Percent
<0.5 mile	65	74.7
0.5-1.0 mile	14	16.1
>1.0 mile	8	9.2
Total	87	100.0

Table B.2: Oneota Sites, Topographic Location

Value	Frequency	Percent
Bluff top	13	14.9
Flood plain	25	28.7
Terrace	49	56.3
Total	87	100.0

Table B.3: Oneota Sites, Perennial Drainage Type

Value	Frequency	Percent
Creek	35	40.2
River	37	42.5
Lake	15	17.2
Total	87	100.0

Table B.4: Oneota Sites, Soil Type

Value	Frequency	Percent
Loam	55	63.2
Sand	27	31.0
Other	5	5.7
Total	87	100.0

Table B.5: Oneota Sites, River Valley

Value	Frequency	Percent
IRV	10	11.5
Lake	17	19.5
MRV	41	47.1
Other	19	21.8
Total	87	100.0

Table B.6: Middle Mississippian Sites, Perennial Drainage Distance

Value	Frequency	Percent
<0.5 mile	24	50.0
0.5-1.0 mile	14	29.2
>1.0 mile	10	20.8
Total	48	100.0

Table B.7: Middle Mississippian Sites, Topographic Location

Value	Frequency	Percent
Bluff top	18	37.5
Flood plain	18	37.5
Terrace	12	25.0
Total	48	100.0

Table B.8: Middle Mississippian Sites, Perennial Drainage Type

Value	Frequency	Percent
Creek	27	56.3
River	21	43.8
Total	48	100.0

Table B.9: Middle Mississippian Sites, Soil Type

Value	Frequency	Percent
Loam	5	10.4
Silt loam	36	75.0
Silty clay loam	3	6.3
Sand	4	8.3
Total	48	100.0

Table B.10: Middle Mississippian Sites, River Valley

Value	Frequency	Percent
CIRV	29	60.4
LIRV	9	18.8
MRV	10	20.8
Total	48	100.0

APPENDIX C: LANDSCAPE CHAPTER CROSS TABULATION RESULTS

Table C.1: Oneota Sites Crosstabulation, Perennial Drainage Distance by Perennial Drainage Type

	Creek	River	Lake	**Total**
<0.5 mile	25	25	15	65
0.5-1.0 mile	7	7	0	14
>1.0 mile	3	5	0	8
Total	35	37	15	87

Table C.2: Oneota Sites Crosstabulation, Perennial Drainage Distance by Topographic Location

	Bluff top	Flood plain	Terrace	**Total**
<0.5 mile	8	18	39	65
0.5-1.0 mile	4	4	6	14
>1.0 mile	1	3	4	8
Total	13	25	49	87

Table C.3: Oneota Sites Crosstabulation, Perennial Drainage Distance by River Valley Location

	IRV	Lake	MRV	Other	**Total**
<0.5 mile	8	17	26	14	65
0.5-1.0 mile	1	0	9	4	14
>1.0 mile	1	0	6	1	8
Total	10	17	41	19	87

Table C.4: Oneota Sites Crosstabulation, Perennial Drainage Distance by Soil Type

	Loam	Sand	Other	**Total**
<0.5 mile	44	17	4	65
0.5-1.0 mile	7	6	1	14
>1.0 mile	4	4	0	8
Total	55	27	5	87

Table C.5: Oneota Sites Crosstabulation, Perennial Drainage Type by Topographic Location

	Bluff top	Flood plain	Terrace	**Total**
Creek	3	9	23	35
River	7	10	20	37
Lake	3	6	6	15
Total	13	25	49	87

Table C.6: Oneota Sites Crosstabulation, Perennial Drainage Type by River Valley Location

	IRV	Lake	MRV	Other	**Total**
Creek	5	3	22	5	35
River	5	1	19	12	37
Lake	0	13	0	2	15
Total	10	17	41	19	87

Table C.7: Oneota Sites Crosstabulation, Perennial Drainage Type by Soil Type

	Loam	Sand	Other	**Total**
Creek	19	13	3	35
River	26	9	2	37
Lake	10	5	0	15
Total	55	27	5	87

Table C.8: Oneota Sites Crosstabulation, Topographic Location by River Valley Location

	IRV	Lake	MRV	Other	**Total**
Bluff top	1	2	5	5	13
Flood plain	3	9	8	5	25
Terrace	6	6	28	9	49
Total	10	17	41	19	87

Table C.9: Oneota Sites Crosstabulation, Topographic Location by Soil Type

	Loam	Sand	Other	**Total**
Bluff top	12	1	0	13
Flood plain	13	10	2	25
Terrace	30	16	3	49
Total	55	27	5	87

Table C.10: Oneota Sites Crosstabulation, River Valley Location by Soil Type

	Loam	Sand	Other	**Total**
IRV	8	2	0	10
Lake	12	5	0	17
MRV	18	18	5	41
Other	17	2	0	19
Total	55	27	5	87

Table C.11: Middle Mississippian Sites Crosstabulation, Perennial Drainage Distance by Perennial Drainage Type

	Creek	River	**Total**
<0.5 mile	15	9	24
0.5-1.0 mile	7	7	14
>1.0 mile	5	5	10
Total	27	21	48

Table C.12: Middle Mississippian Sites Crosstabulation, Perennial Drainage Distance by Topographic Location

	Bluff top	Flood plain	Terrace	**Total**
<0.5 mile	6	10	8	24
0.5-1.0 mile	9	5	0	14
>1.0 mile	3	3	4	10
Total	18	18	12	48

Table C.13: Middle Mississippian Sites Crosstabulation, Perennial Drainage Distance by River Valley Location

	CIRV	LIRV	MRV	**Total**
<0.5 mile	13	3	8	24
0.5-1.0 mile	11	2	1	14
>1.0 mile	5	4	1	10
Total	29	9	10	48

Table C.14: Middle Mississippian Sites Crosstabulation, Perennial Drainage Distance by Soil Type

	Loam	Sand	**Total**
<0.5 mile	22	2	24
0.5-1.0 mile	12	2	14
>1.0 mile	10	0	10
Total	44	4	48

Table C.15: Middle Mississippian Sites Crosstabulation, Perennial Drainage Type by Topographic Location

	Bluff top	Flood plain	Terrace	**Total**
Creek	11	10	6	27
River	7	8	6	21
Total	18	18	12	48

Table C.16: Middle Mississippian Sites Crosstabulation, Perennial Drainage Type by River Valley Location

	CIRV	LIRV	MRV	**Total**
Creek	16	6	5	27
River	13	3	5	21
Total	29	9	10	48

Table C.17: Middle Mississippian Sites Crosstabulation, Perennial Drainage Type by Soil Type

	Loam	Sand	**Total**
Creek	26	1	27
River	18	3	21
Total	44	4	48

Table C.18: Middle Mississippian Sites Crosstabulation, Topographic Location by River Valley Location

	CIRV	LIRV	MRV	**Total**
Bluff top	16	1	1	18
Flood plain	7	5	6	18
Terrace	6	3	3	12
Total	29	9	10	48

Table C.19: Middle Mississippian Sites Crosstabulation, Topographic Location by Soil Type

	Loam	Sand	**Total**
Bluff top	17	1	18
Flood plain	17	1	18
Terrace	10	2	12
Total	44	4	48

Table C.20: Middle Mississippian Sites Crosstabulation, River Valley Location by Soil Type

	Loam	Sand	**Total**
CIRV	26	3	29
LIRV	8	1	9
MRV	10	0	10
Total	44	4	48

APPENDIX D: MORTON VILLAGE DATA

Table D.1: All Morton Village Structures

Structure No.	Architecture Type	Magnetometry Identification	Excavated (yes or no)	Perimeter (m)	Area (m^2)
1	Wall trench	None	yes	21.7	31.3
4	Indeterminate	None	yes	14.7	15.9
5	Wall trench	None	yes	25.3	45.0
6	Single post	None	yes	20.6	27.9
7	Single post	None	yes	25.1	44.7
8	Wall trench	None	yes	20.2	29.1
10	Both	None	yes	25.4	46.0
11	Single post	None	yes	25.4	45.5
12	Single post	None	yes	24.0	40.5
13	Indeterminate	None	yes	20.8	25.2
14	Indeterminate	None	yes	20.1	28.4
15	Wall trench	Likely	yes	16.8	20.4
16	Single post	None	yes	33.3	77.5
17	Both	Likely	yes	27.5	51.1
18	Wall trench	Likely	yes	26.4	51.7
19	Single post	Likely	yes	19.7	26.8
20	Single post	None	yes	8.3	5.3
21	Wall trench	Likely	yes	30.3	65.3
22	Both	Likely	yes	20.2	29.7
23	Wall trench	Likely	yes	25.7	47.8
24	Both	Likely	yes	18.8	24.9
25	Wall trench	None	yes	24.4	41.0
26	Wall trench	None	yes	24.3	41.5
27	Wall trench	None	yes	19.7	26.8
28	Wall trench	None	yes	24.3	43.8
29	Wall trench	None	yes	17.6	21.3
30	Wall trench	None	yes	24.4	41.0
31	Wall trench	None	yes	24.4	41.0
32	Wall trench	Likely	yes	24.3	42.5
33	Single post	Likely	yes	24.1	40.7
34	Wall trench	Likely	yes	36.9	107.8
35	Indeterminate	Possible	yes	16.0	17.4
36	Wall trench	None	yes	17.3	20.6

Table D.1 (cont'd)

Structure No.	Architecture Type	Magnetometry Identification	Excavated (yes or no)	Perimeter (m)	Area (m^2)
37	Indeterminate	Possible	yes	18.9	24.5
38	Wall trench	Likely	yes	26.1	47.2
39	Wall trench	Likely	yes	28.7	58.0
40	Wall trench	Likely	yes	23.6	37.4
41	Wall trench	Likely	yes	24.3	42.0
42	Wall trench	Likely	yes	33.7	75.5
43	Single post	Likely	yes	23.0	39.0
44	Single post	Likely	yes	23.1	36.7
45	Single post	Likely	yes	24.2	40.5
46	Indeterminate	Likely	yes	24.0	35.4
47	Single post	Likely	yes	23.0	39.5
48	Single post	Likely	yes	21.5	32.0
49	Single post	Likely	yes	20.3	29.3
51	Single post	Likely	yes	27.2	49.8
52	Indeterminate	Likely	yes	12.9	12.5
53	Wall trench	None	yes	14.3	12.7
54	Unknown	Likely	no	21.0	29.4
55	Unknown	Likely	no	22.9	37.3
56	Unknown	Likely	no	26.7	48.6
57	Unknown	Likely	no	20.7	29.5
58	Unknown	Likely	no	24.0	40.0
59	Unknown	Likely	no	23.7	39.2
60	Unknown	Likely	no	14.8	17.1
61	Unknown	Possible	no	19.6	27.2
62	Unknown	Possible	no	20.5	30.5
63	Unknown	Likely	no	18.5	23.4
64	Unknown	Possible	no	20.3	30.5
65	Unknown	Possible	no	19.0	24.2
66	Unknown	Likely	no	20.5	21.0
67	Unknown	Likely	no	22.7	35.6
68	Unknown	Possible	no	23.0	35.6
69	Unknown	Possible	no	18.5	25.7
70	Unknown	Possible	no	18.2	23.2
71	Unknown	Likely	no	20.1	29.9
72	Unknown	Possible	no	21.7	33.7

Table D.1 (cont'd)

Structure No.	Architecture Type	Magnetometry Identification	Excavated (yes or no)	Perimeter (m)	Area (m^2)
73	Unknown	Likely	no	21.5	34.1
74	Unknown	Possible	no	23.4	39.4
75	Unknown	Possible	no	12.7	11.4
76	Unknown	Possible	no	20.4	30.4
77	Unknown	Likely	no	15.5	17.0
78	Unknown	Likely	no	21.4	33.7
79	Unknown	Possible	no	15.8	18.5
80	Unknown	Likely	no	22.0	34.1
81	Unknown	Likely	no	20.8	32.4
82	Unknown	Likely	no	25.8	48.2
83	Unknown	Likely	no	20.6	30.9
84	Unknown	Possible	no	17.2	22.1
85	Unknown	Likely	no	22.9	35.7
86	Unknown	Possible	no	23.3	38.6
87	Unknown	Likely	no	31.8	69.7
88	Unknown	Likely	no	27.8	53.6
89	Unknown	Likely	no	28.3	51.5
90	Unknown	Possible	no	16.0	17.5
91	Unknown	Possible	no	18.0	21.7
92	Unknown	Likely	no	23.7	41.3
93	Unknown	Likely	no	22.0	34.6
94	Unknown	Likely	no	16.7	11.4
95	Unknown	Likely	no	25.4	45.0
96	Unknown	Likely	no	25.3	45.2
97	Unknown	Possible	no	24.2	39.5
98	Unknown	Possible	no	15.5	17.2
99	Unknown	Likely	no	21.1	33.6
100	Unknown	Likely	no	27.3	52.5
101	Unknown	Possible	no	23.3	37.6
102	Unknown	Likely	no	24.9	42.8
103	Unknown	Likely	no	19.4	24.1
104	Unknown	Possible	no	22.7	37.8
105	Unknown	Possible	no	14.0	13.5
106	Unknown	Possible	no	19.8	28.0
107	Unknown	Likely	no	26.6	50.3
108	Unknown	Possible	no	17.7	22.2

Table D.1 (cont'd)

Structure No.	Architecture Type	Magnetometry Identification	Excavated (yes or no)	Perimeter (m)	Area (m^2)
109	Unknown	Likely	no	24.7	45.1
110	Unknown	Likely	no	25.1	45.6
111	Unknown	Likely	no	23.6	39.7
112	Unknown	Likely	no	26.2	49.7
113	Unknown	Likely	no	19.8	30.4
114	Unknown	Likely	no	25.4	46.1
115	Unknown	Likely	no	20.5	29.5
116	Unknown	Likely	no	30.5	63.4
117	Unknown	Likely	no	26.2	50.2
118	Unknown	Likely	no	31.8	72.4
119	Unknown	Likely	no	23.6	37.5
120	Unknown	Likely	no	29.3	60.2
121	Unknown	Likely	no	24.1	42.0
122	Unknown	Likely	no	26.8	51.6
123	Unknown	Likely	no	25.0	44.8
124	Unknown	Likely	no	19.6	27.5
125	Unknown	Possible	no	22.4	36.7
126	Unknown	Likely	no	17.5	22.0
127	Unknown	Likely	no	20.1	28.6
128	Unknown	Likely	no	29.0	58.3
129	Unknown	Likely	no	23.5	37.7
130	Unknown	Likely	no	20.6	29.7
131	Unknown	Likely	no	19.3	25.4
132	Unknown	Possible	no	23.2	37.2
133	Unknown	Likely	no	23.5	39.5
134	Unknown	Likely	no	24.6	44.0
135	Unknown	Likely	no	25.0	44.4
136	Unknown	Likely	no	24.9	42.3
137	Unknown	Likely	no	19.2	28.2
138	Unknown	Likely	no	24.4	41.6
139	Unknown	Likely	no	27.8	54.2
140	Unknown	Likely	no	20.2	28.6
141	Unknown	Likely	no	23.1	37.8
142	Unknown	Likely	no	16.9	20.2
143	Unknown	Likely	no	23.4	39.0
144	Unknown	Likely	no	28.5	56.9

Table D.1 (cont'd)

Structure No.	Architecture Type	Magnetometry Identification	Excavated (yes or no)	Perimeter (m)	Area (m^2)
145	Unknown	Likely	no	21.0	32.6
146	Unknown	Likely	no	17.7	21.3
147	Unknown	Likely	no	11.7	9.0

Table D.2: Morton Village Structures included in Analysis

Structure No.	Architectural Style	Household Pattern	Ceramic Styles	Burned or Unburned
1	wall trench	none	middle mississippian	unknown
4	indeterminate	grouping	unidentifiable	unknown
5	wall trench	grouping	unidentifiable	unknown
6	single post	grouping	oneota	burned
7	single post	grouping	oneota	burned
8	wall trench	grouping	oneota	unknown
10	both	grouping	oneota	burned
11	single post	grouping	both	burned
12	single post	grouping	oneota	unburned
13	indeterminate	grouping	oneota	unburned
14	indeterminate	grouping	oneota	unknown
15	wall trench	grouping	oneota	unburned
17	both	grouping	unidentifiable	burned
18	wall trench	multiple	both	burned
19	single post	multiple	oneota	unknown
21	indeterminate	grouping	both	unburned
22	both	multiple	oneota	unburned
23	wall trench	multiple	oneota	burned
24	both	multiple	oneota	unknown
25	wall trench	grouping	both	burned
26	wall trench	grouping	both	burned
27	wall trench	none	unidentifiable	unburned
28	wall trench	grouping	oneota	unburned
29	wall trench	none	unidentifiable	unburned
30	wall trench	grouping	unidentifiable	unknown
31	wall trench	multiple	unidentifiable	burned
32	wall trench	none	oneota	unburned
33	single post	grouping	both	burned
35	wall trench	multiple	unidentifiable	unburned
36	wall trench	grouping	unidentifiable	unburned
37	indeterminate	grouping	unidentifiable	unknown
38	wall trench	multiple	oneota	burned
39	wall trench	grouping	unidentifiable	unknown
40	wall trench	multiple	unidentifiable	burned

Table D.2 (cont'd)

Structure No.	Architectural Style	Household Pattern	Ceramic Styles	Burned or Unburned
41	wall trench	multiple	middle mississippian	burned
42	wall trench	opening	both	burned
43	single post	grouping	both	burned
44	single post	grouping	both	unburned
45	single post	grouping	both	burned
46	indeterminate	grouping	unidentifiable	burned
47	single post	grouping	oneota	unburned
48	wall trench	multiple	unidentifiable	unburned
49	single post	multiple	unidentifiable	unburned
50	wall trench	none	oneota	burned
51	single post	grouping	both	unburned
52	indeterminate	grouping	unidentifiable	burned
53	wall trench	none	unidentifiable	unknown

Table D.3: Morton Village Pit Features included in Analysis

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
10	2.0	0.0	106	0.3	0.2	single	mp	ext. (>3.4m)	unid.	basin	none
11	null	null	38	0.5	0.1	single	mp	ext. (>3.4m)	unid.	basin	none
12	null	null	13	0.1	0.2	single	mp	ext. (>3.4m)	unid.	flat	none
13	5.2	0.1	113	0.2	0.3	mult	cook.	ext. (>3.4m)	mm	basin	none
14	293.7	0.3	972	2.0	0.5	mult	proc.	ext. (<3.4m)	mm	flat	none
15	654.8	1.5	431	0.9	0.3	single	mp	ext. (<3.4m)	mm	basin	none
16	null	null	24	0.2	0.1	single	mp	ext. (>3.4m)	unid.	basin	none
17	10.5	0.1	140	0.4	0.2	single	mp	int. (p)	unid.	basin	none
18	0.3	0.0	107	0.2	0.2	single	cook.	int. (c)	unid.	basin	none
19	26.2	0.1	190	0.2	0.4	mult	cook.	int. (c)	mm	basin	none
20	470.8	1.6	288	0.6	0.5	mult	mp	int. (p)	mm	bell	none
21	235.8	2.9	82	0.3	0.1	single	cook.	ext. (<3.4m)	on	basin	none
22	102.4	0.6	158	0.4	0.2	mult	mp	ext. (<3.4m)	on	basin	none
23	272.1	0.4	647	0.6	0.3	mult	mp	ext. (>3.4m)	on	basin	none
24	85.2	1.5	55	0.2	0.1	single	mp	ext. (<3.4m)	unid.	basin	none
25	198.5	0.6	350	0.6	0.3	single	mp	int. (p)	on	basin	grp.
26	57.8	0.3	227	0.6	0.2	mult	mp	ext. (>3.4m)	on	flat	none
27	47.2	0.5	97	0.3	0.2	single	mp	ext. (>3.4m)	on	basin	grp.
28	0.4	0.0	10	0.2	0.1	mult	cook.	int. (p)	unid.	basin	grp.

Table D.3 (cont'd)

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
30	28.5	1.1	26	0.2	0.1	mult	mp	ext. (<3.4m)	on	flat	none
32	36.7	0.2	220	0.4	0.3	mult	mp	ext. (<3.4m)	unid.	basin	none
33	35.4	0.2	216	0.6	0.5	single	mp	ext. (<3.4m)	unid.	bell	none
35	null	null	515	0.4	0.3	mult	mp	ext. (<3.4m)	unid.	bell	none
36	6621.5	10.9	2337	1.8	1.0	mult	storage	ext. (<3.4m)	both	bell	grp.
37	500.6	3.6	138	0.6	0.2	single	mp	ext. (<3.4m)	both	flat	grp.
38	178.0	0.5	324	0.7	0.6	mult	mp	ext. (<3.4m)	on	flat	grp.
39	79.2	0.6	144	0.6	0.1	single	mp	ext. (<3.4m)	unid.	basin	grp.
40	174.1	1.1	155	0.4	0.2	mult	mp	ext. (<3.4m)	on	flat	none
41	2.1	0.0	347	0.1	0.2	single	mp	ext. (<3.4m)	mm	basin	none
42	2323.8	11.7	198	1.6	0.6	mult	proc.	ext. (<3.4m)	on	flat	grp.
43	12.3	0.1	89	0.3	0.2	single	mp	ext. (<3.4m)	unid.	flat	grp.
44	68.0	0.4	156	0.5	0.3	single	mp	ext. (<3.4m)	on	basin	grp.
45	143.6	0.4	399	0.5	0.2	single	mp	ext. (>3.4m)	on	basin	grp.
46	484.8	0.3	1793	2.1	1.0	mult	storage	ext. (<3.4m)	on	flat	grp.
47	271.8	0.5	565	1.7	0.8	mult	proc.	ext. (<3.4m)	on	flat	grp.
48	23.9	0.0	570	0.7	0.4	mult	mp	int. (p)	on	flat	grp.
49	202.2	0.2	1002	0.4	0.6	single	proc.	ext. (<3.4m)	both	basin	grp.

Table D.3 (cont'd)

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
56	743.0	1.6	468	1.0	0.2	mult	proc.	ext. (<3.4m)	both	flat	grp.
57	121.5	0.7	170	1.3	0.4	single	proc.	ext. (<3.4m)	on	flat	grp.
58	6.7	0.1	104	0.4	0.1	single	mp	ext. (<3.4m)	unid.	basin	grp.
59	611.6	1.0	622	1.0	0.3	mult	proc.	ext. (<3.4m)	on	basin	grp.
60	952.7	1.7	565	0.7	0.4	mult	mp	ext. (<3.4m)	on	basin	grp.
61	2323.1	2.0	1183	1.7	0.7	mult	proc.	ext. (<3.4m)	on	flat	grp.
62	1435.0	0.8	1765	1.7	0.5	mult	proc.	ext. (<3.4m)	on	flat	grp.
63	304.0	0.2	1300	1.5	0.4	mult	proc.	ext. (<3.4m)	both	flat	grp.
64	94.1	0.2	433	0.9	0.3	mult	mp	ext. (<3.4m)	both	basin	grp.
65	94.3	0.6	148	0.5	0.2	single	mp	ext. (<3.4m)	on	basin	grp.
66	31.1	0.1	234	0.7	0.2	single	cook.	ext. (<3.4m)	on	basin	grp.
67	814.0	1.8	447	0.9	0.5	single	mp	ext. (<3.4m)	on	flat	grp.
68	422.7	2.4	178	0.9	0.1	single	mp	ext. (<3.4m)	on	basin	grp.
69	480.9	1.1	421	0.8	0.5	mult	mp	ext. (<3.4m)	both	flat	grp.
70	1141.0	2.2	517	0.9	0.3	mult	mp	ext. (<3.4m)	both	flat	grp.
71	362.7	0.7	534	0.6	0.4	single	mp	ext. (<3.4m)	on	flat	none
72	362.7	1.1	330	1.2	0.5	mult	proc.	ext. (<3.4m)	both	flat	none
73	68.3	0.2	341	0.7	0.2	single	mp	ext. (<3.4m)	on	basin	none

Table D.3 (cont'd)

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
74	408.0	0.9	474	0.8	0.3	single	mp	ext. (<3.4m)	both	flat	none
76	167.9	0.4	420	0.8	0.2	mult	mp	ext. (<3.4m)	on	basin	none
77	1522.6	7.9	193	0.7	0.2	single	mp	ext. (<3.4m)	both	basin	grp.
78	63.1	0.3	222	0.6	0.2	single	mp	ext. (<3.4m)	on	basin	none
79	null	null	118	0.5	0.1	single	mp	ext. (<3.4m)	unid.	basin	none
80	365.6	0.8	479	1.8	0.2	single	proc.	ext. (<3.4m)	mm	basin	grp.
82	255.9	0.7	354	0.2	0.4	mult	mp	int. (c)	on	flat	grp.
83	3085.1	3.3	924	1.0	0.4	mult	mp	ext. (>3.4m)	both	basin	grp.
84	442.1	1.4	327	0.7	0.2	mult	mp	int. (p)	both	flat	grp.
87	2.3	0.0	245	0.2	0.3	mult	mp	int. (c)	unid.	basin	grp.
89	139.0	0.7	191	0.9	0.1	single	mp	ext. (<3.4m)	on	basin	grp.
90	360.9	1.0	350	0.7	0.2	mult	mp	ext. (<3.4m)	both	flat	grp.
91	281.8	0.4	659	1.1	0.3	single	proc.	ext. (<3.4m)	both	basin	grp.
92	11.4	0.1	86	0.8	0.2	single	mp	ext. (<3.4m)	mm	basin	grp.
93	19077.4	27.7	689	0.4	0.6	mult	mp	ext. (<3.4m)	both	bell	grp.
94	32.1	0.4	73	1.1	0.1	single	proc.	ext. (<3.4m)	unid.	basin	grp.
95	354.7	0.8	444	0.1	0.3	single	mp	int. (c)	both	basin	grp.
96	21.2	0.2	121	0.6	0.2	single	cook.	int. (c)	unid.	basin	grp.
97	79.8	0.1	716	1.3	0.2	single	proc.	ext. (<3.4m)	mm	flat	grp.
98	272.2	0.3	866	1.0	0.4	single	mp	ext. (<3.4m)	both	basin	grp.

Table D.3 (cont'd)

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
99	210.3	1.8	119	0.6	0.1	single	mp	ext. (<3.4m)	on	basin	grp.
100	177.9	1.0	170	0.4	0.2	single	mp	ext. (<3.4m)	on	basin	grp.
101	0.9	0.0	180	1.4	0.3	single	proc.	ext. (<3.4m)	on	flat	grp.
102	null	null	91	0.7	0.1	single	mp	ext. (<3.4m)	unid.	basin	grp.
103	140.5	0.3	467	0.4	0.4	mult	mp	int. (p)	both	basin	grp.
104	231.9	0.9	259	0.5	0.3	mult	mp	ext. (<3.4m)	both	basin	grp.
105	466.2	1.1	444	0.8	0.3	single	mp	ext. (<3.4m)	both	flat	grp.
106	1773.6	2.1	841	1.4	0.3	single	proc.	int. (p)	both	basin	grp.
108	376.2	1.0	395	0.8	0.3	single	mp	ext. (<3.4m)	on	basin	grp.
109	7858.5	15.8	498	1.2	0.7	single	proc.	int. (p)	both	flat	grp.
110	54.6	0.2	284	0.7	0.2	single	mp	int. (p)	on	flat	grp.
111	52.4	0.6	83	0.3	0.1	mult	cook.	int. (c)	unid.	basin	grp.
113	39.8	0.1	355	0.4	0.3	single	mp	ext. (>3.4m)	on	basin	grp.
115	34.4	0.6	58	0.4	0.1	single	mp	ext. (<3.4m)	on	basin	grp.
125	null	null	18	0.2	0.1	single	cook.	int. (p)	unid.	basin	grp.
126	0.5	0.0	481	0.9	0.2	single	mp	int. (p)	unid.	flat	grp.
127	null	null	61	0.4	0.1	single	mp	int. (p)	unid.	basin	grp.
128	null	null	54	0.6	0.1	single	mp	ext. (>3.4m)	unid.	basin	grp.
132	2875.1	6.4	450	1.0	0.7	mult	mp	ext. (>3.4m)	both	basin	none
133	767.7	1.7	449	0.6	0.4	single	mp	ext. (>3.4m)	mm	basin	grp.
137	33608.2	117.5	286	0.5	0.5	mult	mp	int. (c)	mm	bell	none
152	13793.6	27.5	502	0.5	0.4	single	mp	ext. (>3.4m)	mm	flat	none

Table D.3 (cont'd)

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
154	29605.6	10.7	2766	1.2	0.9	mult	proc.	ext. (>3.4m)	both	basin	open.
160	1341.7	5.0	269	0.6	0.3	single	mp	ext. (>3.4m)	both	basin	none
164	4663.7	8.1	573	1.2	0.3	single	proc.	ext. (<3.4m)	on	basin	grp.
171	6718.6	4.0	1659	2.0	1.6	mult	storage	ext. (<3.4m)	both	flat	mult.
173	5165.2	8.6	598	1.0	0.3	mult	mp	ext. (<3.4m)	on	basin	grp.
206	5610.4	3.9	1435	1.9	0.7	mult	proc.	ext. (<3.4m)	both	flat	grp.
213	6452.8	22.4	288	0.7	0.4	mult	mp	ext. (<3.4m)	on	basin	none
214	6744.8	42.7	158	0.4	0.3	mult	mp	ext. (<3.4m)	on	basin	none
217	453.1	0.7	631	1.1	0.3	mult	proc.	ext. (>3.4m)	mm	flat	mult.
220	146.4	0.5	311	0.4	0.3	single	mp	ext. (<3.4m)	mm	basin	none
222	410.1	1.3	313	0.8	0.4	mult	mp	ext. (<3.4m)	both	basin	none
228	205.2	0.9	238	0.7	0.3	single	mp	ext. (<3.4m)	both	basin	grp.
231	1159.6	3.0	393	1.4	0.2	single	proc.	ext. (<3.4m)	both	flat	none
232	12110.5	5.2	2319	2.0	1.1	mult	storage	ext. (<3.4m)	both	flat	mult.
235	1388.0	11.0	126	0.4	0.1	single	mp	ext. (<3.4m)	unid.	flat	mult.
236	3314.4	4.1	817	1.2	0.4	mult	proc.	ext. (<3.4m)	both	basin	none
237	5942.6	8.3	720	0.7	0.8	mult	mp	ext. (<3.4m)	both	basin	none
243	5791.8	15.7	369	1.1	0.3	single	proc.	ext. (<3.4m)	both	basin	open.

Table D.3 (cont'd)

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
246	2474.0	12.1	204	0.9	0.1	single	mp	ext. (<3.4m)	mm	basin	mult.
253	809.3	2.5	330	0.5	0.3	mult	mp	ext. (<3.4m)	both	basin	grp.
254	138.6	0.5	265	1.0	0.2	single	mp	ext. (<3.4m)	both	basin	grp.
256	429.6	8.3	52	0.2	0.2	single	mp	ext. (<3.4m)	on	basin	grp.
257	989.9	7.2	137	0.5	0.3	single	mp	ext. (<3.4m)	both	flat	grp.
259	158.1	0.8	196	0.4	0.2	mult	mp	ext. (<3.4m)	mm	basin	grp.
260	3265.3	6.5	503	1.0	0.5	mult	mp	ext. (<3.4m)	both	flat	grp.
268	3.6	0.2	17	0.1	0.1	mult	mp	int. (p)	unid.	basin	grp.
269	2119.4	100.9	21	0.2	0.1	mult	mp	int. (p)	unid.	basin	grp.
278	1326.9	55.3	24	0.4	0.5	single	mp	ext. (<3.4m)	both	flat	open.
279	2907.7	6.3	464	0.8	0.6	mult	mp	ext. (<3.4m)	both	bell	open.
280	2840.3	7.3	389	0.8	0.4	mult	cook.	ext. (<3.4m)	on	flat	open.
281	4053.6	12.9	314	0.5	0.5	single	mp	ext. (<3.4m)	on	flat	open.
283	280.8	0.4	668	1.0	0.3	single	proc.	ext. (>3.4m)	unid.	basin	grp.
284	4815.5	6.9	701	1.1	0.6	mult	proc.	ext. (<3.4m)	both	flat	open.
286	93.0	0.6	154	0.6	0.2	single	mp	ext. (<3.4m)	on	flat	open.
287	5919.5	3.2	1823	1.1	1.2	mult	storage	ext. (<3.4m)	both	bell	open.
288	2498.2	1.9	1294	0.9	0.7	mult	mp	ext. (<3.4m)	on	basin	open.
289	1297.0	9.2	141	0.8	0.2	single	mp	ext. (<3.4m)	on	basin	open.

Table D.3 (cont'd)

No.	Wt.	Dens.	Vol. (L)	Area (m^2)	Depth (m)	Dep.	Funct.	Context	Style	Shape	Pattern
292	2137.6	2.3	931	1.5	0.5	single	proc.	ext. (>3.4m)	mm	flat	none
296	65.1	3.4	19	0.1	0.1	single	cook.	ext. (<3.4m)	unid.	basin	open.
306	4214.0	5.3	788	1.4	0.3	single	proc.	int. (p)	both	flat	grp.
307	2368.2	15.5	153	0.5	0.1	single	mp	ext. (<3.4m)	on	basin	grp.
308	1540.6	4.6	338	0.6	0.3	mult	mp	ext. (<3.4m)	both	basin	grp.
311	686.8	1.9	365	0.6	0.5	mult	mp	int. (p)	both	basin	grp.
312	1311.2	1.2	1097	1.5	0.7	mult	proc.	ext. (>3.4m)	mm	flat	open.
313	305.3	0.8	399	0.8	0.5	mult	mp	ext. (<3.4m)	mm	flat	open.
314	1436.3	1.1	1358	1.2	0.6	mult	proc.	ext. (<3.4m)	mm	basin	open.
315	2039.4	1.9	1092	1.7	0.6	mult	proc.	ext. (<3.4m)	mm	flat	open.
316	638.5	6.0	106	0.6	0.1	single	mp	ext. (<3.4m)	on	basin	grp.
318	8481.5	13.7	618	1.7	0.2	mult	proc.	ext. (<3.4m)	both	basin	grp.
319	1152.7	7.6	151	0.5	0.3	mult	cook.	ext. (<3.4m)	both	basin	grp.

Table D.4: Abbreviation Key for Table D.3

Numerical Columns	
No.	Feature Number
Wt.	Weight in grams
Dens.	Density of artifacts in grams per Liter
Vol. (L)	Volume of pit in Liters
Area (m^2)	Area of top of pit in square meters
Depth (m)	Depth of pit in meters
Categorical Columns	
Dep.	**Depositional episodes**
Single	Pit has one depositional episode
Mult	Pit has multiple depositional episodes

Table D.4 (cont'd)

Funct.	Function
Mp	Multipurpose pit
Cook.	Cooking pit
Proc.	Processing pit
Storage	Storage pit
Context	**Where pit is located in relation to structures and other pits**
Ext. (>3.4 m)	Pit outside of structures and further than 3.4 m from other pits
Ext. (<3.4 m)	Pit outside of structures and closer than 3.4 m from other pits
Int. (p)	Pit inside of structure along the periphery
Int. (c)	Pit inside of structure in the center
Style	**Ceramic styles within**
Unid.	Pit with unidentifiable ceramic styles within it
Mm	Pit with only Middle Mississippian style ceramics within it
On	Pit with only Oneota style ceramics within it
Both	Pit with both style of ceramics within it
Shape	**Shape of pit in profile**
Flat	Flat-bottomed pit
Basin	Basin-shaped pit
Bell	Bell-shaped pit
Pattern	**Household Pattern**
Grp.	Pit found in a grouping of structures
Open.	Pit found in an opening between structures
Mult.	Pits found in multiple household patterns
None	Pits not found in a household pattern

APPENDIX E: MULTIVARIATE CLUSTERING

Table E.1: Multivariate Clustering (K-Means) Analysis Results

Cluster No.	STRs in Cluster	No. of STRs	Avg. Distance Between STRs (m)	Nearest Neighbor Ratio	z-score	p-value	Avg. Domestic STR Size in Cluster (m^2)
1	50, 76, 133-137	7	12.06	1.78	3.92	0.000087	39.87
2	27, 29, 78, 84, 85	5	14.51	3.01	8.61	0.000000	27.9
3	112-115, 141-143, 145	8	16.23	2.49	8.08	0.000000	35.64
4	4-8, 14	6	7.5	2.54	7.23	0.000000	31.83
5	17, 21, 28, 72-75, 77	8	8.24	2.01	5.48	0.000000	36.97
6	117, 124	2	31.91	11.3	27.86	0.000000	38.83
7	49, 51, 66-69, 106	7	8.89	2.23	6.2	0.000000	32.14
8	42, 105, 107, 120, 121	5	23.7	2.2	5.12	0.000000	48.29
9	54, 56-58	4	17.92	2.5	5.72	0.000000	36.86
10	101-104	4	11.08	2.53	5.85	0.000000	35.6
11	109-111, 125, 144	5	24.26	2.39	5.93	0.000000	44.79
12	18, 22-24, 34, 36, 70, 71	8	7.97	1.77	4.16	0.000031	41.94
13	10, 11, 44, 108	4	10.17	2.48	5.65	0.000000	37.61
14	15, 16, 25, 30, 31, 52, 79	7	8.64	1.78	3.94	0.000081	35.96

Table E.1 (cont'd)

Cluster No.	STRs in Cluster	No. of STRs	Avg. Distance Between STRs (m)	Nearest Neighbor Ratio	z-score	p-value	Avg. Domestic STR Size in Cluster (m^2)
15	13, 26, 35, 37, 97-100	9	9.33	1.62	3.55	0.000390	32.44
16	118, 119, 138-140	5	9.14	2.16	4.96	0.000001	46.88
17	38-41, 126-128, 146, 147	9	11.08	1.23	1.3	0.193742	35.98
18	55, 59, 60	3	15.54	3.47	8.18	0.000000	31.2
19	1, 53, 129	3	41.0	3.47	8.18	0.000000	27.2
20	116, 122, 123	3	12.23	4.04	10.07	0.000000	53.3
21	33, 43, 45, 96	4	10.4	2.67	0.38	0.000000	41.34
22	46, 47, 91, 92, 94, 95	6	10.66	2.17	5.47	0.000000	32.38
23	48, 61-64, 130-132	8	9.91	1.72	3.88	0.000102	29.47
24	32, 86-90, 93	7	12.4	2.13	5.74	0.000000	43.98
25	19, 20, 65, 80-83	7	9.43	5.79	3.17	0.001479	28.83

Figure E.1: Multivariate Clustering (K-means) Analysis, Cluster 1

Figure E.2: Multivariate Clustering (K-means) Analysis, Cluster 2

Figure E.3: Multivariate Clustering (K-means) Analysis, Cluster 3 and 11

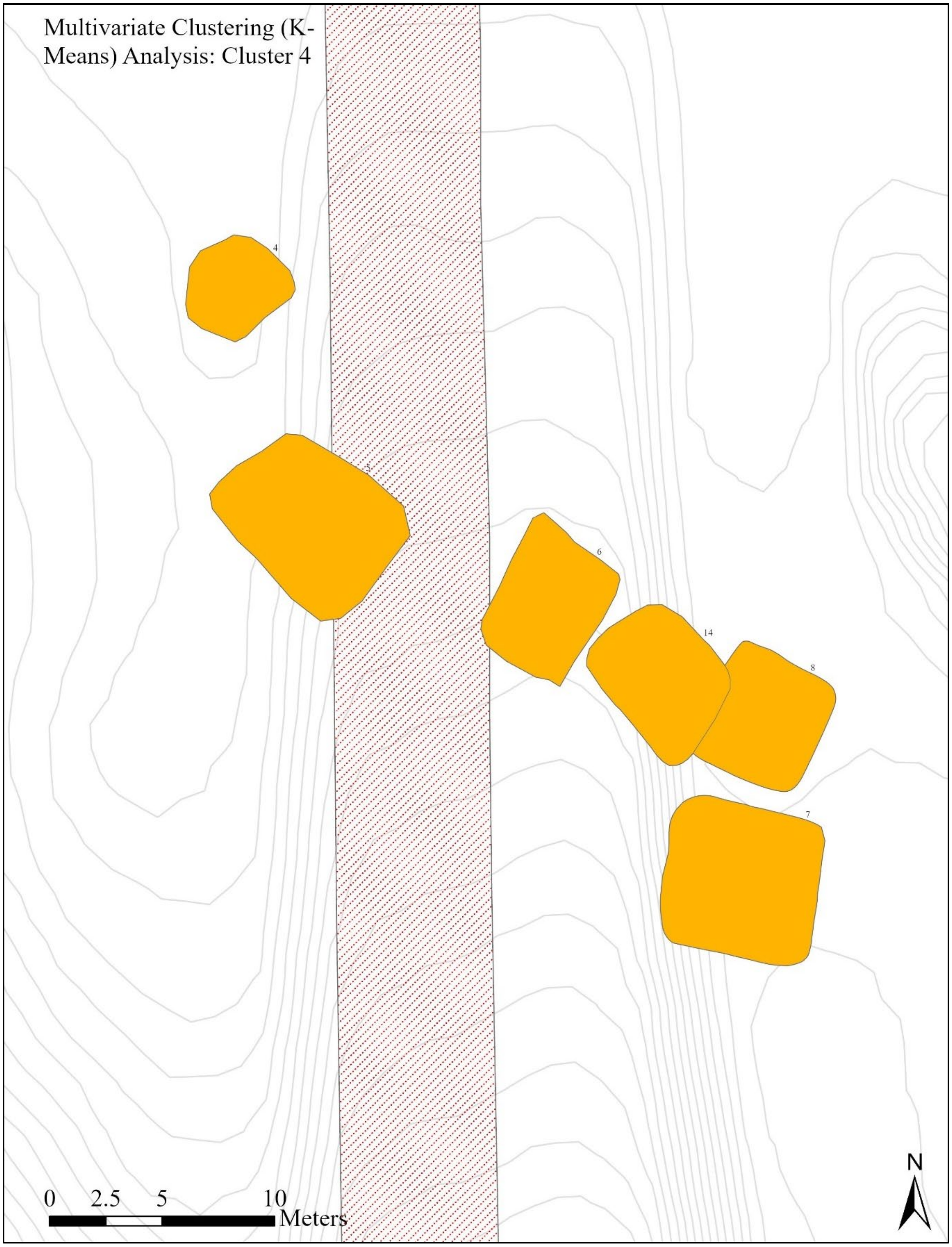

Figure E.4: Multivariate Clustering (K-means) Analysis, Cluster 4

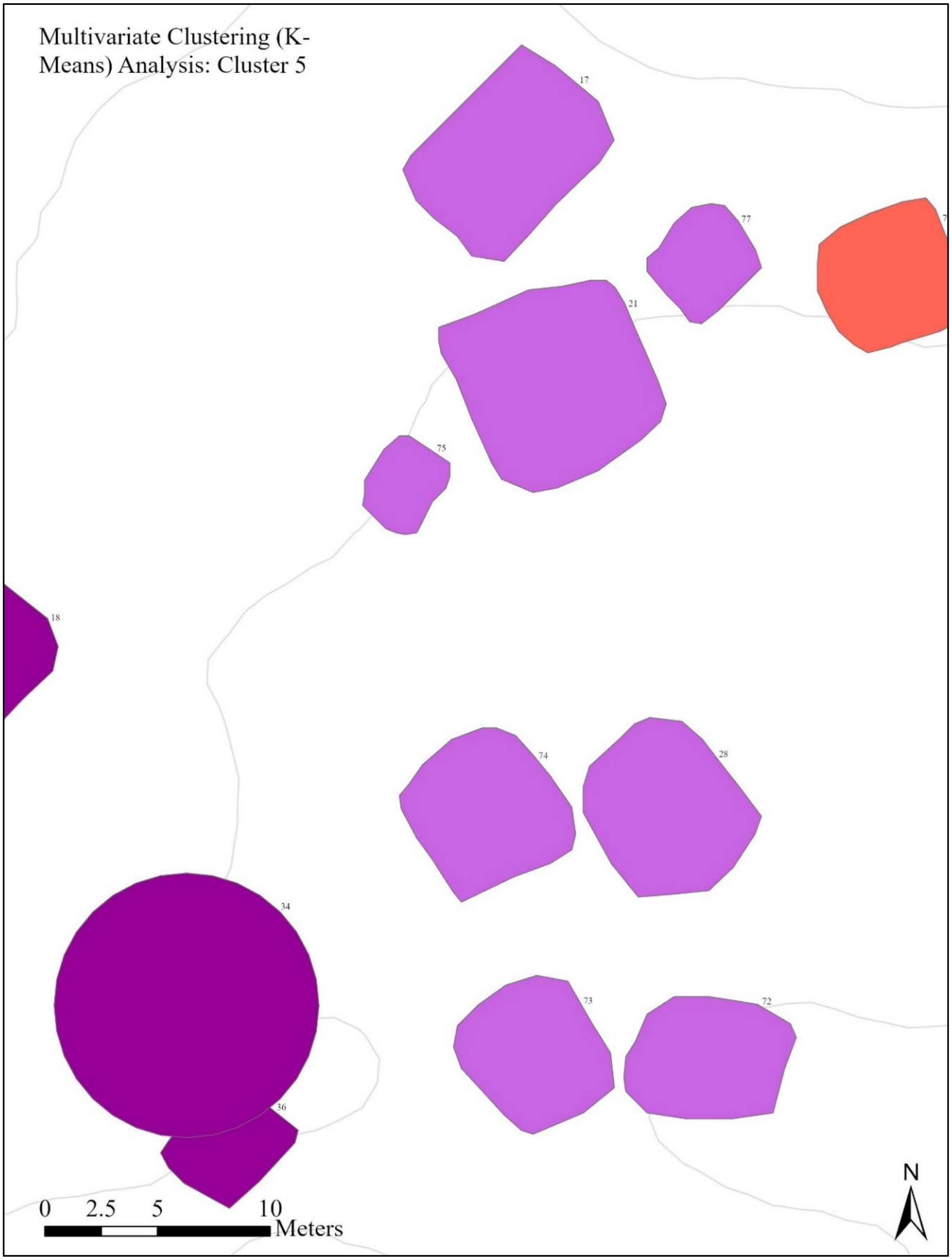

Figure E.5: Multivariate Clustering (K-means) Analysis, Cluster 5

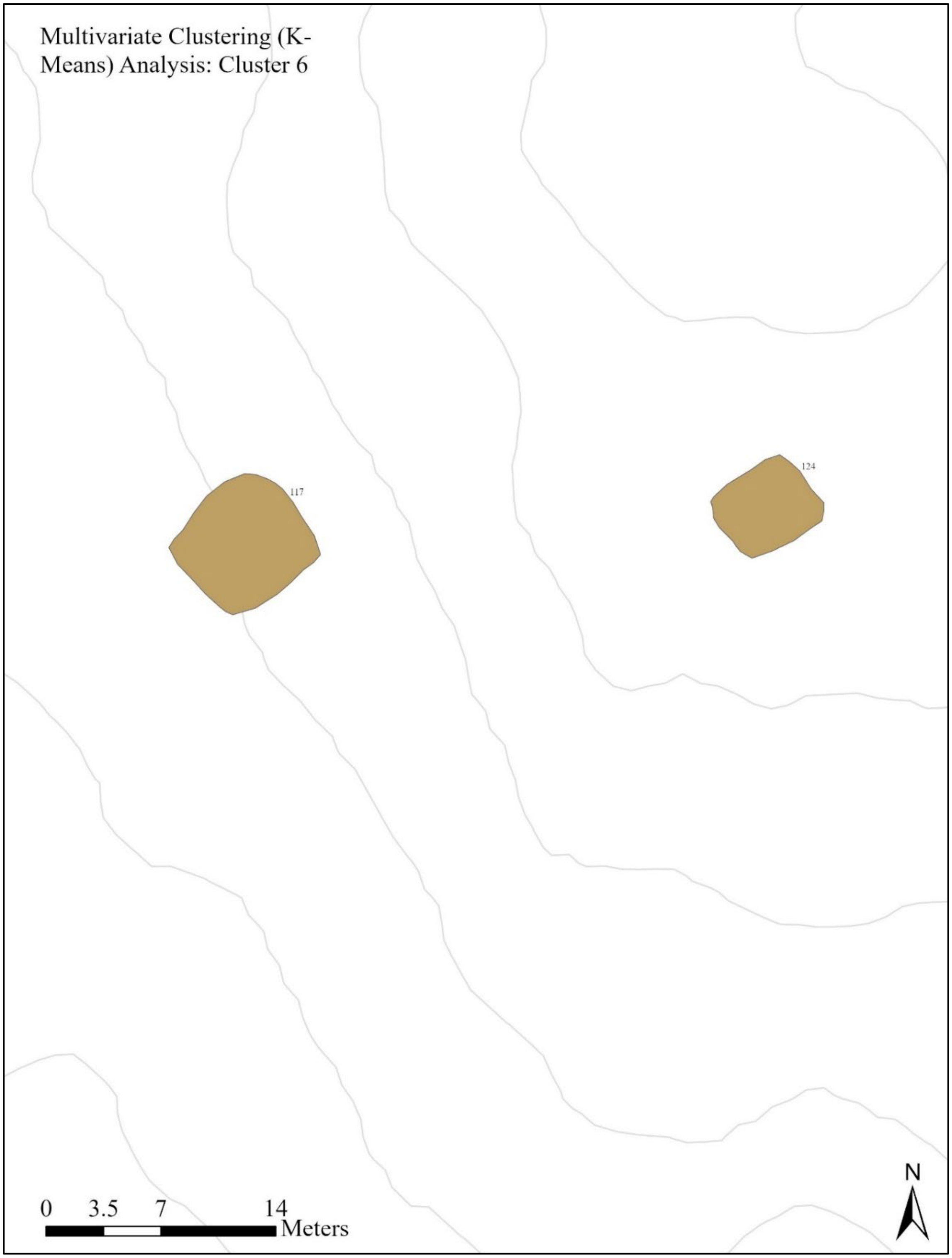

Figure E.6: Multivariate Clustering (K-means) Analysis, Cluster 6

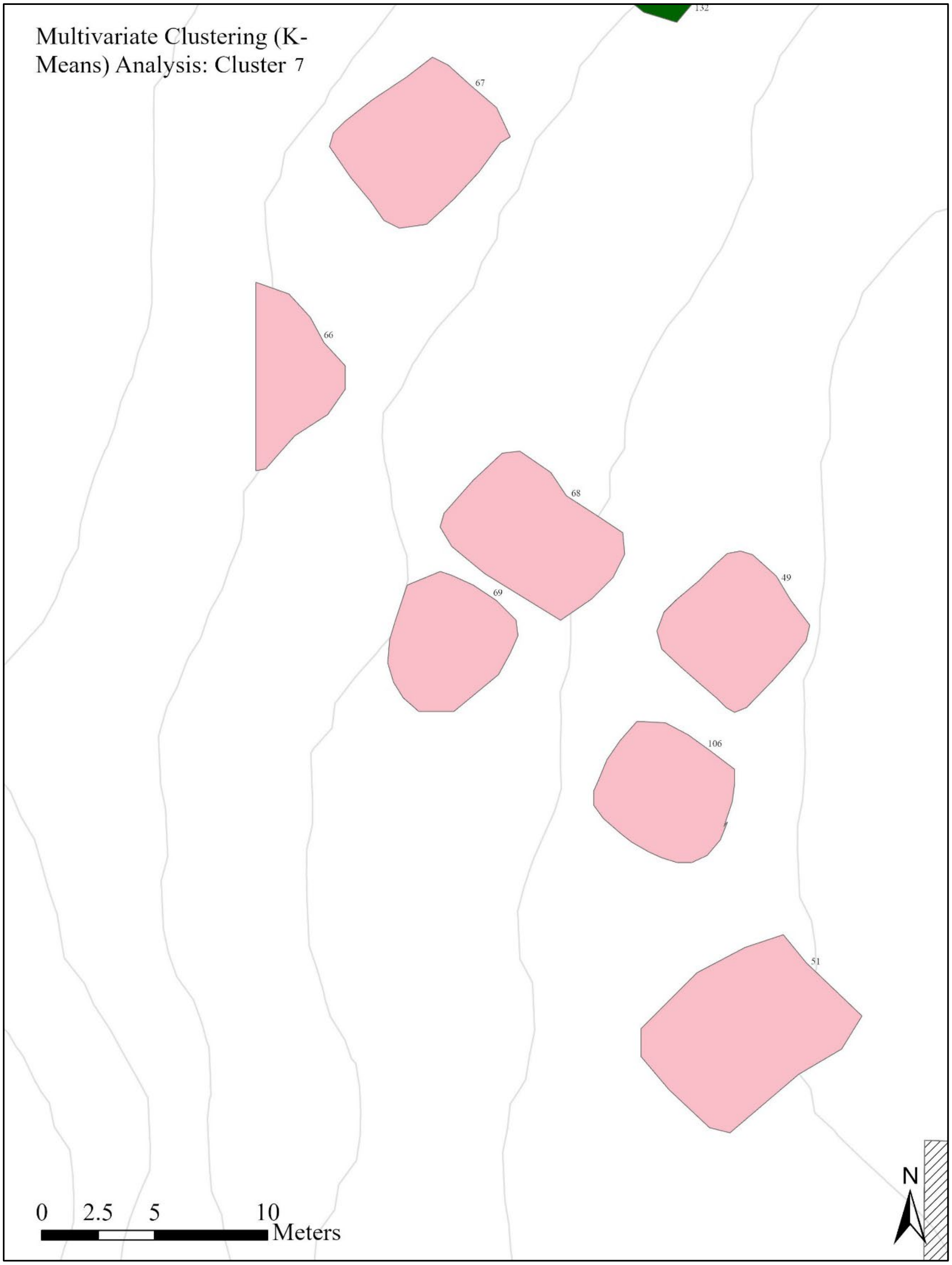

Figure E.7: Multivariate Clustering (K-means) Analysis, Cluster 7

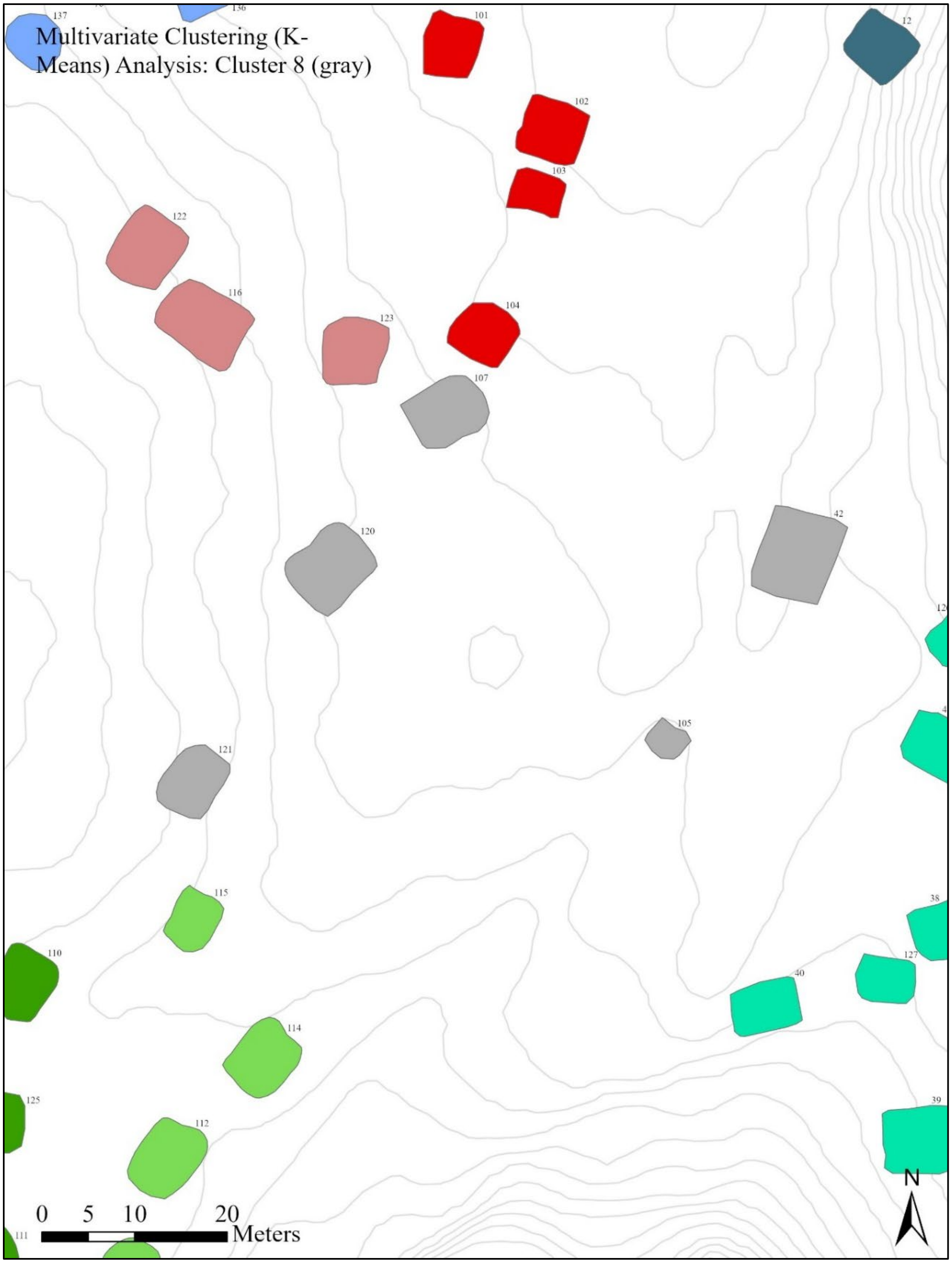

Figure E.8: Multivariate Clustering (K-means) Analysis, Cluster 8

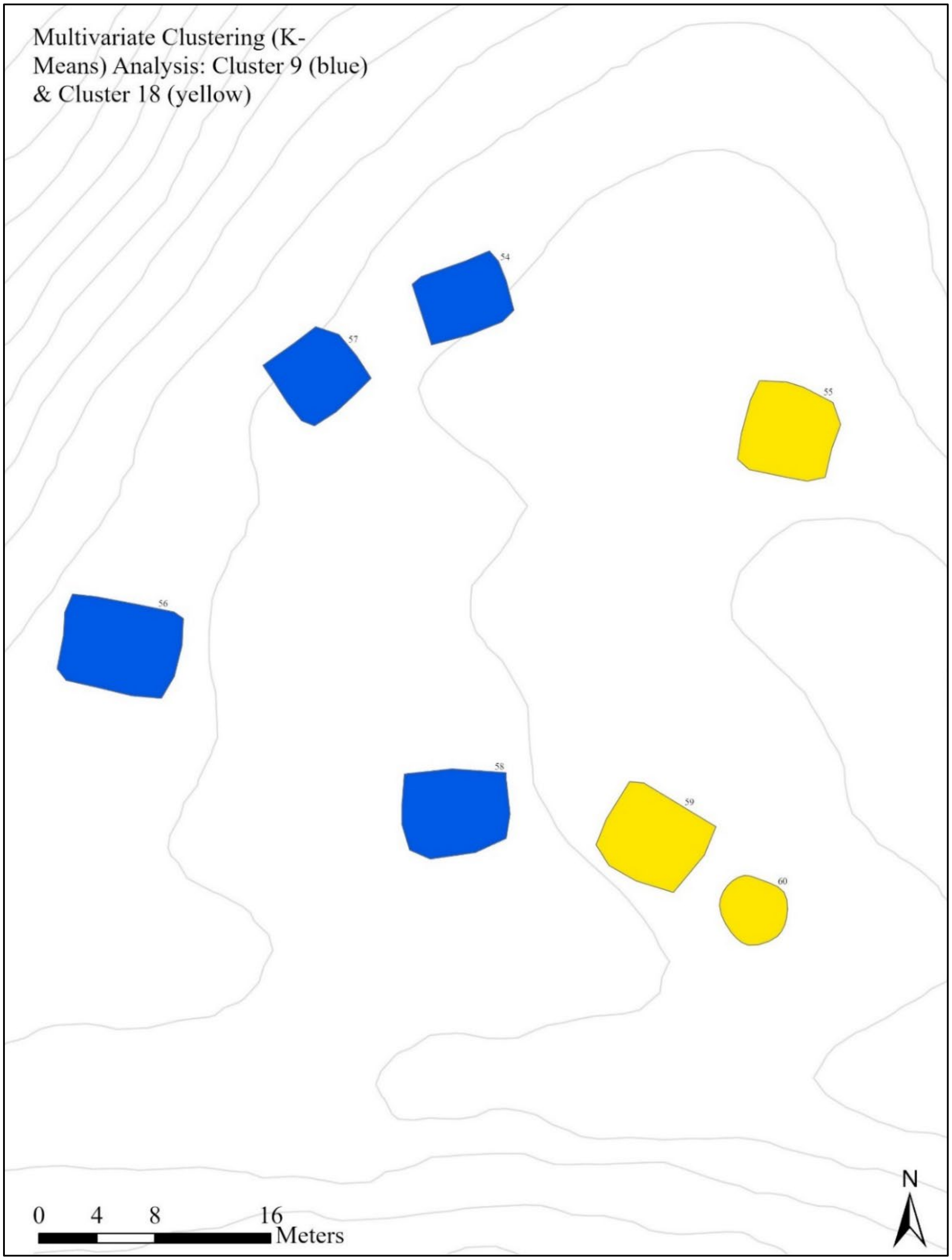

Figure E.9: Multivariate Clustering (K-means) Analysis, Cluster 9 and 18

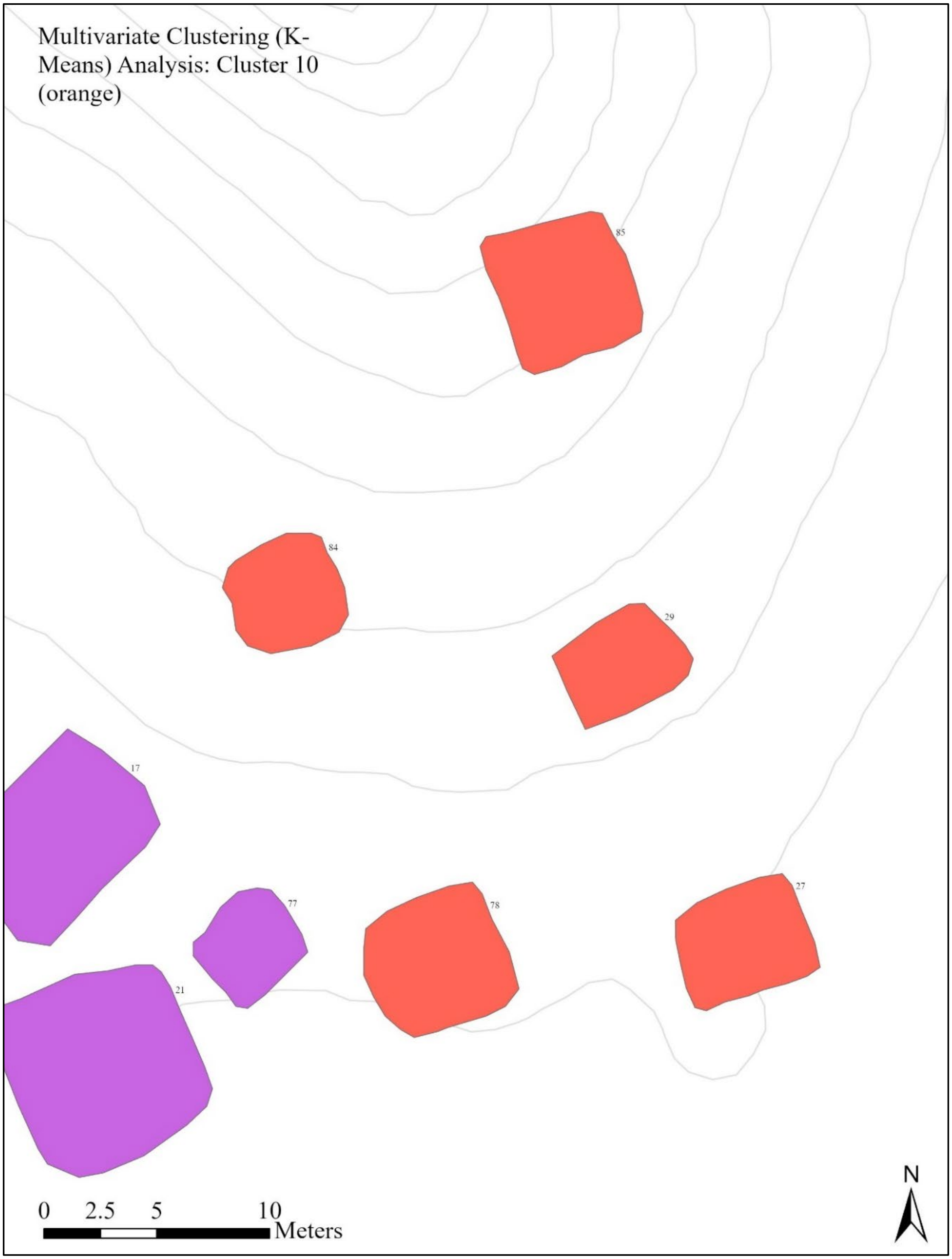

Figure E.10: Multivariate Clustering (K-means) Analysis, Cluster 10

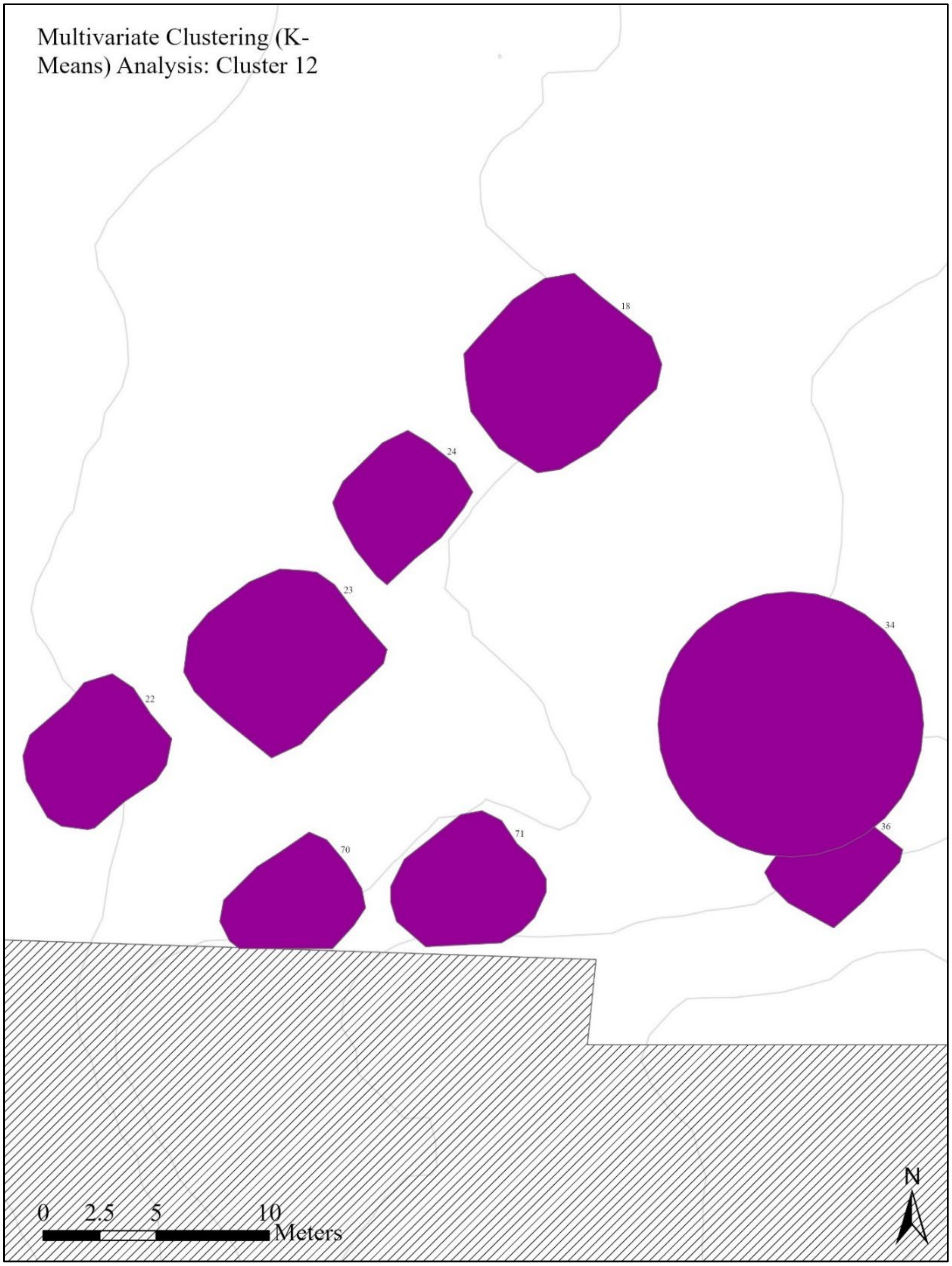

Figure E.11: Multivariate Clustering (K-means) Analysis, Cluster 12

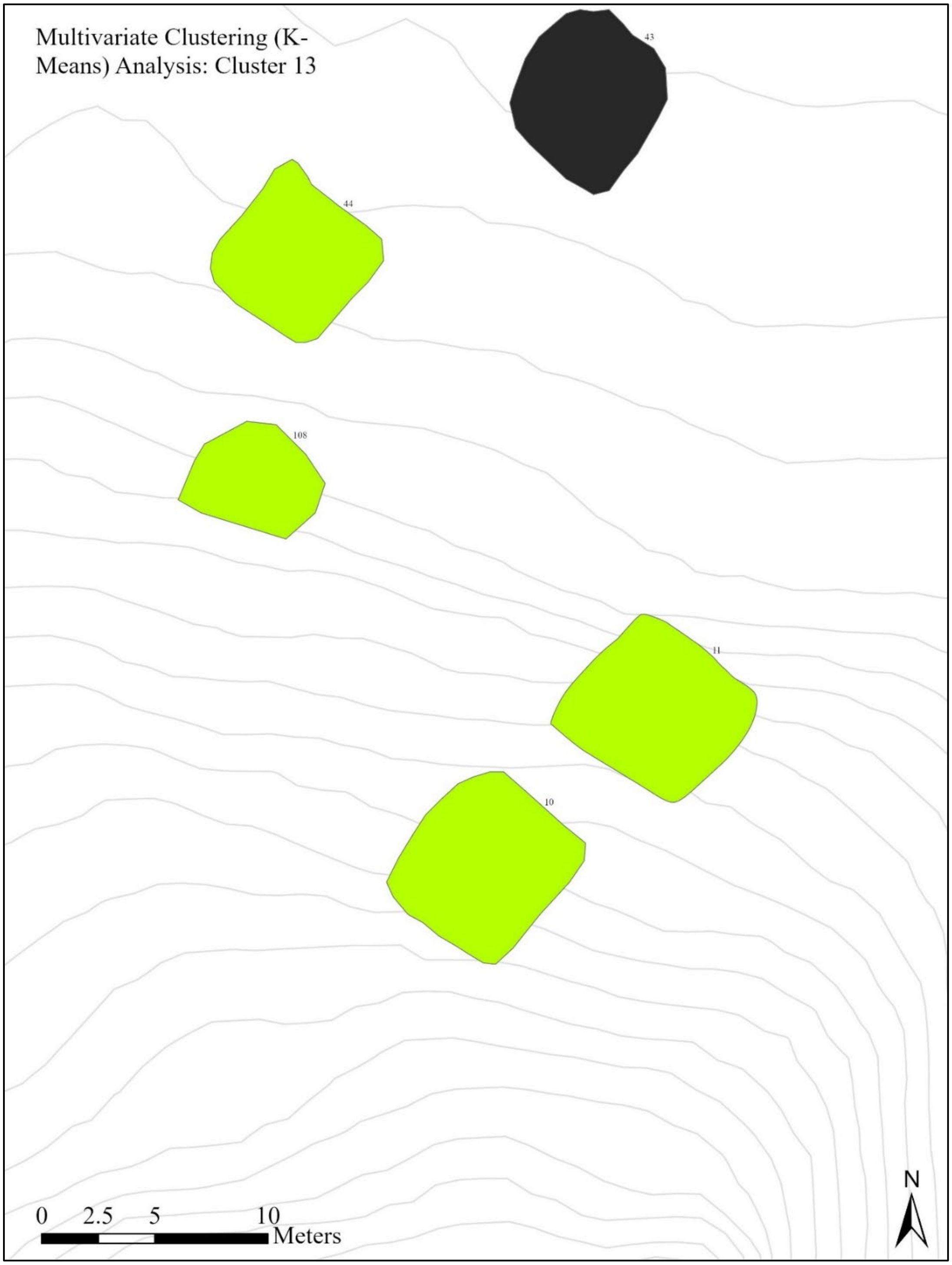

Figure E.12: Multivariate Clustering (K-means) Analysis, Cluster 13

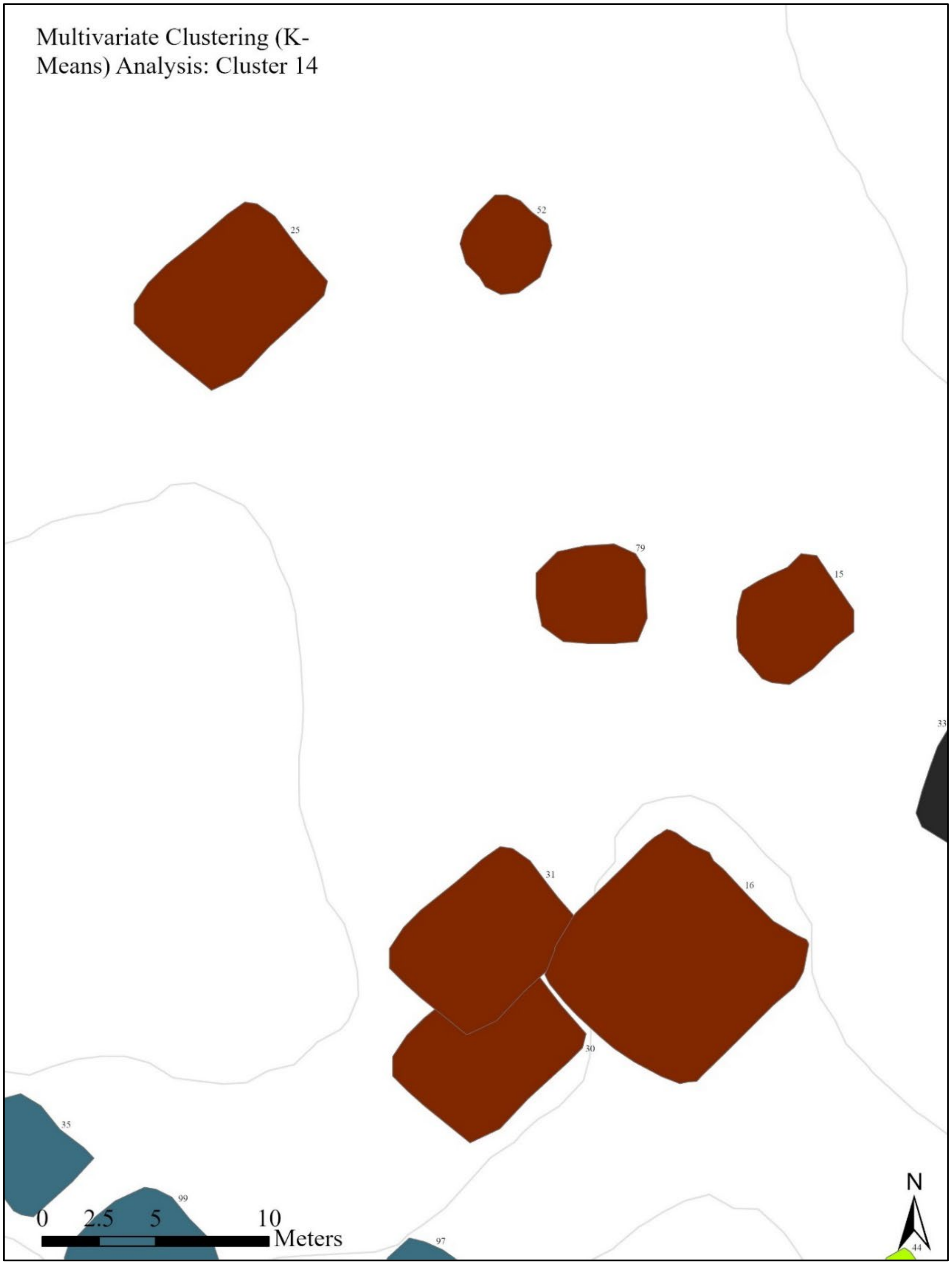

Figure E.13: Multivariate Clustering (K-means) Analysis, Cluster 14

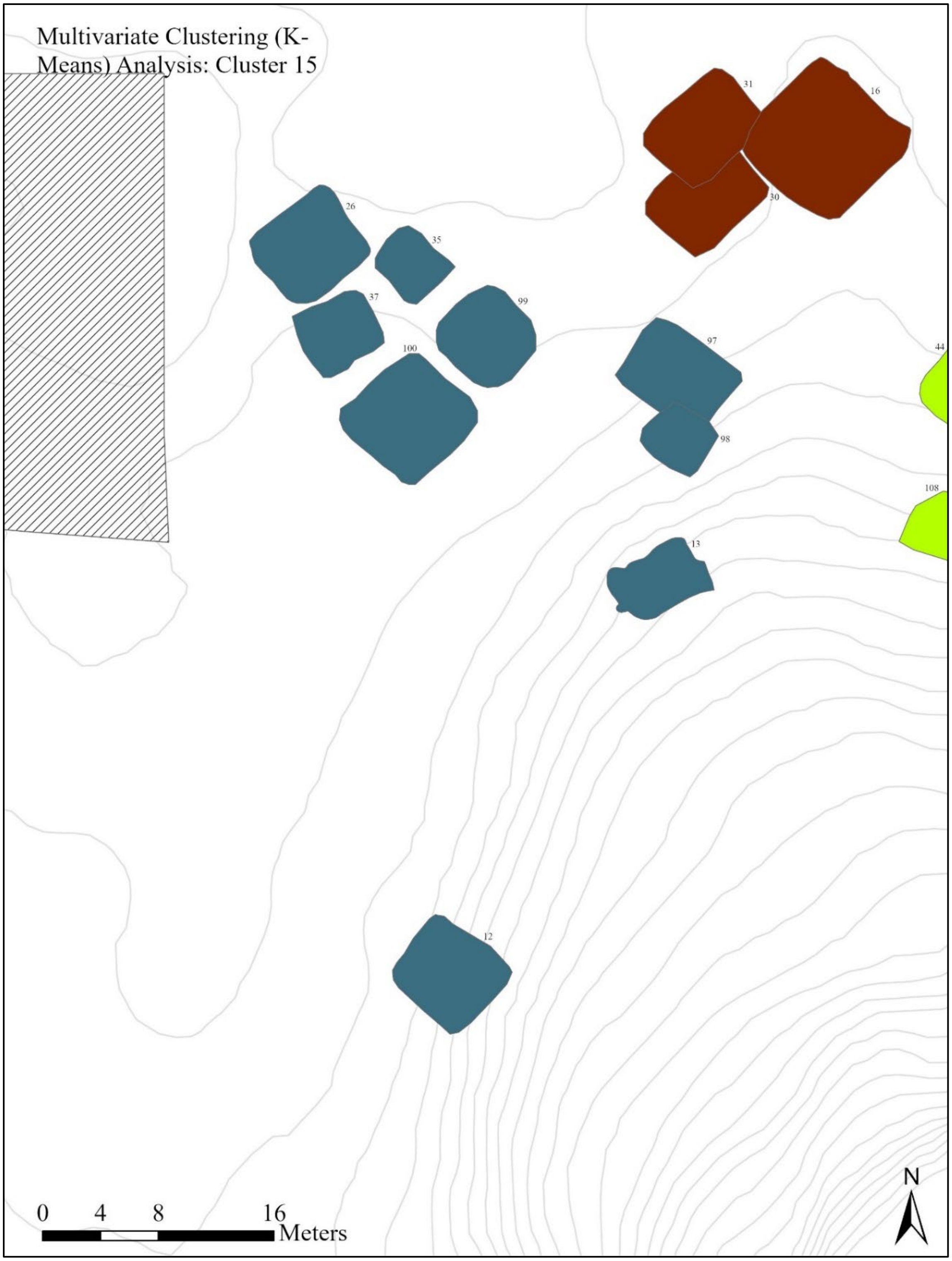

Figure E.14: Multivariate Clustering (K-means) Analysis, Cluster 15

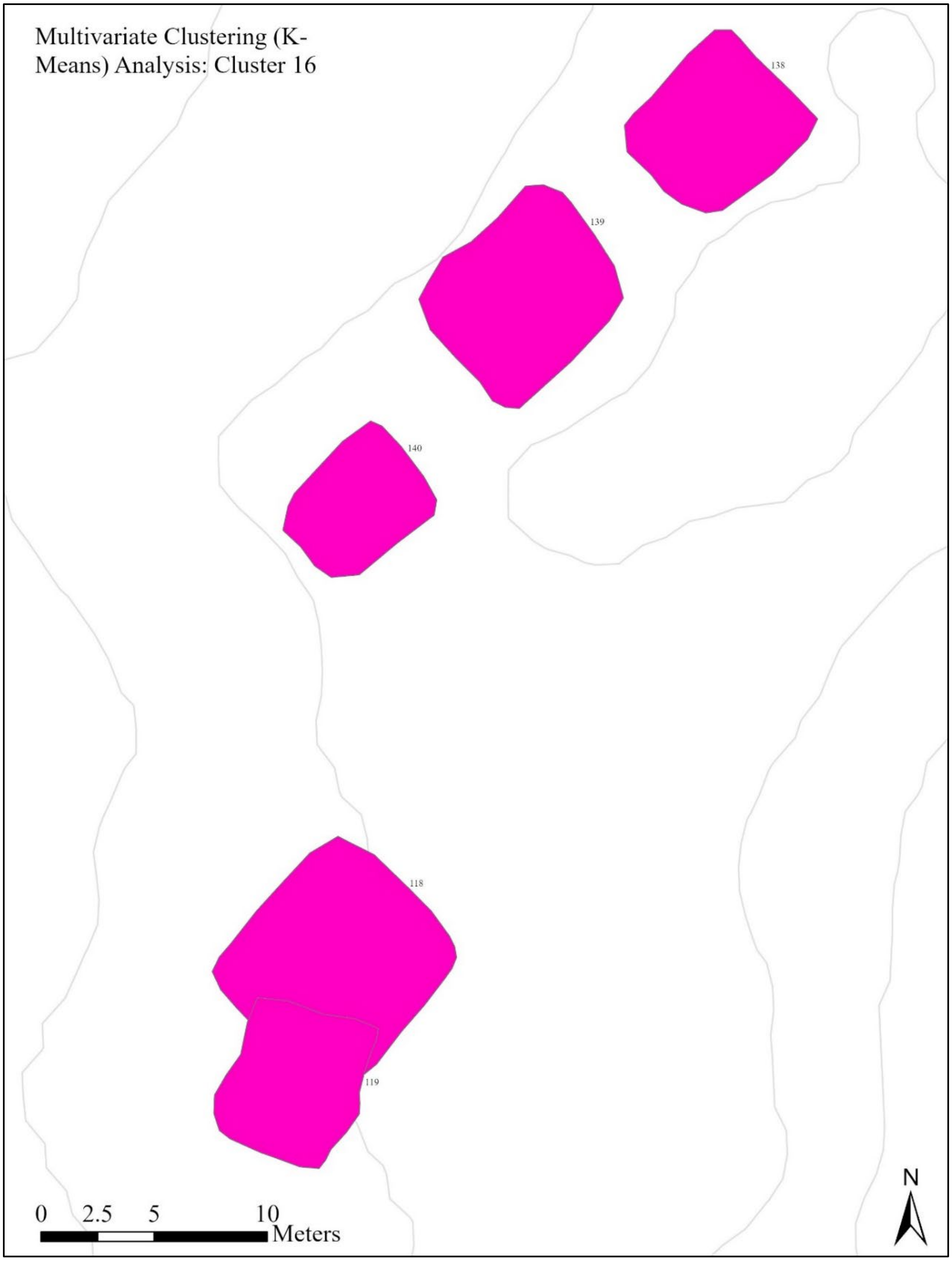

Figure E.15: Multivariate Clustering (K-means) Analysis, Cluster 16

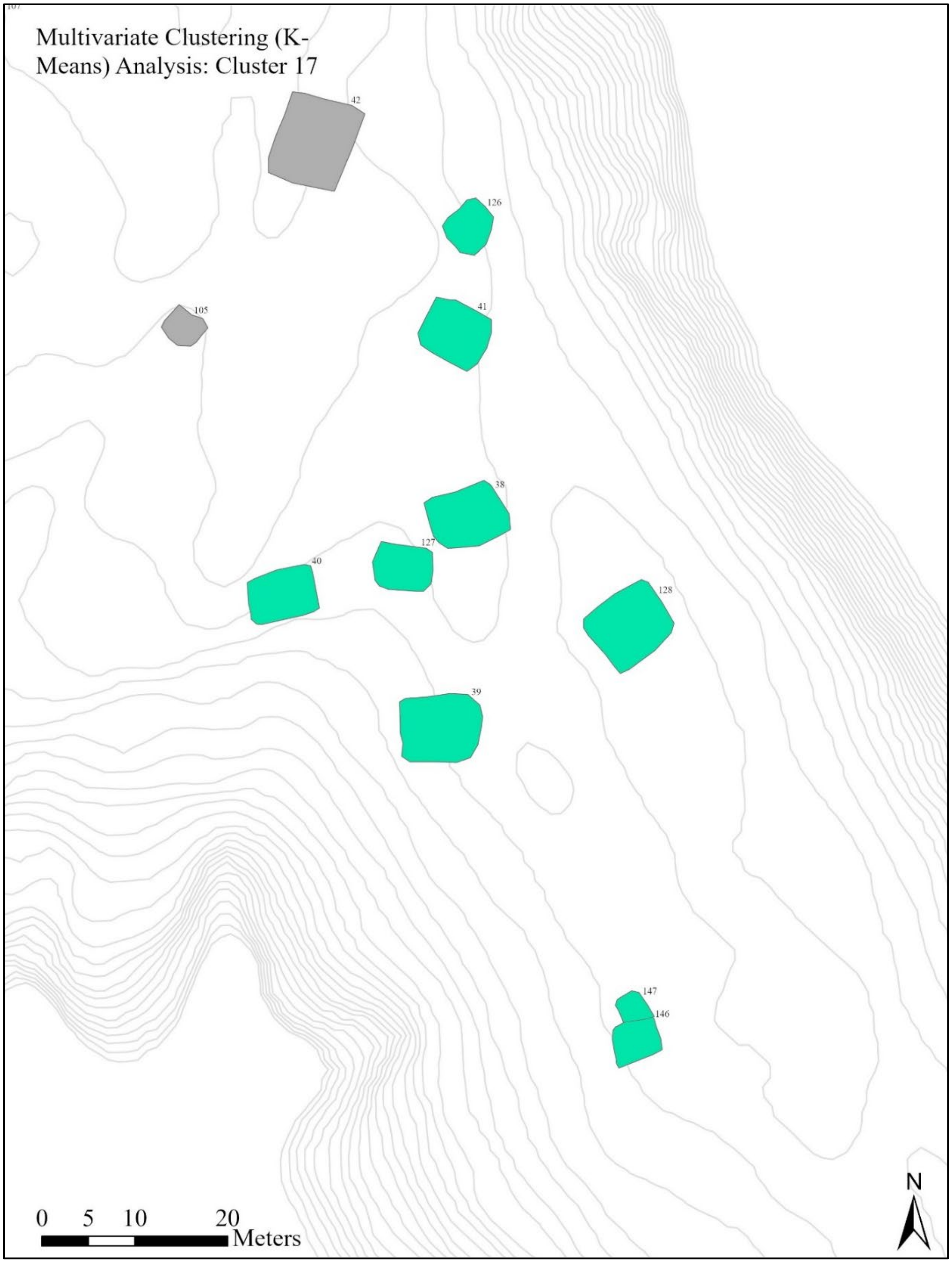

Figure E.16: Multivariate Clustering (K-means) Analysis, Cluster 17

Figure E.17: Multivariate Clustering (K-means) Analysis, Cluster 19

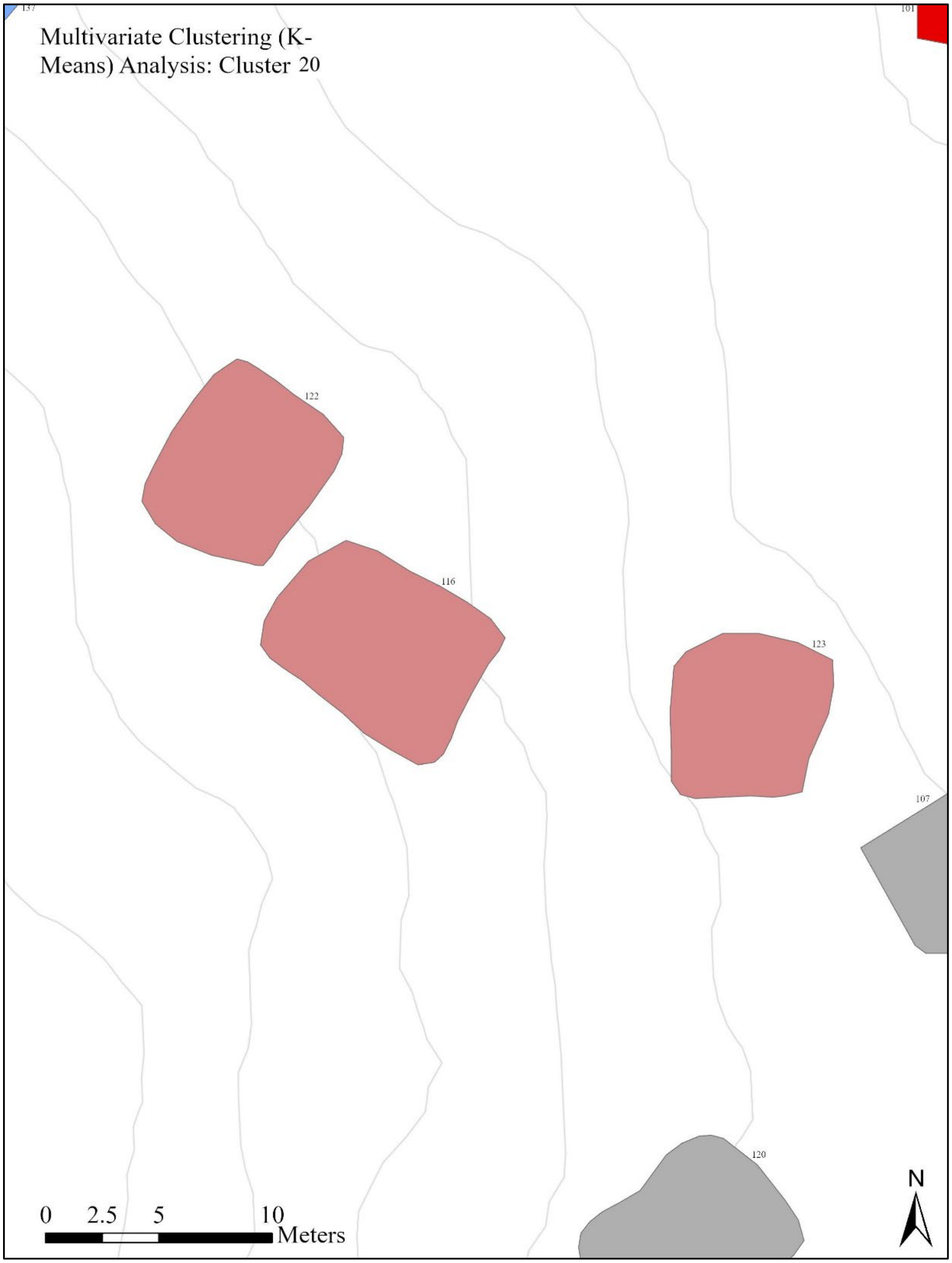

Figure E.18: Multivariate Clustering (K-means) Analysis, Cluster 20

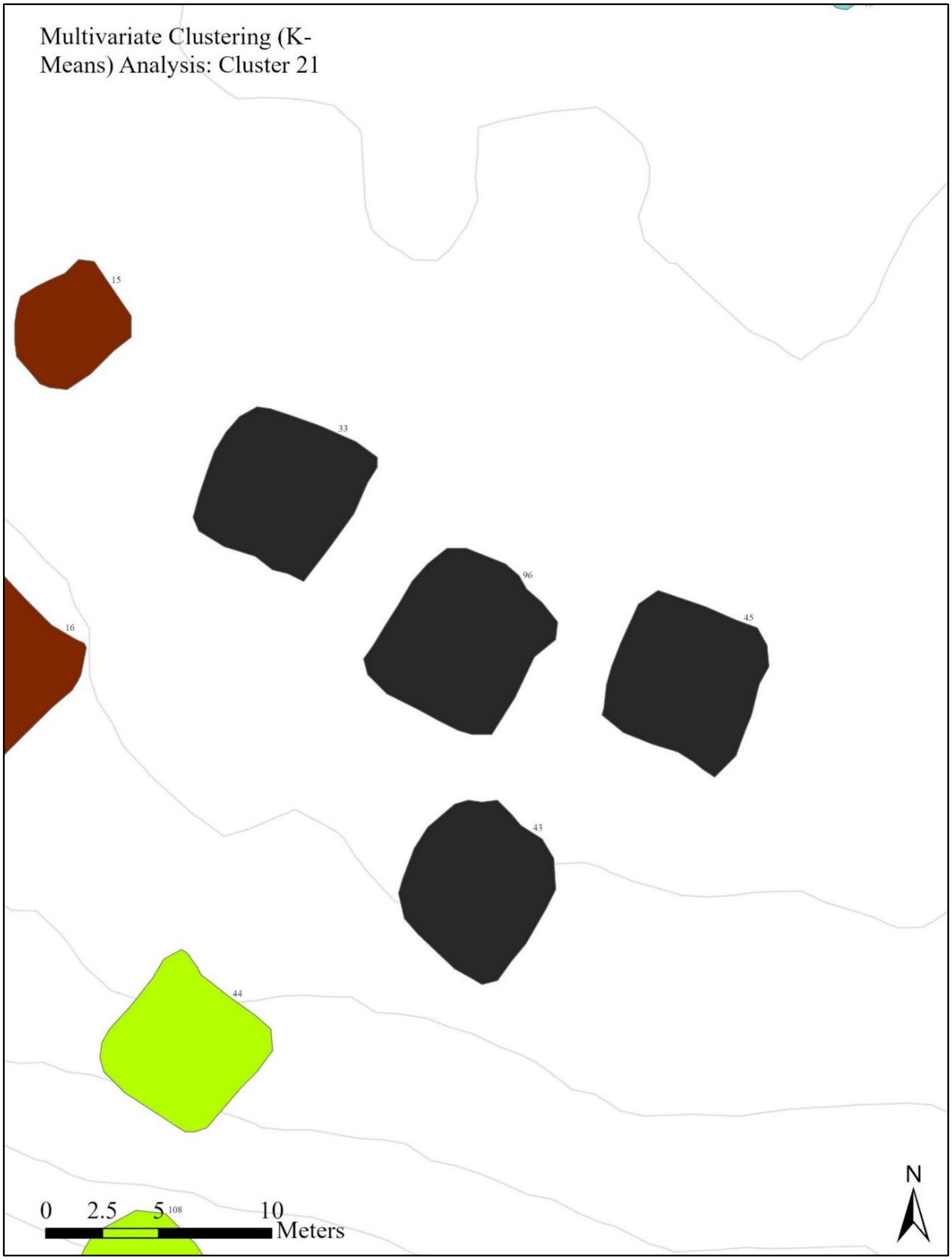

Figure E.19: Multivariate Clustering (K-means) Analysis, Cluster 21

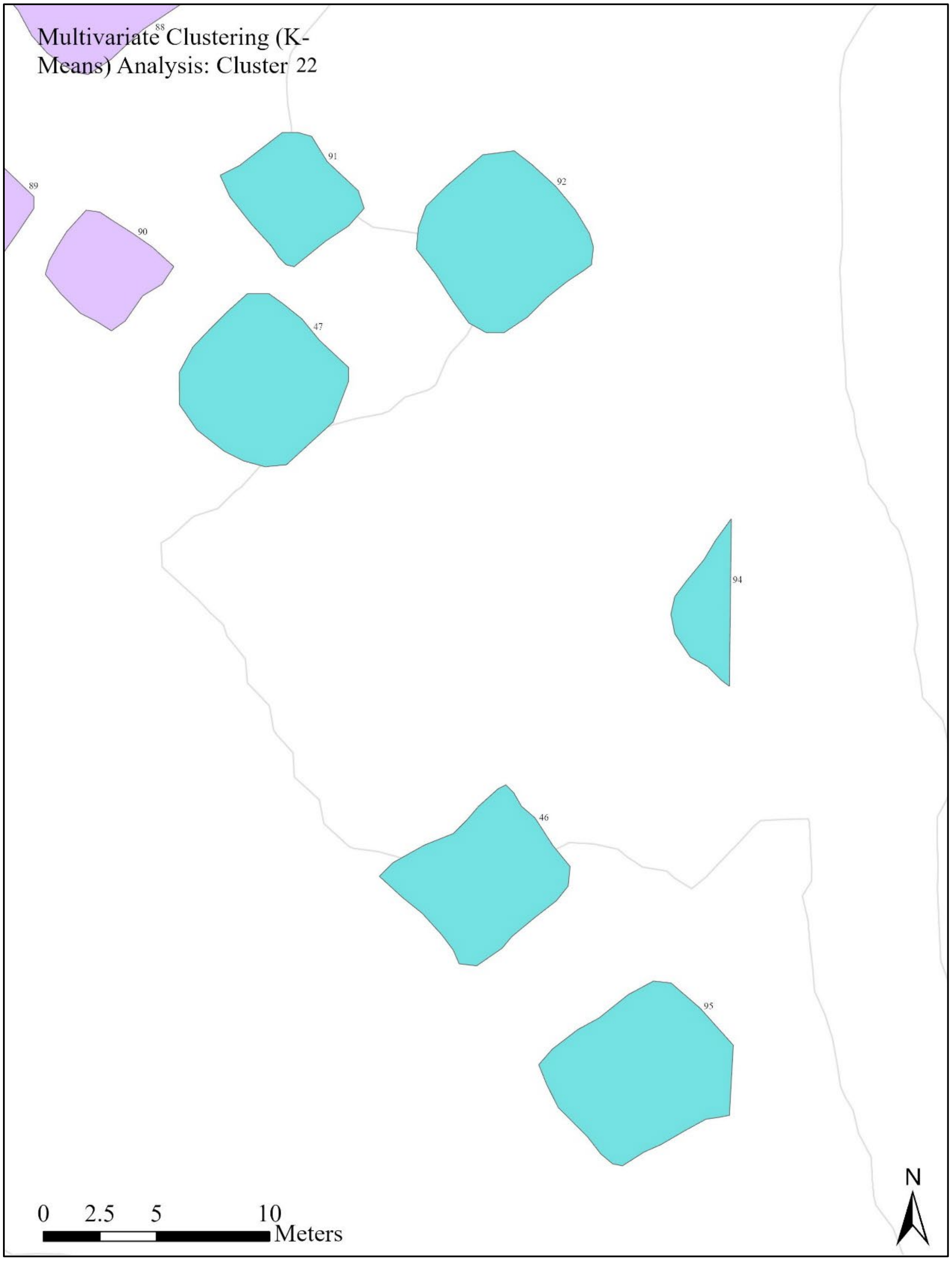

Figure E.20: Multivariate Clustering (K-means) Analysis, Cluster 22

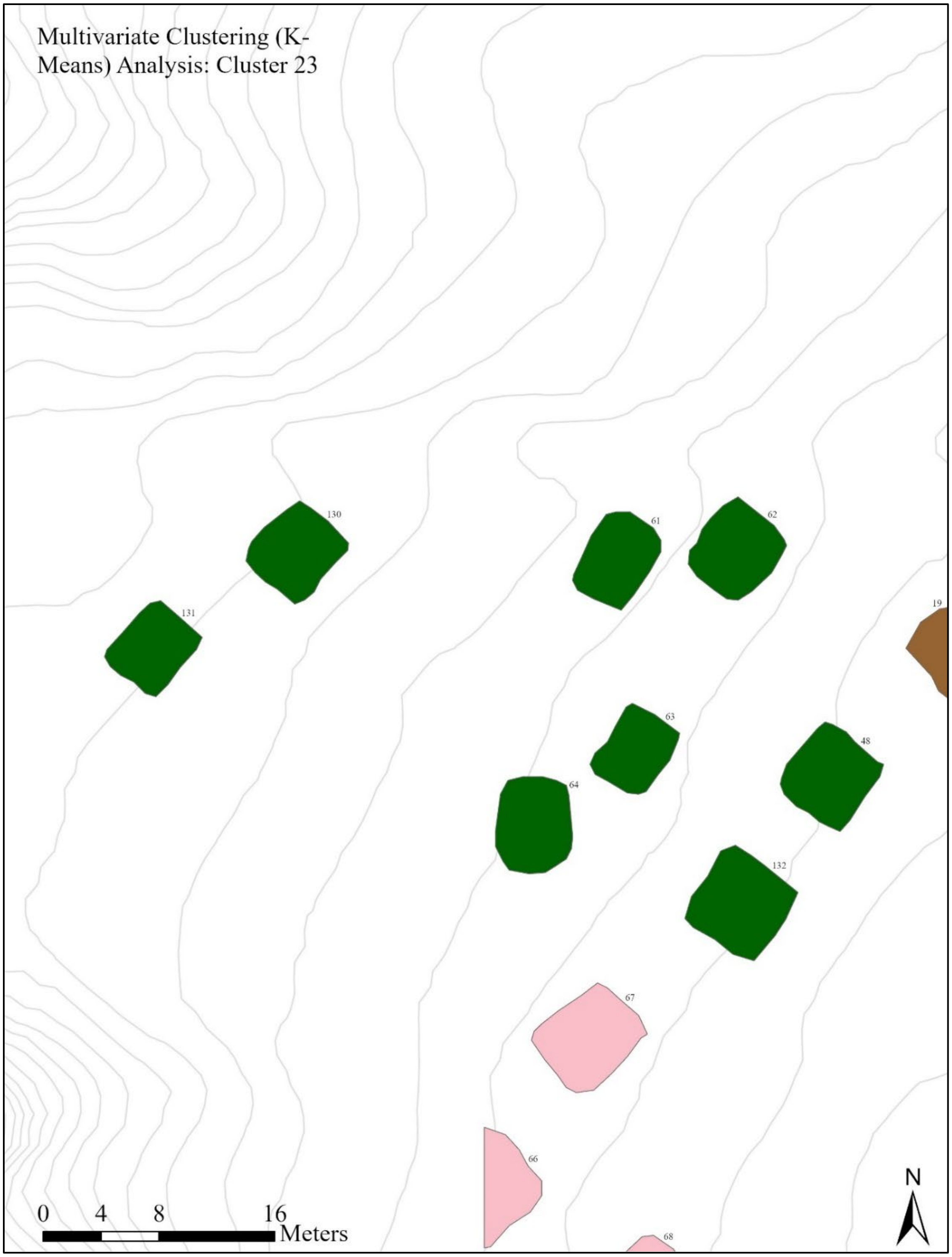

Figure E.21: Multivariate Clustering (K-means) Analysis, Cluster 23

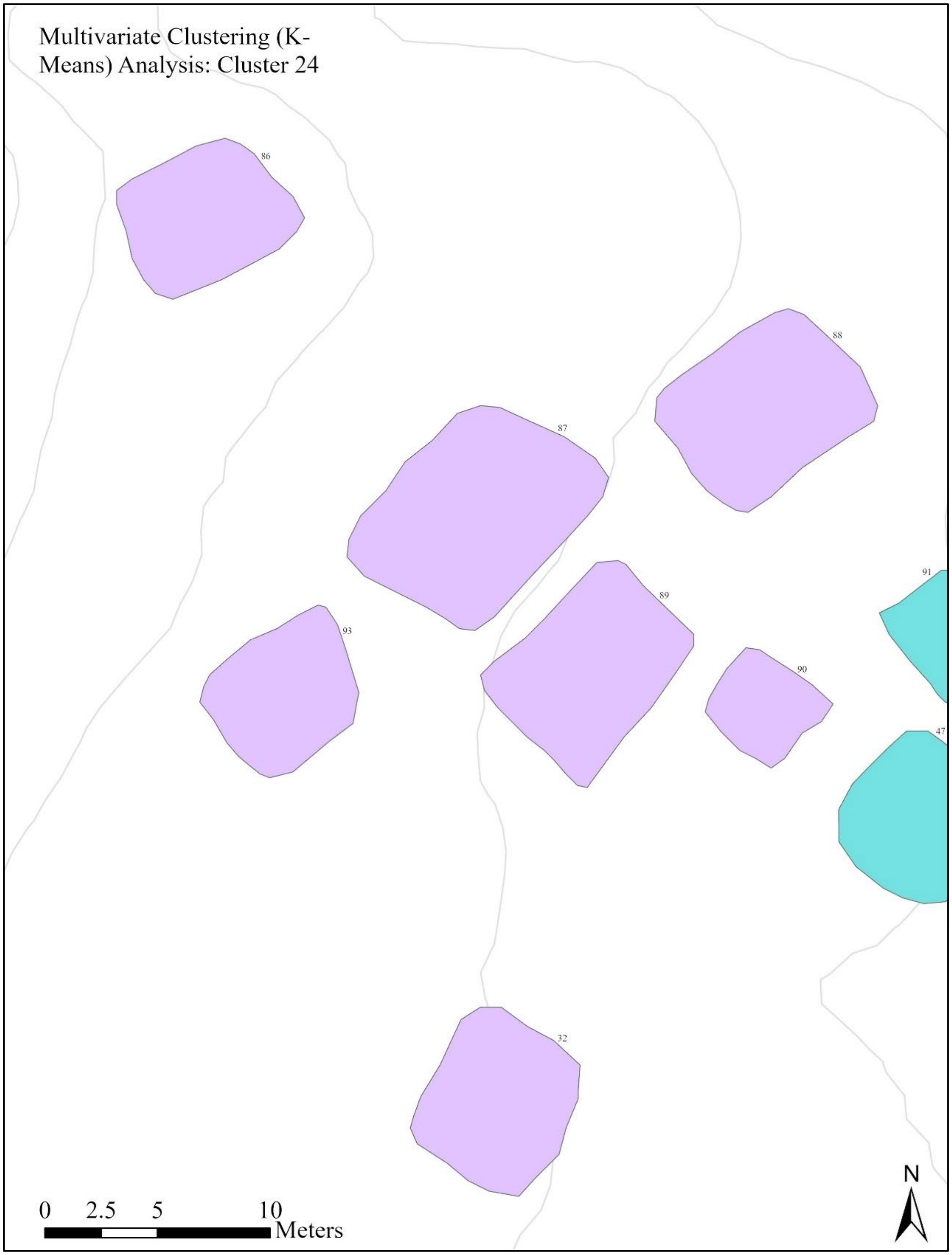

Figure E.22: Multivariate Clustering (K-means) Analysis, Cluster 24

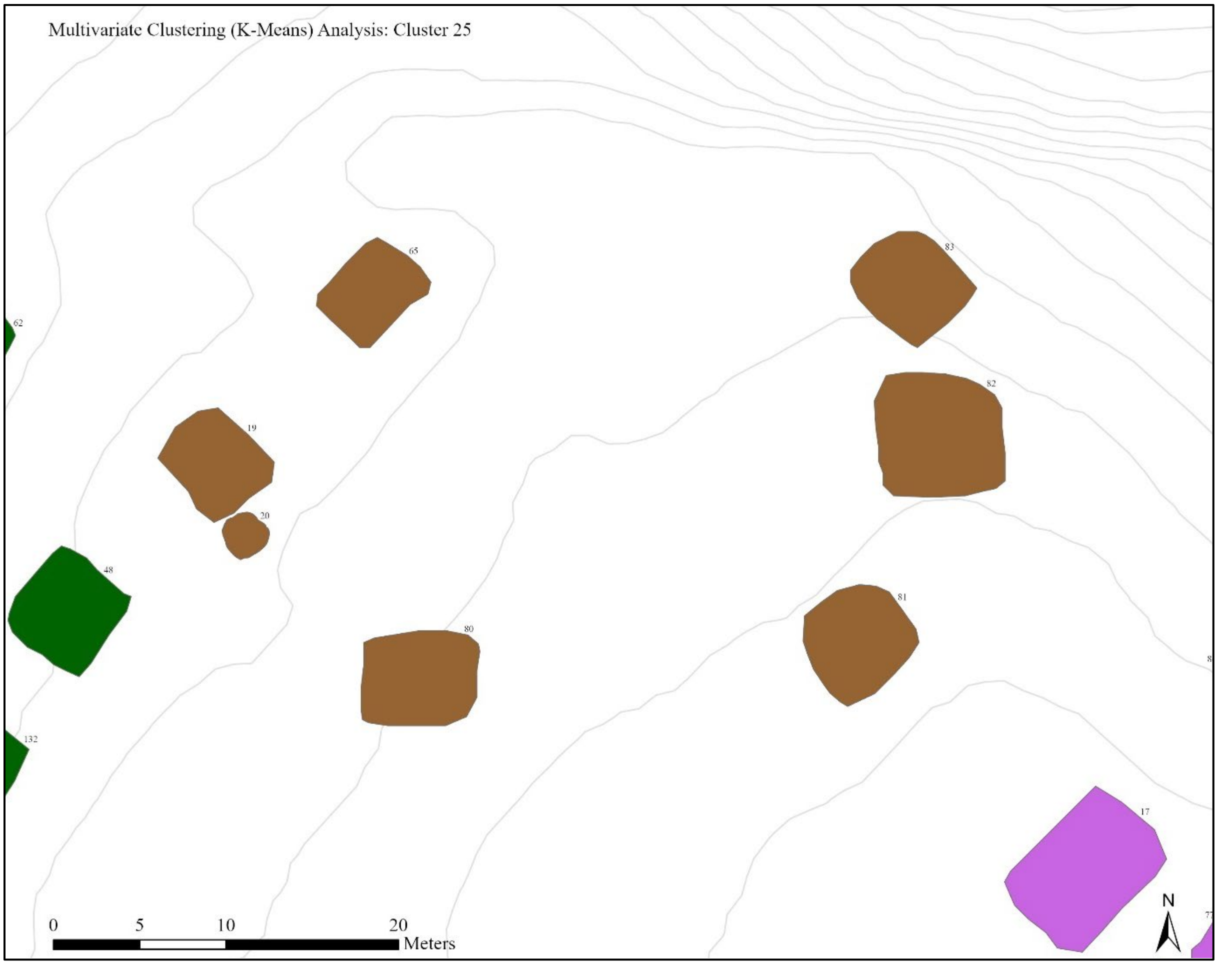

Figure E.23: Multivariate Clustering (K-means) Analysis, Cluster 25

APPENDIX F: HOUSEHOLD PATTERNS

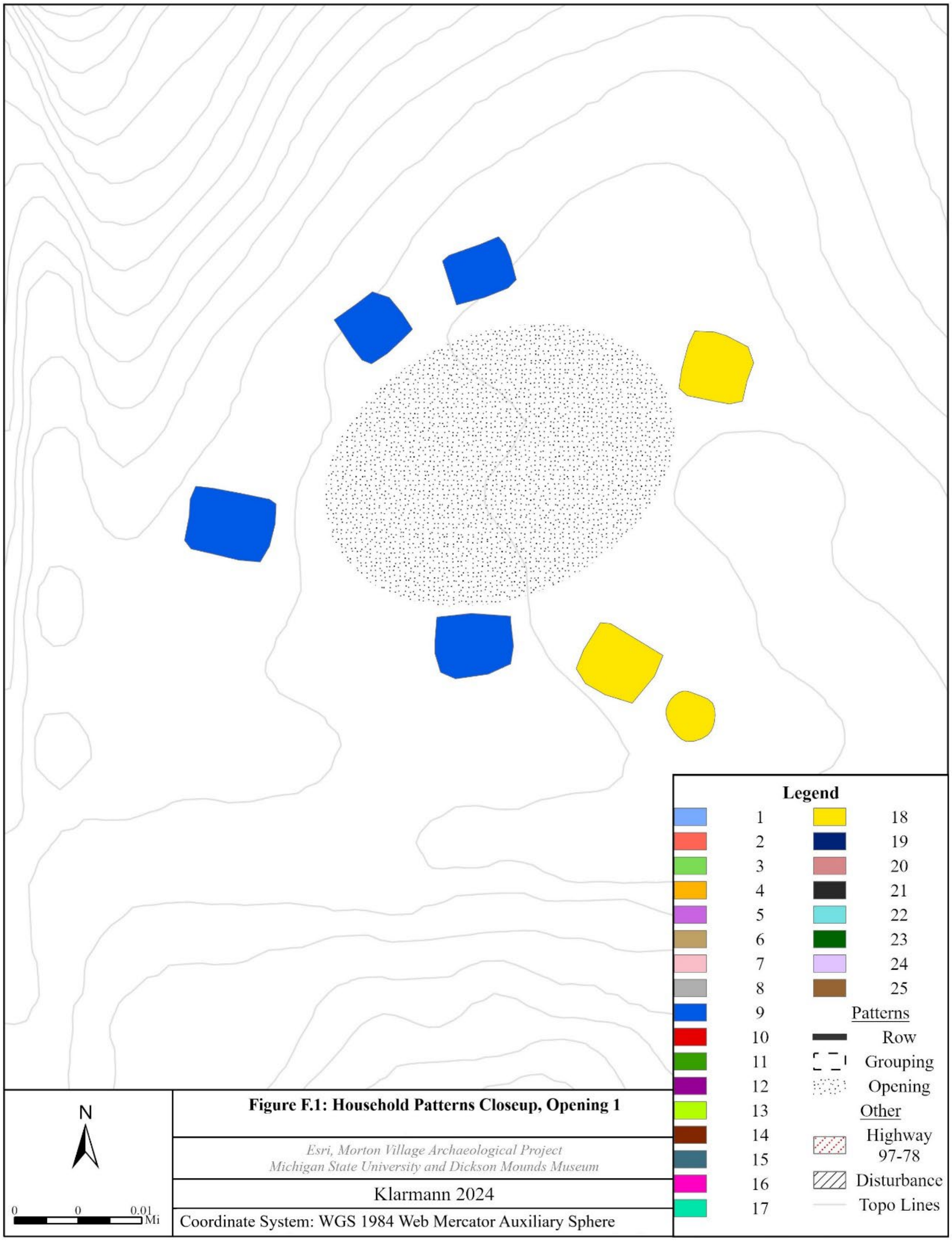

Figure F.1: Household Patterns Closeup, Opening 1

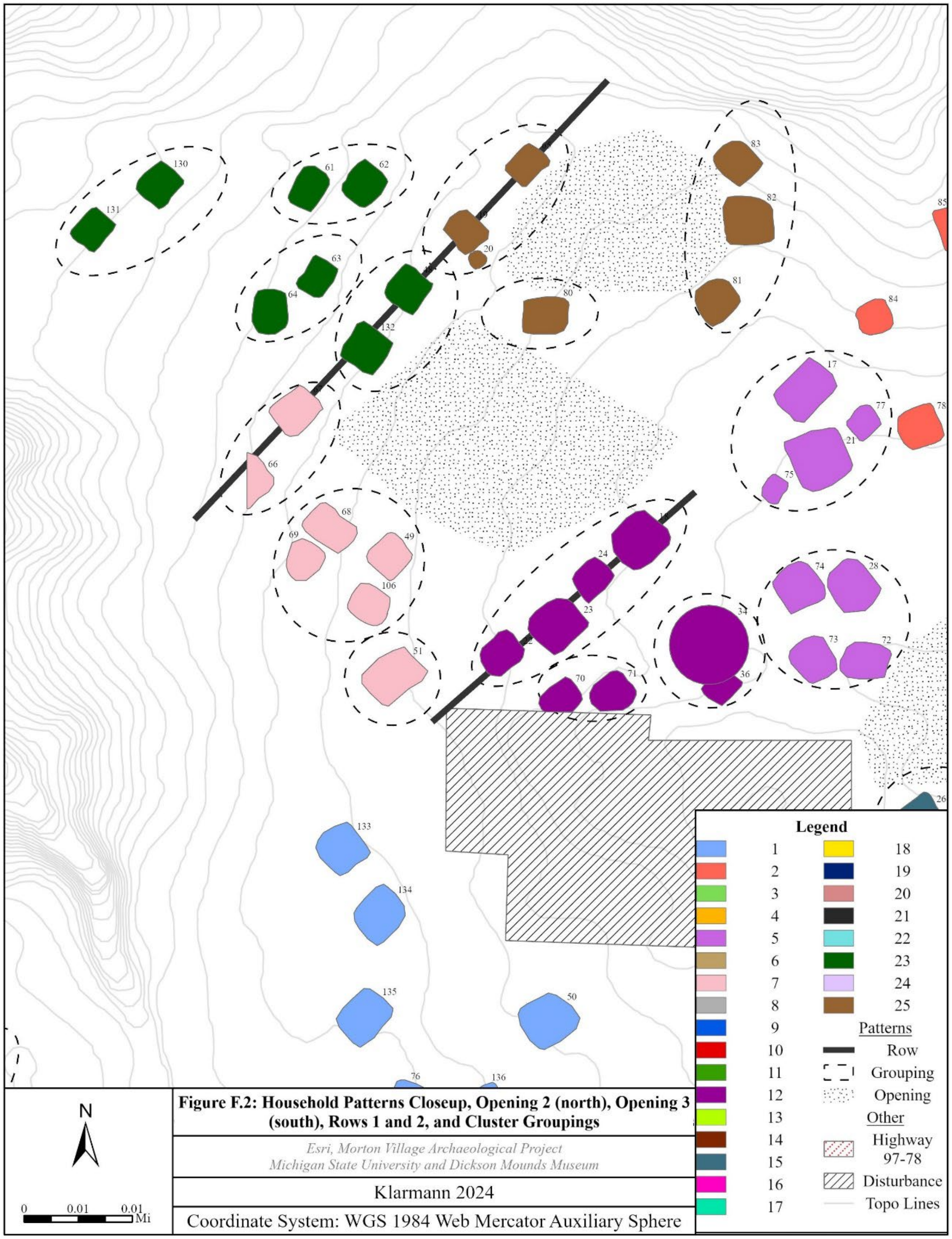

Figure F.2: Household Patterns Closeup, Opening 2 (north, Opening 3 (south), Rows 1 and 2, and Cluster Groupings

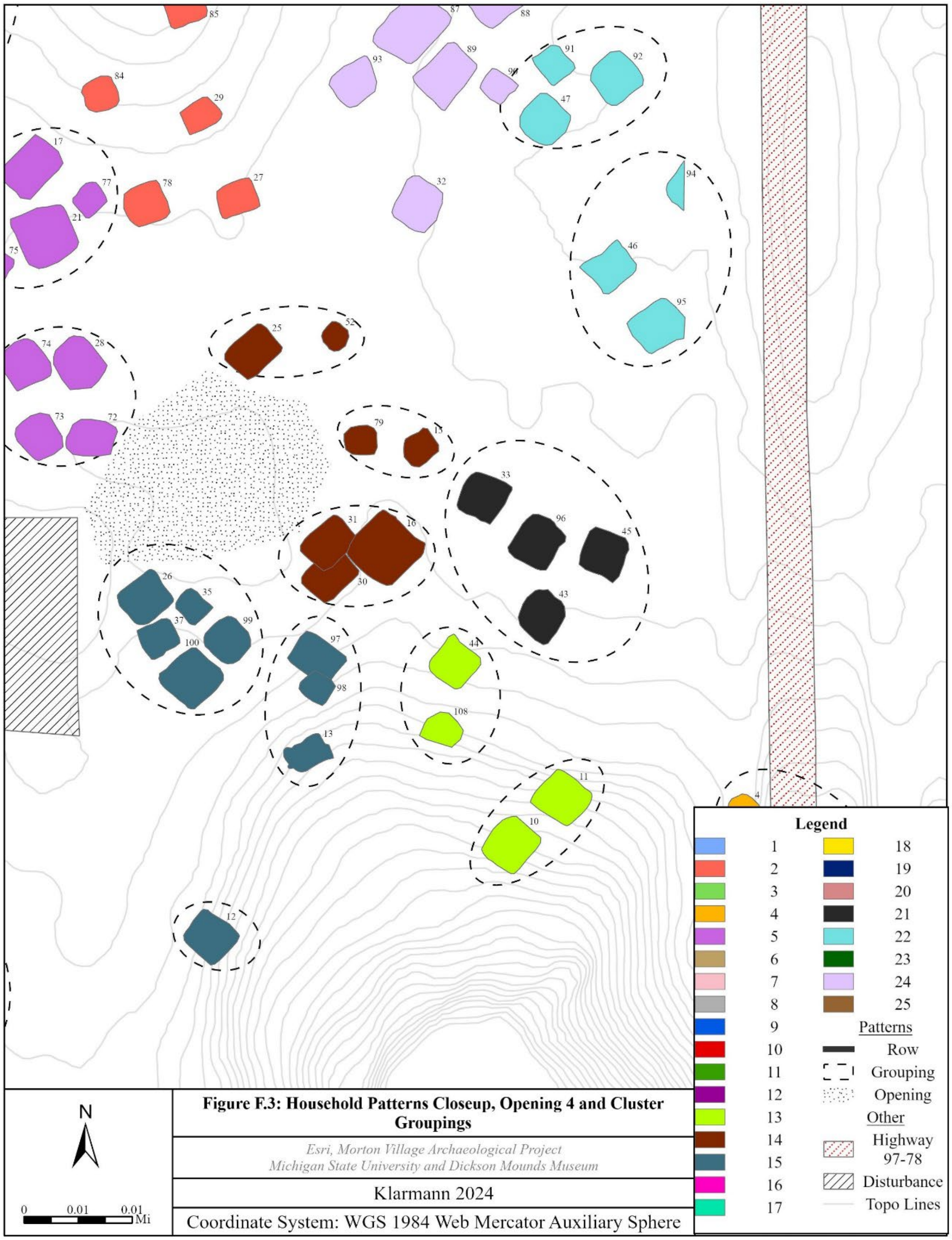

Figure F.3: Household Patterns Closeup, Opening 4 and Cluster Groupings

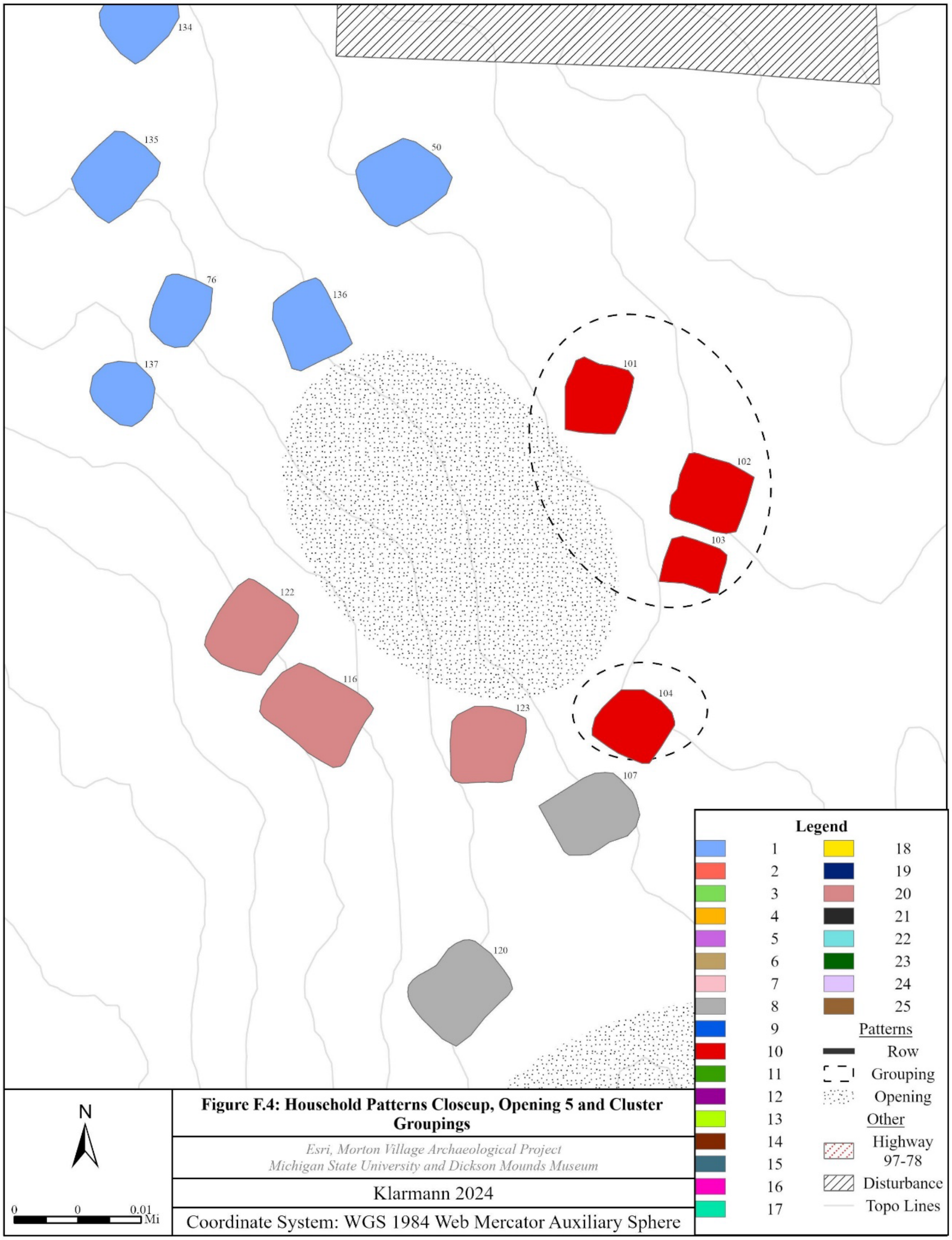

Figure F.4: Household Patterns Closeup, Opening 5 and Cluster Groupings

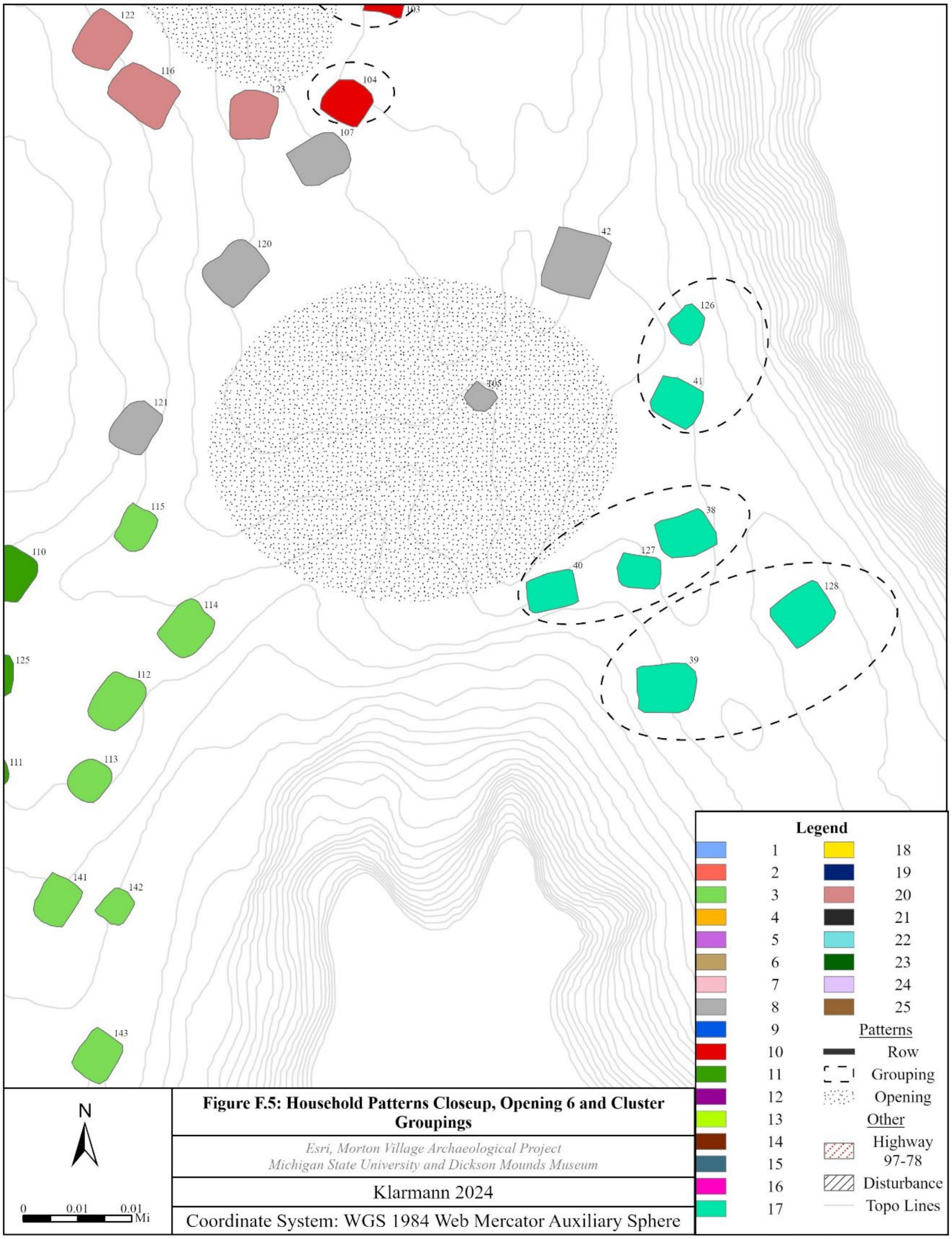

Figure F.5: Household Patterns Closeup, Opening 6 and Cluster Groupings