

The Social Dynamics of Coalescence:
Ancestral Wendat Communities 1400-1550 C.E.

By

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ABSTRACT

Coalescence is a distinctive process of village aggregation that creates larger, socially cohesive communities from smaller, scattered villages. This dissertation asks: how do individual and collective social relationships change throughout the process of coalescence, and how might these relationships contribute to the social cohesiveness of a coalescent community?

Coalescent communities share characteristics that reveal the relationship between collective action and collective identities in their social dynamics. Collective identity is a shared sense of oneness among members of a group. It can be understood as the product of two processes: categorical and relational identification. Categorical identification is a shared association with a specific category, such as an ethnic group or a religious association. Relational identification is the product of direct, interpersonal interaction. The potential for a group to engage in collective action is linked to the intensity (prominence as compared to other aspects of identity) and scale (social unit and size of group) of categorical and relational identification.

Patterns in the intensity and scale of categorical and relational identification are used to trace changing social dynamics through the process of community coalescence. The case study is a sequence of four sites that were successively occupied by the same Ancestral Wendat (Iroquoian) community over a period of 150 years in south-central Ontario. The intensity of categorical identification is assessed by measuring the consistency of decorative styles among pottery vessels. The intensity of relational identification is assessed by measuring production variability among ceramic pots and pipes using microscopic characterization.

The analyses reveal a correlation between the intensity and scale of categorical and relational identification and village-scale social cohesion and collective action.

Village-scale categorical identification was less intensive during the period of initial aggregation, with a subsequent increase in intensity observed at fully coalesced sites where evidence of social cohesion and village-scale collective action is present. As coalescence progressed, the intensity of relational identification at the village scale decreased. This evidence suggests that changing dynamics of categorical and relational ties among community members were intertwined with the development of social cohesion and the increased potential for village-scale collective action at the culmination of coalescence.

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CHAPTER 1

INTRODUCTION

Forty-eight years ago, futurist Alvin Toffler predicted a coming wave of “future shock,” a psychological state of stress, anxiety, and disorientation in his popular book of the same name (1970). This societal epidemic would be caused by the accelerated rate of technological and social change Toffler expected to continue in the coming decades. Depending on one’s sources, Toffler’s dire predictions have either already come to pass (Gutson 2016; Manjoo 2016) or have become irrelevant (Israel 2012; Kleiner and Gordon 2009). The *Future Shock* vision identifies contemporary technological advancement as a force that accelerates social change, moving the pace of change much faster than is “natural” for human societies.

What if the social changes occurring in our world today aren’t qualitatively different from what humans have experienced throughout our history? This is the argument made by Tom Standage in his book, *The Victorian Internet* (2014), which compares the 19th century adoption of the telegraph and the contemporary popularization of the Internet. While the Internet is viewed as having fundamentally changed the nature of human interaction, Standage argues that the widespread use of the telegraph, which made instant long-distance communication possible for the first time, was actually a greater social and cultural transformation. The Internet was then only a quantitative shift, an expansion of already-transformed social interactions among people and communities (1998).

One of the greatest aims and sincerest challenges of archaeology is to draw on time depth to identify patterns in behavior through events that can never be truly

analogous. Certainly, viral videos and subreddits are unique historical developments; however, technological innovation is, itself, a constant in human societies. Contemporary worries about the loss of communication, civility, or shared interpersonal connections due to the amount of activity conducted remotely are widespread, and yet we can see that digital technology facilitates the transmission of knowledge while fostering opportunities to find like-minded others. Ultimately, this creates an opportunity for affiliation to develop among individuals and groups. In this way, we can see how technology is both a tool for, and product of, social realignments.

This dissertation examines a period of social change in the past that I argue is not qualitatively different from contemporary experiences. Coalescence is a phenomenon that transforms communities, bringing together once-separate villages into a single larger community in a very short time. These aggregated communities adopted new social practices that facilitated the development of social cohesion at a larger scale, changing the nature of community life and interactions. Like the vision in *Future Shock*, these changes were very rapid, and transformed key elements of daily life for the people who lived through the transition.

This chapter introduces the subject of this dissertation: an example of rapid, dramatic social change among the Wendat, Iroquoian people living in what is now Ontario, Canada. The nature of village life transformed as villages grew from a few hundred to a few thousand people over the span of a few generations in the fifteenth and sixteenth centuries. This dissertation examines changing social identity in Wendat villages throughout this time period in an effort to better understand the nature of these social changes and how people experienced them.

The Wendat and Coalescence

From the fourteenth through sixteenth centuries, the span of a few generations, Ontario Iroquoian villages grew from a few hundred to a few thousand people through aggregation and agglomeration of smaller, scattered villages into larger ones. The circumstances of this aggregation lead Birch to identify this period of social transformation as “coalescence” (Birch 2010b). Birch presents a detailed picture of the process of coalescence among the Wendat with a focus on life in post-coalescent (already coalesced) villages. This case is briefly introduced here, but a more detailed review of the culture history and evidence for coalescence among the Wendat is found in Chapter 3.

Birch makes it clear that the coalescence of Ontario Iroquoian villages is one manifestation of the fluid social organization typical of Iroquoian communities from the 1300s C.E. to the historic period. In the late 1300s, Iroquoian villages were small and dispersed across the landscape. A typical village was composed of several longhouses, that were likely matrilineal, and grouped in a cluster. Each village was organized in clan segments, like those observed in historic period Iroquoian villages. Settlement patterns were flexible and variable. Small hamlets, larger villages, and dispersed camps are all represented in the archaeological record. Temporary additions to communities, such as impermanent or atypically shaped structures, were also relatively common and may have accommodated newcomers or people staying temporarily (Birch 2010a).

By the late fourteenth and early fifteenth centuries, several forces converged to drive changes in social organization and settlement patterns. Population grew substantially (Warrick 2008), likely creating population pressure and a resulting tension among communities. In south-central Ontario just north of Lake Ontario, early fifteenth century villages were clustered along river drainages, limiting space for expansion,

resource gathering, or hunting. Tensions sometimes led to violence which escalated into cycles of raiding and retaliation among local communities (Birch and Williamson 2013: 159-160). Some villages, such as Parsons, Draper, and Keffer, have extensive scatters of human bone (Williamson 2007). Even in communities that were not directly affected by violence, people must have perceived a significant threat because considerable time and resources were invested in defense. Settlements were placed in defensible positions with good views, often up on high ground near tributaries to major rivers. Villages were also heavily palisaded, some with double or triple rows of palisades.

As tensions mounted, villages began to aggregate. Villages such as Parsons, Draper, and Keffer were settled at about the same time that smaller neighboring villages were abandoned. Draper, one of the sites included in this study, shows evidence of the slow agglomeration of new community segments over time, resulting in a large but spatially separated community (Birch 2010b; Finlayson 1985). The larger villages may have provided residents with additional security. Violence or the threat of violence may have displaced some villages, causing residents to seek refuge and new alliances with other communities. As new alliances developed, smaller villages joined together and shared the burden of defense. These processes and shifting relations among villages contributed to changes in the regional social landscape as alliances among villages came to be important factors in relations among communities across Ontario and New York state (Birch 2010a:42-44).

The aggregation of these villages marks the beginning of coalescence. Birch traces the process of coalescence through changes in the organization of the built environment and the use of public space in villages over time. Small dispersed villages dotted the landscape in the early fifteenth century. By the late fifteenth century, many of these

smaller villages were abandoned. Some people from the Rouge and Duffins drainages had aggregated at the Draper site (Finlayson 1985; Finlayson and Pearce:449; Warrick 2000), although the village segments are spatially separated and oriented in different directions (Finlayson 1985). Based on the organization of the built environment, Birch argues that there was limited social cohesion among the residents of the community, at least initially (Birch 2010b:102-109).

The Mantle site, also featured in this dissertation, is a large, fifteenth century village that is identified as a post-coalescent community by Birch (2010a, b) and Birch and Williamson (2013a). The community of people who had lived at Draper left that village and moved to Mantle, the latter village showing considerable evidence of social integration. The village layout was planned prior to construction, with houses lined up in an ordered manner. At least during the site's early occupation, there was a central plaza area with longhouses oriented around it, two of which were probably clan or meeting houses (Birch 2010b:109-126). A community the size of the Mantle site, which housed around two thousand people, would have required a significant amount of coordination. Feeding and clothing so many people for several decades, the timespan during which the Mantle site was occupied, would have required careful planning and use of resources, particularly in the management of the deer populations that were hunted for the hides used for clothing (Birch and Williamson 2013a). There is also evidence for new and wider-ranging regional contacts, based on the increased diversity of pottery decorative types and the evidence of a significant number of pots traveling a long distance from New York Iroquois villages (Birch and Williamson 2013a).

Birch's foundational work answers many basic questions about coalescence and how it happened in fourteenth and fifteenth century Ontario. In the Rouge-Duffins

drainage, sequentially occupied villages show different transition stages from small dispersed village, to aggregated village, and finally to coalesced village. We also know that residents of the coalesced Mantle community coordinated communal defenses and shared public spaces, an organized village plan, and the feeding and clothing of a village of locally unprecedented size. This existing analysis, along with the excellent archaeological record, make this sequence an exceptional case for further examining the social processes of coalescence.

Coalescence and the Challenge of Creating Community

The Wendat experience was probably not unlike other periods of coalescence, particularly in Late Precontact and Contact Period North America. Coalescence is the aggregation of smaller, village-sized communities into a larger and socially cohesive settlement; it changes the nature of relations among communities, community members, and corporate groups within communities (Kowalewski 2006, 2013). While much is known about what happens in a period of coalescence, including the causes, outcomes, and mechanisms by which the process proceeds, not much is known about *how* these changes happen socially. This dissertation seeks to fill that knowledge gap. The remainder of this chapter introduces the concept of coalescence, reviews what the literature reveals about the social dynamics of coalescent communities and explains what we still need to investigate.

I conceptualize coalescence as one possible outcome when villages aggregate. Aggregation is a common response in times of stress, such as during population growth, resource scarcity, and conflict. When villages aggregate, several different outcomes are possible, as is illustrated by examples from the American Southwest. Villages may

aggregate and the once-separate villages may continue to work independently in some ways, as was the case at Yellowjacket Pueblo in southwestern Colorado (Mobley-Tanaka 2005). An aggregated community may also remain together only temporarily, fissioning rather than developing cohesive ties among community members, a process demonstrated by Shabik'eschee Village in the Chaco Canyon area of New Mexico (Wills and Windes 1989). Coalescent communities result when smaller villages aggregate and form a settlement that is socially cohesive and does not fission over time (Kowalewski 2006). Both internal stressors and the social, economic, and political context are important factors that help determine whether aggregated communities fission or remain together through coalescence.

All growing communities face challenges that stress their social fabric. As village populations grow, so does the potential for intra-group conflict, which can contribute to rifts between groups within the community. This phenomenon was first discussed by Rappaport (1968) who called it the "irritation coefficient." Rappaport observed that the frequency of disputes among the Tsembaga was a function of population density; as population increased, so did the frequency of conflict (Rappaport 1968). Johnson's (1982) term for this phenomenon, scalar stress, is commonly used by archaeologists. The notion is the same: as group size increases, so does intra-community conflict. Johnson further suggested two possible solutions to this scalar stress: 1) split, or fission, the village into smaller units along existing social boundaries; or 2) develop mitigating strategies or institutions.

Scalar stress is not the only factor that influences when and how aggregated communities integrate or fission. Villages are embedded within a larger social, economic, political, and environmental context. Aggregated communities tend to fission in

situations where the cost is relatively low, like when villages have peaceful relationships with their neighbors (Bandy 2004: 324). Fissioning is less likely at times of violent conflict and considerable resultant investments such as defensive installations and circumscription. It is difficult to fission if there is no place available to establish a new settlement (Carneiro 1988).

Communities can mitigate scalar stress through social institutions and practices that foster integration. In anthropology and archaeology, social hierarchies are traditionally thought to mitigate scalar stress and to ultimately lead to social cohesion. In this view, leaders and leadership institutions emerge and facilitate integration of the community by using their authority to resolve or squash conflict. Coalescent communities are most often egalitarian, however, developing community cohesion through non-hierarchical mechanisms. Recent work by Kowalewski (2006, 2013), Birch (Birch 2010b, 2012, 2013), and others provides insight into the mechanisms that commonly facilitate social cohesion. The next section reviews what we know about the social dynamics of coalescent communities.

The Social Dynamics of Coalescent Communities

Kowalewski has extensively reviewed known cases of coalescence (Kowalewski 2006, 2013). This section thus draws from his findings to identify similarities among cases and to gain a better understanding of the social dynamics of coalescent communities. Kowalewski compared cases that had previously been identified as coalescent by others, as well as cases that he identified as coalescent based on existing descriptions. He found that the term coalescence has been applied to cases that vary significantly by scale (from single settlement clusters to entire geographic regions),

specific historical trajectories, and outcomes. Despite these differences, cases of coalescence tend to share several similarities. Kowalewski finds that most cases of coalescence shared a majority of these characteristics:

“-Larger towns or villages

-Attraction of newcomers resulting in multiethnic, multilingual populations

-Movement to new places with security and the potential for sufficient production of necessities

-Collective defense and fortification

-Intensification of local production placing new demands on labor, particularly that of women

-Intensification of trade

-Elaborate community integration by means of corporate kin groups, including greater emphasis on moieties, unilineal (often matrilineal) descent groups, clan systems, sodalities, rituals of intensification, sports events

-Domestic architecture and village layout designed to promote community integration

-Egalitarian, collective, universalizing ideologies and cults

-Migration myths emphasizing universalizing ideologies and cults,

-Collective leadership, including councils, council houses, confederacies, personalized leadership and centralized hierarchical authority are played down

-Macroregional cultural basis of coalescence and political-economic context”

(Kowalewski 2006:117)

This list of shared characteristics is evidence of deeper similarities in the social dynamics of coalescent communities, or how people from once-separate communities live, work, and build cohesive relations among one another. There are three such deeper similarities that I argue are essential to understanding the social dynamics of coalescent communities: 1) coalescence is a process of regional social change; 2) the process of coalescence facilitates collective action at a larger scale; and 3) coalescent communities are socially cohesive without social hierarchy. The following sections explain each point in more detail.

Coalescence is a Process of Regional Social Change

Although this dissertation is mainly concerned with life in coalescent villages, coalescence is a regional phenomenon. Coalescence involves a shift in settlement patterns that results in fewer, larger communities spread farther apart on the landscape. The scale of this shift can vary from the local aggregation of a few villages, as was the case for Ontario Iroquoian communities (Birch 2010a, b), to widespread regional aggregation resulting in large areas of unoccupied land (Drooker 2002; Hill et al. 2012; Hill et al. 2004). Widespread aggregation transforms the social landscape and contributes to changes in the way that coalescent communities interact with one another, their neighbors, and other polities in the area (Kowalewski 2006). The relationship

between coalescent communities and their neighbors is key to understanding the social dynamics of coalescent communities.

One manifestation of changing dynamics between coalescent communities and their neighbors is an intensification of trade (Kowalewski 2006), which can contribute to community coalescence. Vehik (2002) argues that coalescence in the Late Prehistoric period Southern Plains occurred in a climate of conflict, intensification of trade, and population reorganization. The social organization of groups living in the Vaupés region of the Amazon seems to have been shaped by trade. Kowalewski (2006) describes these groups as “coalescent,” but in a different sense than the Iroquoian case. Extensive trade networks developed in the region, where nonlocal goods were essential to sustaining local lifeways. Vaupés people adopted a linguistically endogamous marriage strategy (Jackson 1983), effectively creating social integration across a wide region (Kowalewski 2006:99-100). Larger coalescent villages would need more goods to sustain a larger population, possibly driving an increasing intensity of trade. Exchange, another commonly observed outcome of coalescence, may also be an important part of relationship and alliance building among communities (Birch 2010a).

Coalescence is intertwined with regional dynamics of population movement and migration. Migration and population movement drive coalescence, but once coalescence is established, coalescent communities also attract newcomers (Kowalewski 2006). In the US Southwest, periods of widespread migration created new, diverse communities and likely multi-ethnic ones (Adams and Duff 2004; Clark 2001; Hill et al. 2004); these processes are also described for the Wendat by Birch (2010b, 2012, 2013) and by Etheridge and others (2002) in the American Southeast. In these cases, the new, diverse, coalescent communities were unlike the earlier communities that they replaced. In other

cases, including the Wendat, coalescence instead intensified migration and co-residential practices that had already existed in the region (Birch 2010b).

Coalescence Facilitates Collective Action at a Larger Scale

Collective action is sustained cooperation among a group of people to achieve a common goal (Tilly 1978; White 2008). Some goals that community members might share, such as military defense, are best accomplished with a large group of people, making the need to accomplish collective tasks a common factor in aggregation. Conflict appears to have been a driving force behind large scale population movements and related regional coalescence in the late prehistoric and early historic periods in the US Southeast (Hudson 2002), the Southern Plains (Vehik 2002), among the Ancestral Wendat (Birch 2010a), and the US Southwest (LeBlanc 1999; Wilcox et al. 2001). Fractured populations from many cultural groups created multi-ethnic communities and shared both the burden of defense and the challenge of procuring sufficient resources for growing communities in a hostile landscape.

Large coalescent communities would also require that some kinds of labor be organized at a larger scale, including the work necessary to feed, house, and clothe growing numbers of people. In many cases, these new demands require not just additional labor, but also an intensification of production, meaning that the work itself may also change to ensure that enough resources are produced for the community. Activities such as building houses or growing crops may be undertaken at the household or corporate group scale, but certain aspects of these activities are still a concern of the entire community. For example, a household might build their own longhouse, but the

siting of the longhouse would be part of a community-scale plan for the layout and construction of their village.

Coalescent Communities Are Socially Cohesive Without Social Hierarchy

Coalescence creates socially cohesive communities – new social entities that can collectively accomplish shared goals. Birch’s (2013) volume on the creation of community provides examples of how this cohesion has been created and how it can be observed archaeologically, including shared public spaces, the organization of the built environment, and shared art and symbolism. Social cohesion at a village scale is not unusual; however, coalescent communities are unlike other cases in that they achieve cohesion without developed institutionalized social hierarchies (Kowalewski 2006). Coalescent communities typically comprise corporate groups that are the basis of collective leadership, with representatives of these groups participating in community-level decision making. Furthermore, coalescent communities commonly develop elaborate rituals and myths that describe and order the relations among these groups. Kowalewski observes that in historic cases, people in coalescence communities often participate in ritual and activities that further cement relations among these corporate groups. Community-wide activities such as feasts or sporting events provide a setting in which individuals from each corporate group can interact and make sense of intergroup relationships (Kowalewski 2006).

What We Know and What This Dissertation Does

Coalescence involves new social dynamics within communities as well as wider-reaching regional change. Coalescent communities are usually socially cohesive without social hierarchy, and they often have institutions that help to mitigate scalar stress. Life in coalescent communities can have major benefits, including the ability to accomplish certain collective tasks like military defense that are more efficient with a larger group. Kowalewski has observed that coalescent societies in many different areas share similar features (2006, 2013). What we do not yet understand is how the process of coalescence proceeds from a social perspective. How do the common features of coalescent communities arise?

Coalescence changes the size, demographics, challenges, and goals of a community; however, these changes are intertwined with the dynamics of relationships among individual community members and corporate groups within a community. This dissertation asks: 1) how do individual and collective social relationships change through the process of community coalescence? and 2) how do these relationships contribute to coalescence? This chapter identified three key characteristics shared by cases of coalescence: 1) coalescence is a process of regional social change; 2) the process of coalescence facilitates collective action at a larger scale; and 3) coalescent communities are socially cohesive without social hierarchy. The next chapter introduces a theoretical perspective that unites these three shared characteristics of coalescent communities and proposes a link between these outcomes of coalescence and the dynamics of social relations within coalescent communities. Chapter 3 introduces the case study and study sites in more detail, including previous work on the process of coalescence among the Wendat. In Chapter 4, ceramic decorative data is used to assess the intensity and scale of

categorical identification. The intensity and scale of relational identification is assessed in Chapter 5 through analysis of ceramic pottery and pipe production techniques. The results of these two analyses are compared and integrated in Chapter 6.

CHAPTER 2

SOCIAL DYNAMICS IN COALESCENT COMMUNITIES

This dissertation asks: 1) how do individual and collective social relationships change through the process of community coalescence? and 2) how do these relationships contribute to coalescence? Chapter 1 identified three commonalities among cases of community coalescence: 1) coalescence is a process of regional social change; 2) coalescence facilitates collective action at a larger social scale; and 3) coalescent communities tend to be socially cohesive without social hierarchy. These three commonalities point to underlying similarities in the social dynamics of coalescent communities. Building on that background, this chapter identifies the relationship among these similarities, developing expectations for the social dynamics of a coalescent community and discussing how those dynamics would be expected to develop as coalescence proceeds. It begins with a classic anthropological example that illustrates how the relationship between individual identities, social cohesion, and group identities is evident in our basic understanding of how smaller-scale societies work.

Individuals, Groups, and Collective Work in Smaller-Scale Societies

The relationship between individual identity, group identity, and accomplishing tasks has long been apparent to anthropologists who study smaller-scale societies. The complexity of these dynamics is illustrated by Gearing's concept of the "structural pose":

“The notion of structural pose firmly fixes the mind of the student to that long-evident fact: human communities typically rearrange themselves to accomplish their various tasks... In a word, a human community does not have a single social structure; it has several. Put otherwise, the social structure of a society is the sum of several structural poses it assumes around the year” (Gearing 1958:1148-1149).

Gearing describes how Cherokee social organization facilitated the reorganization of the community to create groups with different compositions and sizes (different “poses”) to accomplish various collective tasks throughout the year. These shifts were initiated by individuals who grouped themselves according to the roles that they would play in the task at hand. Individual roles in Cherokee society were differentiated based mostly on age and gender. As individuals assumed roles to accomplish different group tasks, the role defined their participation in each task (Gearing 1958). For example, during the hunting season, Cherokee society was organized as an aggregate of households. Men would leave the village to hunt, sometimes for months at a time. After the crops were taken in, the young men would return to hunting for a shorter time. The decision regarding who would hunt was made within each household, and small groups of men from several households would coordinate hunting together (Gearing 1958).

When a social dispute such as murder occurred, clan segments became the dominant social units. In administrative dealings, each clan segment behaved like a corporate individual, with the entire clan culpable if their kinsman were found guilty of the murder or entitled to revenge if they were the victim’s family. Clans cross-cut households, so that men would stand with the clan of their birth, separate from the clan

of their wives and children. Clans also controlled the selection of marriage partners and the enforcement of rules regarding marital relationships (Gearing 1958).

In another pose, certain decisions such as building or maintaining public buildings or moving the village were made by the population of the village acting as a single unit. For these decisions, the entire community would come together with each clan segment overseen by a cross-cutting group of elder men. Decisions were reached first among each clan segment for each matter, whereupon the elders would consider those opinions and reach consensus. Matters would be discussed until no strong objections were voiced (Gearing 1958). In this way, each clan segment participated in decision making that was coordinated by group leaders, but no formal, permanent hierarchy was required to coordinate decision making.

This example illustrates several points about the relationship between social dynamics and collective action in smaller-scale societies. In Gearing's vision of Cherokee society, the roles and identities of individuals are fluid, shifting with the organization of the community as the community's goals and activities change. As different situations arise and individuals take on specific roles (e.g., elder, hunter, clansman) these roles become a defining element of their individual and group identities in that situation. Social cohesion is maintained among the separate social units while Cherokee society moves fluidly between each structural pose, even without the development of a formal social hierarchy.

Following Gearing's example, we can imagine how changes in the nature and organization of collective work might shift as coalescence proceeds, and how those changes are intertwined with individual roles and identities. Individual identities of group members are intertwined with the roles they take on in community work as well as

with their group identities. The nature of these relations and their ties to collective work are essential to understanding the social dynamics of a community. The next section contextualizes the changing relations we may observe in coalescence as part of the normal range of variation observed in smaller-scale societies.

Collective Action and the Social Organization of Smaller-Scale Societies

There is an extensive body of literature that considers what collective action is, how it works, and why people take collective action in certain situations. Roscoe (2009), provides a model for understanding the benefits of collective action for a coalescent community and how coalescent communities might make an organizational shift to facilitate collective action without social hierarchy.

Roscoe (2009) argues that smaller-scale societies are organized to optimize certain important interests (e.g., biological and social reproduction, subsistence, military defense) that are more efficiently achieved by groups of different sizes (e.g., nuclear family, extended kin group, clan, village). Small-scale societies ideally comprise nested social groups, each optimally sized to accomplish different collective tasks. For example, biological reproduction may be optimally achieved by a nuclear family, but defense of the village is best accomplished by a large group. The sub-groups that comprise small-scale societies are nested and intertwined, creating a modular social organization that can be fluid, as in Gearing's example. While it may appear that these types of societies are hierarchical, especially as they grow larger and more socially complex, Roscoe argues otherwise. The existence of village-scale cooperation among corporate groups within a village is a result of coordination among sub-groups, not of a higher authority (Roscoe

2009). Thus, this nested social organization facilitates non-hierarchical social organization.

The next section introduces theory on the nature of the relationship between individual and group social identities, the development of social cohesion among groups of people, and the potential for groups of people to engage in sustained collective action together – the final theoretical element required to develop expectations for social dynamics in a period of coalescence.

Collective Identity and Collective Action

Collective identity is a shared sense of belonging to a group, a sense that can come from real or imagined shared experience (Snow 2001:3). Collective identity is one facet of social identity that is created and evolves through interactions with others. The creation of collective identity happens through dual social processes called relational and categorical identification. Relational identities grow from direct, interpersonal interaction that occur either one-on-one or through a social network (Tilly 1978). They can be defined in relation to others, like one's role in their family (e.g., sister, brother, wife, son) or they can be defined through relationships based on interactions with others such as through trade or shared labor.

Categorical identities are drawn from perceived, often abstract similarities that are typically marked symbolically. What Wiessner (1983: 257) refers to as “emblemic style” provides such symbolic marking; it has a distinct referent and communicates a clear message, often about social groups and boundaries. The use of shared symbols allows people to communicate their categorical identities and to identify others who

share the same identities, even in the absence of direct communication. For this reason, categorical identities can unite much larger groups than relational identities. A contemporary example would be fans of a professional sports team who share symbols such as team colors, logos, or mascots but who may never interact directly with one another.

Collective identities and social cohesion arise from the intersection of shared categorical and relational identification. Historical sociologists have found that strong social collectives, social movements, and collective action often arise in groups united by both categorical and relational identities (Calhoun 1995; Tilly 1978; White 2008). The greatest potential for sustained collective action within large groups of people arises where there are intensive networks of both categorical and relational ties among group members (Nexon 2009:50-51; Tilly 1978:81-90; White 2008). Smaller groups with intensive relational ties but weak categorical ties may also engage in collective action (Gould 1993; Kim and Bearman 1997; Siegal 2009). However, groups are unlikely to engage in collective action where both categorical and relational ties are weak or absent.

When this dissertation asks about changes in social dynamics, it is more specifically concerned with the changing nature of relations among the individuals and groups within a community that can be understood as changes in categorical and relational identification. I conceptualize differences in categorical and relational identification in terms of *intensity* and *scale*. *Intensity* is the prominence of one aspect of social identity as compared to others. *Scale* refers to the size of the group and the presence of sub-groups. Conceptualizing social identification in these terms facilitates comparisons of social identification among different cases while refining our understanding of how social change proceeds in specific cases.

Intensity is a measure of how important some element or elements of social identity are as compared to others. When an individual or group of individuals prioritizes a particular aspect of their identity over other aspects of their identity, they are engaging in more intensive social identification. Changes in intensity can be big or small. Small shifts in intensity happen frequently in daily life, as is illustrated in Gearing's (1958) description of Cherokee society. As the community organization fluxes through "structural poses," individuals assume different roles. Each role is part of their social identity, but different elements of their identity become more important as they assume different roles (e.g., elder, warrior, hunter). As individuals move through each of these roles, there is a temporary shift in the relative intensity of social identification. More dramatic shifts in intensity are associated with lasting social change. For example, changes in the composition, size, roles, and other characteristics of social groups could come with greater changes in the intensity of social identification as individuals assume new or changing roles.

The concept of scale has two dimensions. First is the social scale at which collective identities are shared. This would most likely correlate with an established social unit or institution such as a community, village, clan, or tribe. In this sense of the term, scale refers to the social extent at which categorical or relational identification is shared. The second sense of the term scale is the number of people involved, like the number of members of a household, or the population of a village. For example, one could consider the intensity of categorical identification at the scale of an entire village; however, a village could comprise only several dozen people or a few thousand people. Understanding both dimensions of scale is key to conceptualizing social dynamics.

Both the intensity and scale of categorical and relational identification are expected to change as communities grow and cohere through the process of coalescence. At the scale of the entire village, coalescence brings together more people than could interact directly on a regular basis, up to almost 2000 people in the case of the Wendat. Community growth of this degree may decrease the intensity of relational identification at the village scale, because people living in a village of 400 have more direct interactions with each other than those in a village of 2000. Categorical identification can unite larger groups of people and thus, as village populations grow, categorical identification is expected to eclipse relational identification in intensity at the village scale. With these principles as a guide, it is possible to develop some basic expectations for the intensity and scale of categorical and relational identification in coalescent communities.

Expectations for Collective Action and Collective Identity in Village Scale Societies

This dissertation asks, 1) how do individual and collective social relationships change through the process of community coalescence; and 2) how do these relationships contribute to coalescence? To answer these questions, the following chapters will assess changes in the intensity and scale of categorical and relational identification through time in four sequentially-occupied sites that trace the progression of coalescence from small, dispersed villages to an aggregated but spatially (and possibly socially) segmented village, to a single socially integrated coalescent community. The sites are described in detail in the following chapter. Using the framework developed above, I make some predictions about the intensity and scale of categorical and relational identification throughout this sequence.

In the small dispersed villages with populations of a few hundred people, all members of the community would likely interact directly on a regular basis. The smallest social unit would be the nuclear family, followed by the extended family household, then possibly the clan or village segment, and finally the village. Relational connections would be the primary means of social identification in these smaller communities, and the intensity of these ties would be strong. Shared categorical identities may exist at the village scale, or may unite people among several villages, but these ties are not likely to be emphasized with much relative intensity.

As people from these small villages aggregate into larger settlements, the primary relational ties would most likely remain constant. Specifically, in an aggregated community with spatially discrete segments that were once separate villages, the intensity of relational identification within each segment would be stronger than any identification across these segments. The intensity of these relational ties would be balanced at the community scale by shared categorical ties that might unite the separate relational networks and that may extend beyond the community. Among the historic period Iroquoian peoples, for example, clan ties cross-cut village boundaries and were important relational networks for exchange of goods and information.

In coalescent communities, segments are no longer separated; rather, there is evidence of planning and collective action at the community scale. Thus, it is likely that the entire community would be united by intensive categorical and relational identification. Specifically, while the relational networks within what had been village segments may have continued, the development of new cross-cutting relational ties is also likely. Categorical identification would be more key to uniting these new large

communities and, thus, is expected to intensify at the village scale and possibly also at the regional level.

There are some additional expectations regarding how coalescence progresses. Using Roscoe's model as a guide, the fluidity of smaller-scale societies provides the advantage of facilitating collective action at different social scales by allowing members of the community to move flexibly among roles and facilitating work toward priority tasks. The expectation is that certain aspects of the organization of smaller groups will remain unchanged while others will change as communities grow. Some tasks, such as subsistence activities or reproduction, would still be best accomplished by the same social units as before, while other tasks, such as mitigating conflict, may require reorganization. As Gearing's example illustrates, people participate in these groups, creating new elements of their individual identities. This is an important element of social dynamics that may exist but may not be demonstrable using available data.

Current Approaches to Material Correlates of Categorical and Relational Identification

The terms categorical and relational identification are not typically used in the archaeological literature, but evidence of relational or categorical identification is often used as evidence to answer questions about social identities that compel different terminology. Archaeology has made major contributions to the literature on categorical and relational identification, specifically in the lasting material evidence of these relations. In fact, archaeological middle range theory, particularly theory of style and its meanings, is an important part of studying categorical and relational identification.

Social identities that are shared by very large groups are frequently categorical in nature. Evidence of categorical identities can be used to identify connections among large groups of people. Perhaps the most common proxy for shared categorical identities is decorative style. Decorative styles can communicate important information about social groups and boundaries, often to more socially distant groups (Plog 1980; Wiessner 1983). When archaeologists observe patterns of shared style, we assume social links among the people who made them. Often, such data are used to identify specific social groups – ethnic groups, tribes, etc. – who would share these abstract connections and use the shared style and symbols to communicate about it. Shared decorative styles of artifacts or shared symbols are frequently evoked as evidence of shared cultural beliefs or practices (Crown 1994), political beliefs or affiliations (e.g., Bowser 2000; Spielmann et al. 2006) or boundaries between social groups (Bowser 2000; Crown 1994; Parkinson 2006).

While decorative style can be one way for people to communicate shared categorical connections, the relationship is not always straightforward. First, important categorical connections may exist but not be consistently communicated through decorative style, or specifically, through decorative style that is archaeologically accessible. For example, personal appearance is a highly visible and easily-manipulated way to communicate about categorical affiliations. The *Jesuit Relations* (Thwaites 1896) describe how community affiliation could be easily observed in the personal dress, adornment, and hair style of individuals among historically-known Iroquoian and Algonkian groups of the northeast. While there is often an expectation that decorative style communicates specifically about ethnic or linguistic boundaries, the relationship between style and social identities is complex and multifaceted (Gosselain 2000).

Relational connections are evident in many archaeological settings. For example, relational connections are manifest in the exchange of goods between communities at large and small scales (Baugh and Ericson 1994; Earle and Ericson 2014; Ericson and Baugh 2013). This includes more traditional approaches, such as pottery exchange networks (Foias and Bishop 2007; Kelly et al. 2009; Kuhn 1987; Stark 1992), but also model-based approaches, such as social network analysis, which seek to trace direct interactions among individuals and groups (Hart et al. 2016; Knappett 2013; Mills et al. 2013; Mills et al. 2015). Tracing the movement of people through migration also involves identifying changing relational networks (Cameron 1995; Hegmon et al. 2000; Neuzil 2005; Ortman 2010).

Relational identification generally occurs at smaller, more intimate scales than is typical of categorical identification. Smaller-scale social interactions are often examined using terminology and approaches relevant to the specific social groups or interactions being investigated like households, corporate groups, nuclear families, or communities of practice. For example, communities of practice work together on their craft, interacting on a regular basis within the context of making material culture or through discussions of the process (Lave and Wenger 1991; Wenger 1998). People tend to solve problems in the context in which they are encountered, and there are often many different possible solutions to a production challenge (or possible means to execute a production step) (Lave and Wenger 1991). This means that different communities of practice often develop their own methods for doing things, especially when there are many possible ways to accomplish the same task. Similarities in the objects they make are frequently used to trace populations of craftspeople, but they are also evidence of relational identification among members of a community of practice.

While identity and processes of identification are often intertwined with archaeological research objectives, identifying categorical and relational identities is not usually an explicit goal of archaeological research. I suggest that explicit recognition of these processes brings to bear an array of useful theoretical concepts that make it possible to study broader patterns and make comparisons more effectively. It also facilitates the application of general social theory such as Tilly's work, which is applied here to learn more from the comparisons between cases.

Matthew Peeples' path-breaking 2011 dissertation demonstrates the benefits of considering categorical and relational identification in an archaeological setting. Peeples explicitly used patterns of compositional properties of pottery and decorative style to study relational and categorical identification and to link these processes to the development of a widespread social movement during a period of community coalescence in the Cibola region of the American Southwest. Peeples frames the regional social transformation he observes as a social movement and applies Tilly's theory of collective identity and collective action to provide an interpretive framework. Given the large scale, regional social change observed in this case, Peeples argues that a regional social movement that is analogous to contemporary and historical social movements, such as those observed by Tilly, had taken place. Thus, Peeples expects to find patterns of both categorical and relational identification uniting the region. He uses compositional analysis of pottery and comparative analysis of decorative diversity among regional sites to trace patterns of relational identification conceptualized as social networks (Peeples 2011). By considering both categorical and relational ties together and in the abstract, rather than identifying specific links among individuals and groups, Peeples observes the social structure of a social movement and the concomitant shifts in social identification all without attempting to identify specific social groups.

This dissertation follows Peeples' approach to categorical and relational identification with a focus on smaller-scale intra-community patterns with the added dimensions of intensity and scale. By focusing on the intensity and scale of categorical and relational ties, this dissertation accomplishes two important things. First, it traces changes in social relations and the social organization of coalescing communities without needing to identify specific social groups (e.g., nuclear families, households, clans). This is important because coalescence introduces additional social change in smaller-scale societies where fluidity already exists. The focus is instead on how the dynamics of categorical and relational identification change and what this might mean for the people experiencing these social changes.

Second, like Peeples' approach, this dissertation facilitates a clear link between patterns of social identification already present in the archaeological literature, and contemporary social theory that links social identification of individuals with group identities and larger scale social processes. This is important because it allows us to ask new questions about past societies, how they worked, and how this compares with our observations of how contemporary societies operate. As Peeples demonstrates, the same social processes sometimes appear to be operating in these ancient societies. However, given that the range of human societies represented by contemporary and historical cases does not represent the full range of what has existed in humanity's history thus far, it is important to broaden our body of comparative data by including more ancient cases. Techniques like the one Peeples' developed facilitate comparisons between what appear to be a broadly diverse set of cultural and social contexts should be embraced.

This dissertation adds new dimensions to Peeples' framework by considering both the intensity and scale of categorical and relational identification. Conceptualizing

categorical and relational identities in terms of intensity and scale makes several useful contributions. Intensity and scale can be assessed quantitatively, making it possible to compare these dimensions across cases. For example, this dissertation will compare the relative intensity and scale of categorical and relational identification in pre-coalescent and post-coalescent villages to learn about changing social dynamics. It would also be possible and informative to compare categorical and relational identification in dissimilar cases, like in an aggregated community that ultimately fissioned versus one that became socially integrated.

This approach could easily be adapted to a wide range of contexts, such as different social units (e.g., clans, large villages, tribes, confederacies, cities, and states) to learn about the relationship between changing social organization and social identities. It could also be applied to contemporary ethnographic or historic case studies, and wherever information about patterns of categorical and relational identification could be obtained and contextualized using available data. Case study comparisons between archaeological, historic, and contemporary cases would be important contributions. As the following sections demonstrate, approaches to assessing the intensity and scale of categorical and relational identification must be tailored for the specific case, so contextual information is essential.

Assessing the Intensity and Scale of Categorical and Relational Identification

This dissertation's research questions will be addressed by assessing the intensity and scale of categorical and relational identification in four sequentially-occupied communities that trace the process of coalescence from small, dispersed villages to large,

coalesced, socially cohesive communities. There are two major expectations: 1) the intensity of categorical identification, at the scale of the entire village, will be greatest in the post-coalescent, socially cohesive community; and 2) the intensity of relational identification, at the scale of village segments/corporate groups, will stay roughly the same throughout the sequence but will decrease in intensity at the scale of the village. These expectations are summarized in Table 2.1 and are described in more detail below.

	Before Coalescence	Aggregated Community	Coalesced Community
Categorical Identity	Shared at community scale at low intensity	Intensity increasing at community scale or among communities	Highest intensity at community scale or among groups of communities Greater intensity of categorical ties among corporate groups within the community
Relational Identity	High intensity among extended kin households and groups of households within community	High intensity among extended kin households and groups of households within community	High intensity among extended kin households and groups of households within community Developing greater intensity of relational ties among corporate groups within community Decreased intensity at the village scale

Table 2.1 Expectations for categorical and relational identification.

Since individuals have many social identities that can become more salient in different settings, my analysis will consider classes of material culture that were made and used in different settings, specifically ceramic pots and ceramic pipes. Each will contribute to an understanding of both categorical and relational identification in different contexts. The next section explains the relevance of the two material classes and how information about each class will be utilized to understand the intensity and scale of categorical and relational identification.

Ceramic pots are ubiquitous on Ancestral Wendat sites and are the primary focus of my analysis. Historical literature indicates that pottery-making was done mostly by women, typically in groups (see Martelle 2002). Finished pots were used for cooking, eating, and storage and were exchanged between villages and sometimes over long distances. Pots were encountered and used by everyone within a village, and by many non-village members involved in inter-village interactions, such as feasts, exchange, etc.

Ceramic pipes are described in the historical literature as men's objects that were used in social and ritual contexts, often with men from different villages. Pipes were probably private objects, used frequently by an individual and shared only in certain situations (Braun 2012; vonGernet 1988). Despite the historical association with men, pipe use by women is a possibility. Pipes range from simple and undecorated to elaborate effigy forms. Pipes are highly portable and easily brought with people as they travel between communities. Thus, they would have been encountered frequently, though certain types were likely limited to specific social situations. Due to the availability of data, ceramic pipes will be used to assess the intensity and scale of relational identification but will play only a supporting role in assessing categorical identification.

Categorical Identities and Decorative Style

Categorical identities are drawn from perceived similarities with others based on shared characteristics, such as social role or group membership. The categories are often marked symbolically in the form and decoration of the material culture that people make and use (Peeples 2011). What Wiessner (1983:257) called “emblemic style” would mark categorical identities; emblemic style has a distinct referent and communicates a clear message, often about social groups and boundaries. Communication about group membership and boundaries in decorative style has been observed to help alleviate social tensions among groups (e.g., Saunders 2000; Spielmann et al. 2006).

A long history of research has established that decorative elements of Iroquoian pottery can provide information about relationships among people at multiple social scales (e.g., Allen 1988; Curtis and Latta 2000; Wright 2006) and can express community ties (e.g., Engelbrecht 1979; Hawkins 2001). These patterns in decorative style can also be subtle and intertwined with other kinds of relations (Hart and Engelbrecht 2012). Recent work has used collar decorations on Iroquoian pots as a proxy for communication and interaction among different groups through time, attempting to use these elements of style to trace relational networks (Hart et al. 2016).

Intensity of Categorical Identification

To assess the intensity of categorical identification, consensus analysis will be used to measure the degree of consistency in decorative styles of ceramic vessels. This method is commonly used in ethnography to discern culturally correct answers to a set of questions (Romney et al. 1986; Weller 2007). Roberts (2013) has demonstrated the

applicability of consensus analysis for identifying stylistic norms in material culture attributable to differences in social identification. The intensity of categorical identification will be assessed in three different ways: 1) by tracing village-scale diachronic changes in decorative consistency; 2) by assessing the consistency of decoration among groups of stylistically related decorative types within each community; and 3) by comparing the consistency of select decorative types among the communities. Considering consistency in these three ways will reveal differences in the intensity of categorical identification and will make it possible to discern whether such differences can be attributed to community or intra-community scale categorical identification.

Intensity and Scale of Relational Identification

Relational Identities and Production Techniques

Relational identities are built through direct, interpersonal interactions, which often involve shared activities or exchanges. Relational identification will be assessed using evidence of choices made during the production of pottery and pipes. While the principles behind these expectations are drawn from theory on communities of practice and learning in craft production, identifying specific communities of practice is not a focus of this study. Rather, these principles are utilized to identify changing relational ties among both producers and consumers of pottery. Evidence for differences in raw material selection and processing will be examined.

Raw material selection and processing are production steps that can change readily over a potter's lifetime. Patterns in these choices may align with local and regional relational networks (Gosselain 2000:192; Michelaki 2008). As potters move

into a new area, as is observed in coalescent communities, they often adopt local procurement techniques and resources. Raw material processing techniques, including the preparation and mixing of tempering materials, are easily passed on or imitated during interactions with other potters (Gosselain 2000:191; Michelaki 2007). Thus, these choices can reveal shifting relational connections as people interacted and worked together in changing communities. Evidence of raw material selection and processing in ceramic pot and pipe fabrics will be examined.

The intensity of relational identification will be assessed by comparing the consistency of production techniques related to raw material selection and processing at each site. Once patterns are identified, the production steps that contribute the most to the consistency and variability of the assemblage at each site will be identified. Using contextual information, including decorative data, the meanings of patterns will be interpreted in terms of relational ties. For example, a single decorative type might be very consistent decoratively, but may be more variable in terms of production choices.

The other way the analysis of pottery and pipes will offer information about relational networks is by providing evidence of consumption and the movement of goods. Pottery and pipes are made and then passed on to others for use. This could be within the same household or clan, or among others in the village or exchange over longer distances. Because goods in smaller-scale societies move hand-to-hand, tracing the movement of these objects is another means of tracing relational networks. Therefore, where possible, evidence of ceramic provenance will be used to identify pottery and pipes that were not made locally. Due to the lack of available comparative raw material samples (temper and natural clays), I do not anticipate being able to

identify exactly where pottery originated from, only whether provenance characteristics are consistent with locally-available materials.

Scale of Relational Identification

The social scale of relational identification will be assessed by comparing the consistency of production techniques within each site. The village-scale will be the primary unit of investigation, with identifying intra-community variability being a secondary goal. Greater variability in production techniques within the entire assemblage of an individual village would indicate a lower intensity of relational identification at the village scale. Where possible, additional data will be used to contextualize community-scale patterns to help to identify intensity at the intra-community scale. For example, spatial distribution of inconsistencies in production that are associated with a specific cluster of longhouses within a community would indicate that relational ties might be stronger among members of each corporate group than they are between members of different corporate groups.

Conclusion

This chapter described the approach that will be used to answer the research questions: 1) how do individual and collective social relationships change through the process of community coalescence; and 2) how do these relationships contribute to coalescence? Coalescent societies share commonalities, outlined in Chapter 1, that suggest underlying similarities in their social dynamics. These similarities reveal the importance of the relationship between collective action and collective identities in the

social dynamics of smaller-scale societies. While this relationship is identified in the anthropological literature, new approaches drawn from the literature on collective action, social identities, and social movements add nuance.

Collective identities are created through the dual processes of categorical and relational identification. Categorical identities are abstract commonalities shared among a group of people, while relational identities are created through direct, interpersonal interactions. The potential for a group to engage in collective action depends in part on the dynamics of categorical and relational identification among group members. I conceptualize these dynamics in terms of intensity and scale. Intensity is the extent to which a certain element of social identity is emphasized over others, while scale has dual dimensions (the site of the group and the social unit) and refers to the social scale at which that identity is shared. This dissertation traces the intensity and scale of categorical and relational identification at four study sites that represent different stages in the process of coalescence: pre-coalescent, coalescence in progress, and coalesced community.

Categorical and relational identification can be traced in an archaeological setting using material evidence left behind. For the Wendat case that is the focus of this dissertation (introduced in Chapter 3), categorical identification is assessed through consistency in the decoration of ceramic pots using existing decorative attribute data. Relational identification is assessed using evidence of production techniques that reveal information about direct interpersonal interactions among the makers and users of ceramic pottery and pipes. This will be described in Chapter 5. Chapter 6 integrates and summarizes the analyses of categorical and relational identification, contextualizes the findings, and proposes ideas for new research.

CHAPTER 3

ONTARIO IROQUOIAN CULTURE HISTORY AND STUDY SITES

More than forty years of cultural resource management excavations ahead of urban expansion in the Greater Toronto Region have produced an extraordinary number of fully excavated Iroquoian sites, many with full settlement plans uncovered. These villages were typically occupied for a short time (25-50 years) before the community relocated a few kilometers away, usually within the same river drainage. The result of this work is a wealth of high-resolution intra-site (hearth, household, longhouse cluster, village) data that we can also easily contextualize in terms of larger-scale social process – an excellent setting to investigate the research questions asked by this dissertation.

This chapter introduces the case study with some general background to the region and the archaeological sites under analysis. It begins with a brief description of the physiographic setting of south-central Ontario, followed by a review of the regional culture history from the development of Iroquoian settlements with an emphasis on the evolution of social organization as it relates to social identity among Ontario Iroquoians. Finally, the four study sites are introduced. Additional detail about the settlement patterns and material culture from the study sites will be introduced in the analysis chapters.

Physiographic Setting

The Iroquoian occupation of the north shore region of Ontario was shaped by its unique geological history (Figure 3.1). Here I briefly discuss the local geology as it relates to physiography of the landscape; for a more detailed review of geology see Chapter 5. There are two major bedrock zones in Ontario that shape the physiography of the local

environments. Northern Ontario is underlain by the ancient granite of the Precambrian Shield, while limestone and other sedimentary bedrock are found in the Southern portion of Ontario, including the study area. This geographic division is called the Frontenac Axis and roughly divides areas primarily occupied by Iroquoians in the south and Algonkians in the north. Iroquoian settlement of the region likely involved three phases: 1) initial settlement of the Iroquoian Plain; 2) expansion from the Iroquois Plain to the South Slopes Till Plain, Simcoe Uplands, and part of the Peterborough Drumlin Field; and 3) an amalgamation of settlements in certain physiographic zones. Clusters of sites are located around specific physiographic features, and when populations sought to move to new territories, they would most often relocate to an analogous physiographic zone. This strategy structured settlement of new regions (MacDonald 2002).

While not technically a peninsula, much of Southern Ontario is bordered by the Great Lakes – Lake Huron to the west, Lake Erie to the southwest, and Lake Ontario to the south. The St. Lawrence River connects Lake Ontario to the Atlantic Ocean. Southern Ontario is a typical post-glacial landscape with gently rolling plains and drumlins – elongated, spoon-shaped till deposits. One large glacial deposit, the Oak Ridges Moraine, is both an important physiographic feature of the area and a significant visual feature of the landscape near the study sites. The Oak Ridges Moraine is comprised mostly of sand and gravel deposited in the Late Wisconsin glacial period (ca. 25,000-21,000 years ago) (Figure 3.2). Running from Rice Lake in the west to the Niagara Escarpment in the east, the moraine is the high point in the region from which many streams originate, and flow to either the north or south (Chapman and Putnam 1984). The well drained sand and gravel of this formation create a dry substrate that is unfavorable for maize agriculture, so the moraine itself was not a preferred area for settlement by Iroquoian peoples. Prior

to European settlement in the area, it would have been primarily maple, beech, and oak forest (Chapman and Putnam 1984).

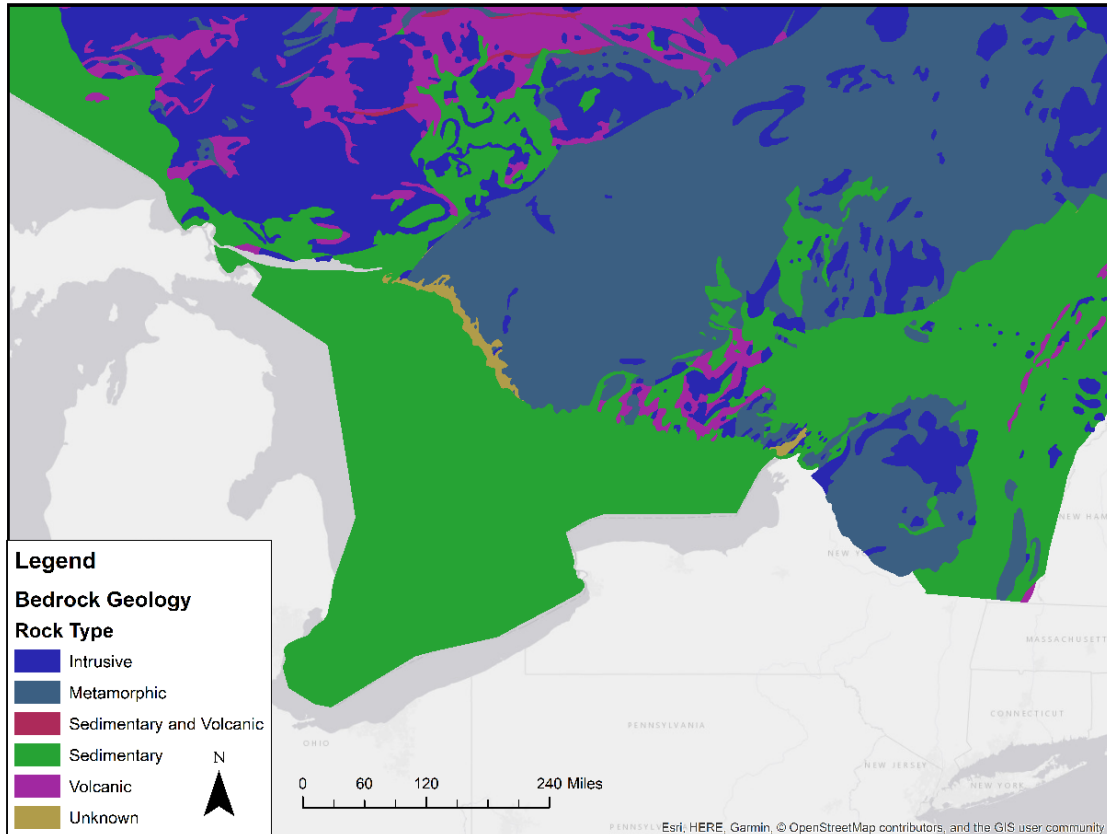


Figure 3.1 Major bedrock zones of Ontario. The Canadian Shield is primarily metamorphic while southwestern Ontario is primarily sedimentary.

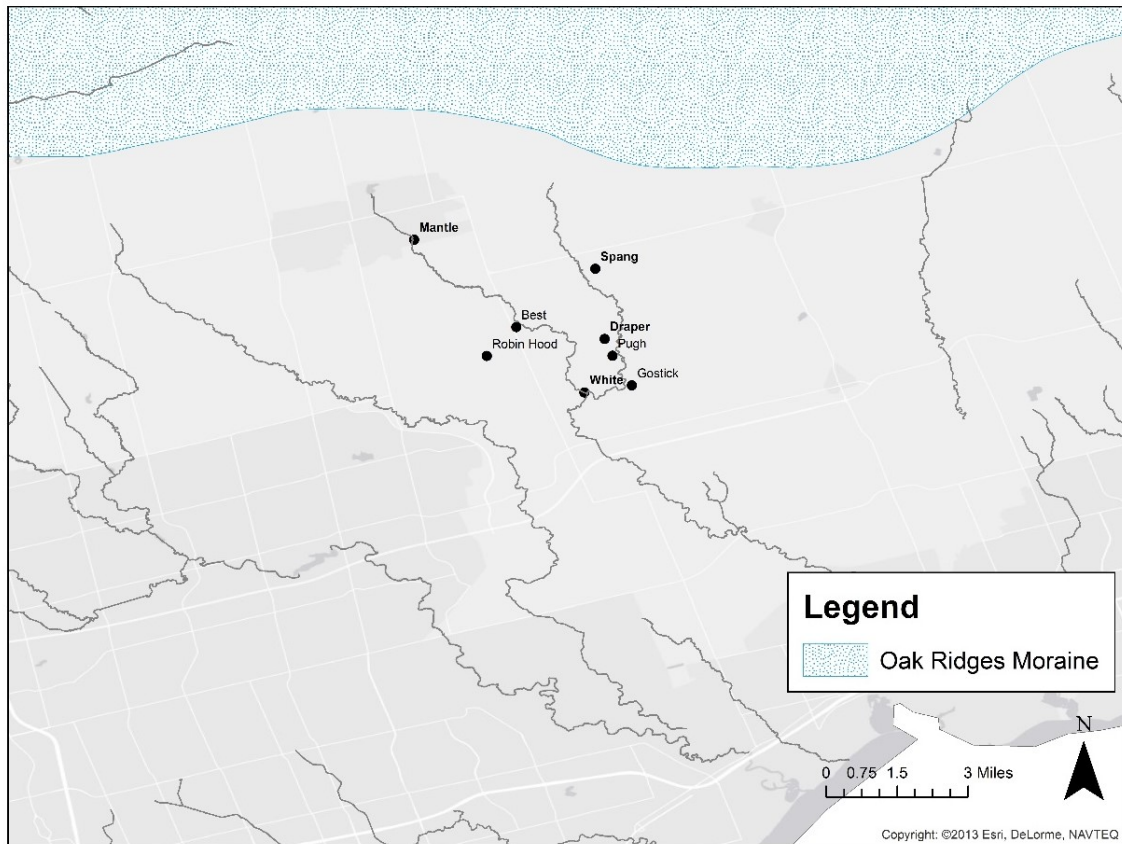


Figure 3.2 Fifteenth through mid-sixteenth century Iroquoian village sites in the Rouge-Duffins Drainage.

The study sites are all located in the South Slope region, a drumlinized landscape between the Oak Ridges Moraine and Lake Ontario (Figure 3.2). The climate is humid continental, with warm, humid summers and cold winters, with annual precipitation ranging from 30-39 inches. Silt and loam soils make this area suitable for maize agriculture. Maple, beech and white pine forests would have occupied this area prior to European settlement (Chapman and Putnam 1984). Within the South Slope, the Peel Plain is a small region of heavy clay soil with maple, beech and oak forest (Chapman and Putnam 1984). To the south, bordering the northern shore of Lake Ontario, is the

Iroquois Plain with sandy soil and oak-hickory forest (Chapman and Putnam 1984). The four study sites – the Mantle, Draper, Spang, and White sites– are all located near the eastern edge of the Peel Plain along West Duffins Creek or its tributaries. This location on the edge of two physiographic zones and near the Oak Ridges Moraine would have provided access to several different kinds of resources.

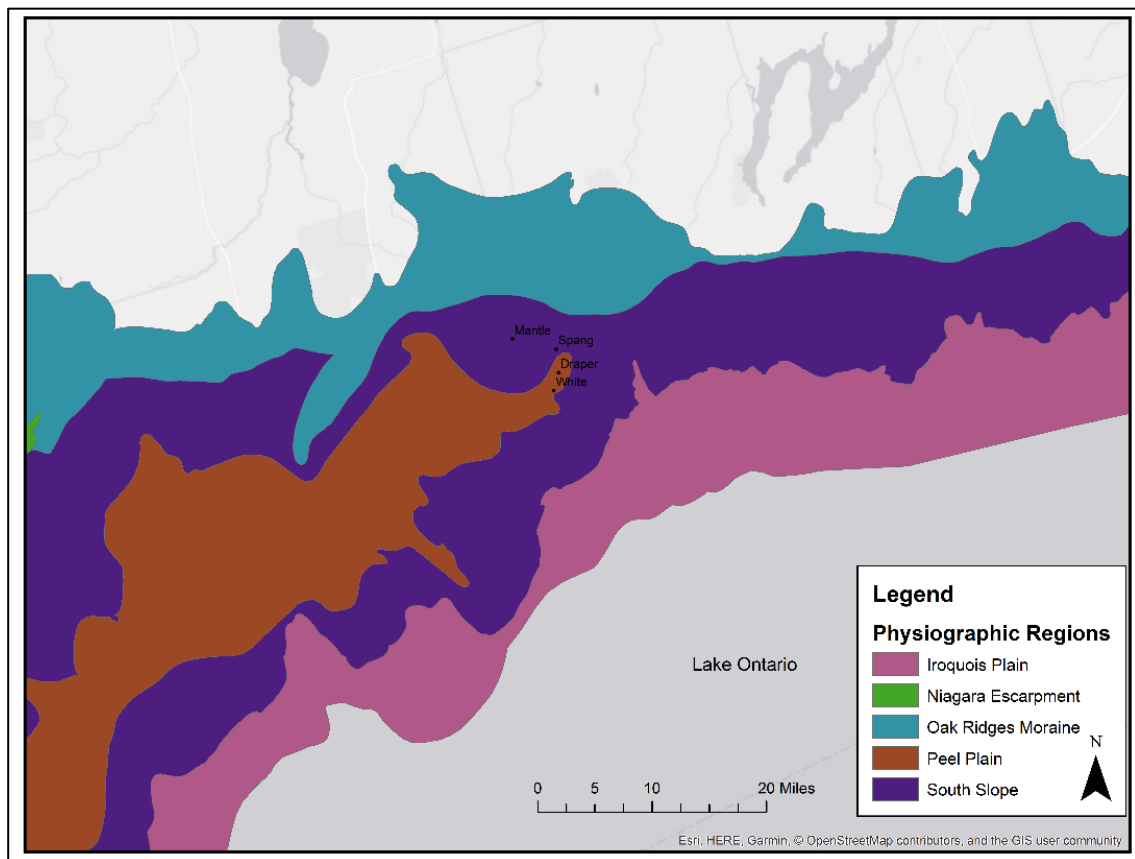


Figure 3.3 Study site locations relative to major physiographic regions.

Regional Archaeological Background

The term “Iroquoian” describes a set of lifeways, and in the contact period (post-1534 C.E.), a language group shared by several distinct cultural groups. In the northeast, Northern Iroquoians lived in what is now Ontario and the northeastern United States, while to the south the Iroquoian-speaking Cherokee lived in the Southeastern Woodlands. Iroquoian people share a maize-farming based subsistence strategy, similar division of labor between males and females, fortified defensible villages, matrilineal clan based social organization, cross-cutting bonds among clan segments, similar organization of leadership roles, prestige-driven warfare practices, some religious beliefs and similar cultural values (Trigger 1976:100-104). In archaeological contexts, it can be difficult to make direct links between historically known Northern Iroquoian groups of Ontario such as the Neutral, Wendat, and St. Lawrence Iroquoians and specific archaeological sites. The geographic distribution of settlement clusters and differences in material culture can be used to identify regional differences but the social reality was likely more complicated. I begin with the Early Iroquoian period in this review, as this is the point at which “Iroquoian” becomes an archaeologically identifiable cultural complex (see chronology in Table 3.1).

Paleoindian	10000-8000 BCE
Archaic	8000-800 BCE
Woodland – Early	900-300 BCE
Middle	300 BCE-500 CE
Transitional	500-1000 CE
Early Iroquoian	1000-1300 CE
Middle Iroquoian	1300-1330 CE
	1330-1420 CE
Late Precontact	1420-1534 CE

Table 3.1 Ontario Iroquoian chronology.

Early Iroquoian 1000-1300 C.E.

Although the period between approximately 1000 and 1300 C.E. has been traditionally called the Early Iroquoian period in the literature, the complete suite of Iroquoian cultural traits does not appear until around 1300 C.E. (Kapches 1995; Williamson 2014:8-11). Northern Iroquoian lifeways developed *in situ* among existing Middle Woodland populations in what is now the northeastern United States and southeastern Canada (c.f. Pfeiffer et al. 2014; Ramsden 1996; Snow 1996; Warrick 2000). Elements of Iroquoian lifeways are first seen in the 1000-1300 C.E. period with the development of settled villages, the appearance of the first longhouses, and the earliest pottery resembling Iroquoian style. This was a time of steady population growth; Warrick (1990) has shown an increase from around 2,000 to 8,000 people between 900 and 1300 C.E.

The record of village life in southern Ontario from between 1000 and 1300 C.E. shows a multi-linear process with different residential, subsistence, political, and economic strategies adopted in different areas at slightly varied times (Williamson 1990). The beginning of village life appears with early settlements found initially in floodplain environments. Sites like Homedale (Pihl et al. 2008), Elliott II (Fox 1986), Auda (Kapches 1987), Grafton (Dibb 2001), and Poretous (Stothers 1977) in southern Ontario postdate the turn of the eleventh century and extend into the twelfth century. These “base camps” were the precursors of the permanently settled villages of later periods. These sites are small with poorly defined village limits and circular or elliptical houses with clusters of hearths and pits. Some sites had single or double row palisades or fences that may have been windbreaks or territorial delineations. Large, deep pits were probably used to store domesticates or other plant foods. Maize is ubiquitous on many of

these sites suggesting that this food was shared by everyone in the community, even if maize was only a secondary contributor to diet (Williamson 2014).

In the mid-twelfth to thirteenth centuries, these base camps developed into small villages. These village sites such as Van Besien (Noble 1975), Reid (Wright 1978), Elliott I (Fox 1986), Tara (Warrick 1992), Ireland (Warrick 1992), and Calvert (Timmins 1997b), were typically small (<1 ha.) and palisaded, with four or five “incipient longhouses” (a short, 10-15m long structure with the basic form of a longhouse) that housed around 75-200 people (Timmins 1997b). Such early villages are extremely variable in terms of the size and spacing of longhouses and the organization of structures from village to village. Some villages, like the Calvert site, were re-occupied over many years (Timmins 1997).

During the twelfth and thirteenth centuries, changes in settlement and subsistence strategies, and social, political and economic developments continued at slightly different times in different regions (Williamson 1990). Small, autonomous communities may have been part of social networks and alliance building through spousal exchange, war alliances, and trade. These relations may have been the foundation for the later amalgamation of these smaller communities into larger villages (Timmins 1997b). Villages were likely governed by a council of lineage representatives (Noble 1968; Trigger 1981; Williamson 1985; Williamson 1990), perhaps each lineage with its own longhouse (Timmins 1997b). Schumacher’s recent analysis of technological style in ceramics at the Van Besien site demonstrated a significant amount of variability in technological choice in pottery production, suggesting the absence of both matrilocality and participation in the creation of a “regional social identity” (Schumacher 2013:100-101), further supporting the notion of small, autonomous villages with varying social trajectories.

Early Iroquoian villages are found throughout southern Ontario in tight clusters of small sites separated by 20-30km stretches of unoccupied land. There are approximately 15 of these clusters in southern Ontario (Warrick 2000:435). Each cluster has 1 or 2 village sites with additional special purpose camps for utilizing specific resources or resource zones. These settlement patterns facilitated a mixed horticultural subsistence pattern with cultigens becoming more important over time (Williamson 1990). Villages within the same cluster and neighboring clusters probably had the most contact, especially for trade and exchange of marriage partners (MacDonald and Williamson 1995; Timmins 1997b; Williamson and Robertson 1994). The importance of local interaction is suggested by the extreme variability in ceramic decoration across the region, as compared with later periods. Early Iroquoian vessels are typically collarless, with incipient collars appearing near 1300 C.E. Regional differences in decorative technique (linear-stamping in the west and dentate stamping in the east) were once thought to indicate two distinct culture areas, although better data now show clinal drop-offs rather than an abrupt difference (Ferris and Spence 1995; Spence 1994; Timmins 1997b; Warrick 2000; Williamson 1990; Williamson and Robertson 1994). Nonetheless, even in the Early Iroquoian period, the presence and frequency of specific decorative techniques, such as punctuation and body surface treatments, do have temporal and spatial patterning, suggesting social significance for these types of decoration (see Williamson 1990:295-299).

Beginning in the mid-thirteenth century, communities rapidly amalgamated in a manner that is like the regional social change observed in the Late Precontact period. Villages aggregated quickly, creating much larger communities in a short period of time. Along with this aggregation came an intensification of agricultural production which now comprised at least half of the diet, as evidenced in isotopic analyses (Nikolaas et al.

2003), as well as increased cooperation among neighboring groups (Dodd et al. 1990; Kapches 1982; Pearce 1996). These changes mark the transition to the Middle Iroquoian period and occurred at different times among regional populations from the mid-to-late-thirteenth century (Williamson 2014:9-10).

Middle Iroquoian 1300-1420 C.E.

1300-1330 C.E.

The early fourteenth century was a period of rapid regional social change. Along with larger communities comes the additional evidence for socially integrative practices that continue to be important in Iroquoian society for centuries: “long” longhouses, semi-subterranean sweat lodges (MacDonald 1988), and ossuary burial (Warrick 2000:443). Semi-subterranean sweat lodges are often found in each house in a village of this period (Ferris and Spence 1995:113; Kapches 1995; MacDonald and Williamson 2001). Newly amalgamated villages would have brought unrelated males together as part of extended matrilineages. Semi-subterranean sweat lodges are thought to have been a place where these men could socialize and bond within their longhouse (Kapches 1990; MacDonald 1988; MacDonald and Williamson 2001; Trigger 1990; Warrick 1990:443). Ossuary burial, typically associated with a “Feast of the Dead” type of community event, was common in the historic period and would have reinforced kin ties among community members, living and deceased; the earliest community ossuary burial dates to the late thirteenth century (Kapches 1995; Warrick 1984; Warrick 1996; Williamson and Pfeiffer 2003).

As communities grew larger, relations among families within them also began to shift. Village plans with groups of longhouses aligned into clusters may be evidence that fictive kinship had become more important than simple matrilineages in village organization (Wright 1986). These developments— semi-subterranean sweat lodges, ossuary burial, and longhouse clusters – have been interpreted as indicative of the early development of formal extended matrilineages and clan organization (Kapches 1995; Pearce 1996; Trigger 1985; Warrick 1984; Warrick 1996; Warrick 2000). Despite these trends, however, large communities of this period remained variable, and we do not see evidence for the crystallization of clan-based social organization until the Late Precontact period.

Villages would have had 400-500 people, placing a strain on the sociopolitical mechanisms that could have united an Early Iroquoian-sized community (Warrick 2000:440). Resource stress was not thought to have been a factor in village relocation during Early Iroquoian times (Fecteau et al. 1994), but it may have become increasingly so with the new larger villages. Deer, an essential source of hides for clothing, became locally scarce in some areas, perhaps causing people to move north of the Oak Ridges Moraine for the first time (Warrick 2000:441), even into Simcoe County in the thirteenth century with pioneering communities that became the foundation nation for the Wendat (Williamson 2014). Occupational histories of these early villages indicate fissioning or fluctuations in village size, documented at Myers Road (Williamson 1998). As is discussed in more detail in Chapter 2, fissioning is a common response to scalar stress and was the primary means of mitigating this issue in this period.

Contact between neighboring site clusters and interregional interaction became much more important (MacDonald and Williamson 1995; Warrick 1984, 2000;

Williamson and Robertson 1994). One indication of this interaction is the widespread adoption of pottery with horizontal lines as decoration, a trend that appears to have begun among young potters in the later 1200s (Kapches 1995; Timmins 1997a). The pottery of this period has a distinctive rolled rim, which first developed in the late Early Iroquoian period. The preferred technique for applying decoration to pottery shifts, with incised and push-pull techniques replacing cord-wrapped stick and linear stamping (Dodd et al. 1990:330).

1330-1420 C.E.

In the latter half of the fourteenth century, activities associated with social integration became increasingly common and Iroquoian people began to colonize new areas. In about a century, the population of south-central Ontario grew from approximately 11,000 to 29,000 people (Warrick 1990:353), the result of both high fertility and declining infant and juvenile mortality (Warrick 1990:361). The continuing colonization of the Barrie area in Simcoe County, and new areas like Waterloo County, and Prince Edward County, sped growth significantly (Warrick 2000:445).

Communities of this period developed in different ways and at different times, depending on local contingencies and the structure of the social and economic networks in which they were participating (Williamson and Robertson 1994). Both Trigger (1985) and Engelbrecht (1985) suggest that clans became more important in this phase. Rather than councils of matrilineages, a village might be governed by a council of representative leaders from clan segments (Trigger 1985). Communal ossuaries and use of semi-subterranean sweat lodges continued to be important practices to foster social cohesion (Warrick 2000:445; Williamson 1990). Some villages developed distinctive decorative

styles of ceramic pipes (Dodd et al. 1990:338; Smith 1987) indicating the importance of village identity in some social contexts. Regionally, collared pots decorated with incised horizontal and oblique lines, and horizontal motifs became ubiquitous (Dodd et al. 1990).

Late Precontact and Community Coalescence 1420-1534 C.E.

The Late Precontact period has long been recognized as a time of social change bringing the development of historically known Iroquoian nations. Recent work by Birch and Williamson and colleagues (Birch 2010b, 2013; Birch and Williamson 2013a, 2013b; Pihl et al. 2011) envisions the Late Precontact as a period of rapid, sweeping social transformation that Birch characterizes as the development of a coalescent society (see Chapter 1). This was a period of widespread conflict, community coalescence, increasing regionalization, and farther-reaching extra-regional ties in both Ontario and New York (Birch and Williamson 2013a).

By the Late Precontact period, Ontario Iroquoian populations had stabilized, and the size of the villages grew, ranging in size from 0.4-5.4 hectares, with the largest having populations of about 2500 people (Warrick 1990:447). Longhouses also grew, with some exceptionally large longhouses reaching over 100m in length (see Warrick 1990:447). Warrick attributes these larger dwellings to population growth in the preceding decades. As those “baby boomers” came of age they needed to be integrated into existing longhouses when they married and had their own children (Warrick 1990:449). These enormous villages were probably amalgamations of several local settlements. The Draper site is an excellent example of villages aggregating over time. The Cleary (Warrick 1990:240), Parsons (Williamson and Robertson 1998) and Coulter (Damkjar 1990) sites

all likely developed in the same manner. While Middle Iroquoian communities grew and then often split apart, communities during the late contact period began to remain aggregated. This suggests that there was either a stronger push to aggregate into larger communities than before, and/or an evolution of sociopolitical organization that could support larger villages.

Violence probably encouraged aggregation. While the nature and extent of conflict is not entirely clear, several proxy indicators suggest there was a strong expectation of violence, and some definite violence. Beginning around 1450 C.E., villages were sited in more defensible settings on high ground above streams. Extensive, multiple-row palisades are common. Thousands of pieces of human bone scattered around sites and in village middens is interpreted as evidence for killing of enemies and/or prisoner torture as described in the *Jesuit Relations* (Thwaites 1896). Scattered human remains and the manufacture of human bone artifacts are particularly common on sites of this period, suggesting an intensification of warfare related ritual violence (Jenkins 2015; Williamson 2007). By the early sixteenth century, the threat seems to have subsided. Although villages were still palisaded, direct evidence for violence is not widespread.

While Iroquoian communities had grown large before (though not quite this large), the crystallization of clan-based village organization with a formal village council likely helped keep these communities together. Clan-based identities would have taken precedence over lineage-based identities and aided in social integration within communities serving as a foundation for continued positive relations among emerging “tribal” groups, that is social groups of similar size, scale and social role as the named tribes of the historic period (Birch 2010a, b; Birch and Williamson 2013a, 2013b). The

appearance of large, socially cohesive communities concurrent with evidence for increasing long-distance regional interaction led Birch (2010) to characterize fifteenth through early sixteenth century Ontario Iroquoian society as “coalescent” (see Chapter 1). More than simply adding a new label to old culture history, reframing this period of Iroquoian history in these terms emphasizes the transformative nature of the social changes that took place during this period while linking these developments to trends observed in previous periods.

The Rouge-Duffins Sequence

The four study sites (see Table 3.2) form part of what is thought to be a nearly unbroken occupation sequence dating to the Late Iroquoian period along the Rouge-Duffins drainage system (Figure 3.3). A forthcoming publication by Jennifer Birch and her colleagues regarding the development of an absolute time frame for sites in the ca. A.D. 1400-1600 period from Iroquoia will report on a Bayesian model using new radiocarbon dates for this sequence; however, the approximate dates presented in Table 3.2 are consistent with what has been published previously for this sequence (see Williamson 2014; Birch and Williamson 2013a).

This section will briefly review Iroquoian settlement patterns in the drainage from the Early Iroquoian period to the settlement of the study sites. For a full review of known sites in the Rouge-Duffins sequence see Williamson (2014) and Birch and Williamson (2013a). At least nine Early Iroquoian villages and many associated special purpose sites are known in this area. Most of these sites have not been extensively excavated. Investigations at the Miller (Kenyon 1968) and Boys (Reid 1975) sites

revealed small (0.5-1ha) palisaded villages with a handful of longhouses (Williamson 2014:17).

Site	Period	Approximate Date	Size
White (AlGt-35)	Pre-coalescent	Mid-15 th century	1 ha
Draper (AlGt-2)	Coalescent	Mid to late 15 th century	4.2 ha
Spang (AlGt-66)	Coalescent	Late 15 th century	3.4 ha
Mantle (AlGt-334)	Post-coalescent	Early 16 th century	4.2 ha

Table 3.2 Study site size and chronology

There are enough roughly contemporaneous sites dating to the fourteenth century to indicate that at least three separate communities lived in the Duffins drainage. Among village sites, there are also several small cabin sites suggesting continued flexibility in residential settlement patterns (Williamson 2014 p. 18). The Garland ossuary, found on a tributary of West Duffins Creek, contained the remains of 198 individuals (Webb 1969) and dates to this period as well (Williamson 2014 p. 18).

Fourteenth and early-fifteenth century villages to the west of the Duffins River, along the Rogue River and Highland Creek, were likely related to the Duffins communities and by the early fifteenth century, these communities appear to have relocated, possibly eastward to the Duffins Creek drainage and the Draper-Spang-Mantle community (Birch and Williamson 2013a:26-29; Williamson 2014:18). In the first part of the fifteenth century, at least eight small communities were dispersed along the Duffins drainage (Figure 3.3). Of these, the White, Robin Hood, Pugh, Best, and Wilson Park sites have all been at least partially investigated. The Pugh and Best sites are larger than the other communities, though the Pugh site may be an amalgamation of two earlier, smaller communities (Birch and Williamson 2013a:29). By the mid-fifteenth century, these dispersed communities were abandoned, and their populations likely relocated to

the Draper site to the north (Birch 2010b; Birch and Williamson 2013a; Finlayson 1985; Warrick 2008). From the mid-fifteenth century on, it seems that there was only a single village occupied in the Duffins drainage

Continuities in pottery decorative style, population size, and proximity link these small communities to the mid-fifteenth century Draper site (Birch and Williamson 2013a; Finlayson 1985; Warrick 2008). The Draper site settlement pattern indicates gradual expansion to accommodate new village segments over the course of the village occupation (see Birch 2010b). The Spang site is thought to date between the Draper and Mantle sites in the habitation sequence based on ceramic stylistic data and the location of the site just north of the Draper site along Duffins Creek. The Mantle site, dating to the early to mid-sixteenth century, is the result of coalescence, producing a very large and spatially well-integrated community. The following sections briefly review the history of archaeological investigations at each study site. Additional detail on previous work at these sites, as relates to the analyses conducted in this dissertation, will be discussed in later chapters.

Pre-Coalescent: White (AlGt-32) Mid-Fifteenth Century

The White site was first reported to the Archaeological Survey of Canada, National Museum of Man in 1972 as part of a survey conducted by the Department of Geography from York University (Konrad 1973), although local residents had been aware of this site for some time. The Barnes family, the first Euro Canadians to own this land, knew of the site in the early 1800s, and the area had been disturbed over the years by planting and plowing (Tripp 1978:1). Only preliminary testing was conducted during the 1972 survey. The first excavations were undertaken by Patricia Cook (1974). This project

did not locate any longhouses, and only minimal faunal material and worked bone. All this, along with the location of the site, led Cook to believe that the White site was only seasonally occupied (Cook 1974).

In 1974, the seemingly imminent destruction of the site for the New Toronto International Airport led to salvage excavations directed by Grant Tripp, funded by the Canadian Ministry of Transport and organized by the Archaeological Survey of Canada, National Museum of Man. Major salvage excavations were conducted in 1974 and 1976 expanding from Cook's original trenches. The site was completely excavated, partly by hand and partly with a backhoe to remove the topsoil and expose the complete village plan. As a result, part of the site was excavated in two-meter squares, while other portions in ten-meter squares (Tripp 1978:9). This exposed the entire extant village plan.

The village is spread across both the secondary and upper stream terraces along Duffins Creek, with two distinct portions of the site. There are seven longhouses on a lower terrace and four on the higher terrace. This is not the most common settlement pattern for a village of this period, but there are other sites with a similar layout. The Robin Hood site is also in the Duffins drainage and dates to roughly the same period. Excavations in 1979 exposed four longhouses (Williamson 1983), but a high-density artifact cluster was also known to be located on the opposite bank of a nearby creek as a possible second residential cluster (Birch and Williamson 2013:29). In the Don River drainage, the Hope site comprises two clusters of longhouses on opposite sides of a stream and seventy meters apart. Ceramic assemblages indicate that both portions of the site were likely occupied simultaneously in the early fifteenth century (Birch and Williamson 2013 p. 34). The two residential clusters at the White site may have been

occupied concurrently as well, although the lower terrace was probably occupied longer than the upper terrace (Tripp 1978).

Provenience information was recorded in the catalog found at the Canadian Museum of History (CMH), but a feature list or a detailed excavation map with the excavation grid referenced and numbered features plotted could not be located. There was a map in the CMH archives with part of the grid and some house and palisade lines marked, but this was not complete enough to link specific artifacts with specific provenience beyond the general area within the site.

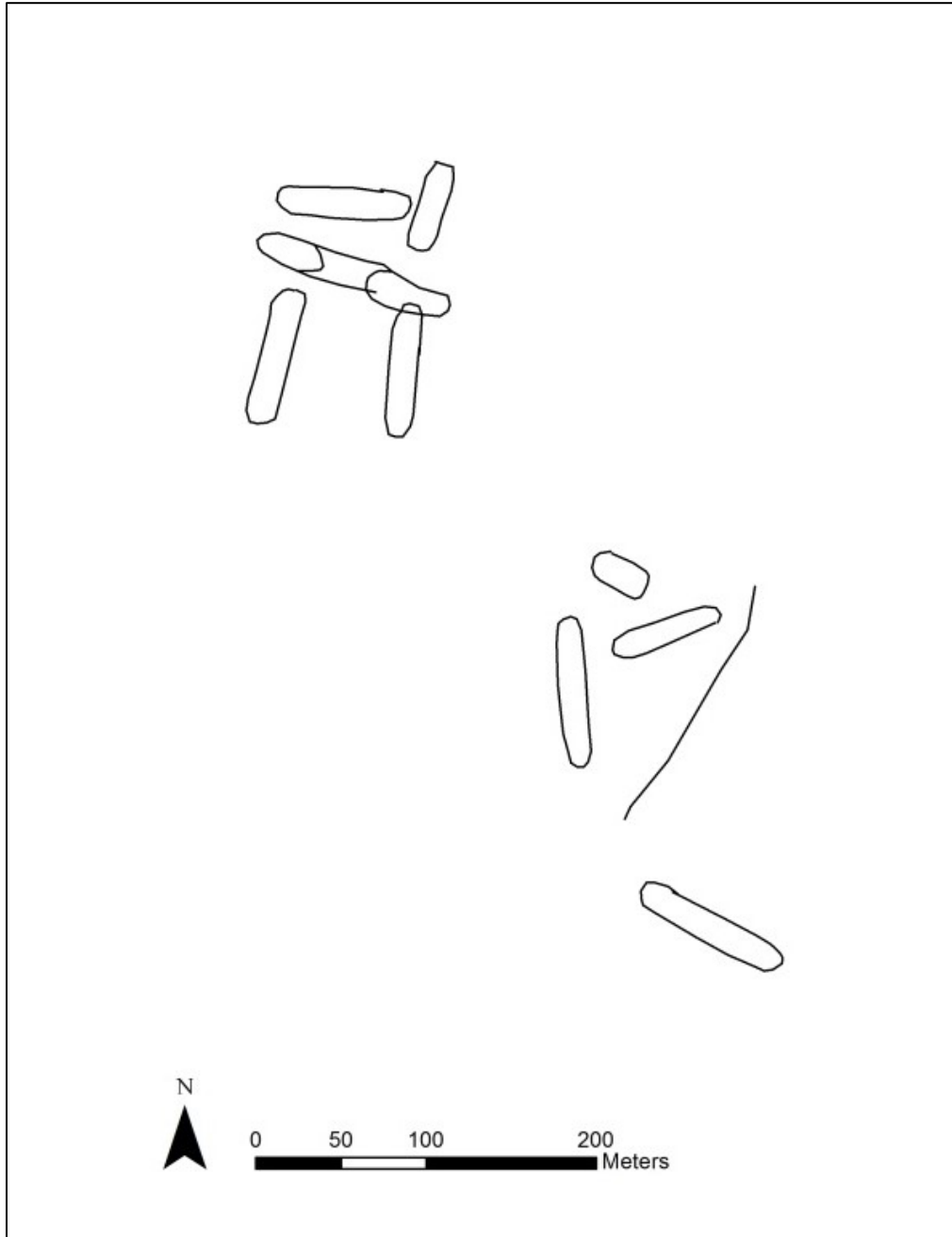


Figure 3.4 The White site (AlGt-35) village plan redrawn from Tripp 1978 with supplementary maps. Note the two separate settlement clusters that may have been occupied simultaneously.

Coalescent: Draper (AlGt-2) Mid to Late Fifteenth Century

The Draper site, located on a terrace above the west bank of West Duffins Creek, was occupied in the mid-to-late fifteenth century. Like the White site, it was extensively excavated during 1975 and 1978 salvage excavations for the New Toronto International Airport. Prior to these major excavations, partial excavations in 1950 and 1973 had uncovered portions of the site. The materials from the earliest excavations could not be located at the time of this study but there is a report on the findings in the archives of the CMH. While the 1973 excavations used modern techniques, a different grid system was established for the 1975/1978 major excavations, making these two datasets difficult to reconcile. For this reason, the more extensive data from the 1975/1978 excavations are used. I located the original excavation maps and artifact catalogs from the 1975/1978 excavations to make the first GIS map of the Draper site to facilitate sampling and future intra-site analyses building on this study.

Draper's settlement pattern is one of the most fascinating in the region. The main settlement covers 3.4 hectares and is palisaded. There is a second, smaller (.85 hectare) cluster of longhouses to the south called the "south field" that was probably built later in the Draper occupation and inhabited for a relatively short time (Finlayson 1985). Extensive settlement pattern studies were completed for the final excavation reports (Finlayson 1985; Hayden 1979) and Birch (2010a) has recently reexamined the history of occupation at Draper. Finlayson determined the relative sequence of palisade sections, and by extension longhouse clusters, by observing where structures overlapped or obliterated other architectural features. The density of house wall post molds was also used to compare relative occupation length for each longhouse, with the longest-used structures having the greatest density of post molds due to repairs and maintenance.

Finlayson placed segment A (the core) first, then C, D, E, B, and F (1985:65-70) (Figure 5.5). The third expansion, segment E, may have occurred as two separate house groups (see Birch 2010b:108). The physical separation of the south field houses suggests that a socially distant group may have lived there; however, these structures show no evidence of long-term maintenance, so they may have been temporary (see Birch and Williamson 2013a). While newcomers were added gradually, Birch notes that the main core of the village was located farther from the adjacent creek than is typical for Iroquoian villages of this period. This may indicate that village expansion was anticipated when the site location was selected (Birch 2010b:109).

Although the palisade was expanded each time the village grew, the clusters of longhouses suggest that the residents of each village segment considered themselves to be more closely related to one another than to the rest of the village. Each segment also has a “long” longhouse, thought to be a focal point for corporate activity in each segment. Birch (2010b) and Birch and Williamson (2013a) argue that each segment likely retained its own social and political identity, perhaps even operating as a largely independent corporate unit. With each village expansion, community government would have become more complex and may have also become more formal, possibly including the development of a village council with representatives from each community segment. This evidence suggests an incremental, deliberate negotiation among each community segment in the creation of the Draper village (c.f. Birch and Williamson 2013a).

There have been many extensive analyses of settlement patterns at the Draper site and excellent artifact studies (e.g., Finlayson and Pihl 1980; Hayden 1979, 1982; Pearce 1977; Pearce 1985a, 1985b; Poulton 1985; von Gernet 1982; Pihl 1984). Pihl for example, used temporally sensitive ceramic attributes and attribute combinations to

seriate the ceramics from each of the village segments (Pihl 1984). These previous analyses will provide important interpretive context for analysis in this dissertation.

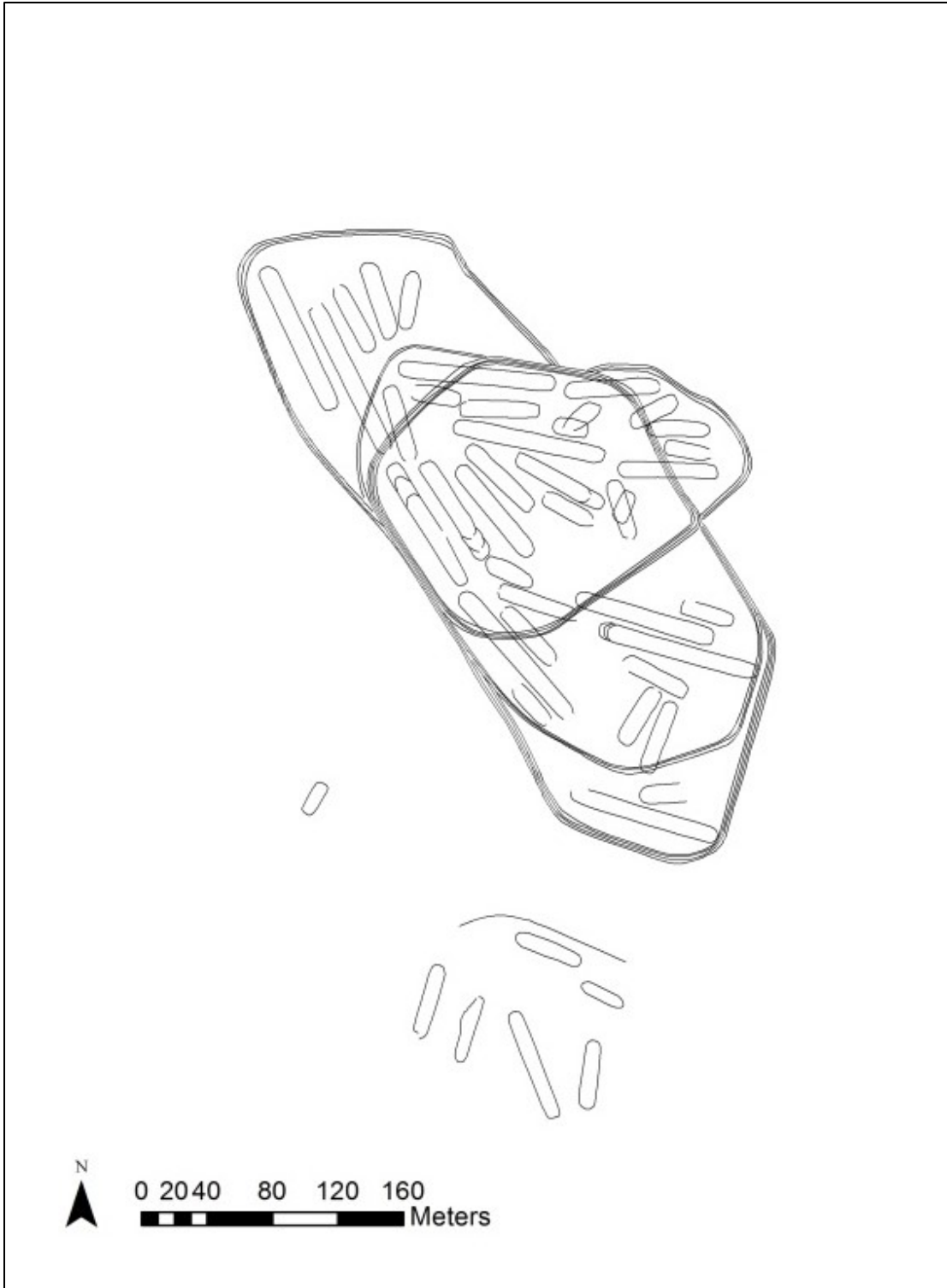


Figure 3.5 The Draper site village plan. Redrawn from Finlayson 1985 with supplementary maps from David Smith.

Coalescent: Spang (ALGt-66) Late Fifteenth Century The Spang site is located on the west bank of a major tributary of West Duffins Creek. Of the four study sites, the least is known about Spang because it has only been partially excavated and it is not currently threatened. Spang was likely occupied during the late fifteenth century based on ceramic seriation and contextual settlement data (see Birch and Williamson 2013a).

The Spang site was excavated in 1968 and 1979 by the Archaeological Survey of Canada, National Museum of Man, National Museums of Canada, Museum of Indian Archaeology and the Villages des Huron, Lorretteville, Quebec. Two excavation blocks were completed, including a test trench and two midden excavations. Unlike at the other study sites, heavy equipment was not used to uncover settlement patterns at Spang. Hand excavations uncovered a portion of the palisade, two midden areas, and parts of five longhouses (Figure 3.6).

A recent geophysical prospection study by Jennifer Birch has revealed some clues about the spatial organization of the Spang village. Using magnetic gradiometry, magnetic susceptibility, and soil phosphate analysis, Birch surveyed the site to identify its extent and any evidence of settlement patterns. This survey suggests a loosely organized scatter of longhouses, with the potential for several longer longhouses on the edge of the study area (Birch 2016). While these results have not been verified with excavation, they might suggest that the Spang community plan was not as well defined as the carefully planned organization of the Mantle site. It may be that the organization of the Spang village was like the semi-coordinated placement of longhouses on Iroquoian sites usual for the late fifteenth century, which aligns with our expectations for Spang as a transition site between the Draper and Mantle sites. Luckily, the remains of Spang are intact, so we are likely to learn much more about this community in the future.

Since the Spang site has not been as completely investigated as the other study sites, its temporal position in the Rouge-Duffins sequence is uncertain. It is most likely that the Draper community relocated to Spang and then Mantle sites, but it is possible that the Spang site was contemporary with Draper (or Mantle). Ceramic seriation places Spang between Draper and Mantle (Pihl et al. 2011). Each of the three communities are roughly the same size, with no obvious source for the additional people required to populate two villages simultaneously, although small groups may have remained at the previous villages for some time or conversely acted as advance parties to prepare new communities for occupation. Finally, radiocarbon dates and ceramic seriation date the Mantle site to the early to mid-sixteenth century, creating an 80-year window for the occupation of these three sites. With average village occupation around twenty-five to thirty years, it is reasonable to assume that these three villages were occupied in succession (Birch and Williamson 2013a:62).

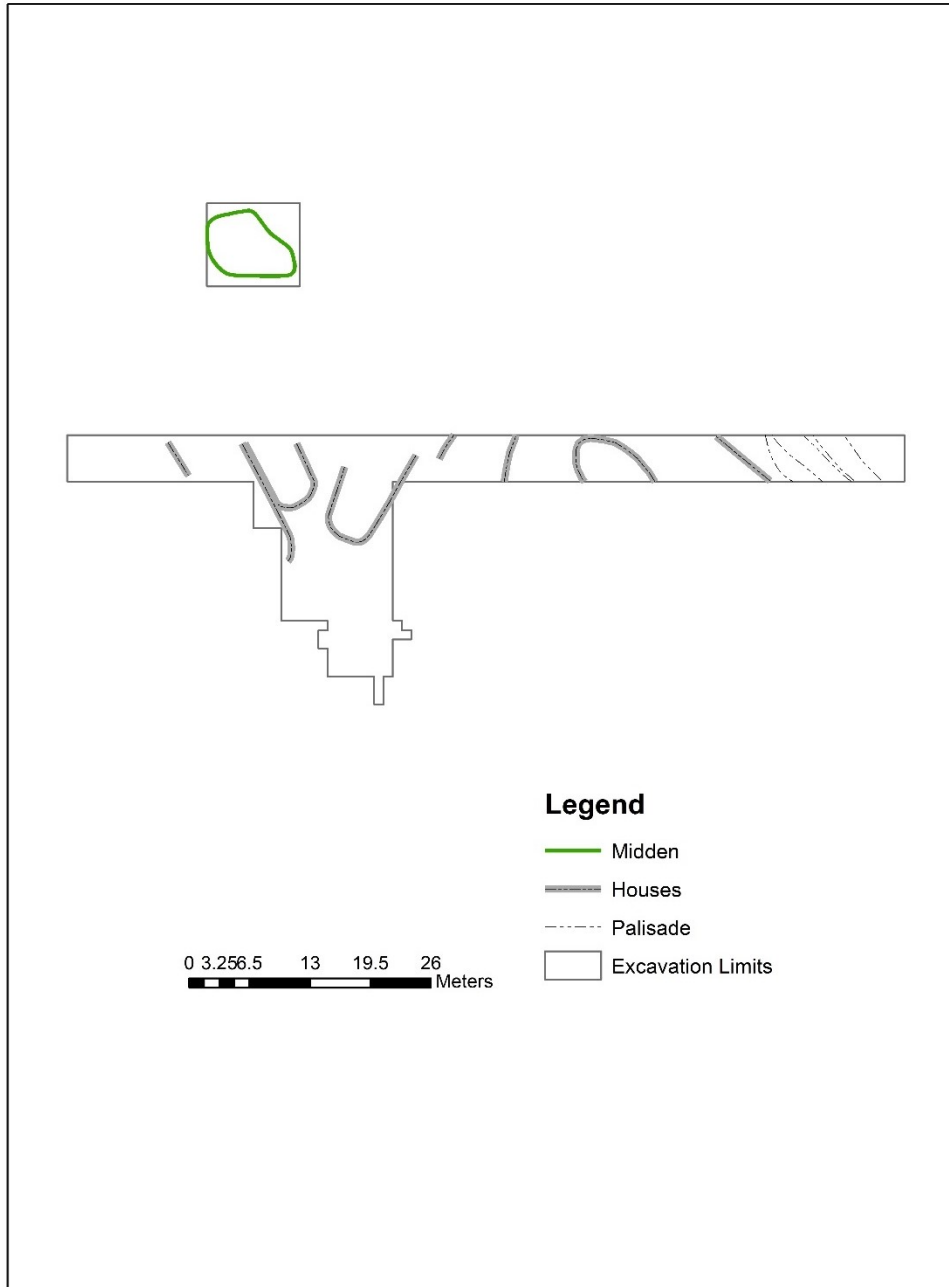


Figure 3.6 The Spang site excavations redrawn from Carter 1981

Post-Coalescent: Mantle ALGt-334 First Half of Sixteenth Century

The Mantle site is located along the west bank of Stouffville Creek, a tributary of Duffins Creek. Among the largest and most complex Iroquoian sites to be completely excavated, the Mantle site is the latest village in the site sequence analyzed herein. The Mantle site was completely excavated from 2003 to 2005 by Archaeological Services Inc. (ASI) field-directed by Andrew Clish, ahead of residential development. There is now a subdivision, storm-water management pond and park where the site had been situated.

Material culture and two radiocarbon dates indicate that the Mantle site was occupied during the early sixteenth century although occupation likely continued into the middle part of the century. Ceramic sherds from Mantle are smaller than those from the Draper and White sites, likely due to the extensive plowing of the area prior to the site's discovery. The village was approximately 3 hectares in size and surrounded by a palisade. Ninety-eight separate longhouses were identified, with approximately 50 having been occupied at any given time. Another 1,415 surface features were excavated, and five separate activity areas identified, including a plaza space (ASI 2012).

The most striking feature of the Mantle site is that the village was extremely well-organized and carefully laid out, particularly during the earliest phase of occupation (Figure 3.7). At the north end of the village, longhouses were lined up parallel to one another with those in the central and southern portion of the site oriented in a radial pattern surrounding an open plaza space. Temporary short houses found throughout the site and in the plaza area may have been constructed to house short term visitors, such as Algonkians, who are known to have wintered in or adjacent to Iroquoian villages in the historic period (Birch and Williamson 2013a:74). In the later occupation of the village, the plaza was filled with houses and the palisade was rebuilt, shrinking the size of the

enclosed area slightly. While some longhouses appear to have been maintained for the duration of the occupation, others were dismantled and rebuilt or moved (Birch 2010b, 2012; Birch and Williamson 2013a).

The careful planning and coordination of the early Mantle village demonstrates social cohesion among its residents at the time of its initial construction. Other aspects of the built environment at Mantle also suggest shifts in social relations among members. Birch and Williamson argue that in Pre-Coalescent villages, the lineage-based household was probably the primary decision-making unit. Comparing the Draper and Mantle villages, average longhouse length decreased significantly, suggesting that clans (groups of households) were becoming more important in the structure of local political organization by the early sixteenth century. In addition, there are fewer “long” longhouses at the Mantle site than at the Draper site, and a single, large village plaza; these trends are interpreted as evidence for a consolidation of public space and evidence of cooperation among villagers to share common resources (Birch and Williamson 2013a).

The diverse styles of material culture at the Mantle site suggest that its population was quite cosmopolitan, had a wide-reaching exchange network, or both. Pottery with decoration associated with New York and St. Lawrence Iroquoian groups was quite numerous (ASI 2012; Birch and Williamson 2013a). Compared to the Draper and Spang sites, the Mantle site had more different types of pottery, although many types are represented by only a handful of vessels (see Birch et al. 2016; Pihl et al. 2011). Also notable is a switch in preference from pebble pendants to steatite pendants, indicative of social ties with groups to the south and east (ASI 2012:321). Two European copper artifacts along with a fragment of a Basque iron tool also indicate at least indirect

connections with Europeans, likely through Iroquoian communities along the St. Lawrence River (ASI 2012; Birch and Williamson 2013a). As Birch and Williamson argue, these external connections were important for the Mantle community both in terms of resource availability and social relations and should be recognized as evidence of dramatic social change during this period (Birch and Williamson 2013a).

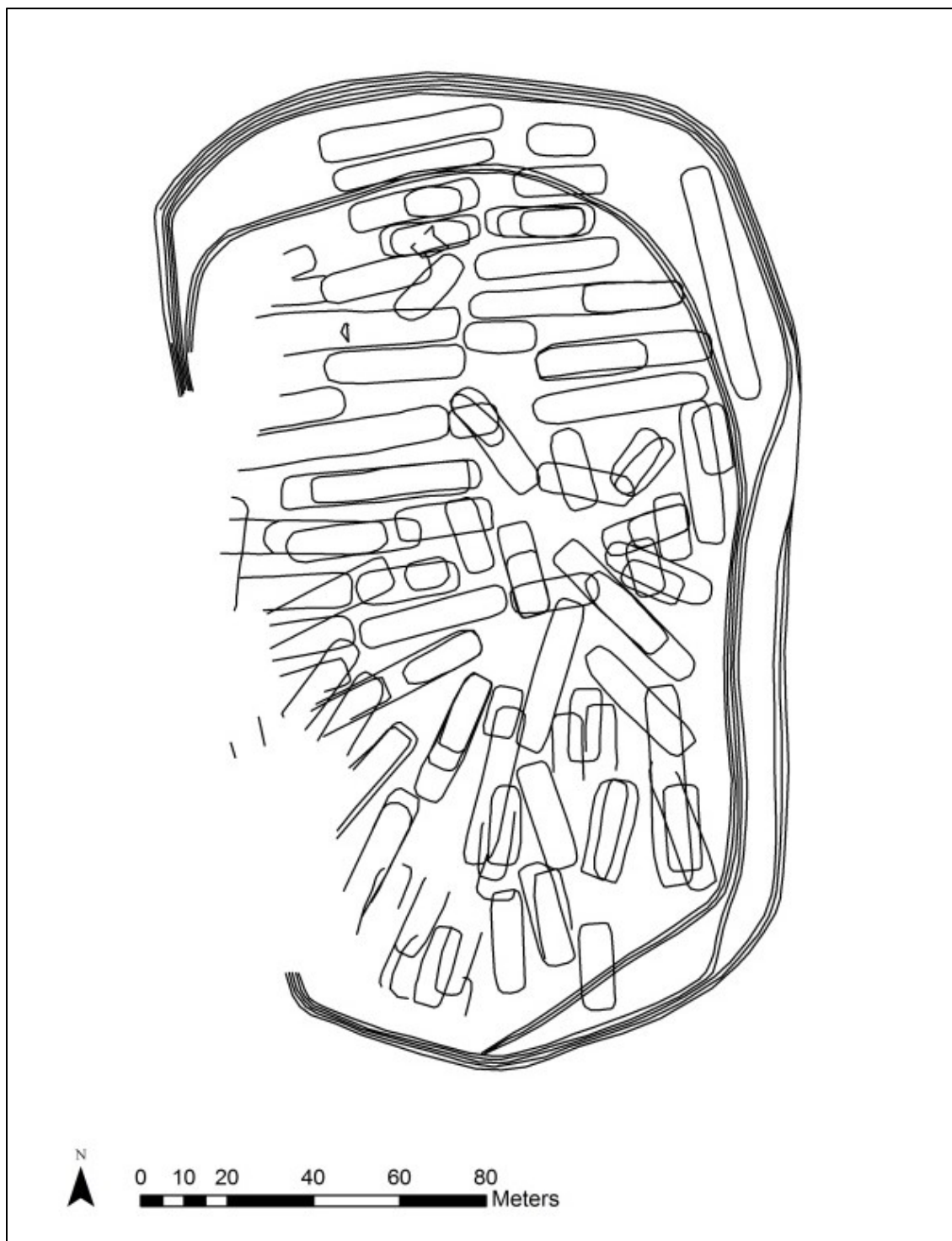


Figure 3.7 The Mantle site village plan redrawn from ASI 2012

Expectations for Social Identification in Coalescent Communities

The first three chapters provided the theoretical background for this dissertation, culminating in the creation of expectations for the intensity and scale of categorical and relational identification at each community (see Table 2.1). With the background introduced in this chapter, the foundation for this dissertation is complete. The remaining chapters focus on the analyses of the data used to answer the research questions. Table 3.3 summarizes the expectations for the intensity and scale of categorical and relational identification at each study site and through time. This table also serves as a guide to the next chapters of this dissertation. As shown in Table 3.3, Chapter 4 will assess patterns in the intensity and scale of categorical identification, Chapter 5 will assess the intensity and scale of relational identification. Chapter 6 summarizes the results of Chapters 4 and 5 and integrates the analyses of categorical and relational identification using additional contextual evidence.

	Pre-Coalescent White	Coalescent Draper/Spang	Post-Coalescent Mantle	Data Expectations
Categorical Identity (Chapter 4)	Shared at community scale at low intensity	Intensity increasing at intra and possible inter-community scale	Highest intensity at community scale or among groups of communities Greater intensity of categorical ties among corporate groups within the community	Increasing consistency of decoration within site over time Increasing consistency of decoration among contemporaneous sites over time (demonstrated in published data)
Relational Identity (Chapter 5)	High intensity among extended kin households and groups of households within community	High intensity among extended kin households and groups of households within community	High intensity among extended kin households and groups of households within community Developing greater intensity of relational ties among corporate groups within community Decreased intensity at the village scale	Production differences remain consistent or decrease slightly among corporate groups. Larger communities with more separate corporate groups may have slightly more variability in production

Table 3.3 Expectations for categorical and relational identification for study sites

CHAPTER 4

DECORATIVE STYLE AND CATEGORICAL IDENTIFICATION

Categorical identities are drawn from perceived similarities shared among a group of people that are often abstract in nature. Categorical ties can be shared among large groups of people, even if individual members do not directly interact on a regular basis. Categorical identities are often marked symbolically, in dress, ornaments, architecture, and objects such as ceramics. In this chapter, decorative style of ceramic pots is used to assess categorical connections over time. Although ceramic pipes will be included in the study of production techniques in Chapter 5, sufficient decorative attribute data were not available to include pipes in the present analysis. A more detailed discussion of the theoretical basis for this analysis is provided in Chapter 2.

Conceptualizing Decoration on Iroquoian Pottery

Knowledge of how Iroquoian pottery decoration is characterized is important for understanding the rationale for applying consensus analysis to these data and for interpreting the results. The basic form of Iroquoian pottery is remarkably consistent throughout Ontario, New York State, and the St. Lawrence region during the period of this study. Iroquoian pots of any decorative type are widely recognizable as “Iroquoian,” even among archaeologists with only limited knowledge of the pottery traditions in the Eastern Woodlands of North America. Vessels most often have a rounded bottom with a constricted neck, a distinctive shoulder, often a collar, and a mouth that is narrower than the shoulder diameter (see Figure 4.1). Iroquoian vessels are grouped into types based on the decorative elements found in these locations and, to a lesser extent, the contour of

the vessel profile. Some examples of sherds found at the Mantle site are shown in Figure 4.2.

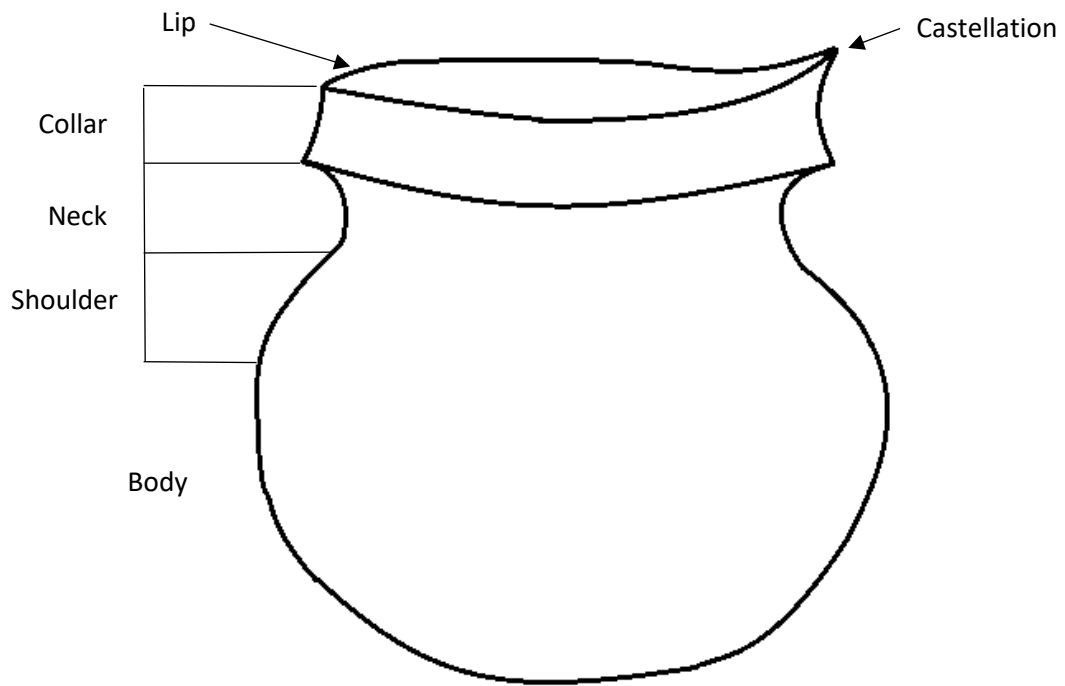


Figure 4.1 Form of idealized Iroquoian vessel. Redrawn from Emerson (n.d.:2).



Figure 4.2 Examples of pottery from the Mantle site. Counter-clockwise from the upper left: Huron Incised cat. #9752, Dutch Hollow Notched cat. #10409, Lalonde High Collar cat. #12113, Roebuck Corn Ear cat. #9649

MacNeish's *Iroquois Pottery Types* (1952) has been the standard reference for Iroquoian ceramic analysis since its first publication. In addition to providing the standard type definitions, MacNeish's conceptualization of Iroquoian pottery is also foundational to the various attribute-based systems that are typically used for more in-depth analysis of Iroquoian pottery. MacNeish's types are distinguished primarily by the form and decoration of the shoulder, neck, collar (if present), rim, and lip (Figure 4.2). Some types also have additional accents to the rim called castellations (due to their resemblance to parapets on a castle wall). Designs are most often incised, stamped or

notched in each part of the vessel which can create a zoned appearance in some types. Vessels are rarely slipped, glazed or painted, but they may have a wiped or smoothed finish.

The relative merits of type versus attribute-based approaches to ceramic analysis have been discussed extensively in the literature for decades, beginning with Emerson's expansion of MacNeish's methodology to develop an approach for identifying temporal and spatial trends in the frequencies of types (Emerson 1956). Wright argued that type-based analyses created artificially rigid groupings did not best account for the range of variation within each type through space and time. He suggested that an approach that placed the attributes as the basic unit of analysis would avoid these issues and offer analytical advantages (Wright 1966, 1967). Following Wright, attribute-based approaches utilize temporal, spatial, and social associations with specific attributes or suites of attributes. Early demonstrations of attribute-based analysis such as Ramsden's use of rim attributes to identify clusters of villages with shared pottery traditions (Ramsden 1977) and Smith's (1983) comparison of the utility of types versus attribute complexes for seriation in which he found attribute complexes to be preferable. Attribute based approaches are now commonly used, especially to study interaction (Curtis and Latta 2000; Engelbrecht 1979; Hawkins 2001; Niemczycki 1995; Wright 2006), community life and social integration (Birch et al. 2016; Howie-Langs 1998; Martelle 2002).

Some aspects of the relationship between type and attribute-based approaches are particularly important for understanding why the following analysis is structured in the way that it is. For one, the degree of difference among MacNeish's types varies. For example, Huron Incised and Lawson Incised types are decorated with the same motifs

but are distinguished by the interior collar profile (convex or concave). In contrast, other types are distinguished by motif. For example, the defining characteristic of Roebuck Corn Eared type is a repeating pattern of vertical notches that resemble an ear of corn in the decorative motif. While Huron Incised and Lawson Incised are sometimes grouped together during analysis, Roebuck Corn Eared is consistently separated from other types.

Some secondary decorative variation is non-diagnostic in MacNeish's type system. These secondary decorative elements, such as additional oblique lines or notching, can significantly change the appearance of a vessel. This means that a certain amount of variation is missed in a type-based analysis. Many attribute-based systems also distinguish among attributes that describe the decorative motif (e.g., horizontals, obliques, notches) and those that describe the technique used to apply that motif (e.g., stamped, incised, notched, fingernail). Since choices about the motif and technique used to decorate a pot are linked to different aspects of a potter's decorative choice (see Chapter 2), patterns in these types of attributes will be examined independently.

The structure of this analysis is designed to take three major factors into account: 1) that decorative motifs are identified by location on the vessel; 2) that types are not equivalently different; and 3) that not all decorative variation is diagnostic. Since decorative motifs are conceptualized in terms of their location on the vessel, attribute data are comparable among types. That is, attribute data are recorded in the same terms regardless of type, so these data can then be aggregated and treated in the same manner during analyses. As these types are not equivalently different, the addition of many vessels of certain unique types (e.g., Roebuck Corn Eared, plain types, or New York Iroquois types) could change the measure of consistency within an assemblage significantly more than the addition of many more sherds of a type such as Lawson

Incised, which is similar to the very common Huron Incised. Finally, since not all decorative variation is diagnostic, there is variability to measure beyond type classifications. If all decorative variation were diagnostic, then simple type groupings would account for most variability in Iroquoian ceramic assemblages. Since this is not the case, I can consider whether certain types are more consistently made at some sites as compared to others.

Decorative Style and Cultural Consensus Analysis

There are several analytical methods appropriate for characterizing the similarity of two or more ceramic assemblages. Because I am more concerned with characterizing the consistency of decoration than variability, I employ a method that can characterize the similarities within a dataset in several dimensions. By *consistency* I mean the degree of conformity in ceramic decoration. I have chosen a novel application of cultural consensus analysis which is particularly well suited for understanding how assemblages are consistent internally and with one another.

Cultural consensus analysis is a mathematical procedure for assessing whether a group of people agree about something (Romney et al. 1986; Weller 2007). The theoretical foundation for these procedures is cultural consensus theory, which argues that some parts of culture are stored in the minds of the members of that culture even though every individual does not necessarily carry or agree on every part. When anthropologists survey informants, they are trying to get reliable information about a culture from the knowledge that each informant carries about it. Some informants are more reliable than others, and not all informants are as knowledgeable about some topics as others. Therefore, it is necessary to talk to multiple informants and use the

responses of others to gauge the knowledge and reliability of each individual. The formal method of consensus analysis is a mathematical model that provides an estimate of the “cultural competence” of each informant, and an estimate of the “most correct” (most agreed upon) answer to each question. There are various iterations of the technique that are appropriate for different kinds of data.

A detailed description of the mathematical procedures used in this method is available in the seminal article by Romney et al. (1986). Consensus analysis produces several complementary types of output (Table 4.1 is a quick reference guide). The ratio of the first and second eigenvalue is a goodness of fit measure for the test. The consensus model fits if the ratio (1st/2nd) is greater than one. If the consensus model does not fit, this indicates that there is not agreement among respondents. Non-agreement implies that the individuals involved did not share sufficient common knowledge to be considered members of the same group with regards to that topic. Competence scores are calculated for each individual and a higher competence score indicates that an individual is “more knowledgeable” about the topic than others with lower scores, or in other words, that the individual’s responses are closer to the most common responses. Scores below 0 indicate a strong deviation from the group.

The UCINET software package (Borgatti et al. 2002) was used to complete the consensus analysis. Excel files of the ceramic decorative attribute data (described in more detail below) were imported into UCINET and the outputs were saved after each run. Unless otherwise noted, all test results reported here were from analyses that were found to fit the consensus model (eigenvalue ratio greater than one). Consensus analysis creates an enormous amount of output that is useful for addressing questions about the favored responses of the group as a whole, individual performance, and how much

individuals agreed on certain questions as compared to others. In this chapter, I will refer only to output relevant to the applicability of the consensus model to the data and statistics that describe patterns in the competence values. Additional output is used in future chapters.

Term	Significance	Interpretation
Competence Value	Measures how consistent the individual (pot) is compared to the group	Higher competence value = more consistent with the group
Ratio of 1st to 2nd Eigenvalues	Goodness of fit test for the consensus model	Model fits if greater than 1
Agreement	Measure of the similarity between attributes of two vessels	Higher value = more similarity
Answer	For each attribute, the state (motif, technique, etc.) that is most consistent with the group consensus	The choice of decoration or technique that best represents the group consensus

Table 4.1 Consensus Analysis Quick Reference

While consensus analysis was designed for use with interview survey data, Roberts has demonstrated its applicability for assessing style in artifacts (Roberts 2013). I use consensus analysis as a measure of consistency in the decorative attributes of pottery. The logic of this application is as follows. Decorative style is the sum of the stylistic choices that a potter makes about a pot. Decorative attribute data are like the record of a conversation with a potter about the choices that they made. How should the rim be decorated? Should the lip be notched? How many elements should there be in this motif? Which elements are appropriate to use together? For this analysis, each attribute is a question, and the attribute state for each vessel is the answer to that question. Specifically, in this application the vessel is analogous to the individual, the

attributes to be coded are analogous to the survey questions, and the actual attribute states on each vessel are analogous to responses. The answer table is essentially a summary of the attribute states that best represent the collection. This is not simply a measure of the most common response, because consensus analysis considers the reliability of the respondent in identifying the most “correct” answer. Therefore, outliers are given less weight and the assessment of the entire group is not as easily skewed by a few extreme cases. In this case, I am looking for two types of agreement: one is the degree of consistency in decorative choice overall within a community; the other is the consistency with which certain types were made. Both are measuring the degree to which the potters who were part of the same community agreed on how pottery should be made.

Background to the Data and Comparative Sites

The analyses that follow consider the Pre-Coalescent, Coalescent, and Post-Coalescent periods. Village size increases through this sequence. Population size is difficult to estimate. Warrick (2008) discusses in detail the process of estimating Iroquoian village population size by using an impressive range of comparative measures to contextualize archaeological settlement pattern data. Birch and Williamson (2010) use a formula based on cross-cultural population studies and informed by local ethnographic data to estimate the population of the Draper and Mantle sites using the total roofed floor space in each village. For the Draper site, they estimate an initial population of around 458 people, with a maximum population, after village expansion, of 1831, including the south field. This estimate is based on the reasonable assumption that all sections of the fully expanded Draper village were concurrently occupied. For Mantle,

estimates are 1730 people for the early village and 1338 for the later occupation (Birch and Williamson 2010:77-78). Population estimates have not been calculated specifically for White and Spang. Typical late fifteenth-century Iroquoian sites had a population of around 350-450 people (Warrick 2008:173-185), so it is reasonable to estimate White's population would have been in that range. Excavations at Spang were not extensive enough to determine the overall size of the village, but as it was likely occupied by the same community of people that occupied the Draper and Mantle sites, it is reasonable to assume a population similar to the late occupation at Draper or the Mantle site.

Since only reasonable estimates and not exact population figures are required for this discussion, it is sufficient to say that Pre-Coalescent villages probably had a population in the range of 350-450 people and Coalescent villages in the range of 1300-1800 people. Therefore, during coalescence, village populations increased by about three to four times. A larger population requires more vessels, and this fact is evidenced in the larger vessel counts at the later sites (see Appendix 1). In other words, there were many more vessels in use at the Coalescent and Post-Coalescent sites than at the Pre-Coalescent sites.

This analysis requires vessel by vessel attribute data. None of the vessel by vessel data for White, and only a portion of the Draper data could be located at the time of this study. However, vessel by vessel attribute data were available for several additional sites spanning the Pre- through Post-Coalescent periods. Pugh and Gostick are Pre-Coalescent period villages located in the Duffins Creek drainage where the study sites are found. The Pre-Coalescent period Walkington 2 site and Coalescent period Jarrett-Lahmer site are both found in the Don River drainage. Although there are some differences in material culture between Don and Rouge-Duffins sites, these differences are not expected to

factor into this analysis. Since the consensus analysis provides a measure of overall decorative consistency within each collection, and comparisons are based on that value, differences in specific decorative choices between sites will not skew the results. Aurora is a Post-Coalescent period site found to the north along the Oak Ridges Moraine. Figure 4.3 shows the location of these regional comparative sites and Table 4.2 summarizes the sites and their approximate period of occupation. These sites, in addition to the Draper, Spang, and Mantle sites, give a total of eight sites for this analysis.

The attribute data for seven of the sites (all except the Draper site) were recorded using the same attribute coding system with minor adjustments. This system was developed by Rob Pihl and Rob Wojtowicz of ASI (Riddle et al. 2014). For all sites, diagnostic sherds were grouped by vessels, so each individual sample in this analysis represents a single vessel. The Draper site collection was analyzed in the 1970's after the initial excavation. The coding system used for the Draper site collection is comparable to the ASI system but not identical. For the purposes of this analysis, it is most important that the attribute systems are recording the same amount of variability in each collection – it is not possible to accurately compare measures of consistency if the same level of detail is not recorded in the first place. The Draper site data included several variables that were not part of the ASI coding system. These variables were overwhelmingly consistent throughout the assemblage, for example, interior decoration was recorded but few vessels have interior decoration. Including these data produced artificially high competence values for the Draper site in comparison to the other sites recorded by ASI. Thus, I excluded these variables for the Draper site, producing input data that resemble the ASI data.

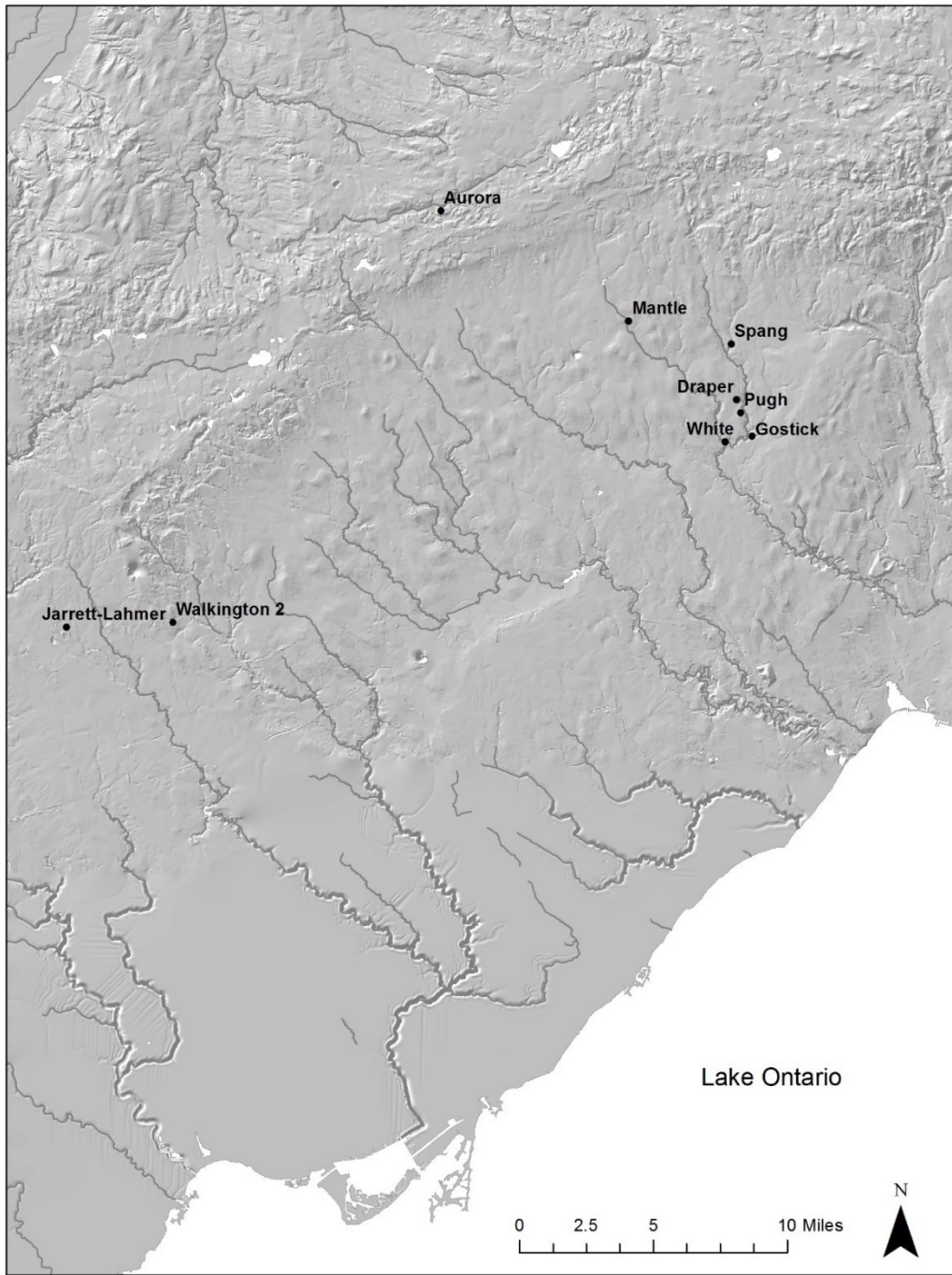


Figure 4.3 Regional site locations

Post-Coalescent Period 1500-1580 C.E.	Coalescent Period 1450-1525 C.E.	Pre-Coalescent Period 1400-1450 C.E.
Aurora	Spang	Pugh
Mantle	Jarrett-Lahmer	Gostick
	Draper	Walkington 2

Table 4.2 Comparative sites

The consensus procedure was performed for each site separately with competence values produced for each vessel. The competence value for each vessel is a measure of the degree to which the vessel is similar to other vessels in the assemblage. I use the individual vessel competence values to compare the consistency of the various assemblages.

Mantle: ASI provided the original type and decorative attribute data from their analysis of the Mantle site collections. The data were collected and analyzed by Rob Wojtowicz and are summarized in the Mantle final site report (ASI 2012).

Spang: Summary ceramic type and attribute data are published in the Spang site report (Carter 1981) but the original attribute data could not be relocated. Aleks Pradzynski of ASI recently reanalyzed this collection and generously shared the data. It is important to note again that the Spang site was not completely excavated like the other study sites in this dissertation and so comparisons that include Spang should be considered tentative.

Draper: The Draper site was investigated on several separate occasions prior to the major salvage excavations of the mid- to late 1970s (see Chapter 3). The ceramic data I use here are from the major salvage excavations and do not include data from the earlier, smaller projects. Summary ceramic decorative and attribute data from the Draper site have been presented in both published (Finlayson 1985) and unpublished sources. With assistance, I obtained scans of the original paper forms used to code the assemblage in the late 1970's and 1980's which allowed me to include the Draper site in this analysis. The attribute coding system used in these forms is very detailed and well-documented (Finlayson 1985). Four undergraduate students entered these coded data into MS Excel to prepare them for analysis.

Kyle Forsythe then used these attribute data to type the sherds. As with the attribute data, type data were recorded when the collection was first analyzed, but vessel-by-vessel records of type were not found at the time of this study. The frequencies of types in the collection from the 2016 data re-analysis are compared with the published complete type frequencies in Appendix 1. The 2016 data are included in the original data collection, but do not represent the full collection. Although the frequencies of types do not match, some of this difference is attributable to the combining of Huron Incised and Lawson Incised types in the 2016 data collection. The rest of the type frequencies are not quite the same; however, they are within the range that would be expected for a site of this period.

Comparative Sites: A comparative dataset of six additional sites in the region was provided by Rob Wojtowicz of ASI and was collected by ASI analysts. The methods for collecting and coding these data were the same for these sites as for Mantle and Spang.

Summary data for the Aurora, Jarrett-Lahmer (ASI 2003), Pugh, Gostick and Walkington 2 (ASI 2010) sites were generously provided by Rob Wojtowicz and ASI.

Cultural Consensus Analysis Part I: Whole Assemblage

The consensus analysis was performed using the attribute data for the total available assemblage from each site in three different ways. First, with the entire set of attribute data, then just the attributes that characterize motif and technique separately. For each of the following comparisons, a table, bar plot, and box and whisker plot are provided. The box and whisker plots show the median, high and low quartiles, and range of the competence values for each site. The following sections review the analysis and briefly identify significant results.

All Applicable Attributes

All categorical attributes recorded by the analyst are included in this category (except for those excluded from the Draper site to facilitate comparability as described above). I also excluded attributes of the neck and shoulder of the vessel since these portions of the vessel are frequently missing and could alter the results of the analysis. Furthermore, I excluded attributes that are numerical in nature, such as measure of rim thickness.

Table 4.3 presents summary data from the consensus analysis. The lack of negative competence values and the ratio of the first and second eigenvalues indicate a good fit to the consensus model for each data set. The average competence value for each site is also included in the table and plotted in Figure 4.4. Average competence values are

lowest during the Coalescent period and slightly higher in the Pre- and Post-Coalescent periods. Figure 4.5 a box and whisker plot of the competence values for each site. The box plot shows that the median values are relatively consistent, with slightly higher values in the Pre- and Post-Coalescent sites with the exception of the Draper site. The interquartile range of competence values is larger in the Coalescent Jarret-Lahmer and Spang sites and although the range of values at the Draper site is smaller than the other Coalescent period sites, there are more outliers. Together, the bar chart and box and whisker plot show slightly lower decorative consistency at Coalescent period sites that at Pre- or Post-Coalescent sites.

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd eigenvalue	Average competence
Pre-Coalescent 1400-1450 C.E.	Walkington 2	0	64.769	11.153	5.807	0.7668
	Gostick	0	6.73	1.067	6.308	0.7392
	Pugh	0	116.022	15.527	7.472	0.7202
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	221.462	27.67	8.004	0.7103
	Draper	0	792.262	122.303	6.478	0.7315
	Spang	0	428.829	64.355	7.285	0.7257
Post Coalescent 1500-1580 C.E.	Mantle	0	1160.418	138.993	8.349	0.7589
	Aurora	0	76.415	5.269	14.5	0.7879

Table 4.3 Consensus values for all attributes

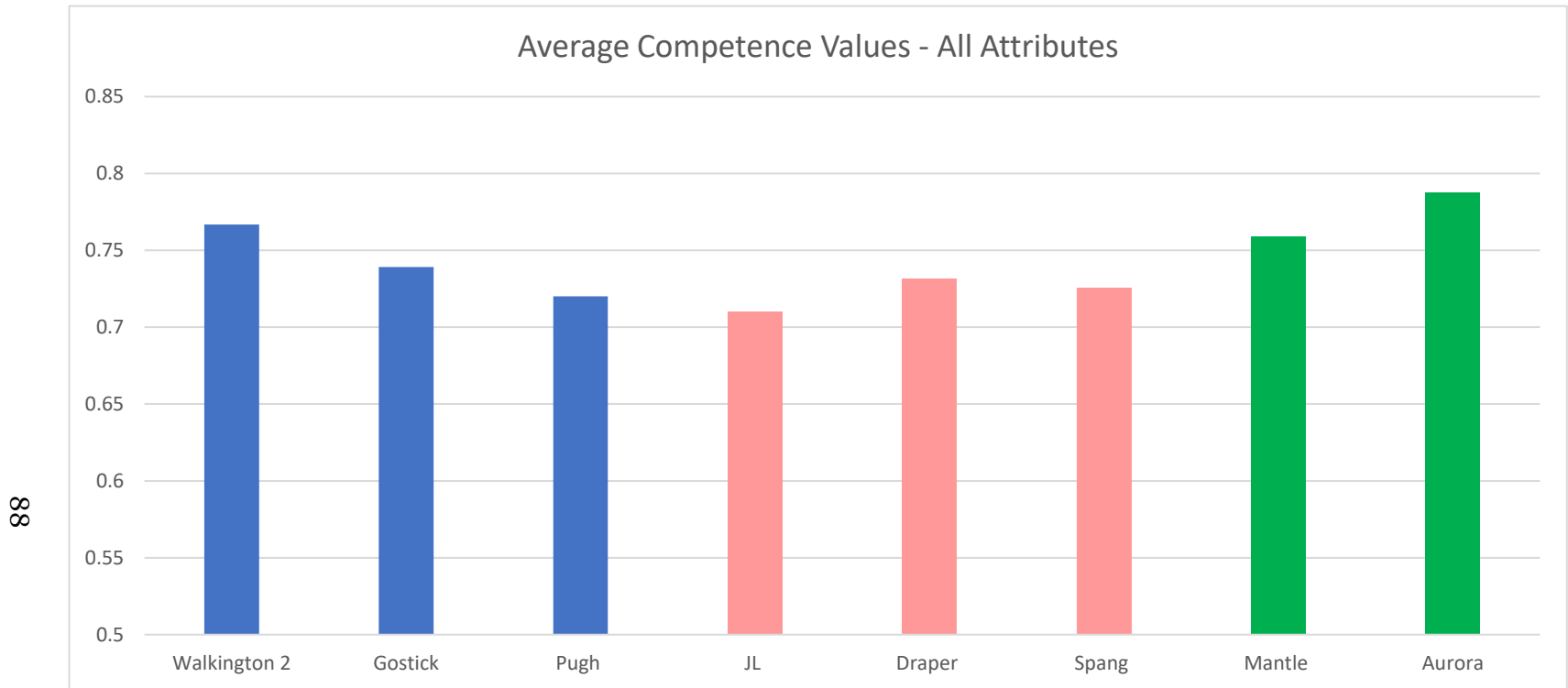


Figure 4.4 Average competence values by site, all attributes. Pre-Coalescent sites are blue, Coalescent sites are pink, and Post-Coalescent sites are green.

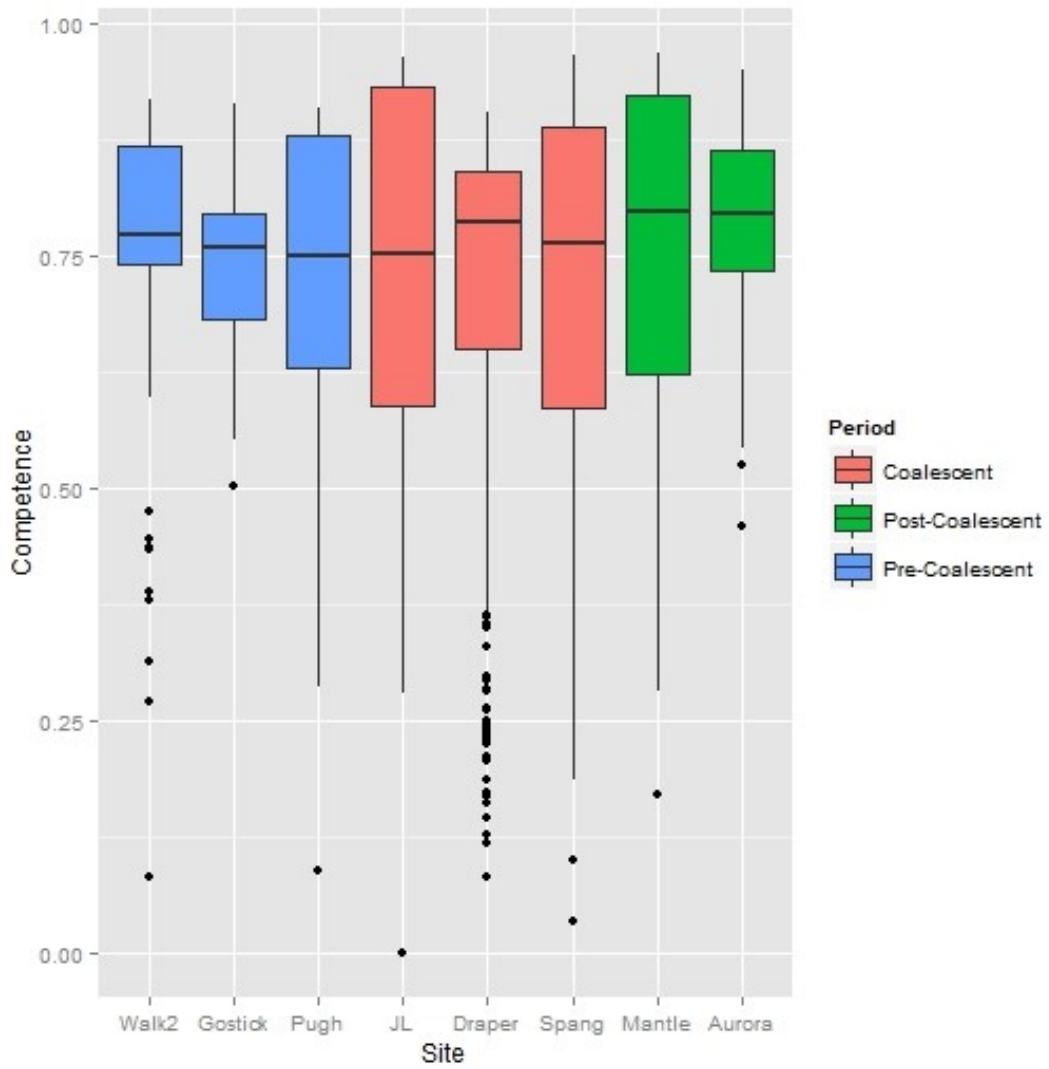


Figure 4.5 Box and whisker plot of competence values, all attributes

Motif Only

This analysis includes only attributes that describe the vessel collar motif. One negative competence value is observed for Walkington 2, but otherwise the summary statistics in Table 4.4 illustrate that the data fit the consensus model. Figure 4.6 shows that the average competence values are lowest in the Coalescent period sites and the lowest average value of all is from the Draper site. This is consistent with the data for all attributes, but the pattern is stronger as all Coalescent period sites have lower average competence values than any of the Pre- or Post-Coalescent period sites. The box and whisker plot (Figure 4.7) indicates that the median and interquartile range follow the same pattern with lower median values in the Coalescent period and smaller ranges of competence values at the earliest and latest sites.

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd eigenvalue	Average competence
Pre-Coalescent 1400-1450 C.E.	Walkington 2	1	62.888	9.966	6.31	0.7517
	Gostick	0	6.858	1.132	6.056	0.7462
	Pugh	0	110.992	12.597	8.811	0.6998
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	225.466	27.723	8.133	0.7142
	Draper	0	625.7	180.57	3.364	0.6748
	Spang	0	469.967	59.946	7.84	0.7233
Post Coalescent 1500-1580 C.E.	Mantle	0	1138.068	132.49	8.59	0.7691
	Aurora	0	78.006	5.967	13.07	0.7970

Table 4.4 Consensus values for motif attributes

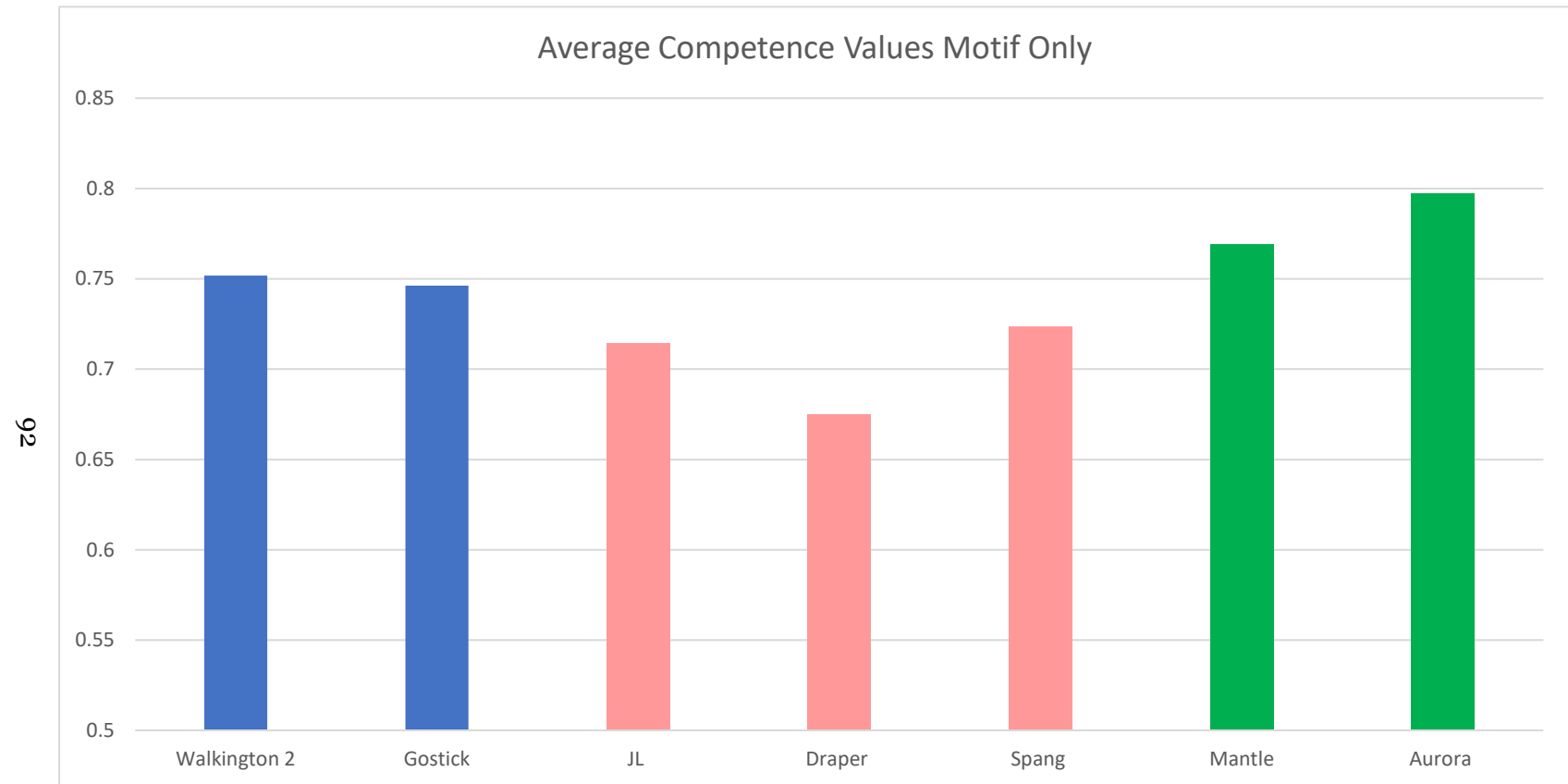


Figure 4.6 Average competence values by site, motif attributes. Pre-Coalescent sites are blue, Coalescent sites are pink, and Post-Coalescent sites are green.

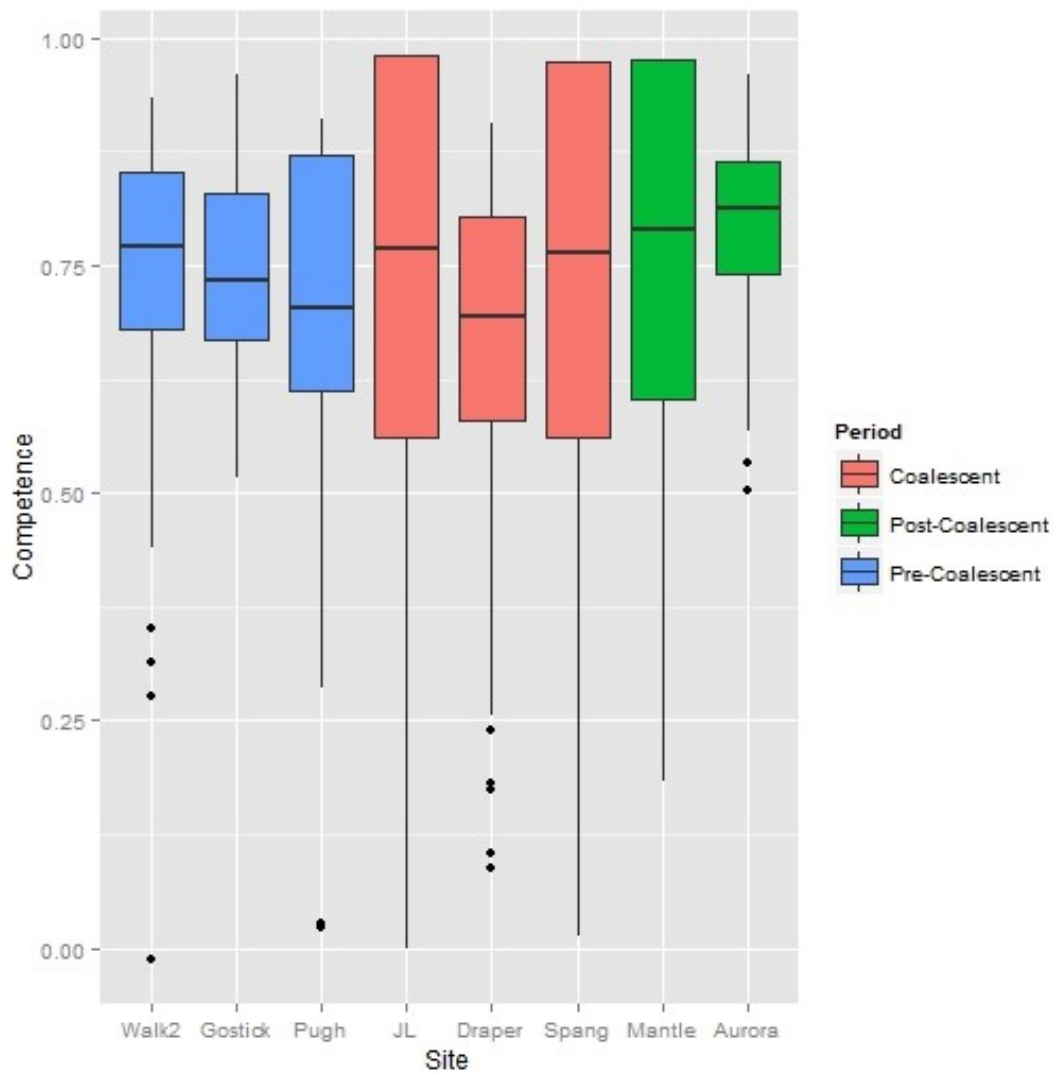


Figure 4.7 Box and whisker plot of competence values, motif attributes

Technique Only

This includes only attributes that describe the techniques used to apply decorations to the vessels. The summary statistics shown in Table 4.5 indicate that the data for each site fit the consensus model. Average competence values are variable and do not display the same pattern noted for the other analyses (Figure 4.8). The Draper site has the highest average competence value but also three negative competence values. The box plot in Figure 4.9 shows that the Draper site is unusual in that the median competence value is quite high but interquartile range skews lower, with more low outliers than found at the other sites. This pattern results from many vessels that scored extremely high competence values and a smaller number of vessels clustered in the lower ranges of competence values calculated for the Draper site data.

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd eigenvalue	Average competence
Pre-Coalescent 1400-1450 C.E.	Walkington 2	0	65.957	13.649	4.832	0.7734
	Gostick	0	6.49	1.798	3.61	0.6999
	Pugh	0	120.468	19.592	6.149	0.7327
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	217.461	30.303	7.176	0.7046
	Draper	3	924.487	167.796	5.51	0.8190
	Spang	0	467.905	78.219	5.982	0.7248
Post Coalescent 1500-1580 C.E.	Mantle	0	1150.85	156.142	7.31	0.7563
	Aurora	0	72.764	9.947	7.315	0.7501

Table 4.5 Consensus values for technique attributes

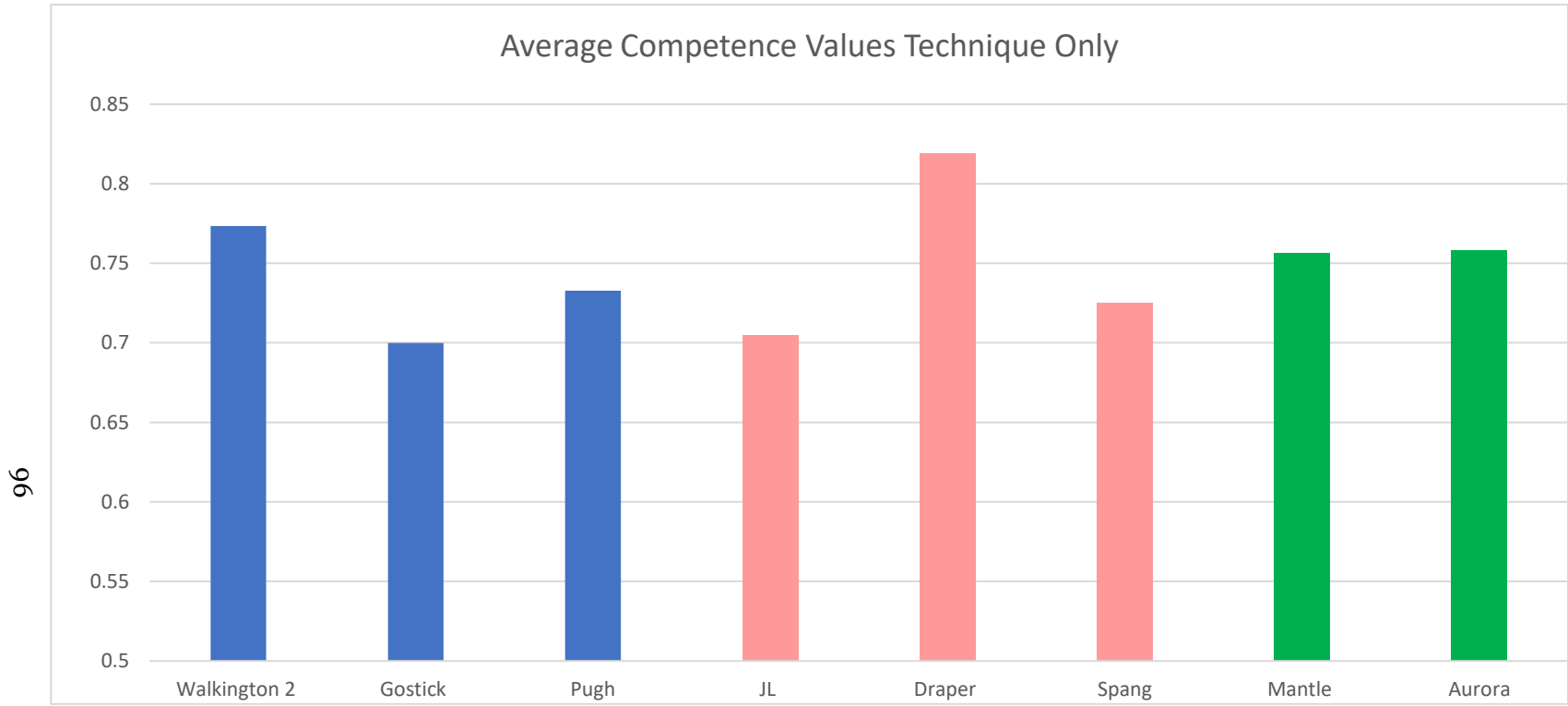


Figure 4.8 Average competence values by site, technique attributes. Pre-Coalescent sites are blue, Coalescent sites are pink, and Post-Coalescent sites are green.

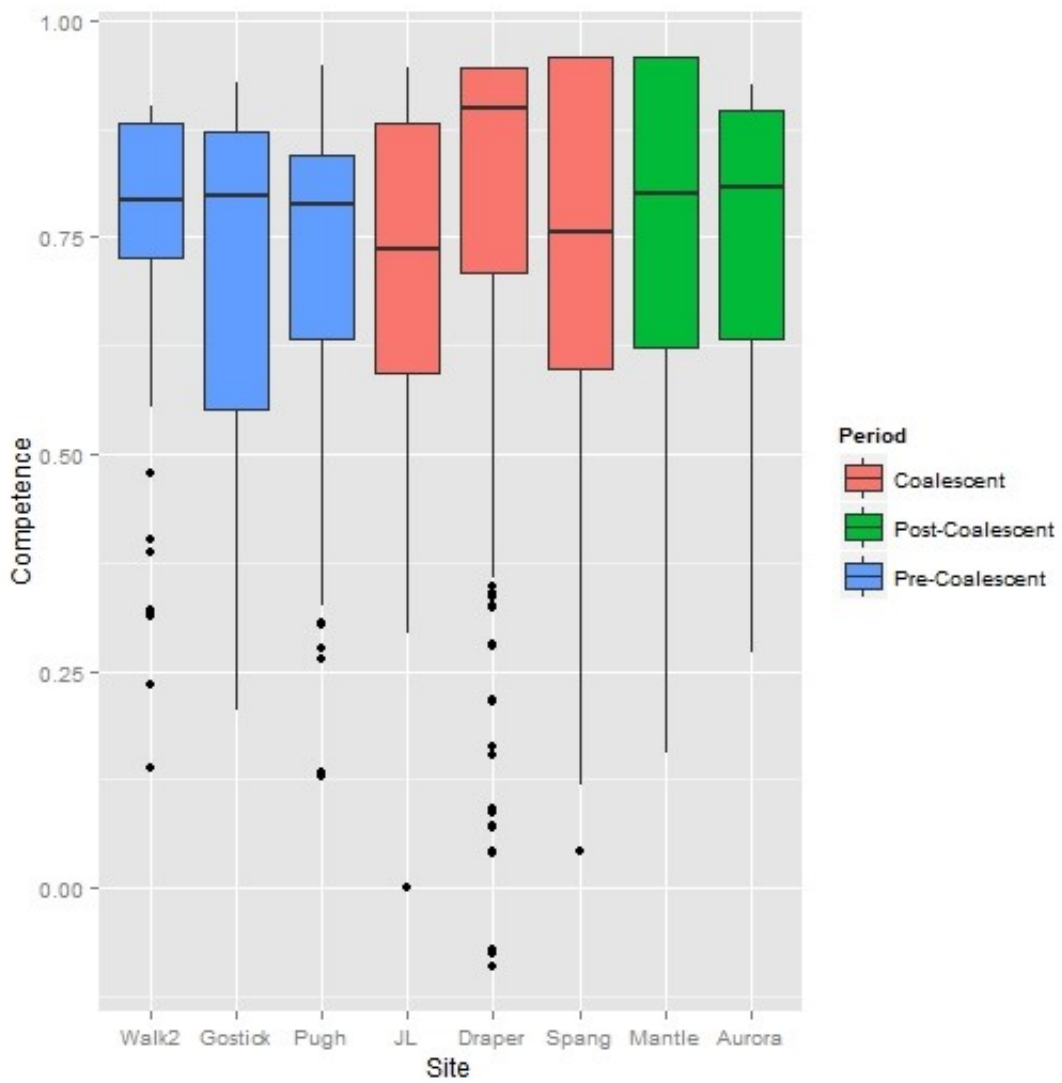


Figure 4.9 Box and whisker plot of competence values, technique attributes

Discussion

The results show that decoration is more consistent at the Pre-Coalescent and Post-Coalescent sites than at the Coalescent sites. This means that in both the small Pre-Coalescent villages and the large Post-Coalescent communities, potters were making decorative choices that were more consistent with one another than were potters in the Coalescent period. The consistency of decoration suggests that shared categorical identification at the village scale was most prominent during the Pre- and Post-Coalescent periods. In addition, it is likely that the Draper site assemblage included pottery brought from the once-separate villages. Both the social setting and the assemblage formation might have contributed to a less consistent assemblage.

The consensus analysis of technique attributes revealed that the degree of consistency with technique-related attributes remained relatively consistent over time. It is likely that choices of decorative technique, and tool choice in particular, may be more influenced by relational than categorical ties. While certain techniques, such as incising or stamping, are characteristic of particular decorative types (e.g., corded types), tools may have also been part of a personal or family pottery making kit. If this were the case, it is likely that technique choice would not be greatly affected by the process of coalescence.

The Draper site is an outlier with much higher average competence values for technique with an average skewed higher by many values at the highest end of the competence value range. I suspect that this pattern may be due to minor differences in the coding system used for the Draper site as compared to the other sites. Alternatively, this pattern could result from differences in technique preferred by certain village

segments or a portion of the collection that is quite different from the rest. This would be an interesting starting point for further investigations at the Draper site.

Cultural Consensus Analysis Part II: Groups of Types and Individual Types

Consensus analysis using groups of types and individual types adds some resolution and clarity to the patterns observed at the assemblage level. Competence values were calculated separately for each group of types or individual type by site. This means that for each comparison discussed, the competence values reported are a measure of the consistency of decoration within the stated group (e.g., Huron Incised type at the Spang site). Types are grouped by their social significance and geographic distribution relative to the study region as shown in Appendix 1 following Birch and Williamson (2013a:130-140). The first group includes types that are common at Ancestral Wendat sites and comprise the majority of locally made vessels. The second are types that are relatively common or not uncommon at Ancestral Wendat sites but are not the majority. The final group is exotics – those associated with St. Lawrence Iroquoians to the east and New York Iroquoian groups to the south. The two most common types, Black Necked and Huron Incised are treated separately. Counts of other individual types were not large enough to allow for consensus analysis through the entire sequence.

Common Types

Common types are those that dominate the assemblages. From the Pre-Coalescent through the Post-Coalescent period, the frequencies of these most common

types shift from primarily Black Necked and Pound Necked to primarily Huron Incised, Lawson Incised, and Sidey Notched. This is part of a regional trend in changing preference for notched decoration over necked forms through time. To encompass common types through time, this group includes Huron Incised, Sidey Notched, Lawson Incised, Pound Necked and Black Necked.

Common types are likely to be locally made, so variability within these groups should reflect decorative choices of resident potters. These types are also the only ones consistently found in large quantities at each site. This means that for comparing the consistency of decoration, grouping the common types will reveal what amount of variability within each assemblage might be due to different quantities of secondary types. Gostick was not included in this analysis due to low counts of the above vessel types.

The data for each site were found to fit the consensus model as shown in Table 4.6. Average competence values were highest in the Post-Coalescent sites. Slightly lower competence values were found at the Coalescent period sites as compared to the Pre- and Post-Coalescent sites, as is suggested by Figure 4.10. The box and whisker plot of these data in Figure 4.11 shows that the interquartile range of competence values is smaller at the Pre- and Post-Coalescent sites than at the Coalescent period sites. Median values are largely consistent through time, with a weak pattern of higher values at the Post-Coalescent sites.

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd eigenvalue	Average Competence
Pre-Coalescent 1400-1450 C.E.	Walkington 2	0	56.507	10.511	5.376	0.783
	Pugh	0	111.262	13.727	8.105	0.756
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	190.603	22.04	8.648	0.778
	Draper	0	789.251	102.791	7.678	0.763
	Spang	0	450.053	61.644	7.301	0.735
Post Coalescent 1500-1580 C.E.	Mantle	0	933.487	71.798	13.002	0.798
	Aurora	0	63.41	3.523	17.982	0.81

Table 4.6 Consensus values for common types

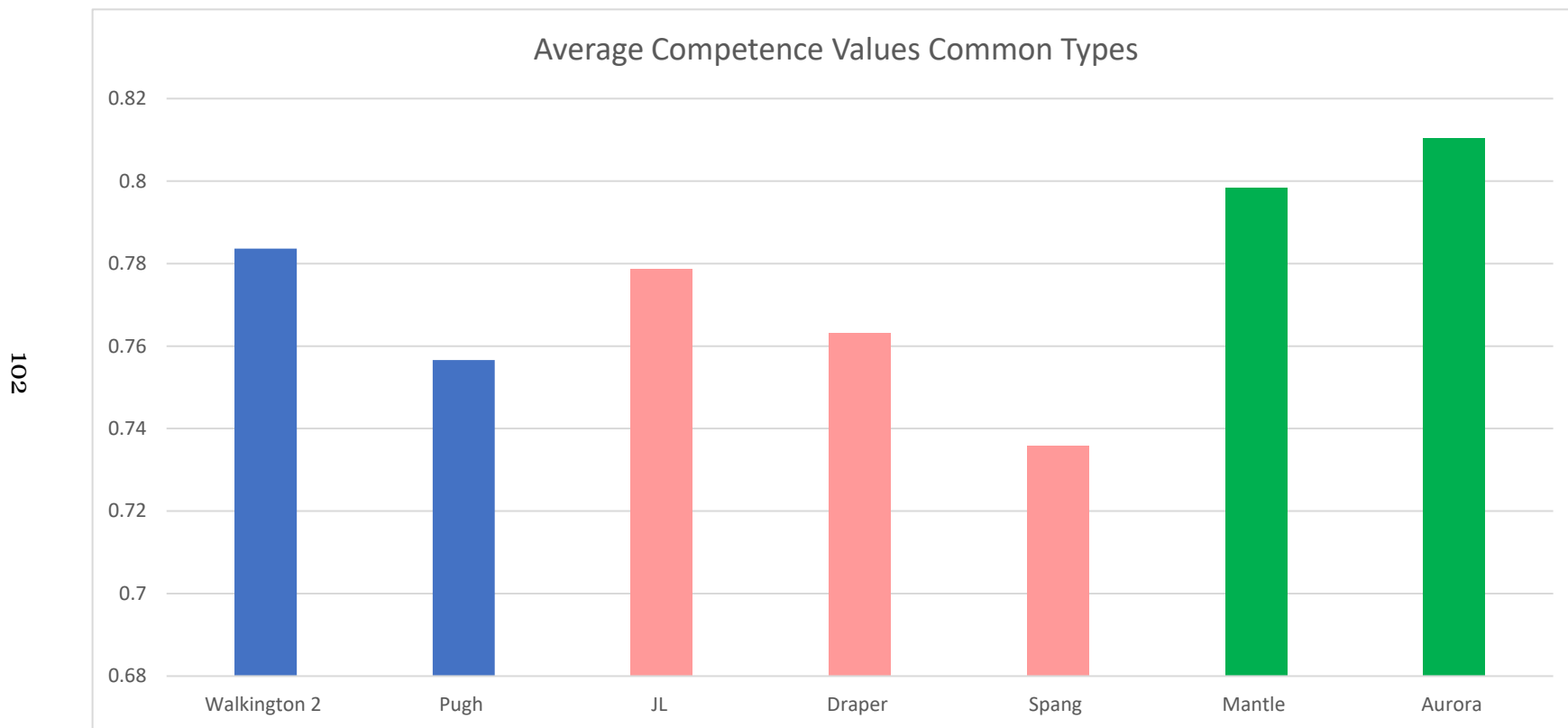


Figure 4.10 Average competence values by site, common types. Pre-Coalescent sites are blue, Coalescent sites are pink, and Post-Coalescent sites are green.

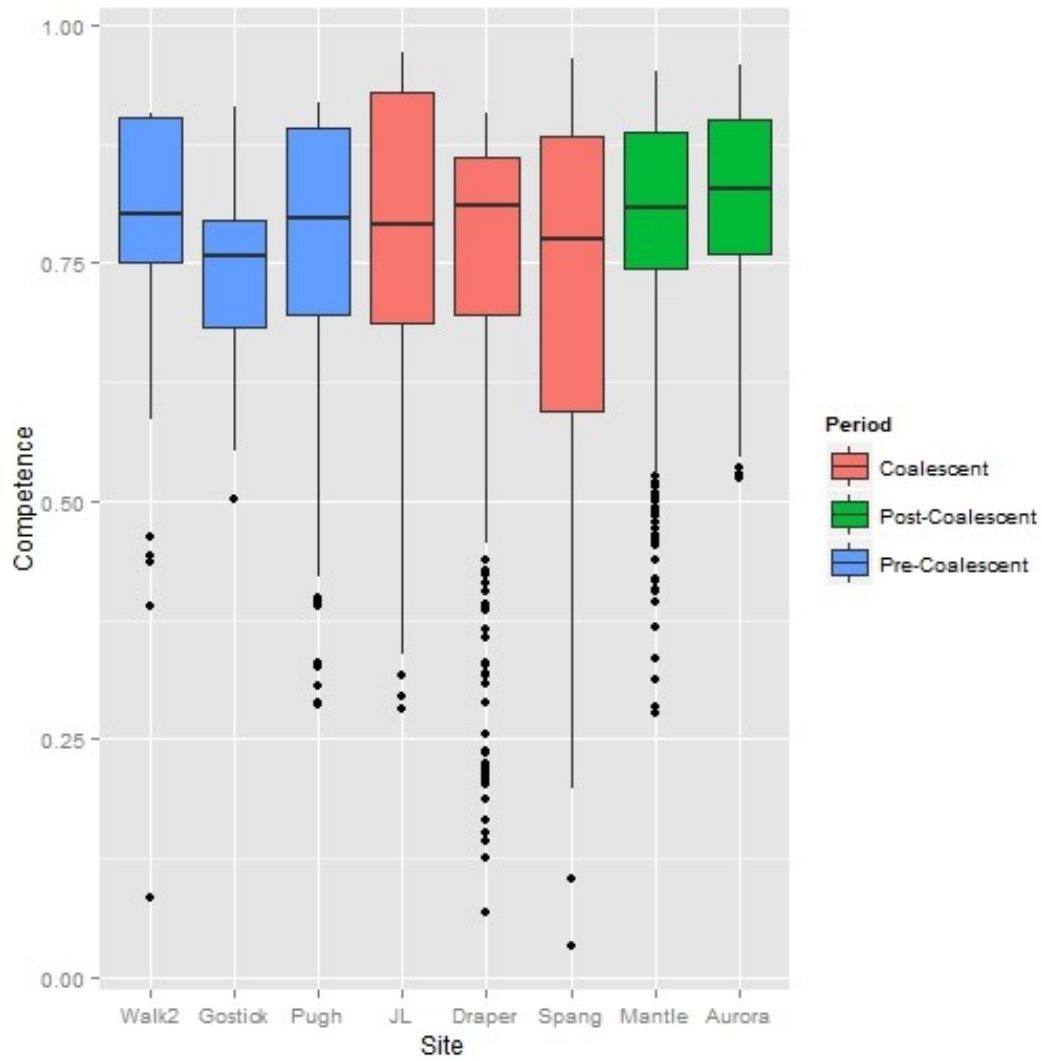


Figure 4.11 Box and whisker plot of competence values, common types

Less Common Types

Gostick was excluded from this analysis due to very low vessel counts. The competence values for the less common types are more variable than the values for the common types. This is not surprising, given that for each site, different less common types were found. Even so, the data were found to fit the consensus model as shown in Table 4.7. The bar chart of average competence values shows that with the exception of the Walkington 2 and Jarrett-Lahmer sites, average competence values increase over time (Figure 4.12). Since two of the seven sites do not fit the model, this result is not as strong as the patterns observed for the common types or the entire assemblage. Variability could be due to influence of different less common types at each site, and so this pattern warrants further investigation in the future. The interquartile ranges for the Spang, Mantle, and Aurora sites were smaller than at the earlier sites, as shown in the box plot in Figure 4.13.

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd eigenvalue	Average competence
Pre-Coalescent 1400-1450 C.E.	Walkington 2	0	6.647	0.439	15.15	0.7689
	Pugh	0	3.78	1.723	2.152	0.628667
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	12.316	1.998	6.163	0.771
	Draper	0	28.592	4.645	6.156	0.669603
	Spang	0	6.678	1.605	4.161	0.694538
Post Coalescent 1500-1580 C.E.	Mantle	0	80.164	9.998	8.018	0.748086
	Aurora	0	6.829	0.714	9.567	0.779727

Table 4.7 Consensus values for less common types

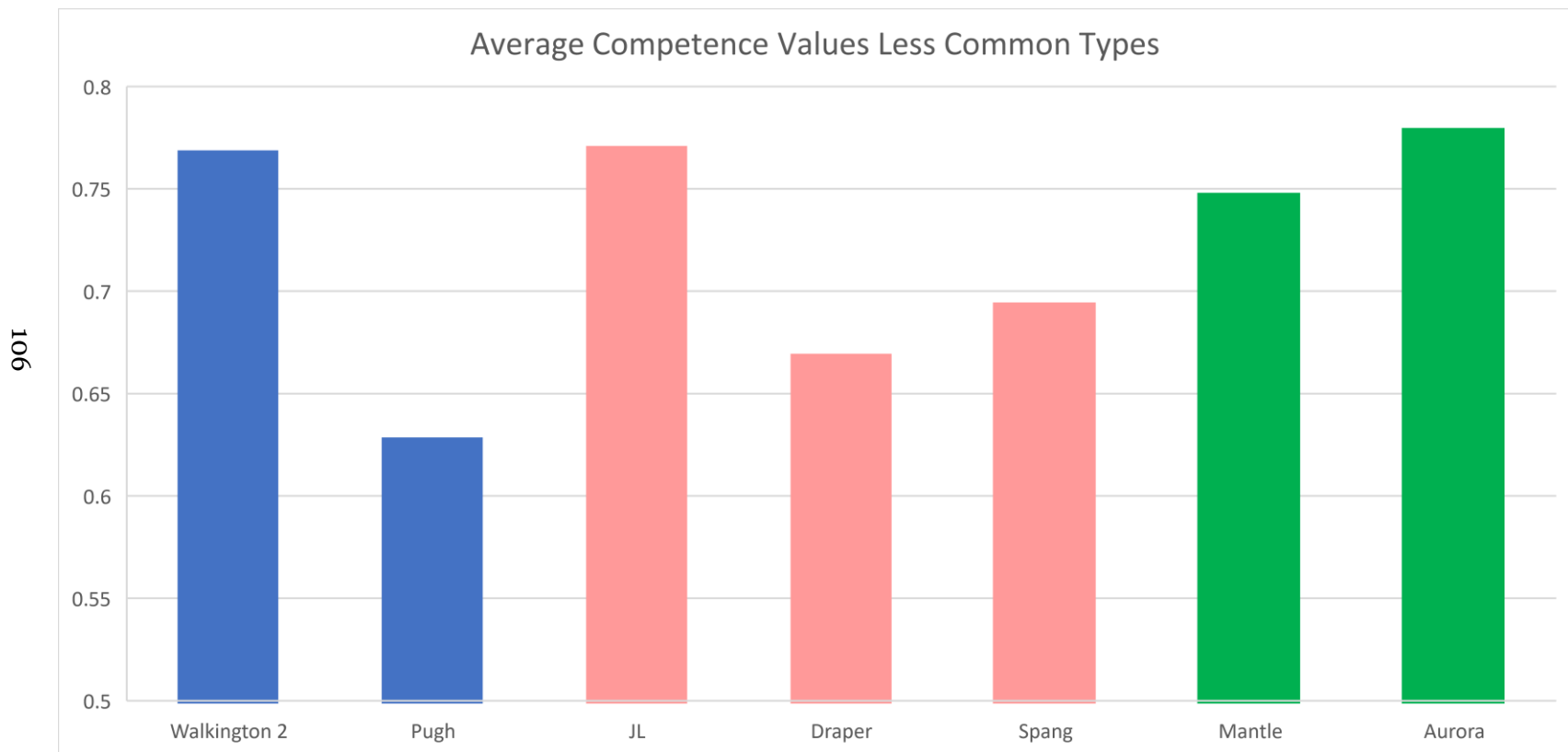


Figure 4.12 Average competence values by site, less common types. Pre-Coalescent sites are blue, Coalescent sites are pink, and Post-Coalescent sites are green.

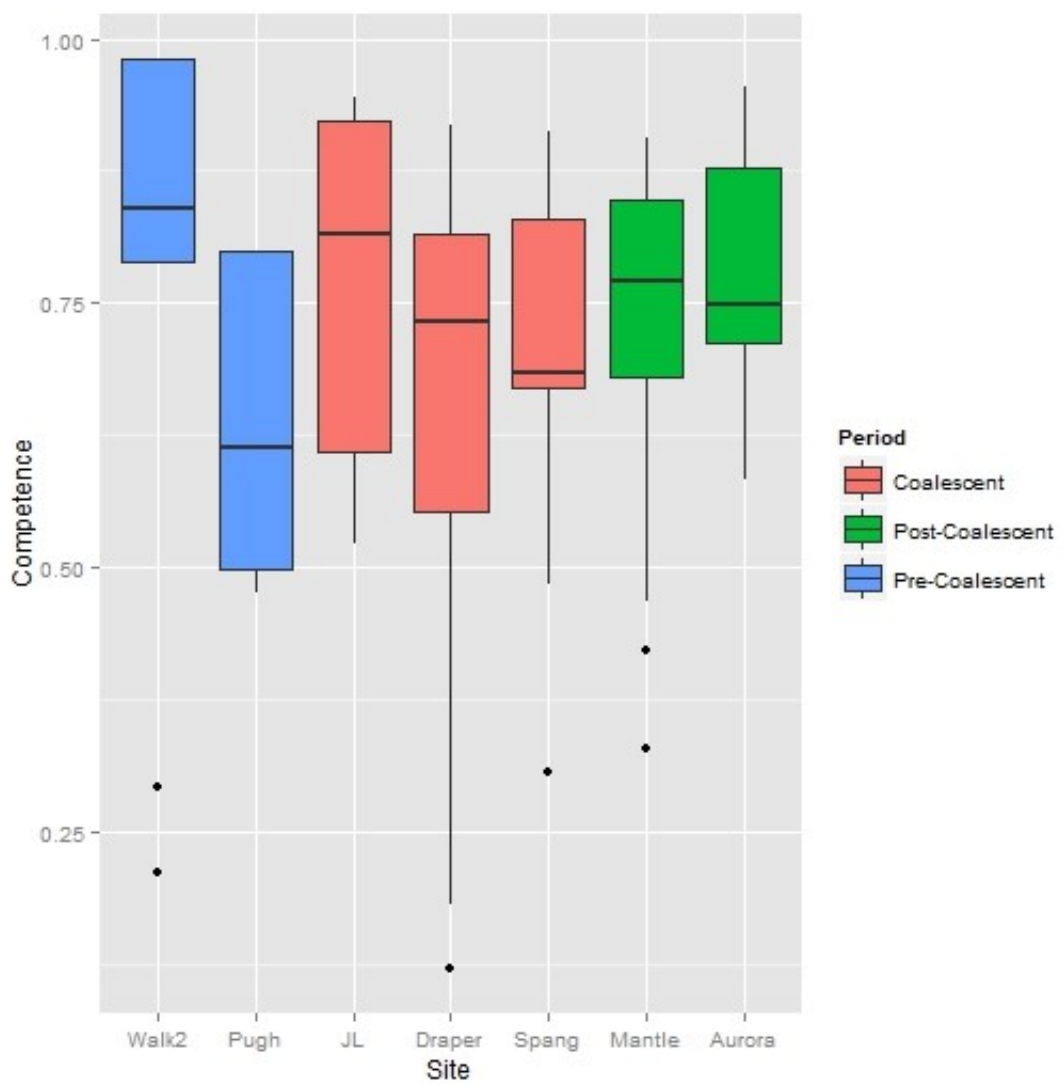


Figure 4.13 Box and whisker plot of competence values, less common types

Exotic Types

The Walkington 2 and Gostick sites are both excluded from this analysis due to low counts. Data from the Pugh, Spang, and Aurora sites did not fit the consensus model and the UCINET program indicated that the data likely come from two different cultures meaning that there were two very unlike groups within the data (Table 4.8). The “exotic types” group includes New York Iroquois and St. Lawrence Iroquois types. The three sites that did not fit the consensus model had close to even proportions of St. Lawrence vs. New York Iroquois types, so it appears that the analysis did differentiate between these two sub-groups of types. Figure 4.14 shows that competence values were highest at the earliest of the Coalescent (Jarrett-Lahmer) and Post-Coalescent (Mantle) sites. Ranges of competence values shown in the boxplot in Figure 4.15 were highly variable with the largest range at Mantle.

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd eigenvalue	Average competence	Notes
Pre-Coalescent 1400-1450 C.E.	Pugh	0	3.708	1.723	2.152	0.628667	Does not fit model
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	14.342	3.539	4.052	0.688414	
	Draper	0	10.97	1.953	5.616	0.64675	
	Spang	0	8.907	3.964	2.247	0.65545	Does not fit model
Post Coalescent 1500-1580 C.E.	Mantle	0	106.202	24.185	4.391	0.747807	
	Aurora	0	4.597	1.608	2.858	0.75425	Does not fit model

Table 4.8 Consensus values for exotic types

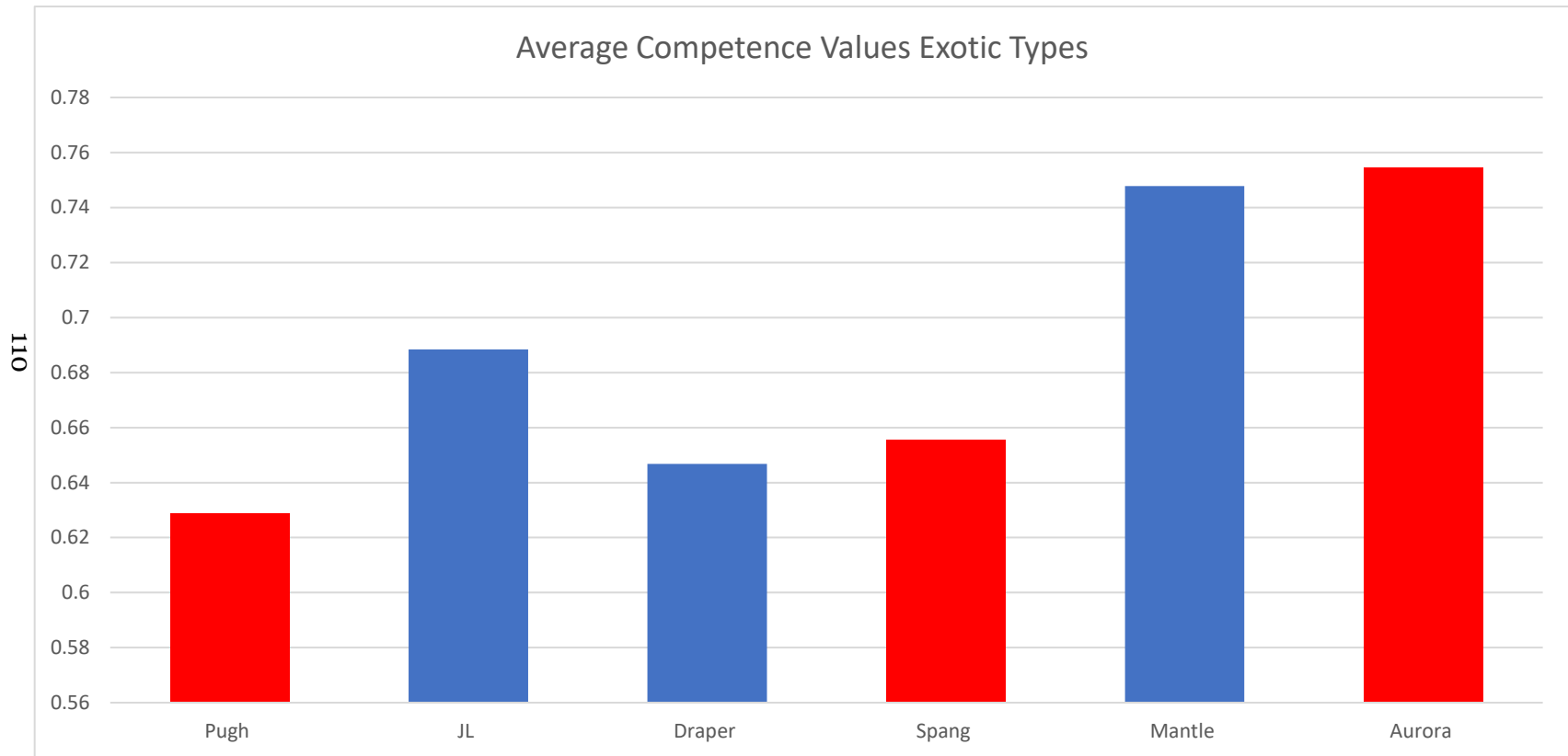


Figure 4.14 Average competence values by site, exotic types. Red bars indicate sites that do not fit the consensus model for this analysis.

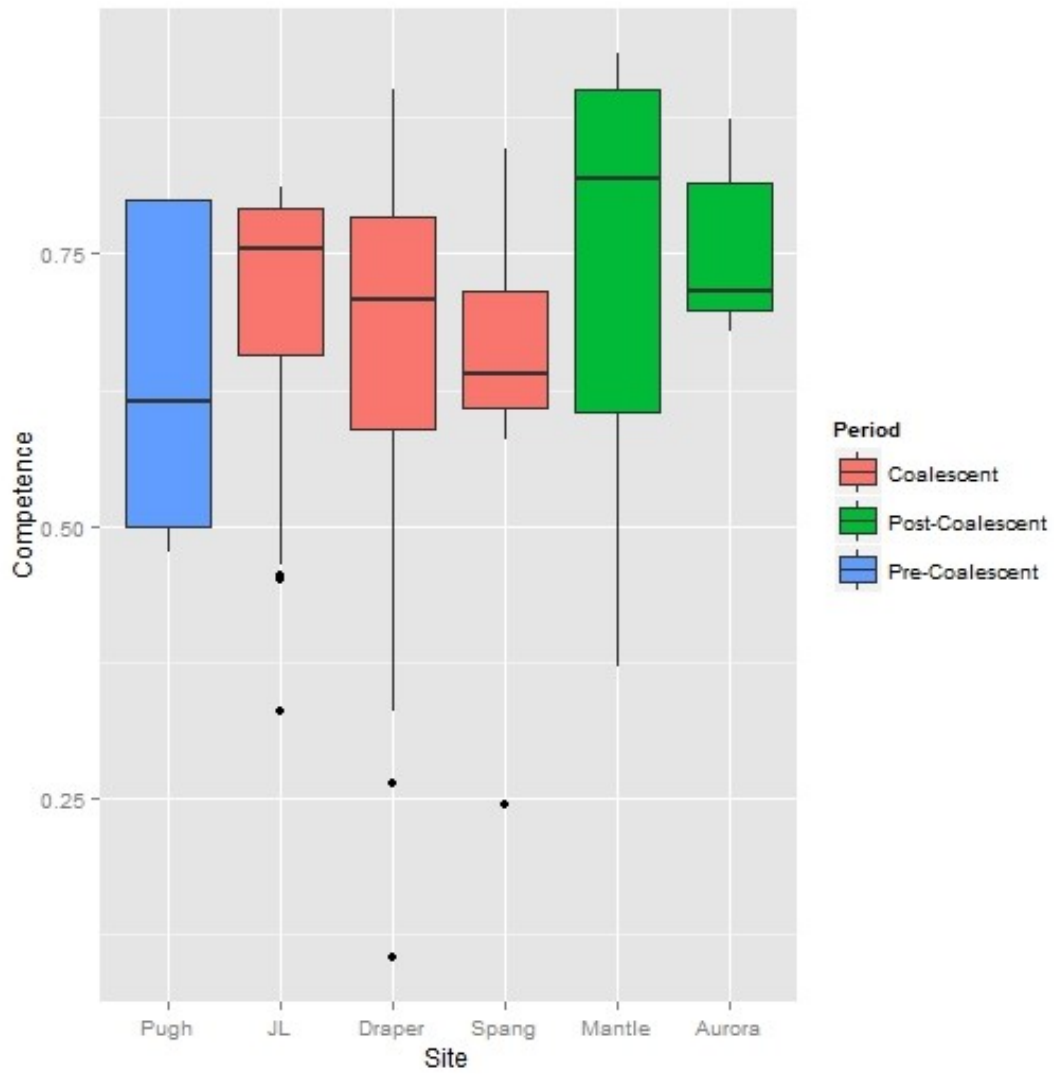


Figure 4.15 Box and whisker plot of competence values, exotic types

Black Necked

Black Necked is the dominant type in the Pre-Coalescent through Coalescent assemblages and remains common in the Post-Coalescent assemblages. Aurora is excluded from this analysis due to low counts of Black Necked sherds. Table 4.9 shows that the data for each site fit the consensus model. Figure 4.16 shows that average competence values remain relatively stable over time. Box plots (Figure 4.17) likewise show consistency over time.

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd largest eigenvalue	Average Competence
Pre-Coalescent 1400-1450 C.E.	Walkington 2	0	33.612	4.14	8.118	0.797824
	Gostick	0	4.976	0.738	6.741	0.731667
	Pugh	0	79.392	9.113	8.712	0.752789
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	38.059	5.393	7.057	0.714155
	Draper	0	364.269	47.199	7.718	0.766226
	Spang	0	181.281	34.432	5.265	0.682362
Post Coalescent 1500-1580 C.E.	Mantle	0	25.978	1.962	13.238	0.811436

Table 4.9 Consensus values for Black Necked vessels

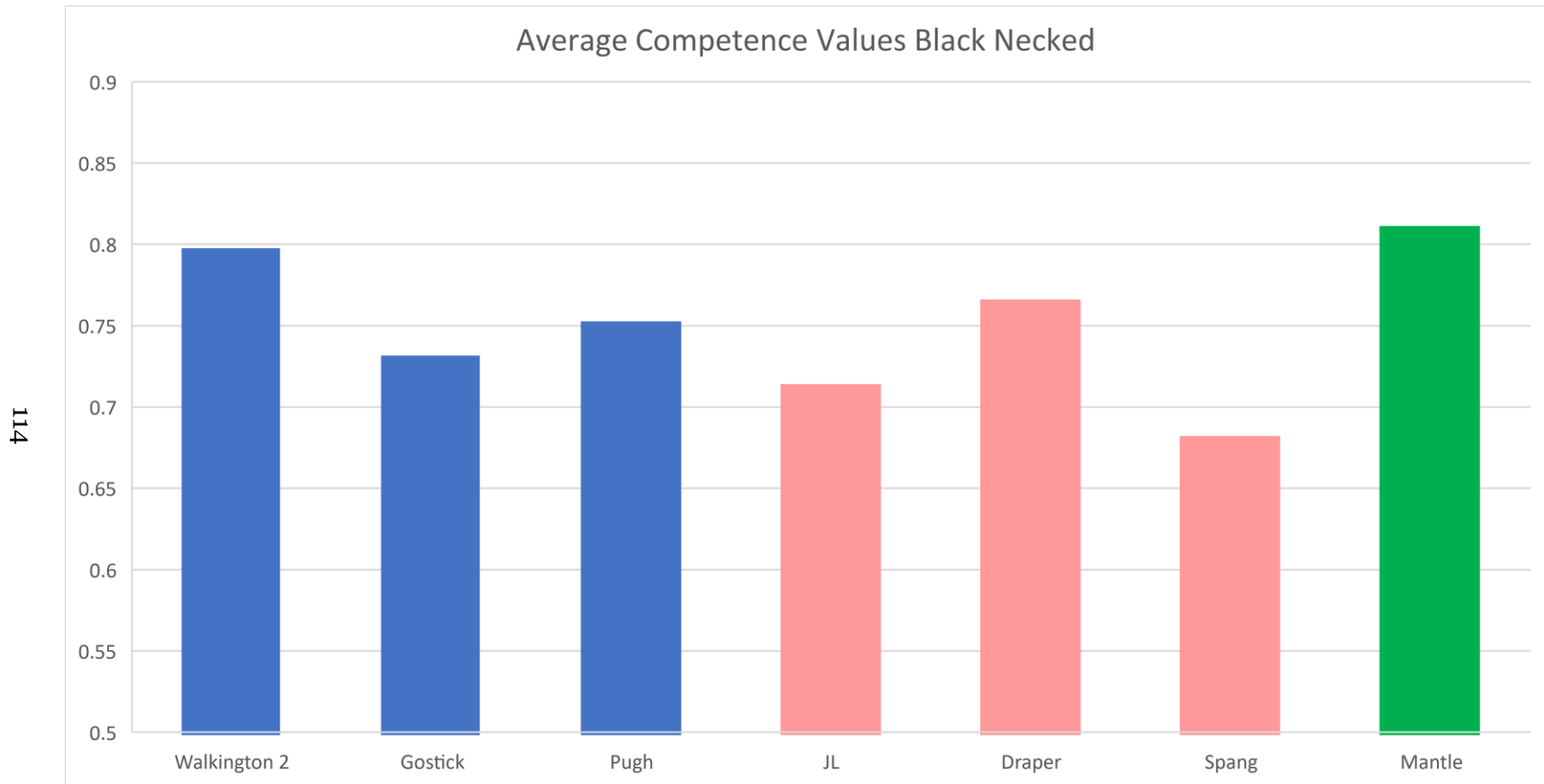


Figure 4.16 Average competence values by site, Black Necked vessels. Pre-Coalescent sites are blue, Coalescent sites are pink, and Post-Coalescent sites are green.

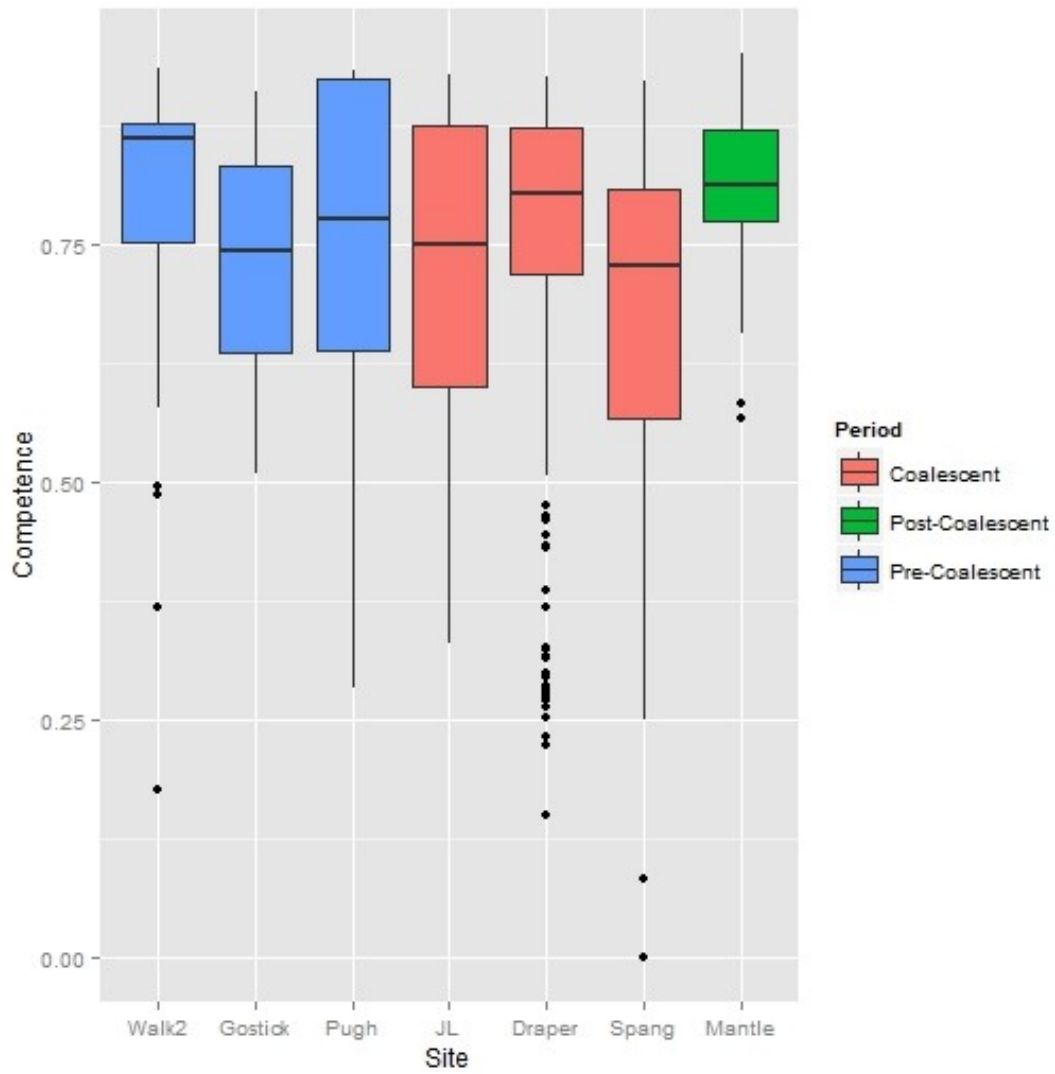


Figure 4.17 Box and whisker plot of competence values, Black Necked

Huron Incised

Huron Incised increases in frequency through time and is the dominant type at the Post-Coalescent sites. Table 4.10 shows that the data fit the consensus model. The average competence values for Huron Incised decrease over time (Figure 4.18). The Pre-Coalescent sites and the Spang site have extremely high average competence values – near 0.9. The Mantle and Aurora sites both have similar average and median competence values and value ranges (Figure 4.19).

Period	Site	Negative Competence Values	1st eigenvalue	2nd largest eigenvalue	Ratio 1st/2nd largest eigenvalue	Average Competence
Pre-Coalescent 1400-1450 C.E.	Walkington 2	0	27.307	1.066	25.615	0.933806
	Pugh	0	37.251	2.701	13.793	0.889174
Coalescent 1450-1525 C.E.	Jarrett-Lahmer	0	120.942	7.795	15.516	0.881732
	Draper	0	452.878	51.768	8.748	0.811454
	Spang	0	279.653	16.974	16.475	0.894701
Post Coalescent 1500-1580 C.E.	Mantle	0	748.476	45.17	16.57	0.830272
	Aurora	0	51.302	2.975	17.246	0.831795

Table 4.10 Consensus values for Huron Incised vessels

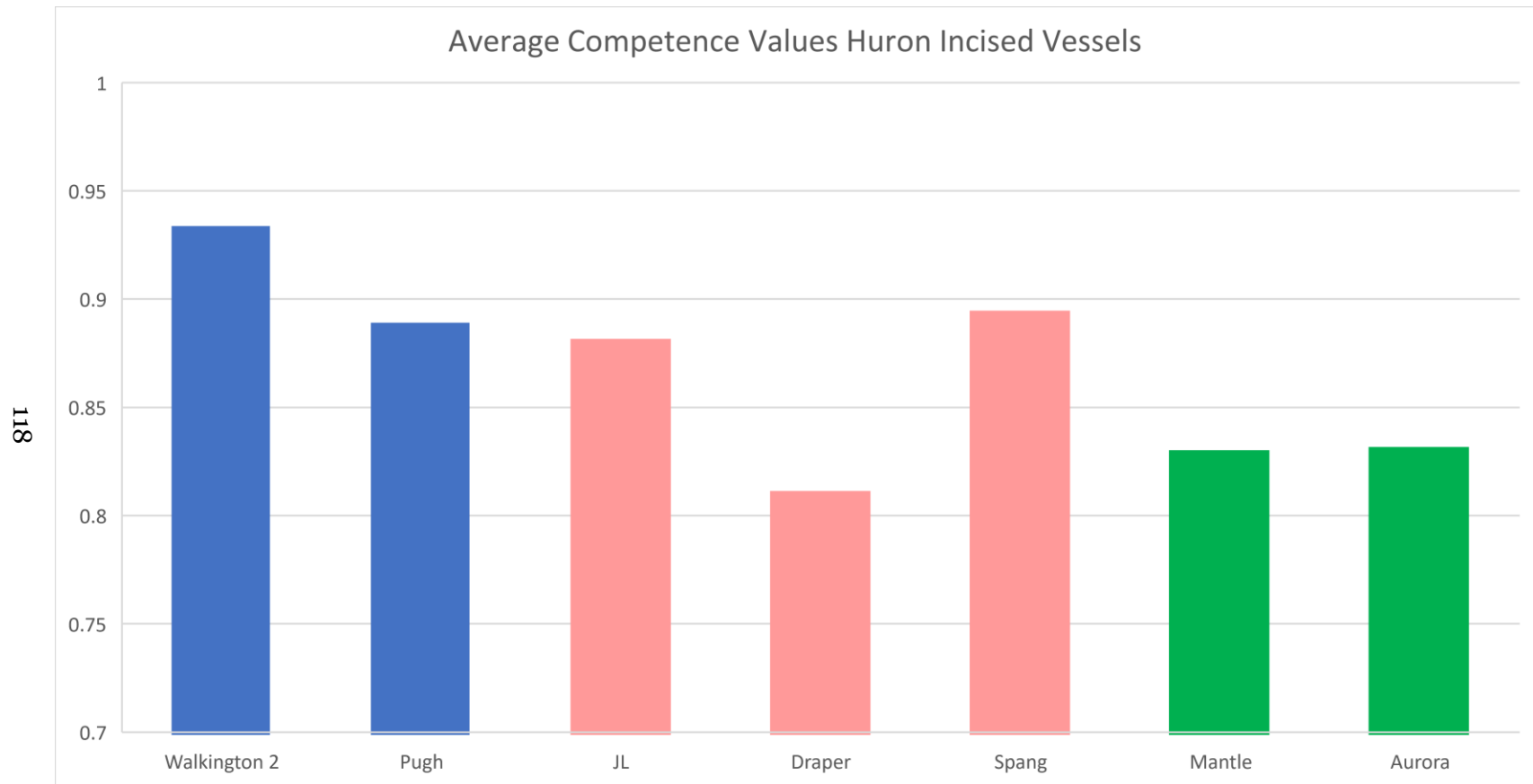


Figure 4.181 Average competence values by site, Huron Incised vessels. Pre-Coalescent sites are blue, Coalescent sites are pink, and Post-Coalescent sites are green.

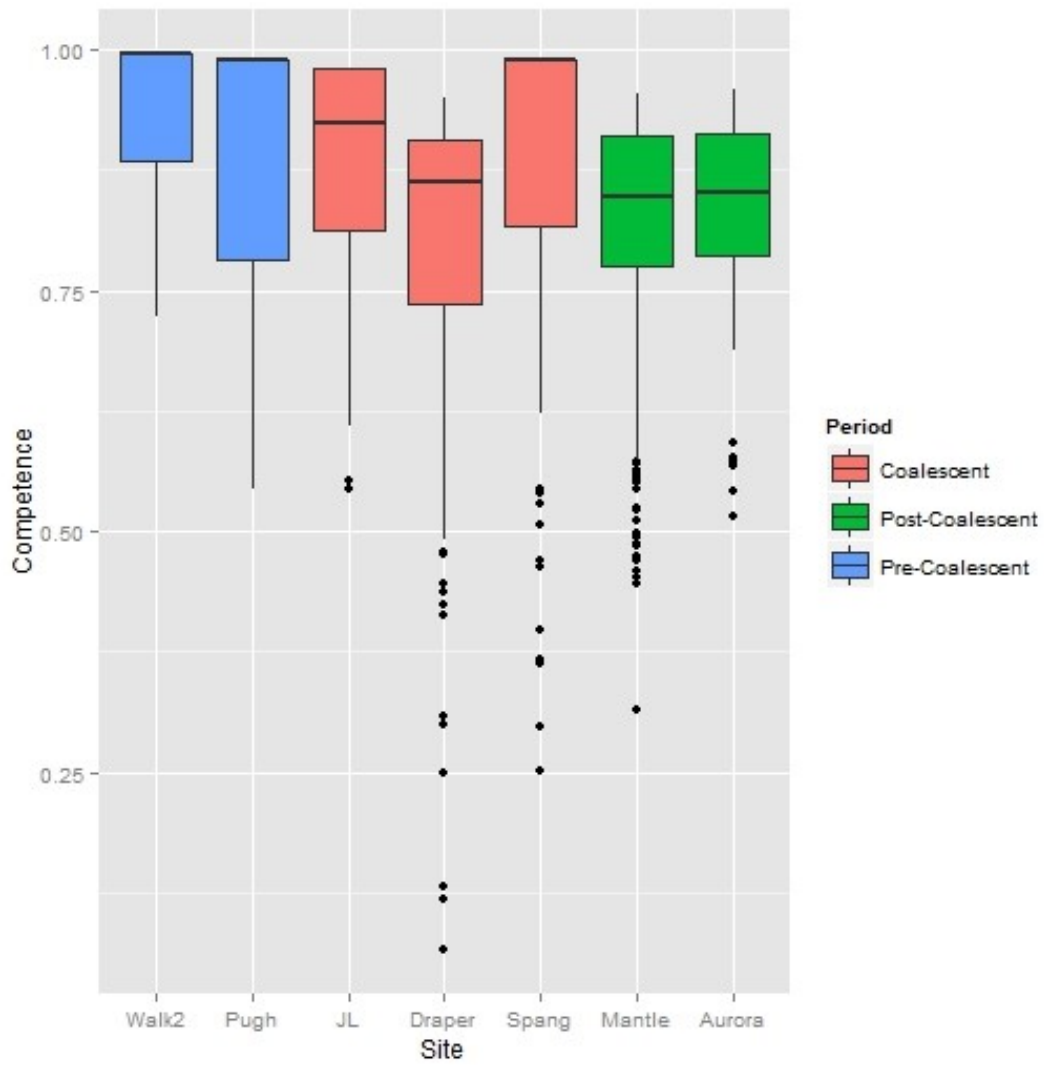


Figure 4.19 Box and whisker plot of competence values, Huron Incised

Discussion

For the common types, the highest competence values were in the Pre- and Post-Coalescent sites. This fits the expectation that pottery, particularly locally made pottery, should be more consistent in villages with evidence of established social cohesion. The average competence value for less common types increases slightly over time as well. There are more different individual types represented among the less common types at Post-Coalescent villages than in the earlier sites and less common types are a larger component of the overall assemblages. The concomitant increase in consistency and typological diversity suggests that the pattern of increasing consistency of decoration is strong. That is, even though there are more different less common types in the Post-Coalescent assemblages, those assemblages are still more decoratively consistent in some respects.

The analysis of exotic types demonstrated the usefulness of the consensus method in that it seemed to identify St. Lawrence and New York Iroquoian types as distinct. The highest average competence value was found at the Mantle site, even though Mantle has more exotic vessels than any other site. Low counts of exotics at other sites could potentially make consensus values for those sites more volatile. However, there is a pattern of slight increase in the consistency of decoration over time. This pattern could also be observed in exotics. It is possible that similar social changes were happening regionally, so a general trend toward consistency in decoration could be occurring elsewhere as well and be represented in both the local and exotic assemblage at the Mantle site.

The consistency of Black Necked remained relatively even over time. In contrast, Huron Incised became less consistent over time. These trends are more significant when you consider that Black Necked becomes less common over time while Huron Incised becomes increasingly common. Huron Incised becomes less consistent as it becomes more common at sites. These two types are the most common local types and contribute significantly to the overall site assemblage.

Summary of Consensus Analysis Results

Overall, potters at the Pre- and Post-Coalescent sites decorated their pottery in ways that were more consistent with one another than did potters at the Coalescent period sites. This is the case even though Post-Coalescent communities had significantly larger populations and pottery assemblages than Pre-Coalescent sites. The meaning of this pattern can be better understood by considering the composition of the assemblages. The average competence values for the common types, which are the bulk of the assemblage are slightly higher in Pre- and Post- Coalescent assemblages (Figure 4.9). Average competence values are relatively even with a range of less than 0.1 among the sites with the average values for Post-Coalescent sites being a bit higher. The two types that comprise the bulk of the common types assemblage – Black Necked and Huron Incised, each follow different patterns. Average competence values for Black Necked remain relatively stable while values for Huron Incised decrease over time. The less common types show a stronger trend of increasing competence values over time with the Walkington 2 and Jarrett Lahmer sites having higher values (Figure 4.12). Exotic types likewise show a slight increase in average values over time (Figure 4.14).

These data indicate that the dip in average competence values during the Coalescent period cannot be attributed to changes in the decoration of any particular type or group of types. This pattern likely results from the convergence of several trends. Increasing consistency among the less common types and exotic types coupled with the decreasing consistency of Huron Incised create a pattern of higher competence values for both Pre- and Post-Coalescent sites. In contrast, no types or groups of types are comparatively more consistent during the Coalescent period.

Discussion

Expectations for patterns of categorical identification for the study sites were presented in Chapter 2 and are summarized in Table 4.11. This discussion contextualizes the results of this consensus analysis; additional discussion of the significance of these patterns is found in Chapter 6 which integrates this information with the analysis of relational identification. The greatest intensity of village scale categorical identification was expected at Pre- and Post-Coalescent villages which have the strongest evidence of social cohesion based on the consistency of decoration. This would be evidenced by an increase in the decorative consistency of assemblages over time (Table 4.12). The consensus analysis did demonstrate that decorative consistency was lowest at the Coalescent period sites. This pattern was further supported by evidence that decorative consistency in the Post-Coalescent sites was higher than Coalescent period sites, even though these later assemblages were composed of more different decorative types, especially exotic decorative types.

Pre-Coalescent	Coalescent	Post-Coalescent	Summary
Shared at community scale at low intensity	Intensity increasing at intra and possible inter-community scale	Highest intensity at community scale or among groups of communities	Increasing consistency of decoration within site over time
		Greater intensity of categorical ties among corporate groups within the community	Increasing consistency of decoration among contemporaneous sites over time (demonstrated in published data)

Table 4.11 Expectations for categorical identification

Most of the discussion thus far has focused on the intensity of categorical identification with respect to scale in one sense of the term as defined in Chapter 2 – the social unit. The other dimension of scale is the number of people involved. The increase in population from the Pre-Coalescent to Coalescent villages suggests even greater significance for patterns of increasing decorative consistency over time. Population is important in three respects. First, the greatest overall decorative consistency is found in the Pre- and Post-Coalescent sites. Since the population of the Post-Coalescent sites was three to four times larger than the population of the Pre-Coalescent sites, decorative consistency would have had to be created and maintained even though many more vessels were being produced and presumably, more potters were making those vessels. These facts suggest consistency in decorative choice was valued and prioritized. This pattern is consistent with the development of more intensive shared categorical ties at the village scale. A greater investment in creating vessels that communicate about shared

ideologies, values, or simply shared community membership would be required as communities grew.

The second point is that the Coalescent period villages are the least consistent in terms of decoration and this slight decline in decorative consistency occurs at the first appearance of the larger villages. In other words, the initial increase in village populations is accompanied by a decrease in decorative consistency. This makes sense, since Coalescent period villages, such as the Draper site, may have been the sites of the initial aggregation of several small villages, each with their own pottery traditions. These data suggest that the intensification of categorical ties takes time and probably significant effort, and thus was not fully accomplished during the occupation of the Coalescent period villages examined here. Of course, it is possible that the material record available is not sufficient to assess that sort of subtle social change. A more detailed examination of evidence from Coalescent period sites may help to clarify these patterns.

Finally, higher levels of decorative consistency at both Pre- and Post-Coalescent sites suggests that these communities were each socially cohesive; however, due to the dramatic difference in population size it is not expected that this social cohesion was created in the same manner. As explained in Chapter 2, both categorical and relational identification contribute to social cohesion. Large or small groups can share categorical identities; however, larger groups tend to be composed of more separate relational networks than smaller groups which can often facilitate direct interpersonal interaction among most group members. These data suggest that ceramic decorative style communicates information about categorical identities that were relevant at the village scale, even as the villages themselves “scaled up” in terms of population. This discussion

will be continued in the next chapter which examines evidence for relational identification.

The other important result that needs additional context is the decorative consistency of exotic types. The highest mean and median competence values, as well as a small range of values, were found at the Mantle site. The Mantle site is an interesting case because, as is discussed in Chapter 3, the assemblage contained more different individual exotic types than comparative sites, however many of these in relatively low counts (see Appendix 1). Why is this assemblage more consistent? One reason is the relatively high count of a single exotic associated with New York Iroquois – Dutch Hollow Notched. The significant contribution from one type, even with other variety introduced from small counts of different types, may be skewing the test. Even with this possibility, there are possible social explanations as well.

In the historic period, trade was largely clan based, with clans favoring relationship with certain long-distance communities over others. For example, a clan might have a strong relationship with Iroquoian communities in the St. Lawrence region or with New York Iroquois villages. Through these relationships, clans would have differential access to exotics goods, including pottery, from these distant communities. At Mantle, I found some differential distribution of pottery types within the site that would support this conclusion (Striker 2013). This point will be examined further in the next chapter, as the pattern is probably driven to a large extent by relational identification.

Conclusion

Categorical identification changed through the period of coalescence as expected. In the small Pre-Coalescent villages, decorative consistency is high. During the Coalescent period, when communities were in the process of aggregating, decorative consistency is lower. The ceramic assemblages of these coalescent communities likely comprised pottery both brought from the parent villages when their residents moved, and pottery made during the occupation of the village, both processes contributing to the observed decorative variability. That decorative consistency then increased in the large Post-Coalescent villages, suggesting that potters in these villages worked together to create shared styles. The results of the consensus analysis support the expectations outlined in Chapter 2 and support the theory that categorical identification significant at the village scale was communicated through ceramic decorative style. The next chapter examines evidence for relational identification evident in the production of ceramic pottery and pipes.

CHAPTER 5

ASSESSING RELATIONAL IDENTIFICATION

Relational identities are drawn from direct, interpersonal interactions either one-on-one or through social networks. Relational identities can be defined in relation to others such as familial roles (mother, sister, brother, father) or they can be defined through interactions with others such as through working relationships or trade partnerships. In this chapter, evidence of variability in ceramic vessel and pipe production is used to assess the intensity and scale of relational identification. A more detailed discussion of the theoretical basis for this analysis is provided in Chapter 2.

Pottery and Pipe-Making in Iroquoian Villages

Despite the extensive historical accounts of life in Iroquoian villages, pottery and pipe production are rarely mentioned. Descriptions by Boucher, Sagard, and Lafitau indicate that pottery was made by women, and Sagard describes vessel forming using a paddle and anvil technique (cited in Martelle 2002:6-9). The current evidence suggests that pottery production in Iroquoian communities was probably accomplished in the same manner as other subsistence and economic tasks. Ethnohistoric sources describe subsistence activities, such as hunting (Biggar 1922:60-61, 82-85), fishing (Wrong 1968 81), and planting and harvesting, as being carried out by men's and women's work parties, perhaps organized at the lineage level. Men would typically accomplish tasks such as hunting and fishing, and women would maintain the extensive gardens and fields. Certain stages of pottery and pipe production such as clay procurement, raw material preparation and processing, and firing would similarly be accomplished by

work groups. Pottery production was probably episodic and seasonal, since it is difficult to fire pottery properly in wet and cold conditions (Allen and Zubrow 1989).

This study includes pottery and pipes made and used in villages that range in population from a few hundred to a few thousand people. Despite this increase in population, there is currently no evidence of specialization in production such as standardization of vessels or pipes (Allen 1992) and specialization is not described in the historical literature. For this reason, I began this analysis with the assumption that pottery production was probably organized in a similar manner within Pre-Coalescent through Coalescent period communities despite population increases; larger communities probably had more potters and pipe makers who perhaps worked in separate groups, but these differences were most likely quantitative rather than qualitative.

Iroquoian Ceramic Pipes

A brief introduction to the characteristics of Iroquoian pottery is provided in Chapter 4, but this section is the first introduction to ceramic pipes. Ceramic pipes are common on fourteenth and fifteenth century Iroquoian sites (Creese 2016). They come in a diversity of forms, from simple undecorated hollow bowls with a stem, to intricate effigy figures (Figure 5.1). Ceramic pipes are classified by type based on the shape of the bowl and the decoration applied to it (Emerson 1954).



Figure 5.1 Examples of pipe bowl decoration. Clockwise from top left: Draper site #51574, Draper site #62306, White site #2338, pipes with corn motif from Mantle site, Mantle site #118251, and Mantle site #12304.

Pipe collections are often variable in terms of production techniques and choices (Braun 2012; Braun 2015; Creese 2016). For example, in the course of this study, I encountered several different techniques for creating the hollow portion of the stem, including wrapping clay around a plain stick, bunches of plant materials, or even woven

plant materials. There is also a variety of finishing techniques including different degrees of burnishing and finer finishing techniques. While some pipes are carefully crafted, others seem to be expediently made with little smoothing or secondary shaping. Such variability in pipe production, in contrast to the relative homogeneity of pottery production, suggests that pipes were made in a different social setting and social context than was pottery. Specifically, pipes are thought to have been at a small scale, by individuals, for specific uses (von Gernet 1982).

Pipe smoking was both a commonplace, everyday activity and part of important social and ritual activities (Braun 2012; Braun 2015; Creese 2016; von Gernet 1982). An earlier analysis (Striker et al. 2017) found differences between pottery produced expediently and pottery that was more carefully constructed, and the same may be true for pipes. Pipes were relatively rare on Iroquoian sites prior to 1200 C.E. From approximately 1280-1400 C.E., the relative proportion of smoking pipes to vessels at Iroquoian sites increased during the fifteenth and sixteenth centuries, the frequency of effigy pipes increased (Creese 2016:30). Keffer (Smith 1991) and Draper (von Gernet 1982), two Coalescent period sites, have large numbers of pipes in many different forms. Such trends suggest that smoking pipes were an important part of the social changes of this period. As described in more detail in Chapter 2, both pottery and pipes are used in this study because of the differences in how they were made and used in Iroquoian communities.

Since pottery and pipes were each made and used in different social contexts in Iroquoian communities, variability with significance for relational identification may manifest in different ways. Some parts of the pottery making process, such as raw material selection and processing and firing were mostly likely accomplished collectively.

Pipes were made in smaller numbers and possibly made in a more individual setting. Pottery was used by everyone to cook and eat communal meals and to store goods. The historical literature suggests that pipes were more personal items, used by individuals in both private and public settings. Despite these differences, as ceramic objects, some of aspects of pottery and pipe production are very comparable. The next section explains how the environmental setting of the study sites contributes to expected variability in pottery and pipe production.

Ceramic Objects and the Environment

To understand the significance of technological variability, especially technological variability related to raw material selection and use, it is important to understand the geological setting within which potters were working. Potters and pipe makers select their raw materials from the environment around them. To know where to locate raw materials with the characteristics they were looking for, potters and pipe makers would need to be familiar with the range of raw materials available nearby and would need to know where different kinds of materials could be found.

Clays and tempering materials would have been encountered during normal activities – working in the fields and gardens, digging pits, gathering wild resources (Gosselain and Livingstone Smith 2005; Michelaki et al. 2015). Female potters would have worked with the local soils and surveyed much of the landscape around a village while traveling to and from their homes to work in the maize fields. Birch and Williamson estimate that by the end of the period during which the Mantle site was occupied, the distance from the edge of the maize fields to the village would have been about 1.6km in any direction (Birch and Williamson 2013a:99-100). Therefore, women

working in the maize fields would be regularly walking, digging in, and exploring around 8km² of land. Potters would then encounter a variety of different possible raw materials that they could choose for their craft. Pipes could have been made by men, or perhaps by women, for personal use or to share with others. So, personal familiarity with available raw materials may have varied more for pipe makers than potters. However, living and working together in the same community, such knowledge would have likely been shared.

Ethnoarchaeological studies demonstrate that potters select clays and tempers systematically, for various reasons (Costin 2000:389). Potters tend to use clay and temper resources that are no more than around 5km distant (Arnold 1985; 2015:16). Furthermore, it is likely that potters also select resources based on their performance characteristics. Often potters identify raw material characteristics based on their feel, smell, taste, and visual appearance (Conneller 2011; Michelaki et al. 2015), in addition to location. Some of the characteristics important to potters may be identifiable in archaeological analyses, but the correlation between potters' criteria and archaeologically identifiable variables is likely to be less than direct.

Geology

The geology of south-central Ontario is complex but generally well understood. The bedrock geology of the province is divided into two broad types of different ages. In the north, the Precambrian crystalline igneous, sedimentary and metamorphic rocks form the Canadian Shield. In the south there are younger Paleozoic and Mesozoic sedimentary rocks; primarily clastic carbonate rocks and shales, these younger rocks

formed in the large marine basin that borders the south end of the Canadian Shield (Thurston 1991) as shown in Figure 3.1 (Chapter 3).

The surficial geology of southern Ontario, like much of northern North America, was heavily shaped by glaciation. The topography of southern Ontario varies from flat plains to rolling uplands and upland ridges and escarpments. These landforms were produced by pre-Quaternary erosion and subsequently shaped by quaternary glaciation, which eroded some areas and deposited sediment in others (Baldwin et al. 2013). The most recent glacial period (ca. 110,000 to ca. 11,700 BP) brought periodic advance and retreat of ice sheets. With each advance and retreat, sediments were deposited in some areas and scoured from others. In the Toronto region, the location of this study, successive deposition of sediments formed till deposits up to 200m thick on top of the Paleozoic bedrock (Eyles and Eyles 2004).

The advance and retreat of glaciers created widespread but irregular deposits of sediment and till across the landscape as shown in Figure 5.2. Ice sheets pick up, carry, and deposit material as they move (Boulton et al. 1985), and in southern Ontario, as the ice sheets advanced southward, they picked up and deposited sediment from the Canadian Shield. This unsorted igneous and metamorphic rock was mixed with younger carbonate and other sedimentary rocks. Eventually, the glaciers deposited long hills of debris (drumlins) and pushed sediment into ridges on the advancing edge of the glaciers (moraine)s. Melting ice from glaciers created rivers and lakes, leaving more well-sorted sedimentary deposits. Eskers are well-sorted cross-bedded sand and gravel layers; kames are mounds of stratified till. Varved lake and pond sediments are repetitive contrasting layers of sandy, silty or clayey deposits. Each of these types of water-related features are found in the landscape of southern Ontario and near the study sites (Figure 5.3).

Together, these processes created a geological landscape with mixed surficial landforms which cross and overlie one another, creating a palimpsest of compositionally and texturally varying landforms. Along with ongoing erosion, sedimentation and deposition, these forces created distinctive soil complexes (Baldwin et al. 2013) resulting in deposits of clayey soils and natural clays suitable for pottery production that vary in their specific textural and compositional properties scattered across the landscape depending on their parent material contributions and soil formation related characteristics specific to their genesis and history. Clays located near to one another on the landscape may share the same mineralogy but have different characteristics. For example, a clay formed in a glacial lake bottom may be varved, while a clay with the same composition made from the same parent material found in a streambed or sandy moraine deposit may have a different texture and evidence of changing depositional conditions.

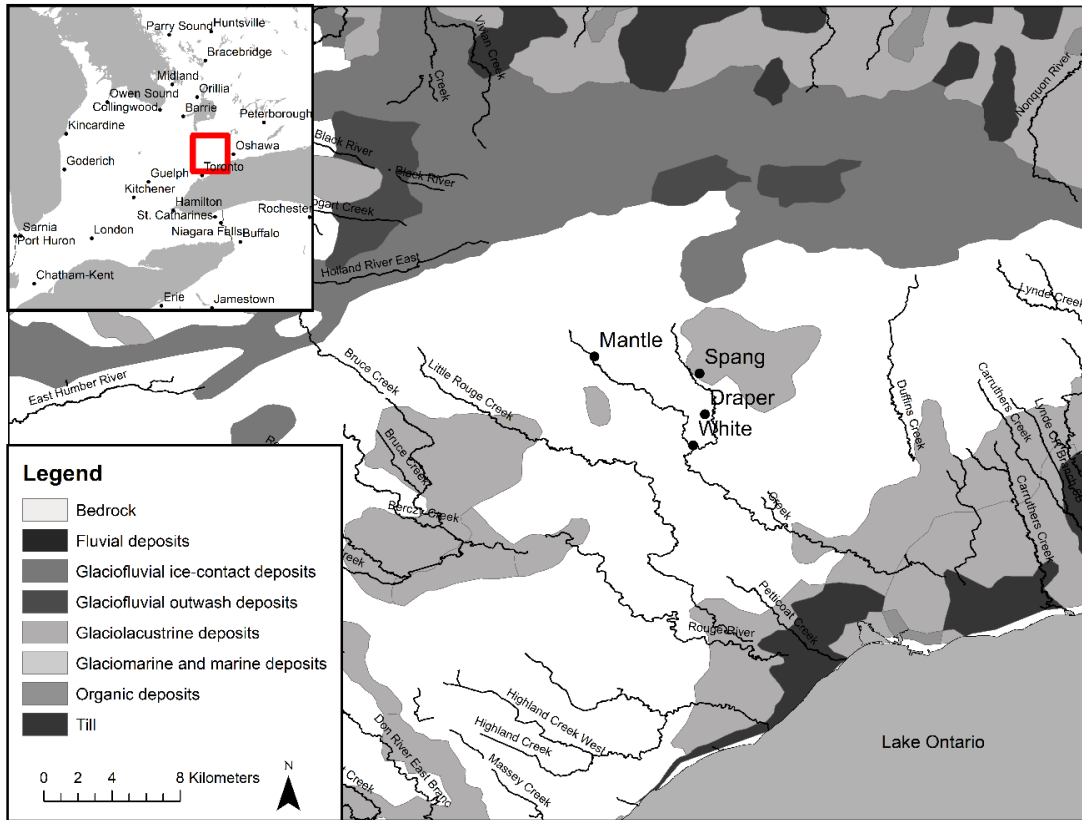


Figure 5.2 Surficial geology of study site region (Striker et al. 2017;57). Data from the Ontario Geological Survey (1997), Esri, TomTom and contains information licensed under the Open Government License – Canada.

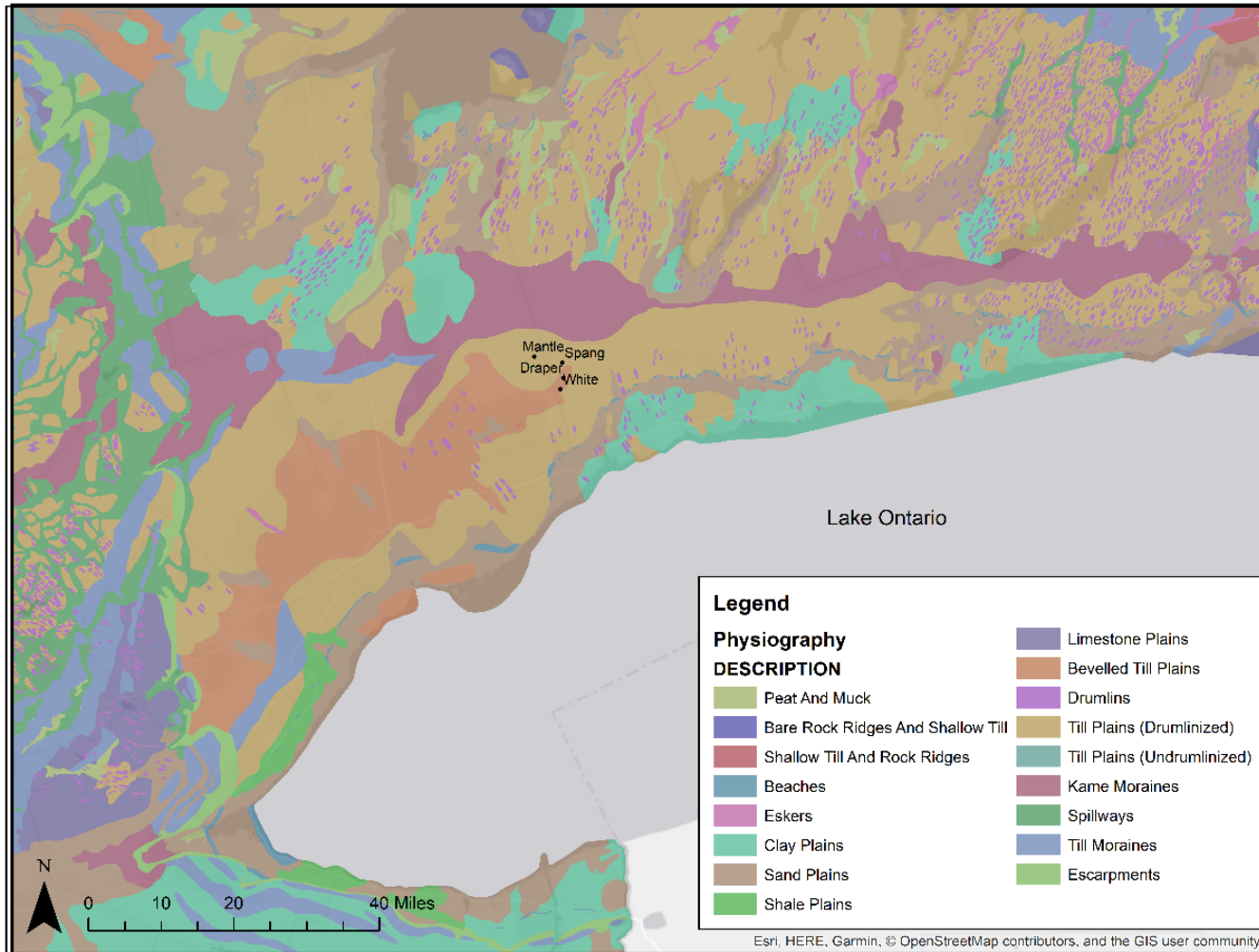


Figure 5.3 Glacial physiography of study area. contains information licensed under the Open Government License – Canada.

Studying Clay and Tempers in Ontario

The geological landscape of Ontario is complex, and quantifying this variability is a challenge. Even considering just south-central Ontario, the data do not exist at a scale that is necessarily helpful for understanding pottery and pottery production. Mining aggregate and clays has been a large industry in Ontario, and so the government and mining companies have mapped clay, gravel, and shale deposits extensively (e.g., Guillet 1967; Guillet and Joyce 1987; Hewitt and Cowan 1969). Geological surveys and maps document the boundaries between major geological units and formations, as well as lithological and textural variation in specific deposits based on regional sampling. These surveys were intended to document variation at a scale relevant to these industries; however, this is quite different from what would be important to a potter gathering locally from varied deposits.

Archaeologists, and presumably ancient potters and pipe makers, are interested in more local scales of variability. Potters and pipe makers would also be less concerned with quantitative or scientifically accurate descriptions and more concerned with visual, tactile, and other characteristics of clays and sediments relevant for pottery production. Importantly, these types of characteristics often vary at a scale much smaller than that recorded by industrial surveys. In surveys of clays around the Mantle, Spang, Draper, and White sites described below, considerable textural and compositional variability was observed.

Although several recent studies have examined technological characteristics of Iroquoian pottery, there is only a small amount of comparative data. Ontario Iroquoian pots tend to be tempered with crushed granite or granodiorite with a variety of different textures, typically medium to coarse. At the Fonger (Holterman 2007), van Beisen

(Schumacher 2013), Holly (Braun 2015) and Antrex (Braun 2010) sites, the composition of temper varied on a spectrum of granite-granodiorite. Granite and granodiorite are both commonly found in the glacial deposits of the region. The primary difference between these two rock types is the relative proportion of feldspar and amphibole, with granite tending to have more feldspar. Mineralogical differences result in granite having a pinker color and granodiorite being darker with a salt and pepper appearance. As discussed below, the analysis done as part of my research also found granite and granodiorite temper.

Clay Survey

Linda Howie, and Sherman Horn and I, conducted a survey of clay resources in within a few hundred meters of each study site. Previous clay surveys by Williamson and Carnevale at Mantle (ASI 2012), and by Bohdanwicz at Draper project (1978) provided some guidance, suggesting that we would find a great deal of variability in clay deposits – which we did. Clay samples were taken from the vicinity of the Mantle site at the time of excavation by Andrea Carnevale and Ron Williamson of Archaeological Services (ASI 2012). They sampled the bank of Stouffville Creek adjacent to the occupation area. In her initial characterization of the Mantle ceramics, Howie did not find any ceramics made of clays that exactly match these clay samples (Howie 2012) suggesting that the clay deposits in this area are quite variable, both vertically and horizontally.

The Mantle site has been completely excavated and a subdivision and park now stand where the site once was. We sampled in the park area, along the creek where the soil had not been disturbed by construction. Our findings were largely in line with what Carnevale and Williamson found earlier, specifically that the riverine clays found around

the Mantle site varied in terms of the density, sorting, and texture of the inclusions. A brief clay survey was conducted during the initial excavations of the Draper site, but we were unable to locate clay fitting that description in our search of the Draper area, further demonstrating great local diversity in clay deposits.

Samples were taken from the vicinity of the Mantle, Spang, Draper and White sites. Clays were collected from terrestrial upland sources as well as from the banks of the creeks found adjacent to each site. Collection sampled different deposits, considering both horizontal and vertical variability. From each site, several natural clay samples, as well as gravel samples, were collected and the coordinates of these sampling locations recorded using a handheld GPS unit (Figure 5.4). Full descriptions of these clays will be included in forthcoming petrographic analysis.

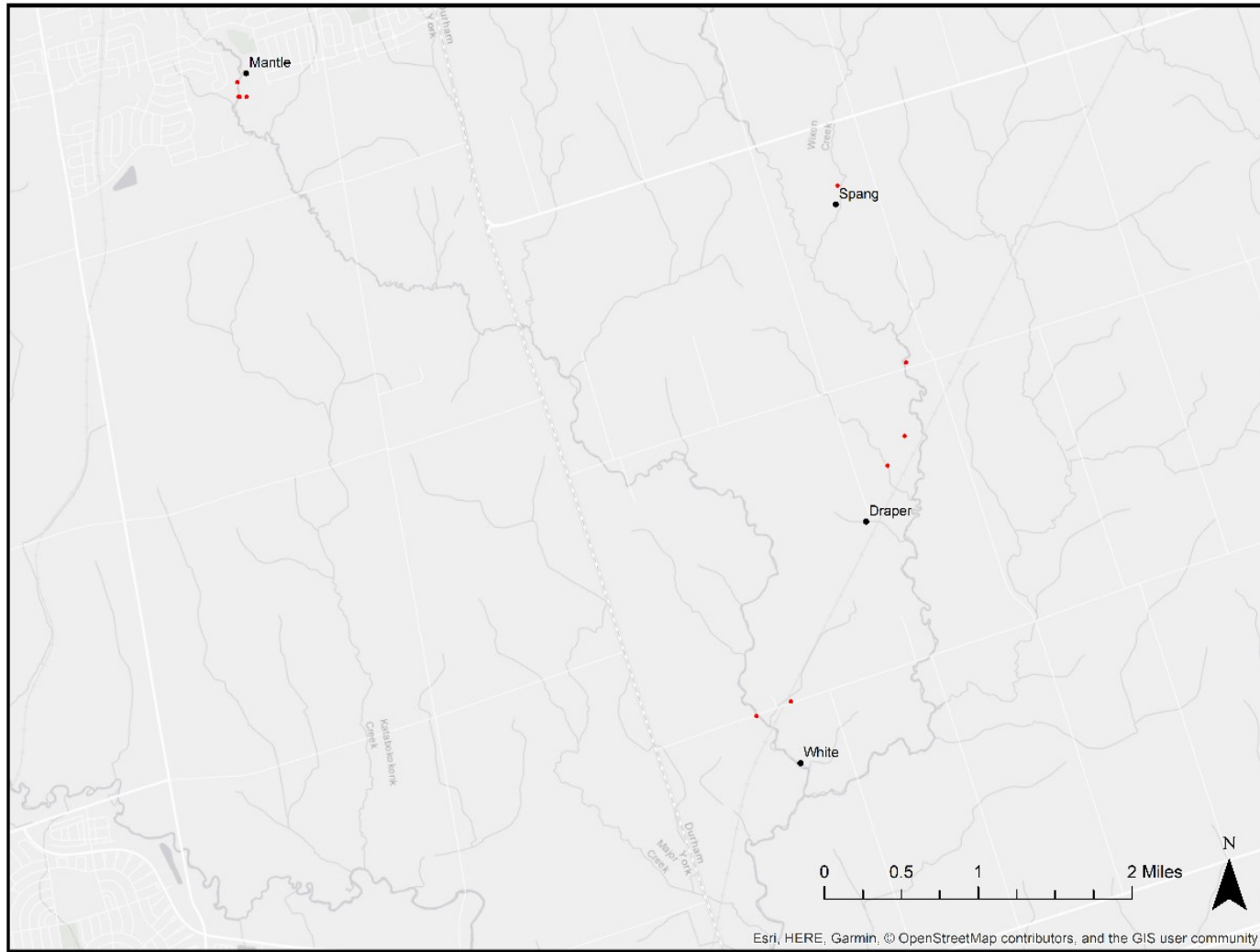


Figure 5.4 Clay sample locations

Building the Methodology

Together, ceramic pottery and pipes can reveal complementary information about social identification in different social settings. One goal of the methodology developed in this chapter is to characterize ceramic pottery and pipes using the same procedures and attributes so that data are comparable. This approach is similar to Braun's (2015) and allows cross-class comparisons of technological differences, especially those related to firing, raw material selection and processing, and provenance. Making comparisons between pottery and pipes is important for several reasons. First, examining both classes of clay artifacts provides some information about the range of clays and tempering materials utilized by residents of each site. Second, it allows comparison of practices between these classes in terms of consistency. Third, with additional comparative data, it may be possible to determine provenance and thus compare how pottery and pipes were moving through trade.

In developing this methodology, I considered incorporating many different features of ceramic pottery and pipes that provide information on human behavior. To assess the intensity and scale of relational identification, the methodology needs to provide data that can be used to assess variability in production through time. Many attributes have been linked to relational identities or communities of practice in Iroquoian communities, although many of these, such as vessel profiles, rim shaping techniques, pipe stem shaping, and finishing techniques, are not comparable on pottery and pipes. For these reasons, the methodology developed here focuses on evidence of firing, raw material selection, raw material processing, and raw material provenance. It is important to identify whether technological variability is present in pottery made locally, or whether objects made non-locally contribute more variability to the collection.

Therefore, while it is not a primary goal of this analysis to identify the provenance of vessels and pipes, evidence of non-local provenance will be considered where possible.

Given the research potential for technological aspects of Iroquoian pottery, my research goals included development of a methodology to quickly and efficiently record data on the characteristics of Iroquoian ceramic clays and tempers using a standard USB microscope, such as a Dinolite. These microscopes are easy to find and relatively inexpensive. The methodology was designed to be paired with limited ceramic petrography or other similar more intensive technique. Samples were selected for thin section petrography but this work was not complete at the time that this dissertation was written.

Several recent studies have used a similar approach and informed my methods. Like Braun (2012; 2015), I developed my approach specifically to use with thin section petrography because I this method provides the greatest range of additional information. The data collection strategy was modeled after Whitbread's (1989) descriptive approach to ceramic petrography. This is a qualitative approach to ceramic characterization that is derived from techniques used to characterize soil micromorphology. Whitbread's approach incorporates identification of rock and mineral components of clays and tempers, but also voids, crystalline structures, and other structural features of the ceramic body. This holistic approach provides evidence of raw material choice as well as differences in production and use.

My methods were developed based on several sources of information, including the few previous studies of Iroquoian ceramic clays and tempers, the geological context presented above, and previous in-depth previous petrographic work completed for the Mantle site by Howie (2012). Together, this background gave me enough information to

make some inferences about what I was most likely to observe in my sample collections. Specifically, I was able to build a list of previously observed characteristics of the clays (e.g., texture, inclusions, voids, mineral content, layering), most commonly used tempering materials, variability in technological choice such as raw material selection and processing. With this list in hand, I used the Prehistoric Ceramic Research Group (PCRG) guide to ceramic analysis for direction in how to code these attributes as variables (2010). I paid special attention to the limitations of the USB microscope. It is not possible to reliably identify certain rock and mineral types visually, without additional testing, so I was careful to code certain attributes descriptively instead of identifying them definitively. For example, certain inclusions were identified as “white grains.” These are probably quartz, but without additional testing it is not possible to distinguish them positively as quartz.

The methods were tested using a sample of 62 sherds from the Mantle site that Howie had previously described petrographically (2012). Howie uses an adapted version of Whitbread’s descriptive approach to characterize ceramic fabrics in detail. All sherds previously examined by Howie were examined blindly, so that the findings could be compared with Howie’s descriptions. Working iteratively, I corrected, streamlined, and refined the list of attributes I selected and how I coded them, resulting in a system that includes only features of ceramic clays and tempers that I can consistently and accurately observe with the USB microscope.

Some, but not all, of the variability that Howie observed in thin section under polarizing light is also observable using a binocular microscope. The size, shape, sorting, roundedness, and density of natural and added inclusions can be described with some degree of certainty. Howie also observed a bimodal distribution in the size of clay

inclusions suggesting that both natural inclusions and tempers added by potters were present in some vessels (2012). This variation also could be characterized with a standard microscope. Poor visibility due to very dark ceramic fabrics made it difficult to observe detailed characteristics of the clays and inclusions in some cases and was noted. The roundedness and sorting of very small inclusions were difficult to observe at times, especially for those inclusions smaller than 0.1mm since that size is near the limits of clear viewing with the Dinolite microscope.

The identification of rock and mineral components of tempers and natural clay inclusions is more difficult. Most of the common inclusion types can be identified accurately; these include granite, granodiorite, potassium and plagioclase feldspar, mica, amphibole, and the occasional limestone inclusion with accuracy. More uncommon rock and mineral components, such as iron nodules, are not so easily observed using a standard microscope. My analysis recorded two sets of observations for inclusions, color and likely rock or mineral type. This system would make it possible to easily update my database when more accurate identifications became available later on through the use of complementary techniques.

Sampling Design

Sampling for this analysis worked to balance the requirements of the research question and the limitations of the samples available. The sampling procedures are explained here, beginning with a description of the available data for each site, and then a description of my priorities in selecting samples for microscopic analysis.

Sampling the Sites

In Chapter 4, all of the available decorative data from each site were used to address categorical identification. Given the intensive nature of data collection required in this chapter, samples were selected from each site. The Spang, Draper, and White site collections are all maintained by the Canadian Museum of History (CMH) in Gatineau, Quebec, CA. There were varying amounts of information available for those three sites. All three have catalogs with provenience information by object, including cartesian coordinates as well as house and feature numbers. Even so, it was not always possible to assemble all of the provenience information because lists of feature numbers and descriptions could not be located for the White, Draper, and Spang sites. Thus, although I can identify items as having been found in a numbered feature, it is not clear if that features was a small pit, posthole, hearth, etc.

The procedure is as follows: percentages of decorative types in each collection were determined based on the published data. For each sample-set, a representative percentage of each decorative type was calculated and used to set a type quota for each site. Once the type quotas were calculated for each site, a summary list of proveniences was created and grouped by decorative type. Proveniences were prioritized as follows: 1) features within a longhouse; 2) houses or middens (but not from an identified feature); 3) general provenience such as grid square coordinates. Surface collected items and items without diagnostic decoration were avoided. Items were selected from each provenience at random proceeding through the priority list until each type quota was filled. Examination of the objects revealed that some items were too small to analyze; these were replaced following the same sampling procedure. The following sections describe in detail the data available for each site, including contextual information,

which is important for both sampling and later interpretations. The total sample counts are provided in Table 5.1.

Type	White	Draper	Spang	Mantle
Vessel	233/13.8%	143/6%	129/11.7%	289/14.5%
Pipe	41/27%	160/4%	33/51.5%	91/16.6%

Table 5.1 Sample size by site shown as count/percentage of total

White

Sampling for the White site was the most challenging because only summary decorative type data were available; there were no decorative type data for each item by catalog number. Since it was not possible to sample by type, the loan and subsequent sample were decided based entirely on provenience. White was sampled by provenience, determining the number of items by unit on the total estimated vessel count by unit.

Draper

Given the occupational history of the Draper site, it was important to sample carefully from different village segments. Since sample size is critical to establishing any between-segment differences, samples were limited to Segments A, B, and D as shown in Figure 5.5. To do this, the available sample assemblage was grouped by provenience and sampled proportionately by type in each segment. Items were selected from numbered features within houses wherever possible, although a complete feature list was not available, so it was not always clear what each feature was. Regardless, items found in features were more likely to be in an intact archaeological deposit than items not found

in features and so they were preferentially selected. For various reasons of curation, the CMH was required to make some substitutions to the sample list; these were made based on the parameters of the sampling strategy. Sample counts from each village segment at Draper are shown in Table 5.2.

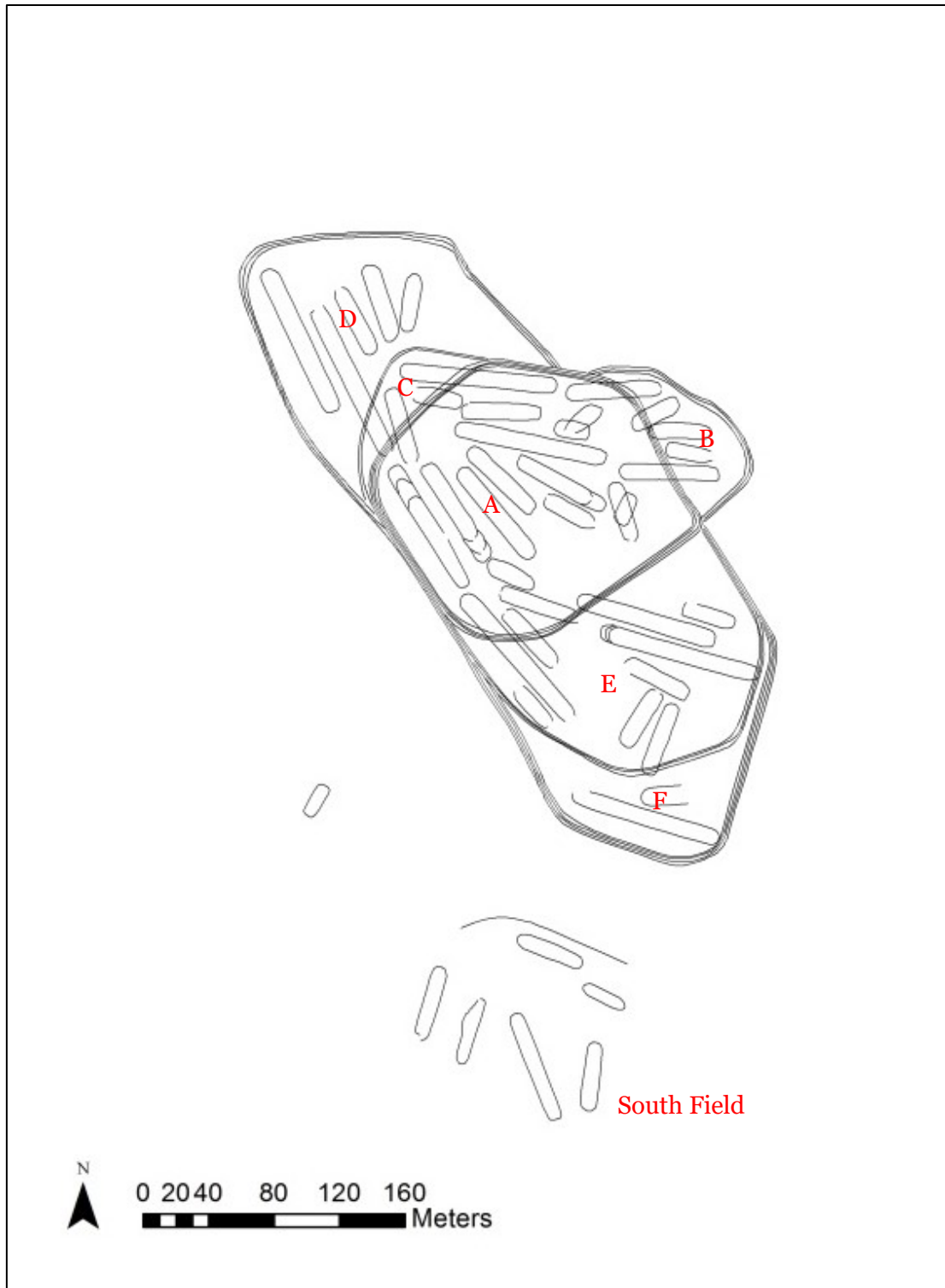


Figure 5.5 Draper site segments. Redrawn from Finlayson 1985 with supplementary data from David Smith.

	Segment A	Segment B	Segment D
Vessels	113	30	14
Pipes	96	41	11

Table 5.2 Sample count by Draper site segments

Spang

The Spang site was not fully excavated, so despite careful sampling, the data collected are limited regarding spatial patterning. The same sampling procedures were used for Spang as for White and Draper. Like White and Draper, it was possible to identify objects that were from feature excavations but not always to identify the features that they came from.

Mantle

The large Mantle site, excavated with excellent modern and complete records, was the simplest site to sample. I also had physical access to the Mantle collection while it was housed at the Toronto offices of ASI. Mantle was sampled using the procedures above with few deviations. Almost every item sampled were from a feature context associated with a house, or from a midden feature. Exceptions were made only if the analyzable samples of a specific decorative type were found in less than ideal contexts.

Data Collection

All samples were photographed, with permission from the CMH, at least twice before any modification. Wherever possible, the rim diameter, percentage of rim completeness, lip thickness, collar thickness, and collar height were also measured, although not all of those measures were used in this analysis. A small, clean break was made with pliers on the pottery or pipe fragment, along an already broken edge near the lip of the object when possible. If some unrepeated decorative element, encrustation, or other unique feature would be damaged, the break was made in another location.

The sherds were examined in natural daylight with a daylight spectrum lamp for additional illumination. This natural bright light was essential for consistent observations. A Dinolite USB microscope at magnifications ranging from 10x-250x and in plain and occasionally cross polarized light was used to examine the details of the clay and inclusions. It was necessary to change magnifications frequently to investigate particular features. Several photos of each sample were taken at low and high magnification in representative areas of the fabric, as well as photos at higher magnification to document unique features or those that could not be positively identified. These photos proved to be valuable for refining my analysis as I learned and gained experience in identifying features.

For the most part, the analysis was visual. A full list of attributes recorded and their definitions is provided in Appendix 2. Appendix 3 provides example descriptions of pottery and pipe samples with images showing the range of variables discussed in the following section. One possible feature of significance identified by Howie's analysis was the presence of calcitic inclusions in the clays (2012). Howie found that the local clays sampled from around the Mantle site were calcareous, while a majority of the pottery she

analyzed was made with non-calcareous clays. These differences are identifiable using a standard microscope to the extent that calcareous inclusions could be seen and positively identified. In this analysis it was possible to identify some sherds made with calcareous clays by the presence of calcareous inclusions that were large enough to see and observe reacting to a HCl test. However, a number of sherds that Howie identified as having been made with calcareous clays did not react to the application of a small amount of 10% HCl solution, while others that were not made with calcareous clays did react. Calcareous deposits in the clay may not be predictably accessible to the HCl in fired clays. The unexpected reactions may be a result of secondary mineral deposits on the surface and in void spaces. Braun has likewise observed that HCl is an unreliable test for this fired pottery for the same reason (2015). It is likely that where my analysis identified calcareous inclusions, they were indeed present, but where calcareous inclusions were very small, they probably were not identified.

Findings

Table 5.3 summarizes the expectations for relational identification through the sequence of coalescence. Overall, production differences between corporate groups are expected to remain consistent or decrease slightly, and larger communities with more separate corporate groups are expected to have slightly more variability in production. These expectations were generally borne out by patterning in several variables. The following sections examine and contextualize these patterns in more detail.

	Pre-Coalescent White	Coalescent Draper	Post-Coalescent Spang/Mantle	Data Expectations
Relational Identity	High intensity among extended kin households and groups of households within community	High intensity among extended kin households and groups of households within community	High intensity among extended kin households and groups of households within community Developing greater intensity of relational ties among corporate groups within community Decreased intensity at the village scale	Production differences remain consistent or decrease slightly among corporate groups. Larger communities with more separate corporate groups may have slightly more variability in production

Table 5.3 Expectations for relational identification

Pottery variables

Rim Diameter and Lip Thickness: Rim diameter and lip thickness are correlated with vessel size. Rim diameter was not recorded for every sherd because some were not measurable (e.g., warped reconstructions or castellations) and some were too small. As is shown in Figure 5.6, most pots were 15-25cm in diameter. Rim diameter skews slightly larger at the White and Mantle sites than at the Draper and Spang sites. The range of values for lip thickness was larger at the Mantle site than at the earlier sites as shown in Figure 5.7.

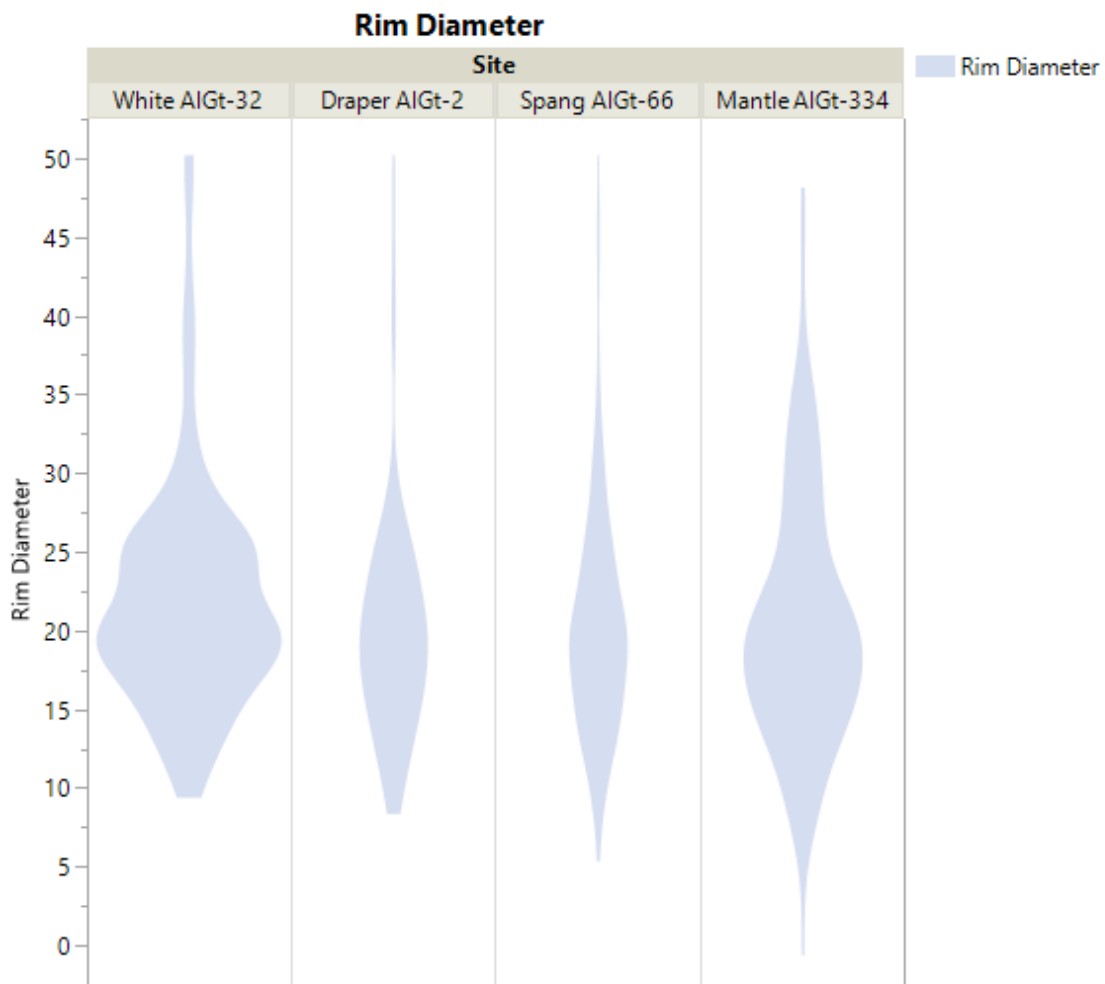


Figure 5.6 Rim diameter in centimeters by site, weighted by percentage of total

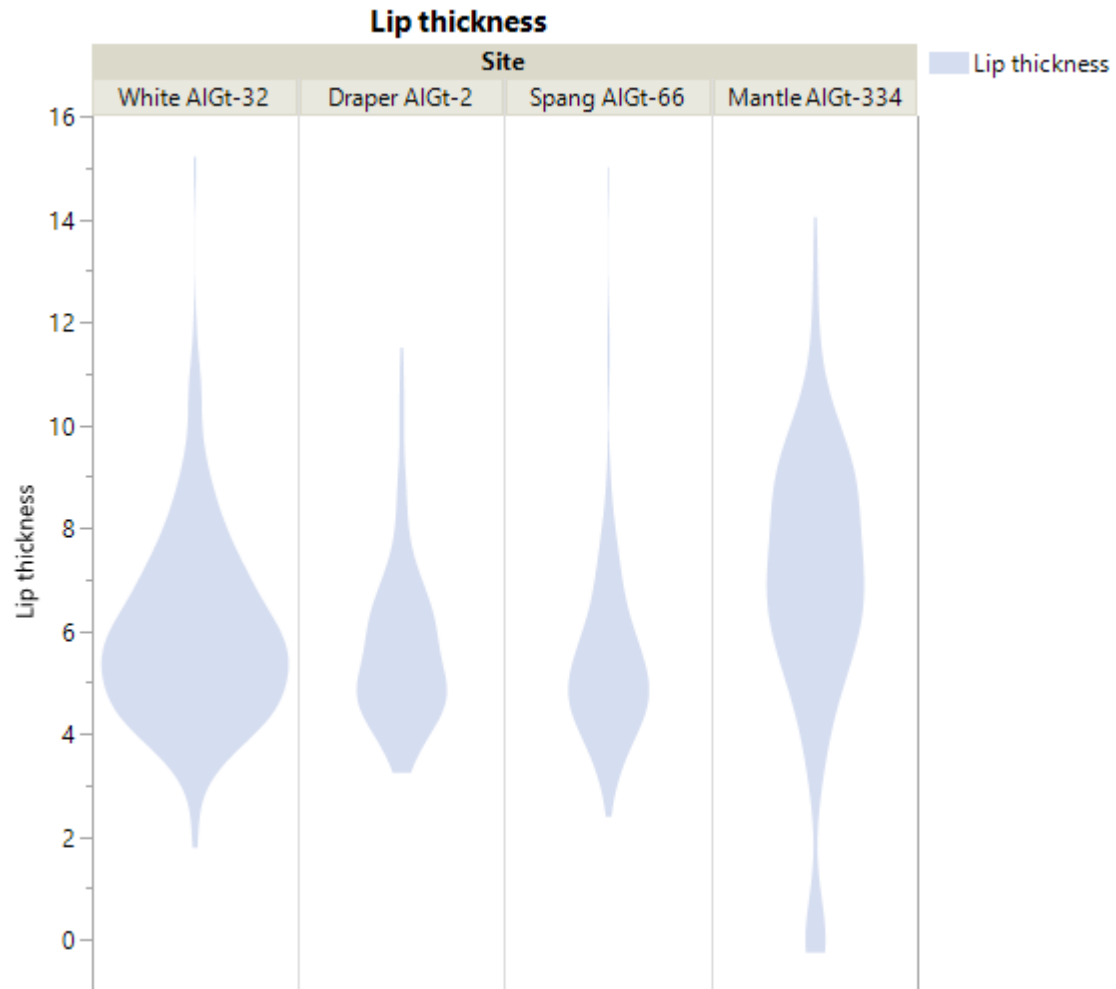


Figure 5.7 Lip thickness in millimeters by site weighted by percentage of total

Firing: Firing was largely consistent across sites with two notable exceptions (see Figure 5.8). First, the core, interior margin, and interior surface of sherds from the White site were commonly oxidized, while those from the Draper, Spang and Mantle sites were more commonly incompletely oxidized, indicating a difference in firing technique at White as compared to the later sites. Over time, there is a slight increase in the proportion of vessels with cores characterized as irregularly fired, meaning that the cores were not evenly oxidized. At the Mantle site, 80% of the sherds examined were irregularly fired at the core.

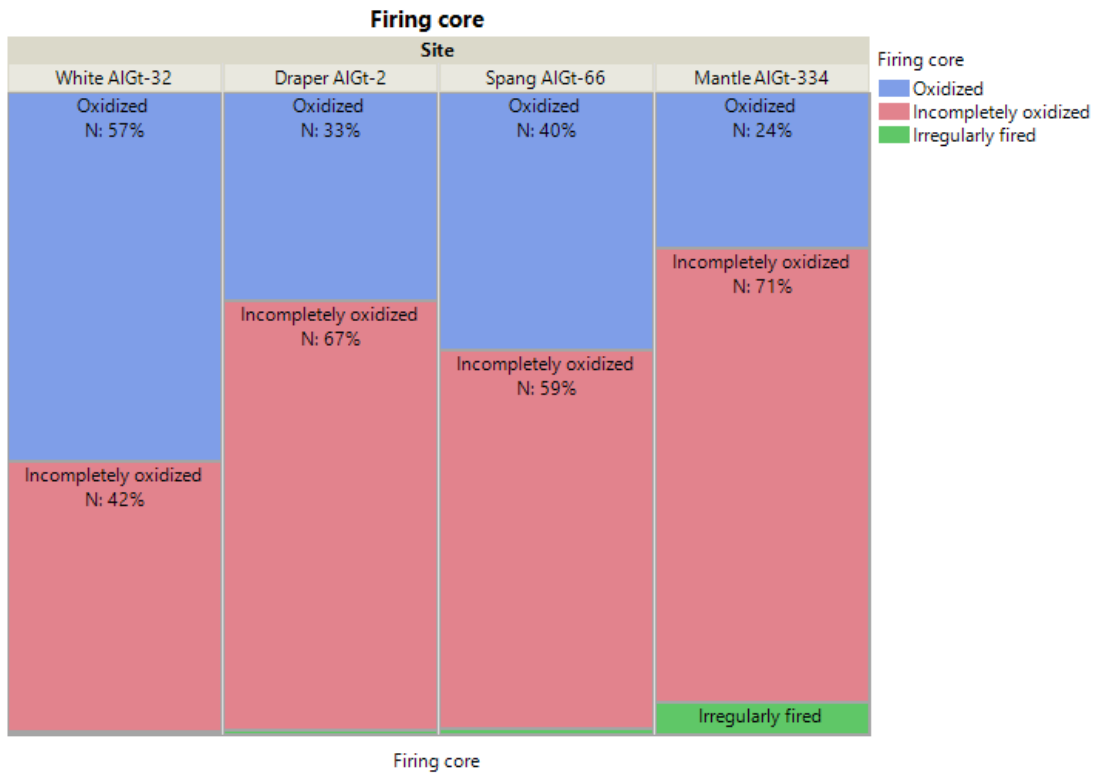


Figure 5.8 Vessel firing at core by site.

Hardness: Most vessels were medium to soft. As is shown in Figure 5.9, the largest proportion of both hard and soft vessels were found at the Mantle site. Overall, there is more variability in hardness at the Mantle site than at any of the three earlier sites.

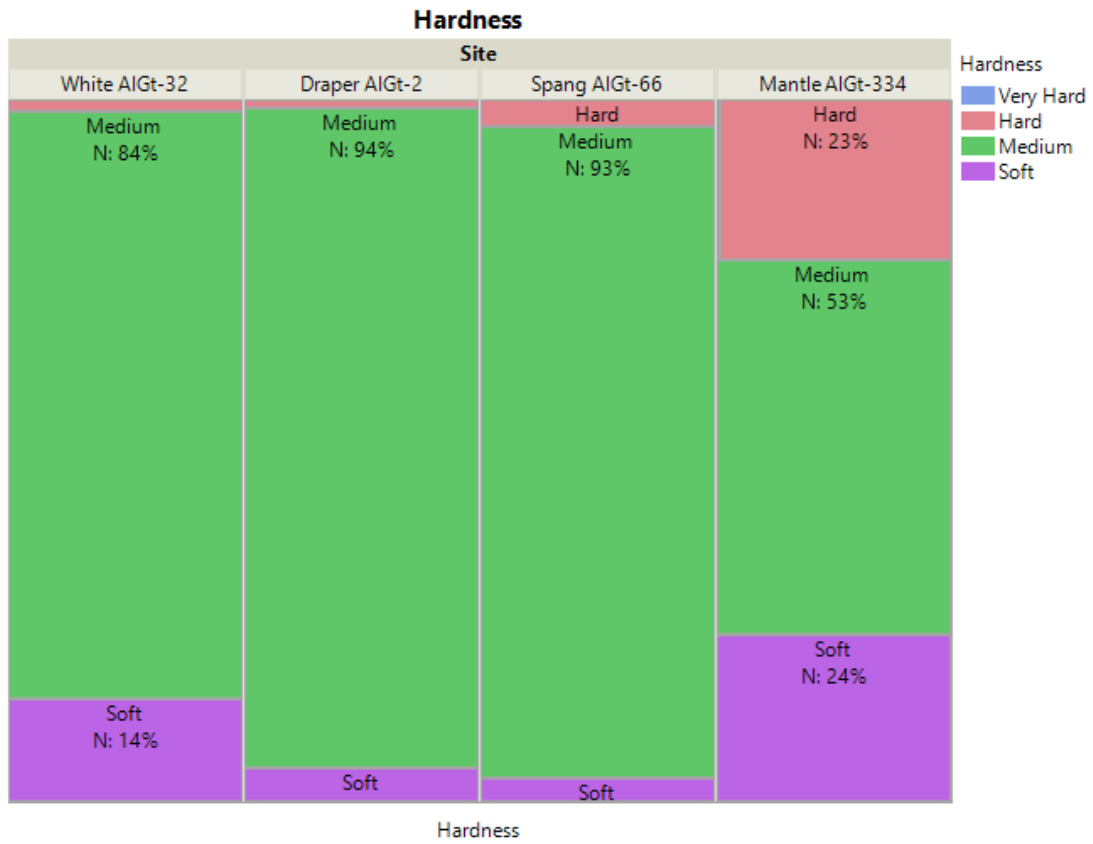


Figure 5.9 Vessel hardness by site

Compaction/Voids: Compaction describes the degree to which vessel walls were worked and compressed, and results are summarized in Figure 5.10. The voids variable describes the abundance of voids, typically channel-shaped and visible in the walls of the vessel (Figure 5.11). Together these variables characterize the extent to which a vessel wall was worked, compressed, and small air pockets worked out of the clay. The vessels from the White site were more heavily worked, with higher compaction values and fewer channel shaped voids. There are more lightly worked vessels, with lower compaction values and more channel voids at the Mantle site than the earlier sites but this difference is slight.

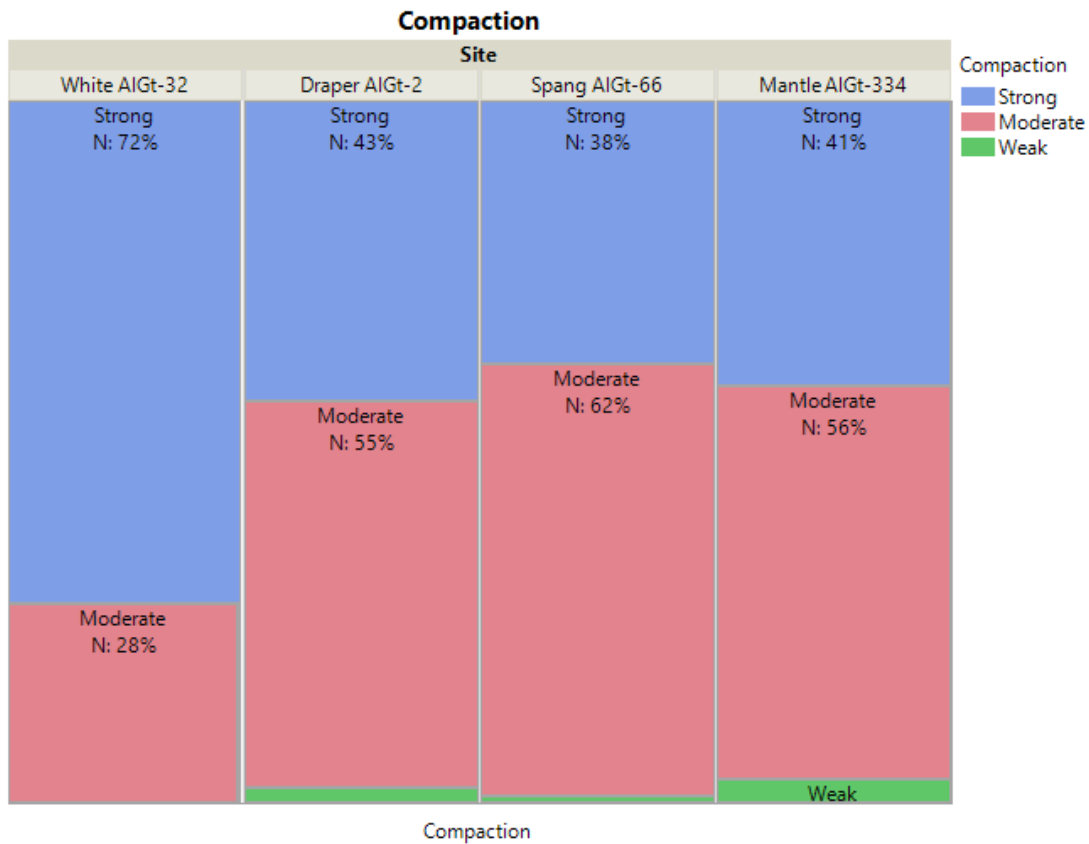


Figure 5.10 Vessel wall compaction by site

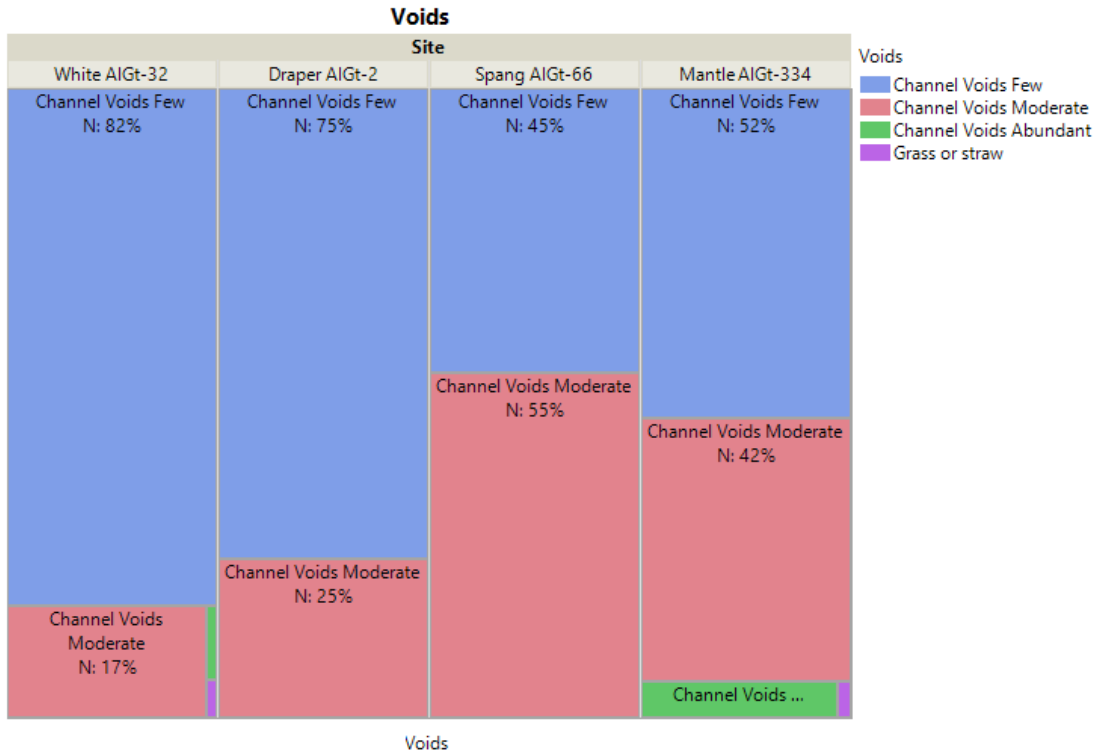


Figure 5.11 Abundance of voids by site

Texture: The pottery from the Mantle site had a more granular texture, while the earlier sites were predominantly smooth (Figure 5.12).

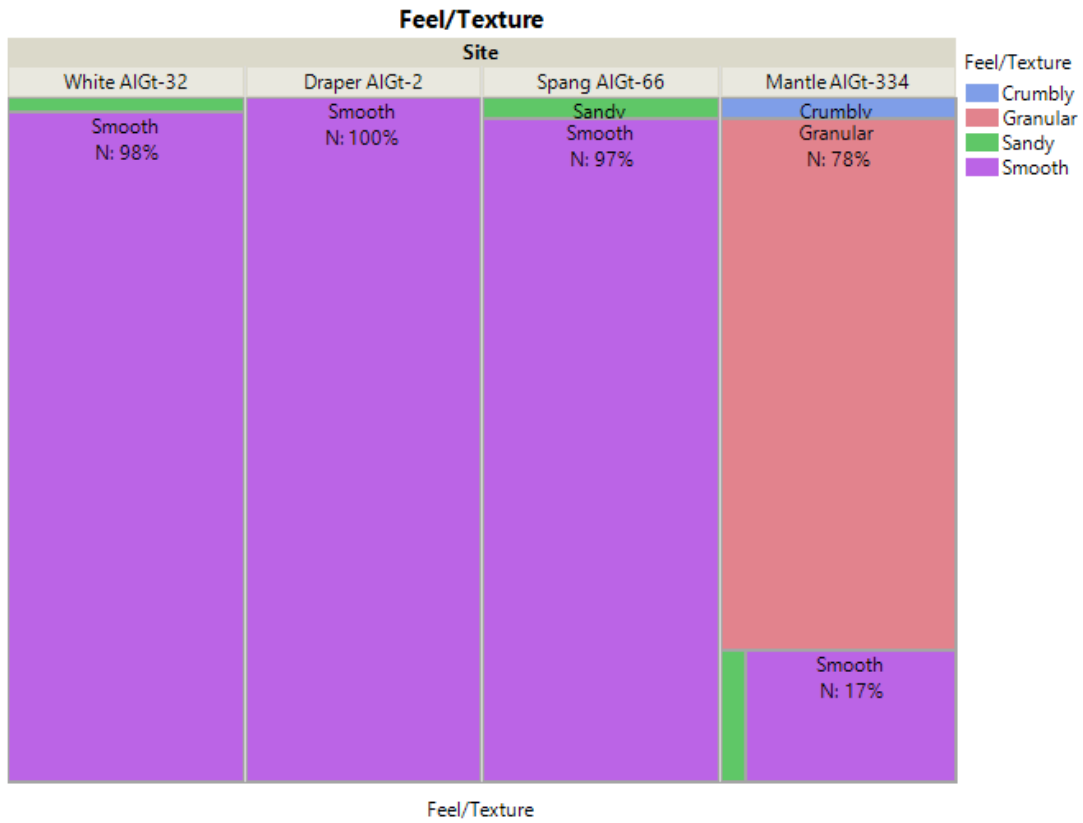


Figure 5.12 Vessel texture by site

Inclusion Max Size: The maximum size of inclusions is a measure of the maximum temper size. If the largest inclusions appeared to be natural clay inclusions, that was noted separately. The size of temper inclusions is larger at the later sites than at the earlier sites (Figure 5.13). Both the largest and smallest temper sizes are found at the Mantle site. Interestingly, the most finely tempered vessels are also found at the Mantle site.

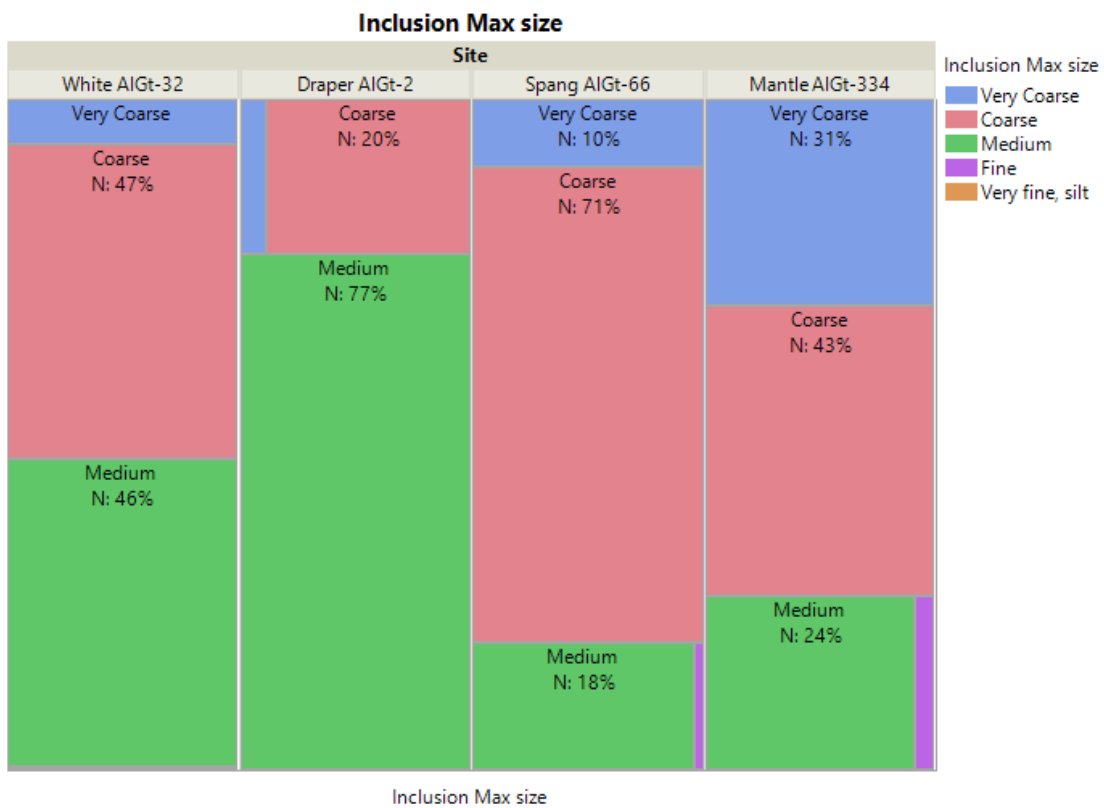


Figure 5.13 Vessel inclusion maximum size by site

Inclusion Sorting: As is shown in Figure 5.14, inclusion sorting was most commonly poor. There is slightly more variability in sorting at the Spang site than at any of the other sites.

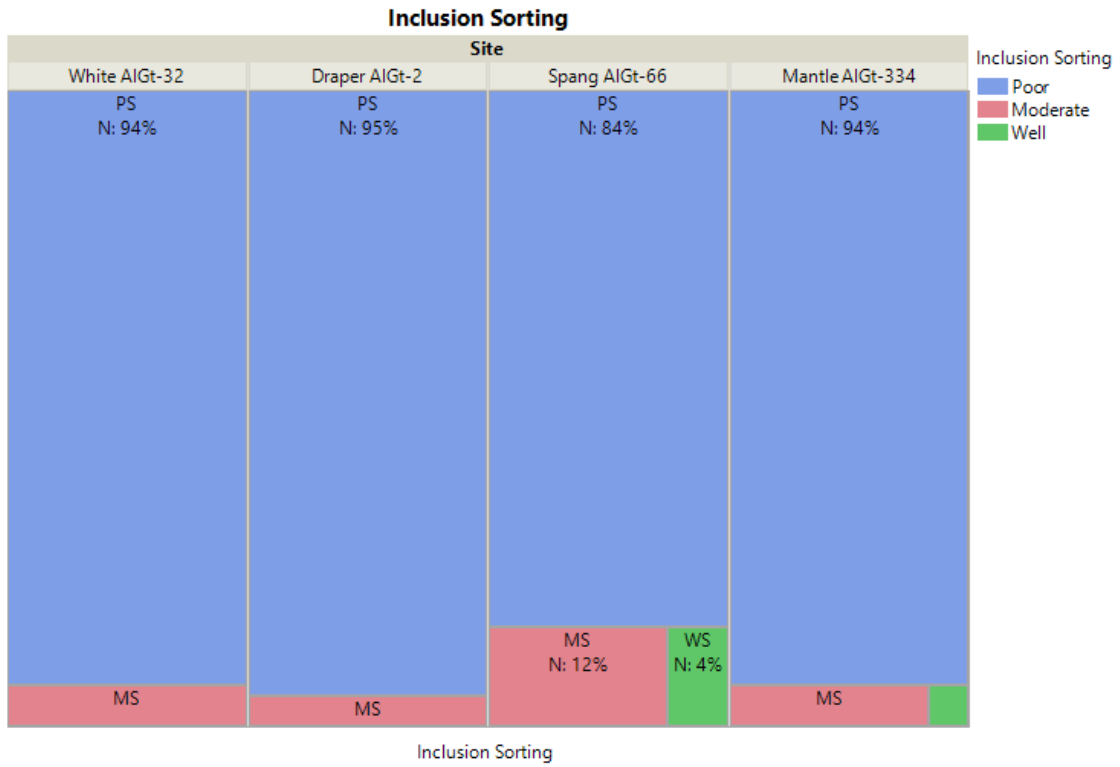


Figure 5.14 Vessel inclusion sorting by site

Inclusion Density: Inclusion density was relatively evenly distributed among the density categories at each site (Figure 5.15).

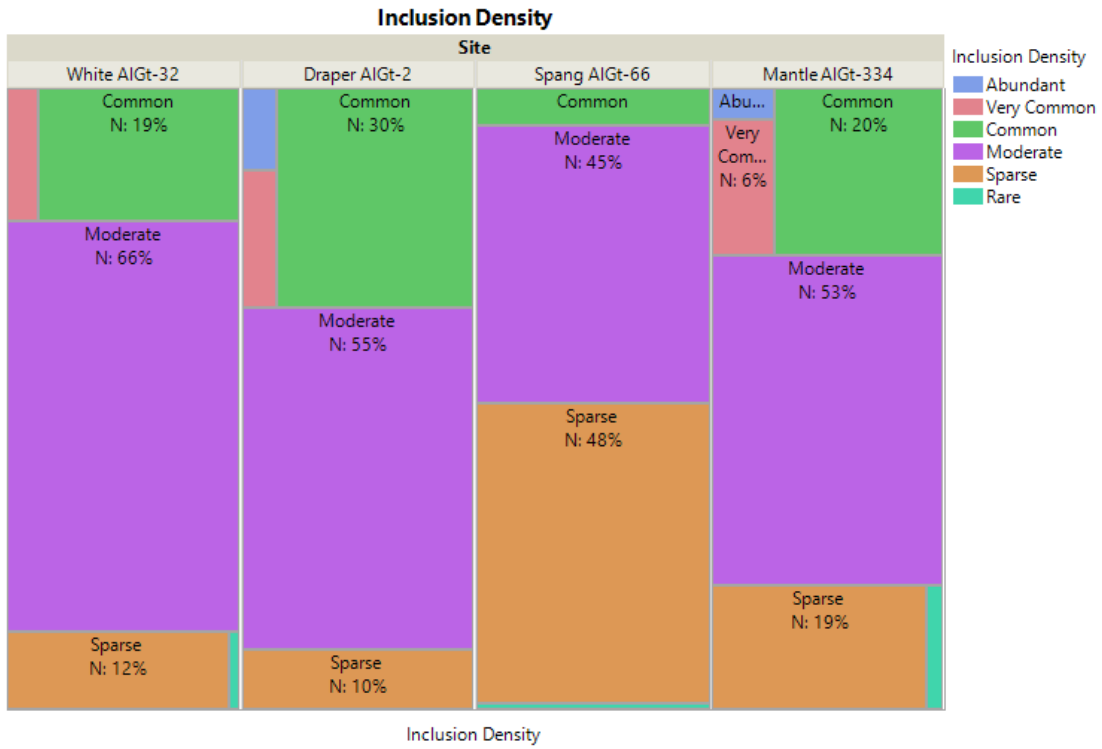


Figure 5.15 Vessel inclusion density by site

Inclusion Sphericity and Rounding: These characteristics were relatively consistent across sites (Figures 5.16 and 5.17). Overall, the vessels from the Spang site tend to have lower inclusion density.

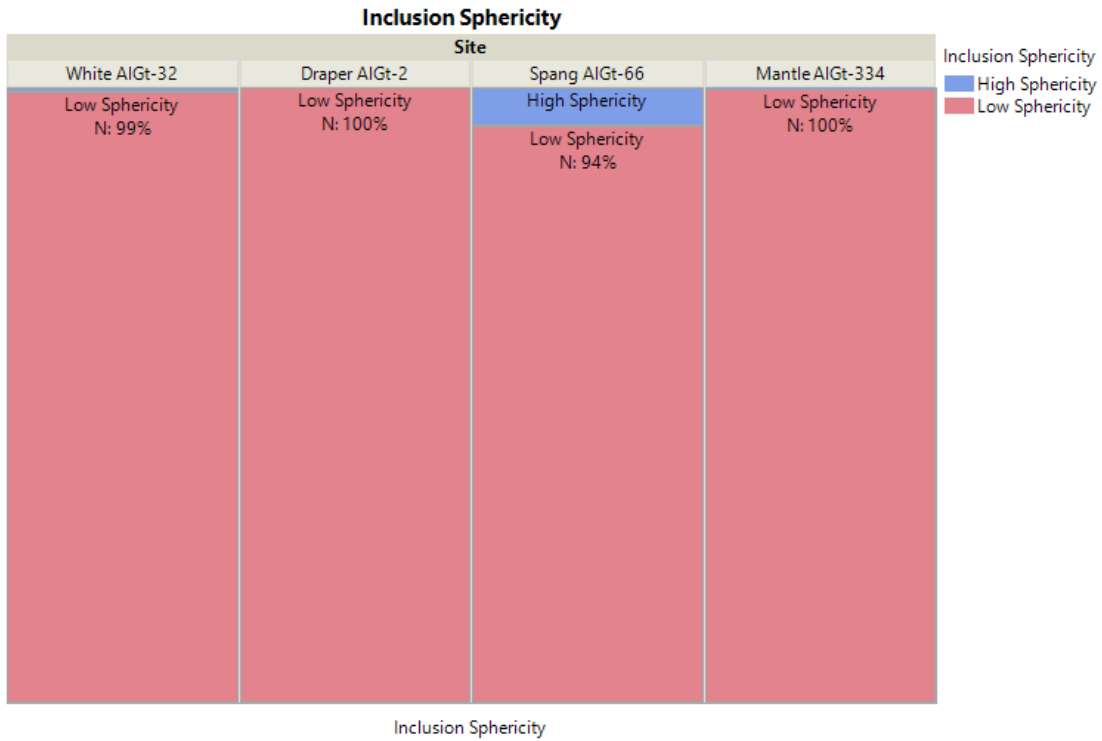


Figure 5.16 Vessel inclusion sphericity by site

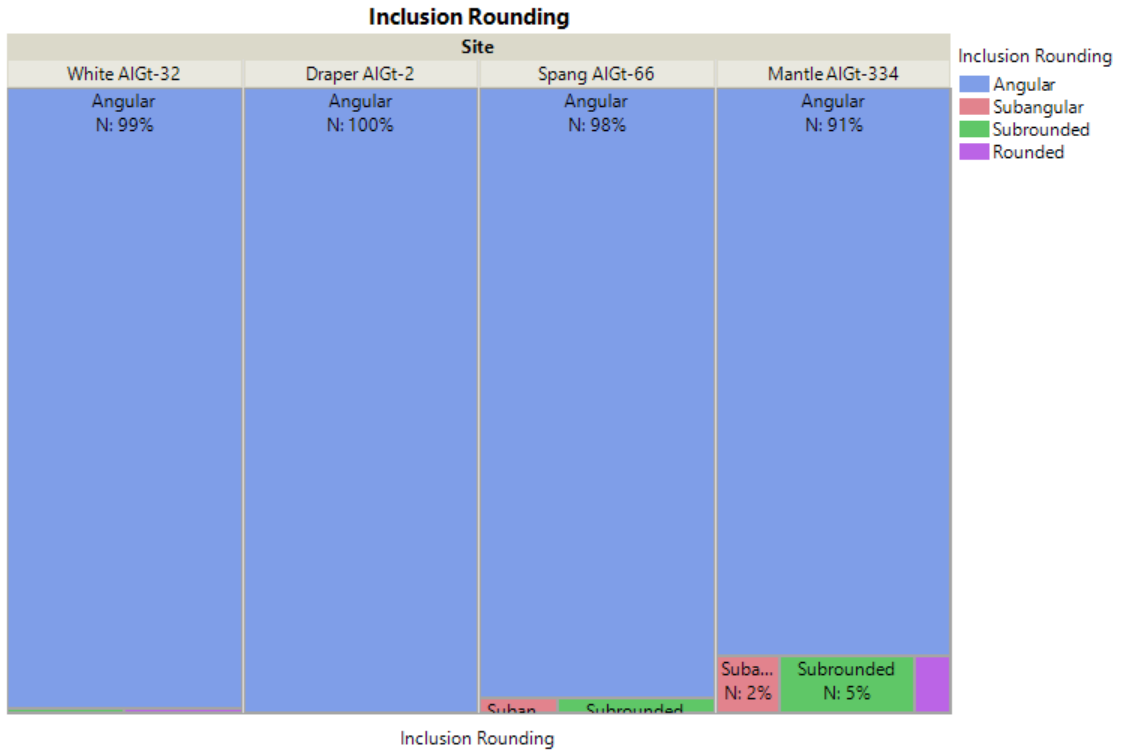


Figure 5.17 Vessel inclusion rounding by site

Rock Inclusion: Rock inclusion is the tentative identification of temper grains comprising multiple mineral components. Definitive identification would require additional analyses; however, I am as confident in these identifications as possible given the information available. Granite dominated the assemblages and was slightly more common at the Spang and Mantle sites than at the earlier sites (Figure 5.18).

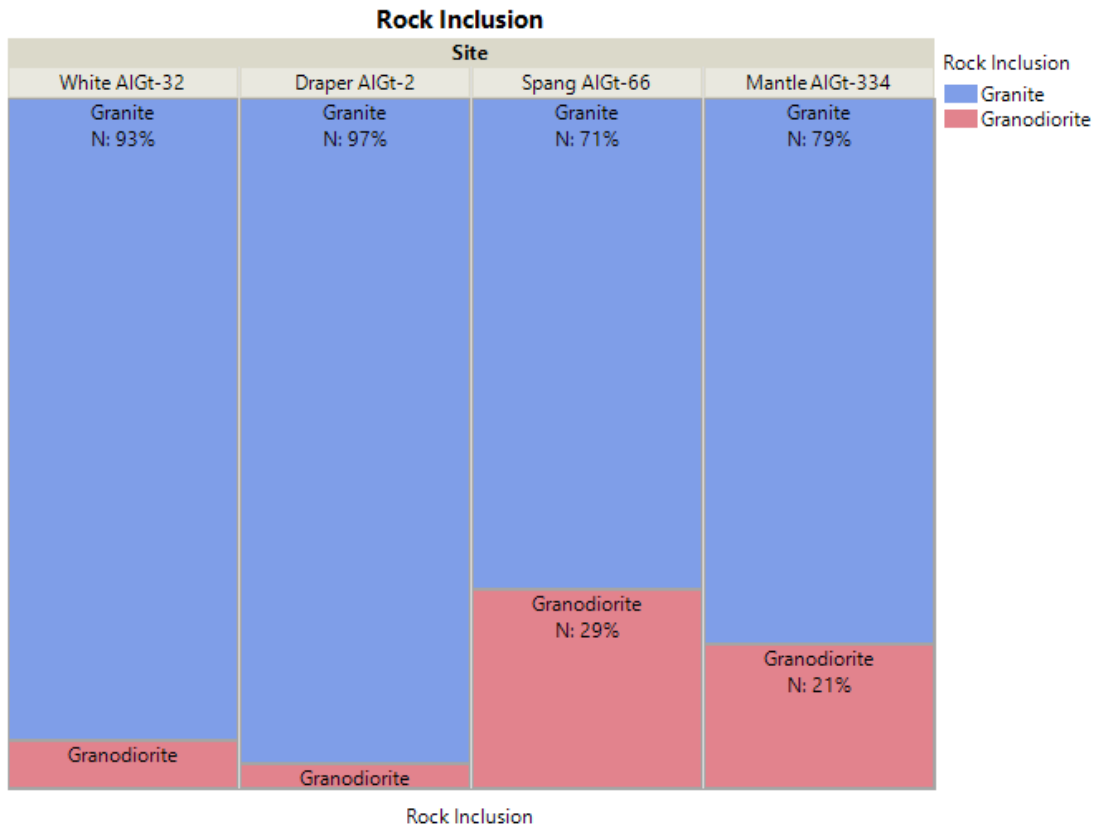


Figure 5.18 Vessel rock inclusion by site

Mica Sheen: Mica sheen describes the amount of mica visible on the exterior surface of the vessel. Stronger mica sheen may be due to a higher mica content in raw materials, intentional addition of mica during vessel finishing to create a mica sheen, and/or weathering of the exterior of the vessel exposing additional mica grains. Mica sheen or mica content is higher at the Spang and Mantle sites than at the Draper site (Figure 5.19).

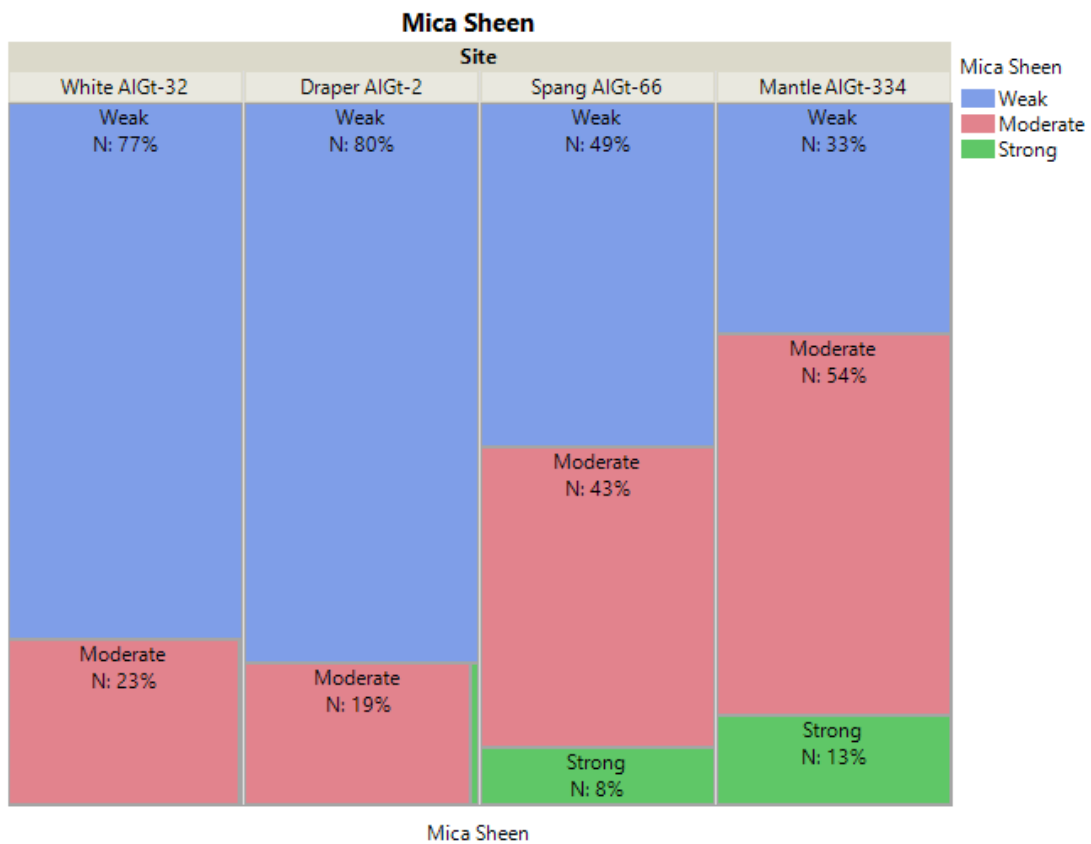


Figure 5.19 Vessel mica sheen by site

Pipes

Firing: Firing was relatively consistent. Incompletely oxidized cores were slightly more common at the Mantle site. There were slightly more irregularly fired cores in pipes at the White site (Figure 5.20).

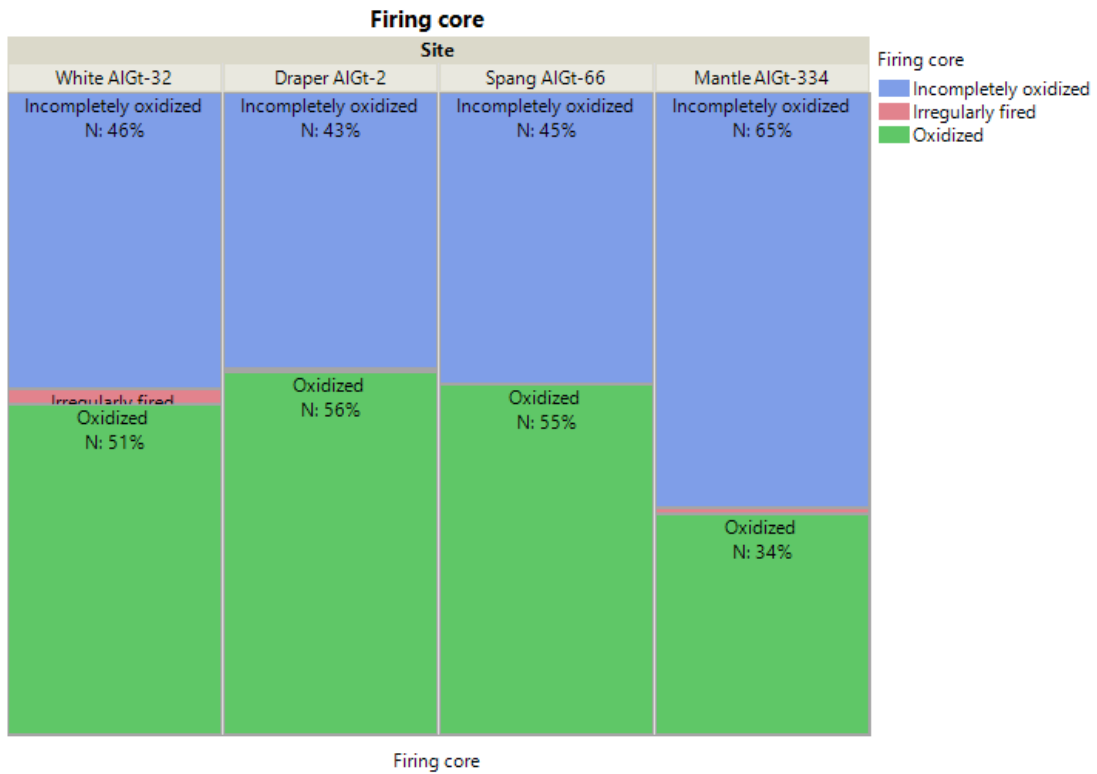


Figure 5.20 Pipe core firing by site

Hardness: Hard, medium, and soft pipes were found at each site. The greatest variability in hardness was found at the Mantle site, with a higher proportion of soft and hard fired pipes (Figure 5.21).

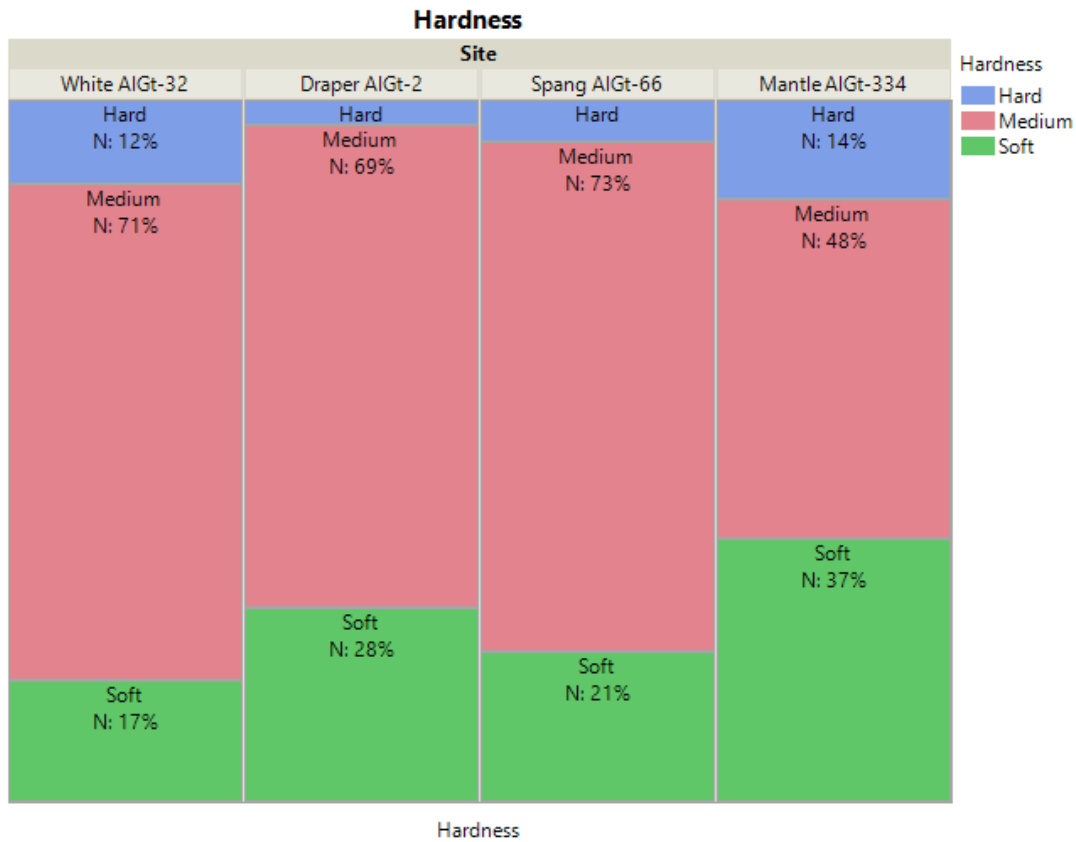


Figure 5.21 Pipe hardness by site

Compaction: In contrast to pottery, which showed strong differences in compaction across sites, pipes were compacted consistently. This is likely because pipes were heavily worked during production. Most walls were strongly compacted, with the greatest proportion of moderately compacted pipe walls found at the Mantle site as shown in Figure 5.22.

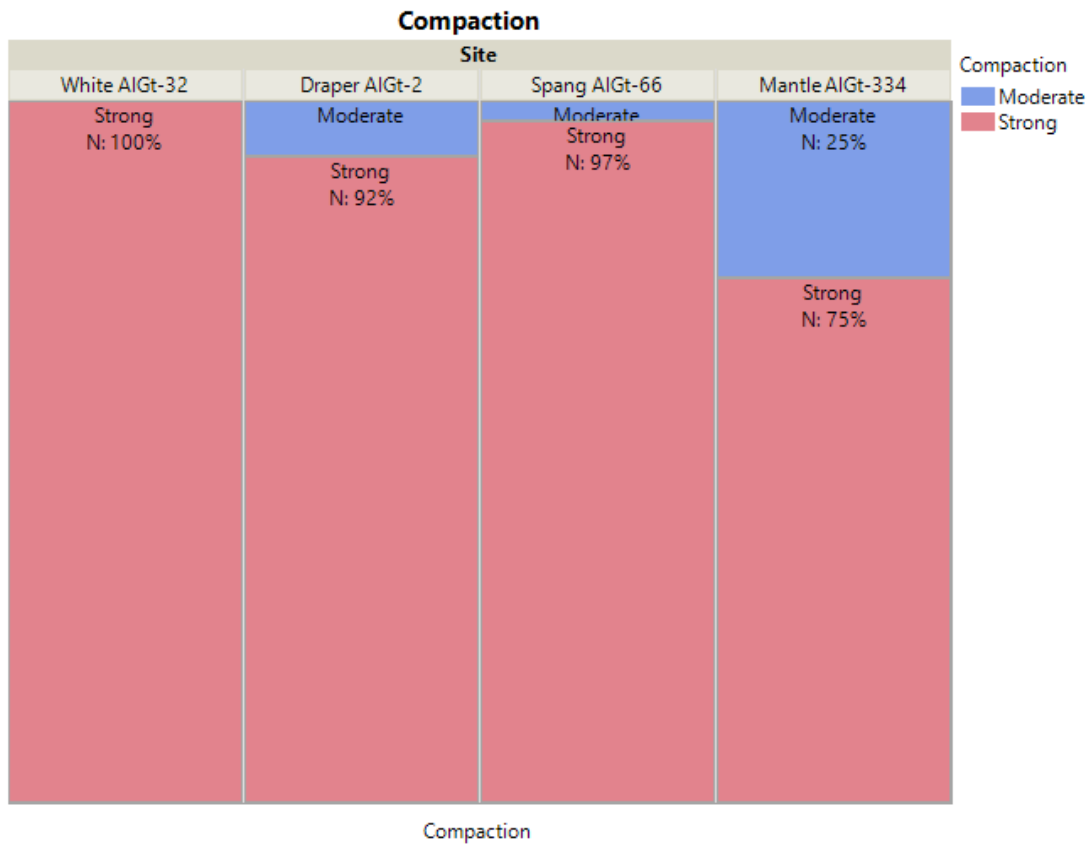


Figure 5.22 Pipe compaction by site

Texture: A majority of pipes had a smooth feel, though some from the Spang and Mantle sites had sandy or granular textures (Figure 5.23).

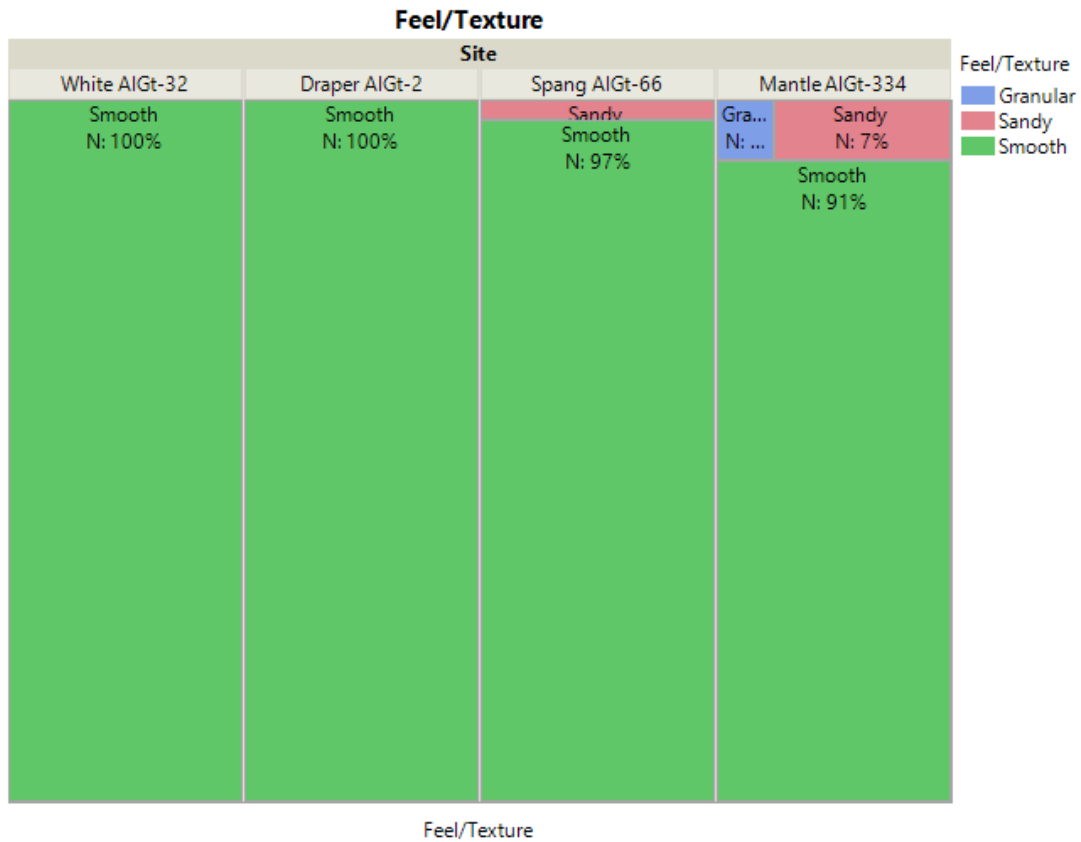


Figure 5.23 Pipe texture by site

Inclusion Max Size: The maximum inclusion size became less consistent and larger over time (Figure 5.24). Where maximum inclusion size is identified as fine, it was often difficult to determine whether the inclusions were intentionally added crushed temper or naturally occurring clay inclusions in untempered pastes. Regardless, the variability is significant since both are indicative of production practices.

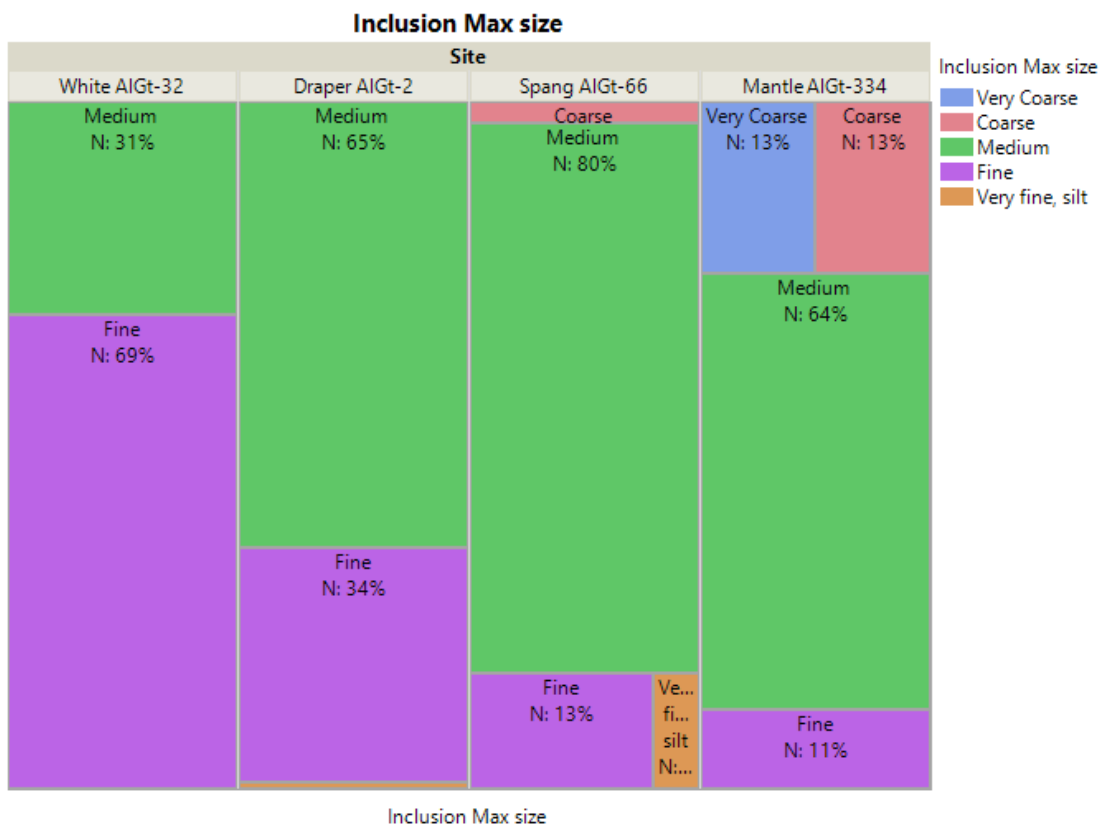


Figure 5.24 Pipe inclusion maximum size by site

Inclusion Sorting: Poorly sorted inclusions dominate the earlier assemblages with moderately- to well-sorted inclusions becoming more common over time (Figure 5.25). This pattern may be related to inclusion maximum size, supporting the conclusion that pipes at the earlier sites were either not tempered or that temper choices changed over time. Detailed thin section petrography could help to clarify this distinction.

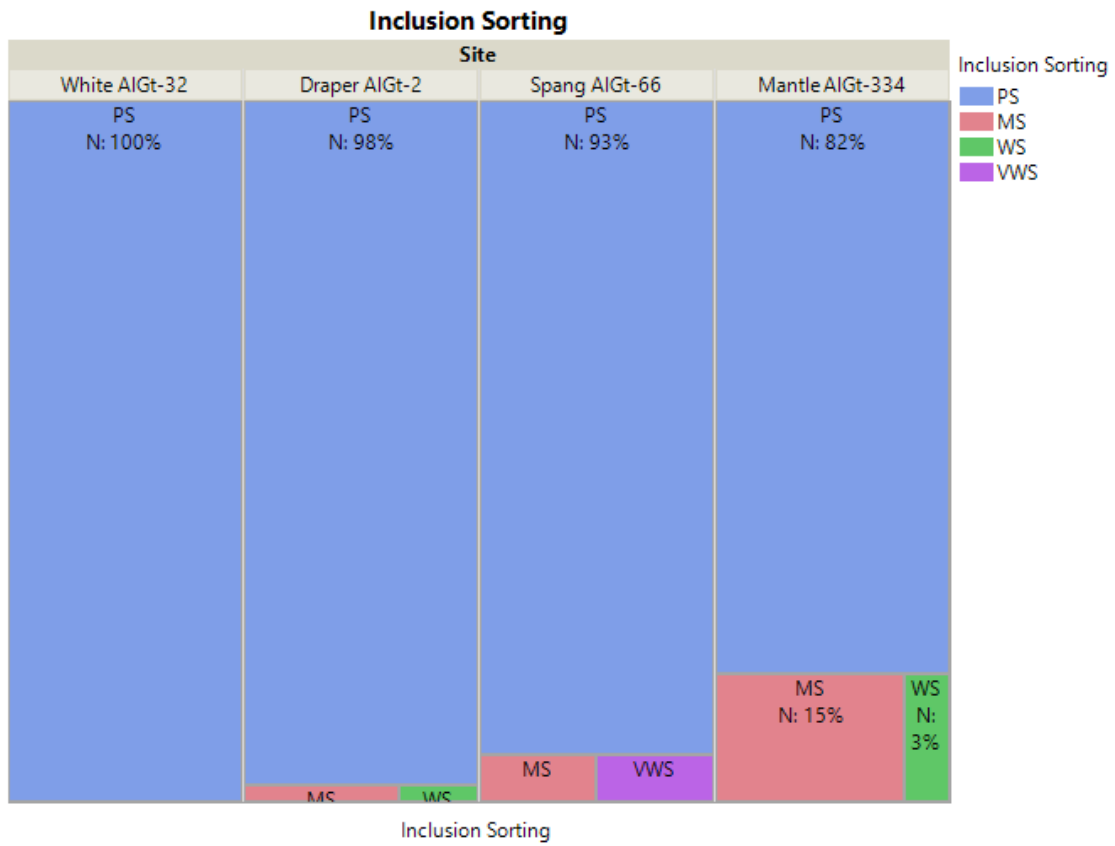


Figure 5.25 Pipe inclusion sorting by site

Inclusion Density: Inclusion density was variable at all sites (Figure 5.26).

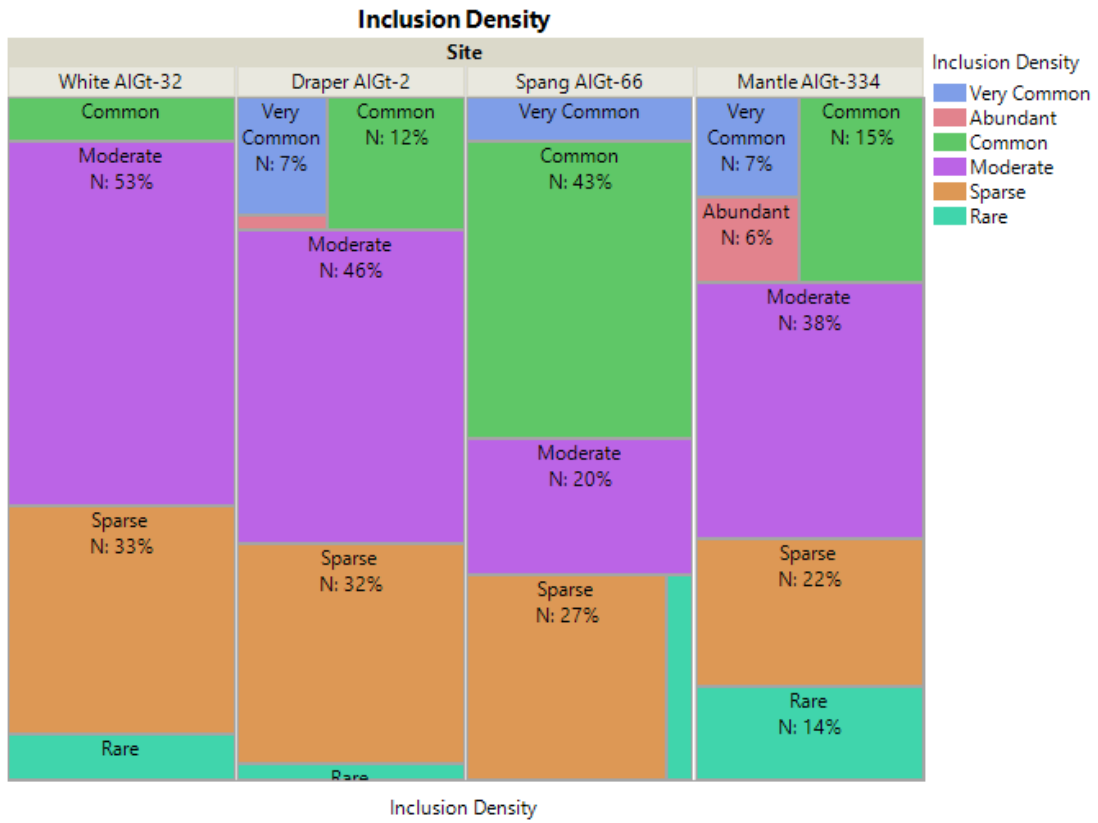


Figure 5.26 Pipe inclusion density by site

Inclusion Sphericity: Inclusion sphericity was consistent across sites (Figure 5.27).

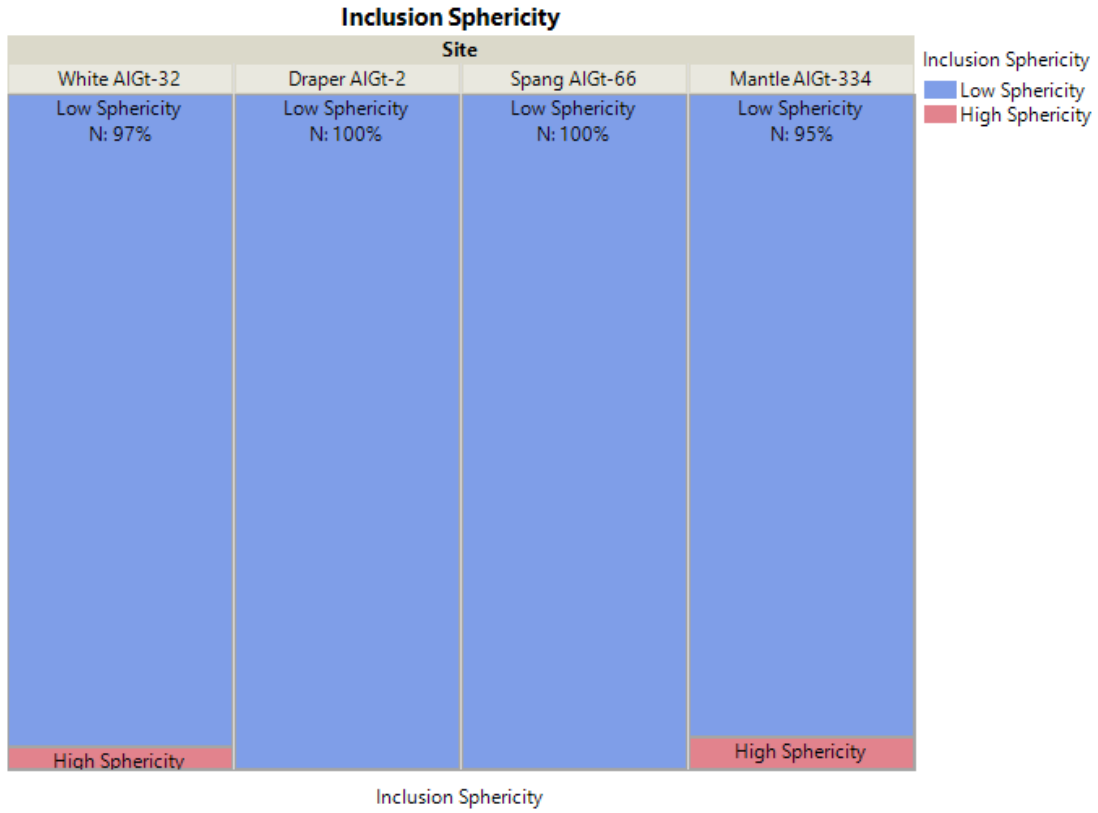


Figure 5.27 Pipe inclusion sphericity by site

Inclusion Rounding: The most variability in inclusion rounding was found at the White and Mantle sites (Figure 5.28). Mantle was the most variable, with only 33% of the pipes having angular inclusions, while angular inclusions dominated the earlier sites.

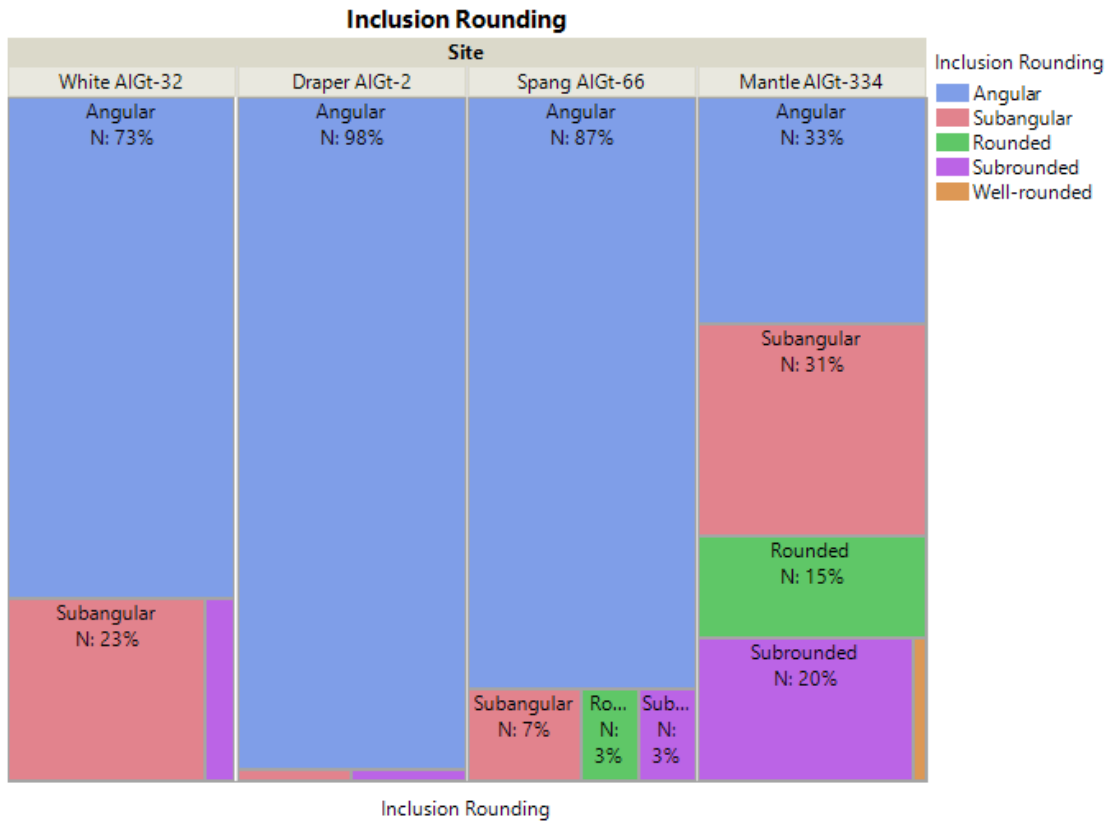


Figure 5.28 Pipe inclusion rounding by site

Rock Inclusion: Rock inclusion is the tentative identification of temper grains comprising multiple mineral components. Definitive identification would require additional analyses; however, I am as confident in these identifications as possible given the information available. Granite dominated the assemblages and was slightly more common at the Mantle sites than at the earlier sites (Figure 5.29).

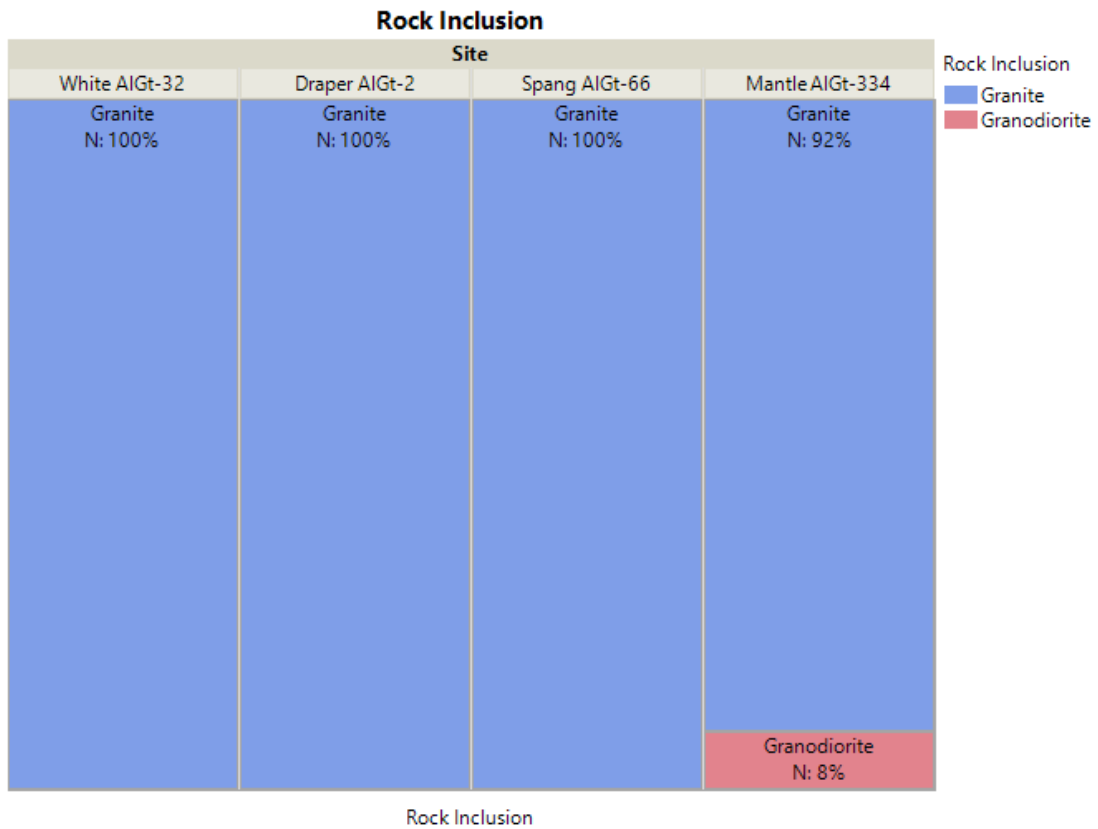


Figure 5.29 Pipe rock inclusion by site

Mica Sheen: Mica sheen was more common at the Mantle site than at the earlier sites (Figure 5.30).

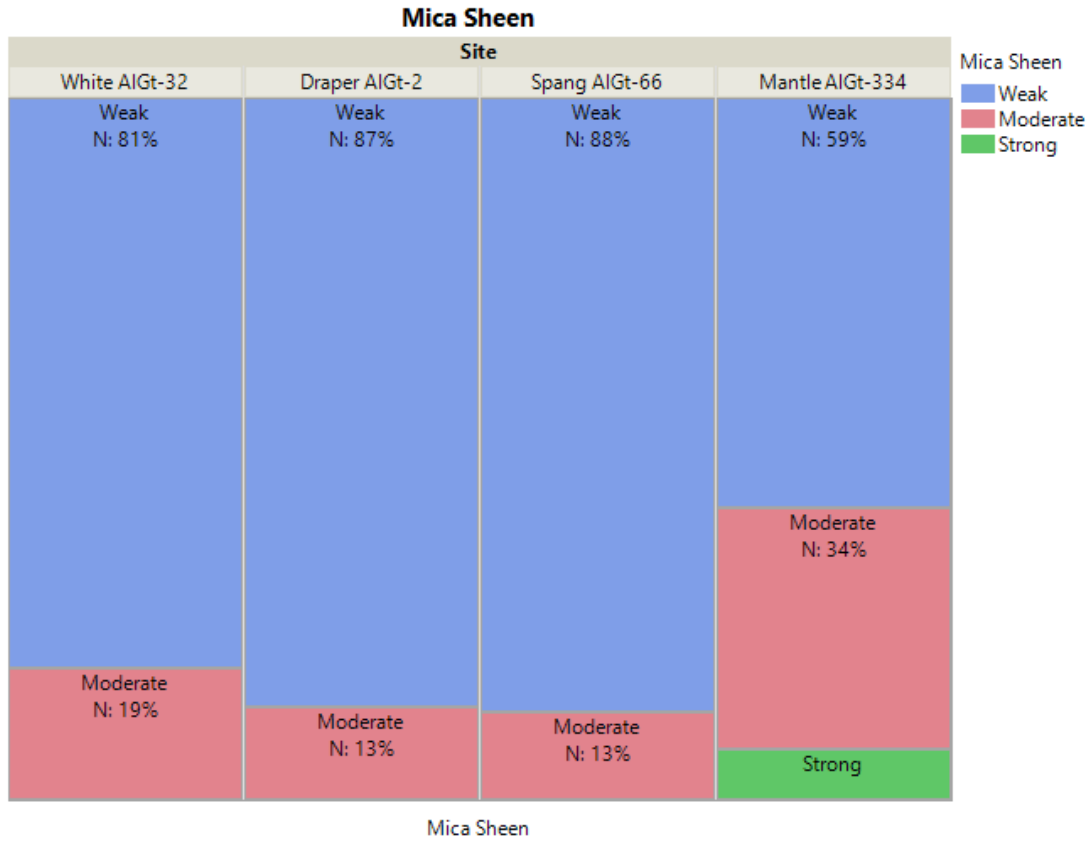


Figure 5.30 Pipe mica sheen by site

Discussion

The findings are summarized by variable in Table 5.3 (vessels) and Table 5.4 (pipes). Overall, the most variability in pottery and pipe production was found at the Mantle site. With a few exceptions, the characteristics of production examined here were otherwise consistent throughout the study period. The Mantle site pottery was more irregularly fired, had more variability in hardness, had a more granular texture or feel, had a wider range of observed temper sizes, and was more likely to be tempered with granodiorite, and more likely to contain higher frequencies of mica. This increased variability at Mantle is likely to have resulted from social and technological processes.

Variable	White Site (Pre-Coalescent Period)	Draper Site (Coalescent Period)	Spang Site (Post-Coalescent Period)	Mantle Site (Post-Coalescent Period)
Rim Diameter	Larger	Smaller	Smaller	Larger
Lip Thickness	Consistent	Consistent	Consistent	Variable
Firing Core	More oxidized	More incompletely oxidized	More incompletely oxidized	More incompletely oxidized, More irregularly fired
Hardness	Medium-soft	Medium	Medium	Medium with hard and soft
Compaction	Stronger	Moderate	Moderate	Weaker
Voids	Fewer	Moderate	Moderate	Moderate
Texture	Smooth	Smooth	Smooth	Smooth/Granular
Inclusion Max. Size	Medium	Medium	Medium	Coarse, Very Coarse, Medium
Inclusion Sorting	Poor	Poor	Poor	Poor
Inclusion Density	Moderate	Common-moderate	Moderate-sparse	Moderate, common, and sparse
Sphericity	Low	Low	Low	Low
Rounding	Angular	Angular	Angular	Angular, subangular
Rock Inclusion	Granite	Granite	Granite, Granodiorite	Granite, granodiorite
Mica Sheen	Weak	Weak	Weak-moderate	Weak, moderate, strong

Table 5.4 Summary of findings by site for vessels

Variable	White Site (Pre-Coalescent Period)	Draper Site (Coalescent Period)	Spang Site (Post-Coalescent Period)	Mantle Site (Post-Coalescent Period)
Firing Core	More oxidized	More incompletely oxidized	More incompletely oxidized	More incompletely oxidized, More irregularly fired
Hardness	Medium-soft	Medium	Medium	Medium with hard and soft
Compaction	Stronger	Moderate	Moderate	Weaker
Voids	Fewer	Moderate	Moderate	Moderate
Texture	Smooth	Smooth	Smooth	Smooth/Granular
Inclusion Max. Size	Medium	Medium	Medium	Coarse, Very Coarse, Medium
Inclusion Sorting	Poor	Poor	Poor	Poor
Inclusion Density	Moderate	Common-moderate	Moderate-sparse	Moderate, common, and sparse
Sphericity	Low	Low	Low	Low
Rounding	Angular	Angular	Angular	Angular, subangular
Rock Inclusion	Granite	Granite	Granite, Granodiorite	Granite, granodiorite
Mica Sheen	Weak	Weak	Weak-moderate	Weak, moderate, strong

Table 5.5 Summary of findings by site for pipes

Investigating the Variability at the Mantle Site

Several factors may have contributed to the variability observed at the Mantle site. The variability in pottery vessels may have resulted from the inclusion of more non-local vessel types rather than being a result of local production. To examine this possibility, variables are compared by groups of types – common, less common, New York exotics, and St. Lawrence area exotics as defined in Chapter 4. Counts for each type group used in this analysis are shown in Table 5.6.

Type Group	N
Common	171
Less Common	45
Exotic – New York Iroquois	41
Exotic – St. Lawrence	5

Table 5.6 Counts per type group from Mantle

Firing: Figure 5.31 shows that the most variability in core firing was among the less common local types. Overall, common and less common types are more variable than the exotic types.

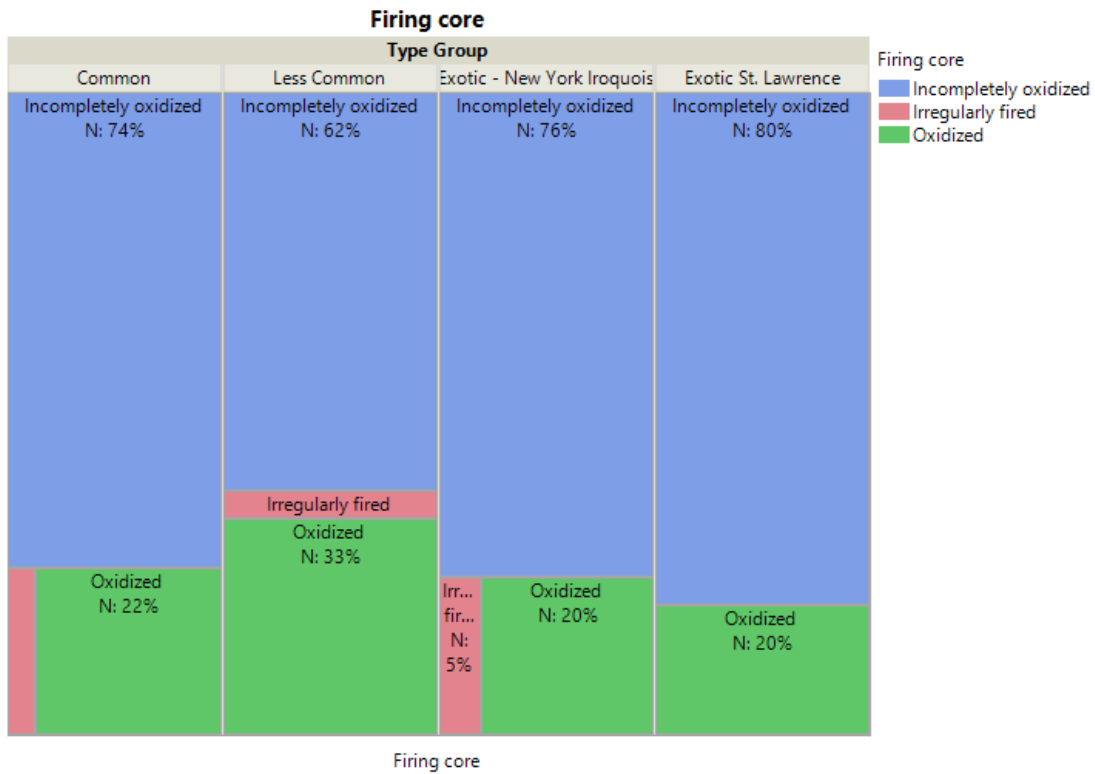


Figure 5.31 Core firing oxidation for vessels from Mantle by type group

Hardness: Hardness was relatively consistent across type groups. St. Lawrence types were less hard than other types however, the sample size of these types is much smaller (n=5) as shown in Figure 5.32 so a larger sample may reveal more variability.

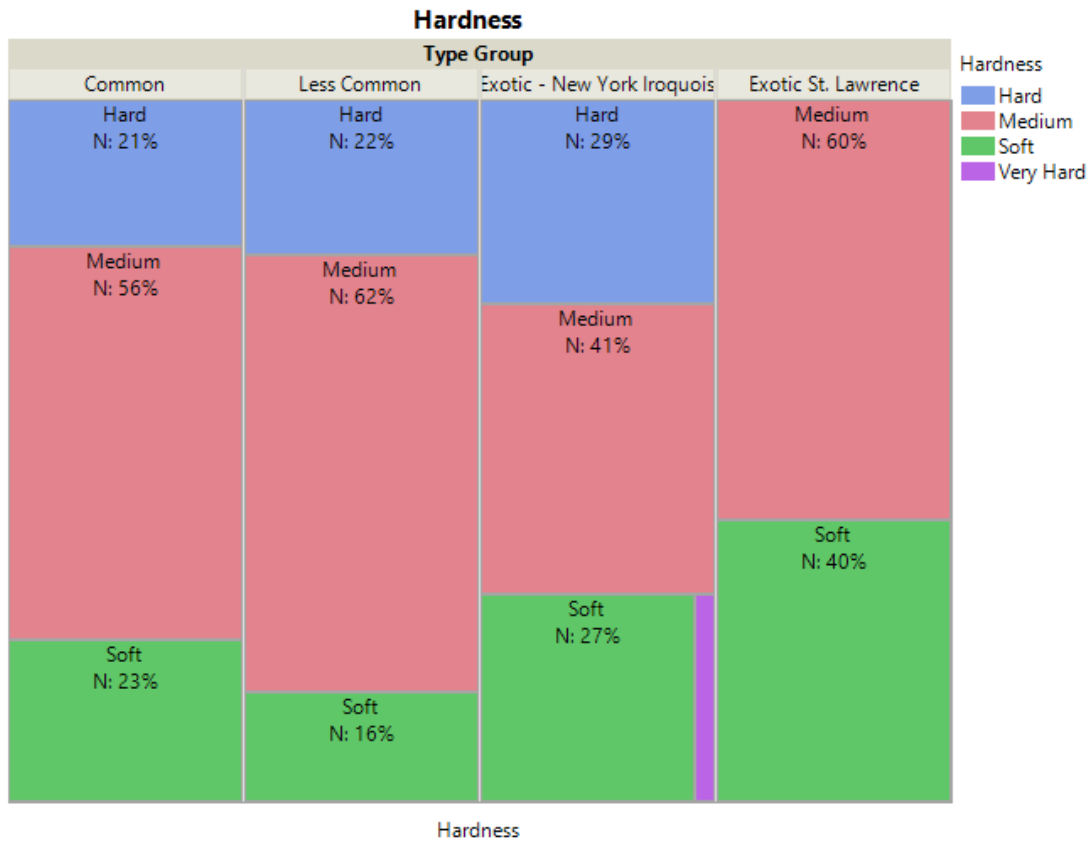


Figure 5.32 Hardness of vessels from Mantle by type group

Compaction/Voids: Compaction and void abundance are both affected by how heavily the clay is worked, and data are summarized on Figures 5.33 and 5.34. Non-local types appear to be more heavily worked, by the measure of wall compaction. Voids were more abundant among the common and less common types, but not by a large margin.

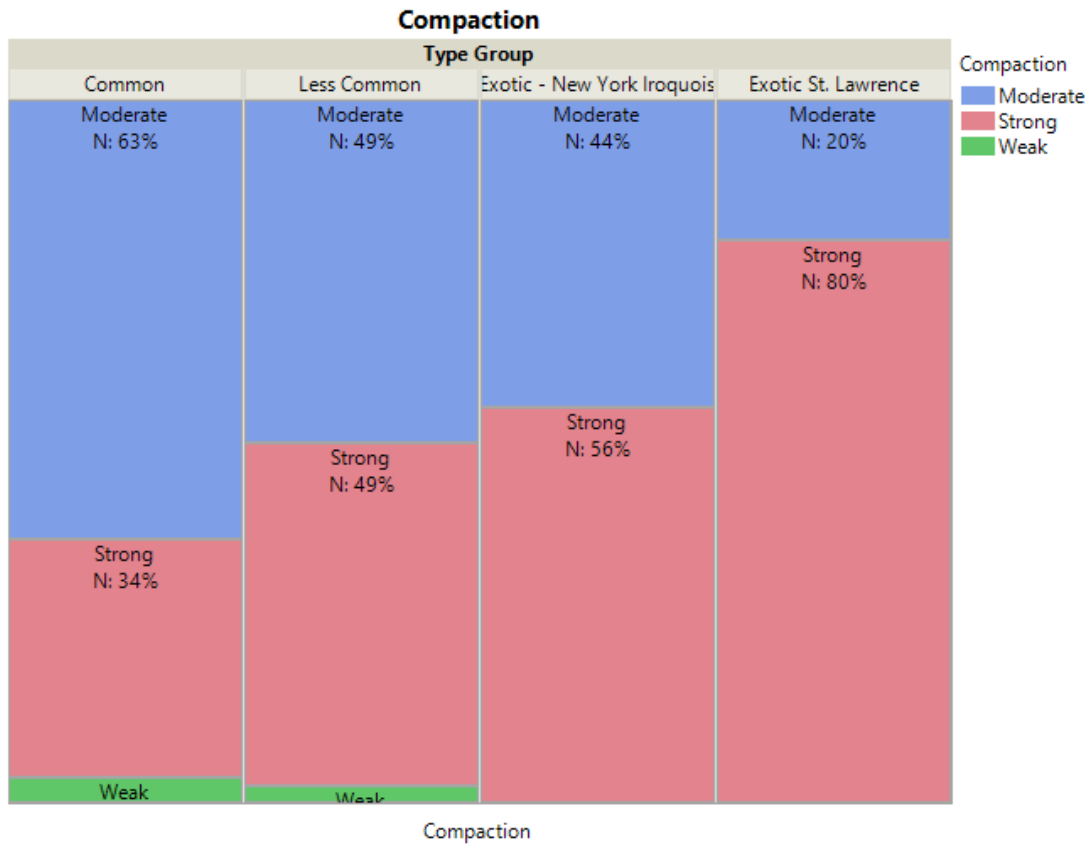


Figure 5.33 Compaction of vessels from Mantle by type group

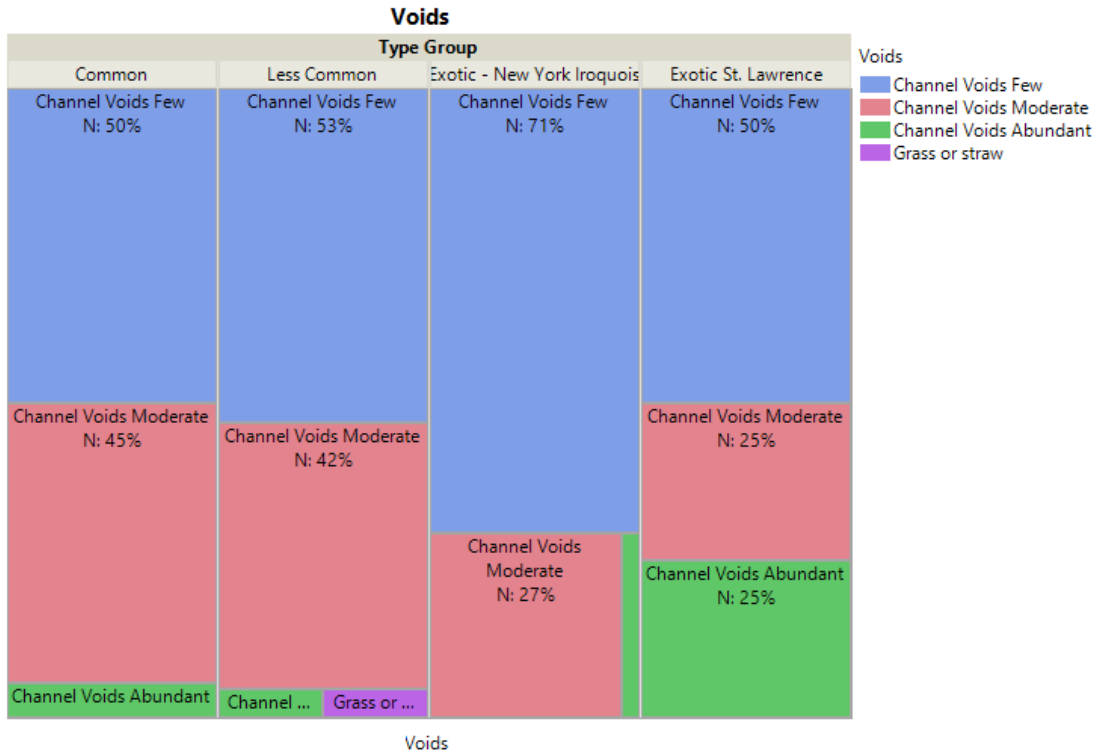


Figure 5.34 Void abundance in vessels from Mantle by type group

Feel/Texture: A larger proportion of the New York type vessels were smooth in texture than the common or less common types (Figure 5.35).

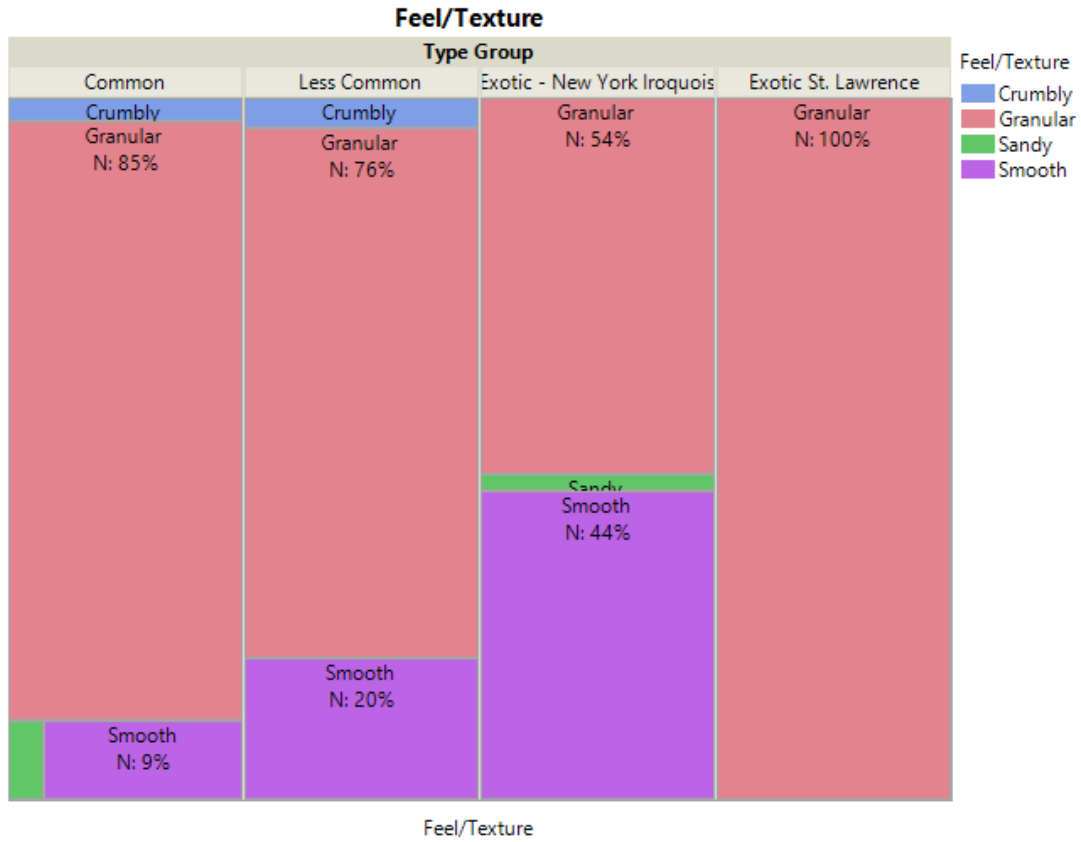


Figure 5.35 Texture of vessels from Mantle by type group

Inclusion Max Size: Maximum inclusion size was consistent among type groups (Figure 5.36). Common types are slightly more coarsely tempered, and more exotic types were finely tempered.

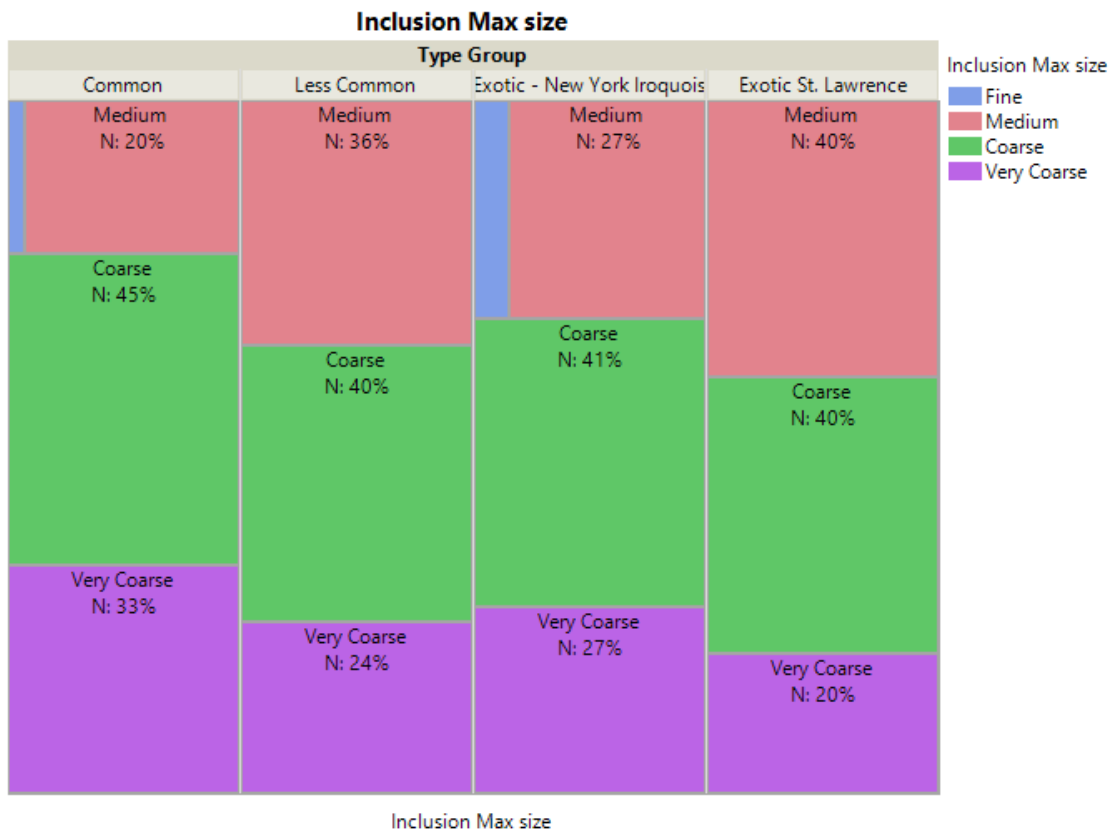


Figure 5.36 Inclusion maximum size vessels from Mantle by type group

Rock Inclusion: For all types, the most common rock inclusion was granite (Figure 5.37).

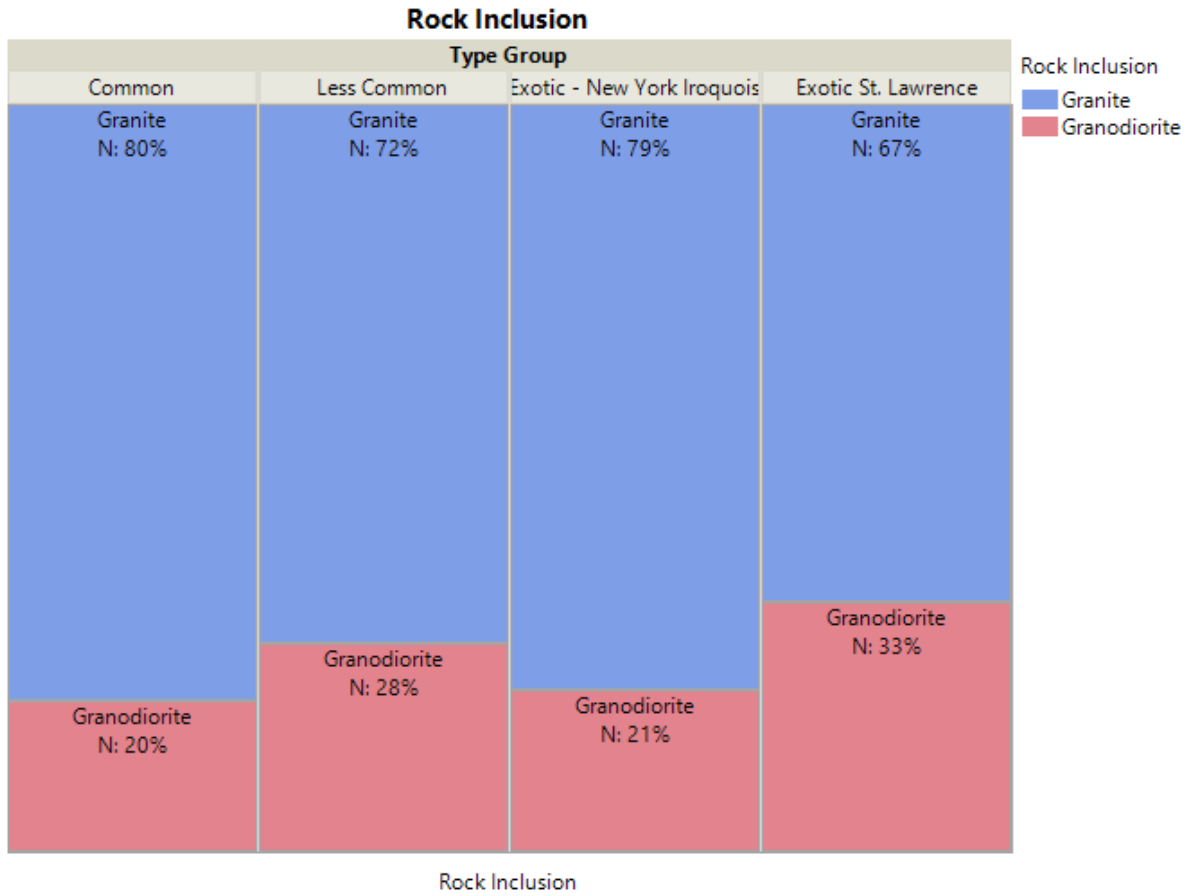


Figure 5.37 Rock inclusion in vessels from Mantle by type group

Mica Sheen: Stronger mica sheen was more frequent in the common and less common types than in the exotics (Figure 5.38).

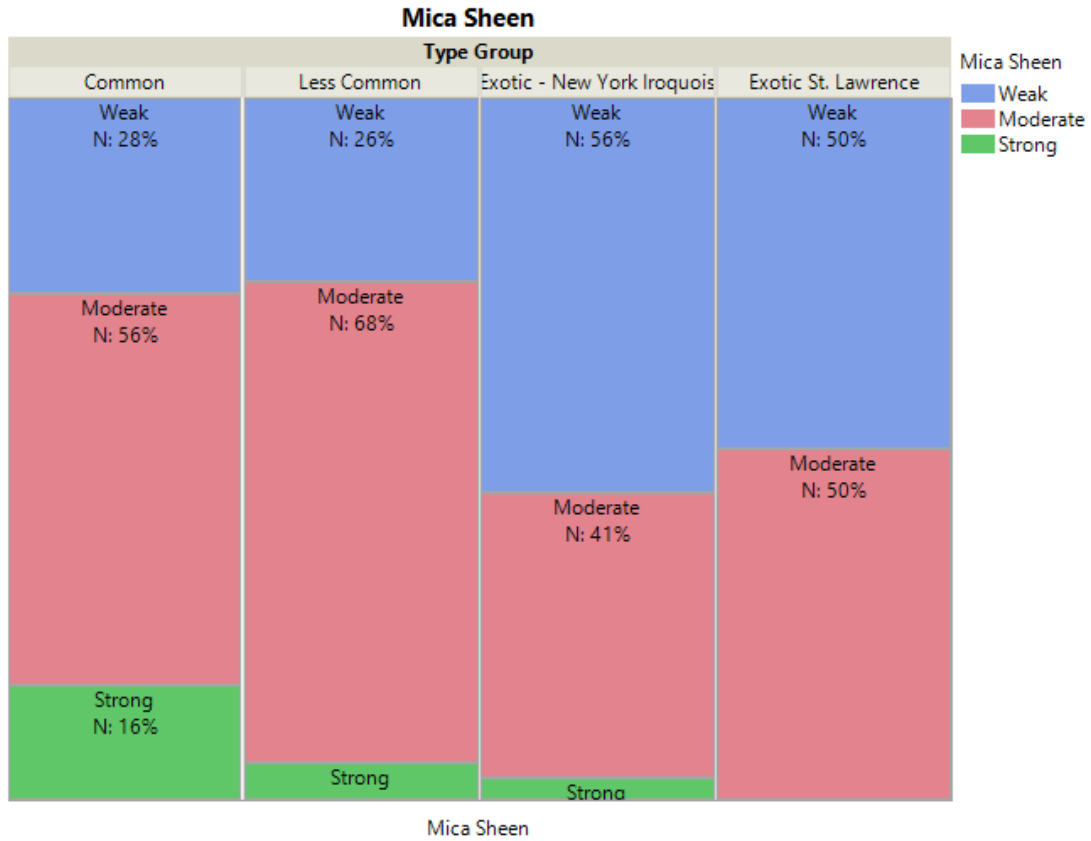


Figure 5.38 Mica sheen of vessels from Mantle by type group

Findings for type groups at the Mantle site are summarized in Table 5.7. For most of the vessel categories, the common and less common types contribute most to the patterns that distinguish the Mantle site from the earlier sites. More variability in firing, lower values for hardness, lower values for wall compaction, more granular texture, and greater incidence of mica sheen are all observed in the common and less common types. Some variables do suggest differences in the production of non-local types. New York Iroquois types seem to be worked more heavily and sometimes tempered with finer temper. St. Lawrence types also had vessel walls that were more heavily compacted, but also had a greater abundance of channel voids suggesting that these vessels were shaped and worked in a different manner than the other types. In sum, the variability in vessels at Mantle cannot be attributed to the increased quantities of exotic types.

Variable	Common n=171	Less Common n=45	Exotic – New York Iroquois n=41	Exotic – St. Lawrence n=5
Firing Core	Incompletely oxidized, oxidized	Incompletely oxidized, oxidized	Incompletely oxidized, oxidized	Incompletely oxidized, oxidized
Hardness	Hard, medium, soft	Hard, medium, soft	Hard, medium, soft	Medium, soft
Compaction	Moderate, strong	Moderate, strong	Strong, moderate	Strong, moderate
Voids	Few-moderate	Few-moderate	Few-moderate	Few, moderate, abundant
Texture	Granular	Granular, smooth	Granular, smooth	Granular
Inclusion Max. Size	Coarse, very coarse, medium	Coarse, medium, very coarse	Coarse, medium, very coarse	Medium, coarse, very coarse
Rock Inclusion	Granite, granodiorite	Granite, granodiorite	Granite, granodiorite	Granite, granodiorite
Mica Sheen	Weak, moderate, strong	Weak, moderate	Weak, moderate	Weak, moderate

Table 5.7 Summary of findings by type group for the Mantle site

In contrast to the pottery, which was more variable at Mantle than at the earlier sites, pipes showed a less consistent pattern of variability. Instead, variables assessed on pipes suggest temporal change in production techniques. There was more variability in hardness and compaction of pipes at Mantle, and more variability in texture at Spang and Mantle than at earlier sites. The maximum size of inclusions increases over time, and inclusions become on average more poorly sorted.

Some of the variability in both the vessels and pipes are likely related. As described in Chapter 2, raw material selection and processing steps in ceramic production are frequently altered as individuals move to new communities with access to different resources, encounter different practices, or change priorities based on the desired performance characteristics of the vessels. In a variable geological environment such as south-central Ontario, potters and pipe makers would have had to learn to how select appropriate clays and tempers based on observable characteristics as part of learning their craft. Working in such a complex geological landscape, potters and pipe makers would have had to be adept at judging the resources around them for desirable performance characteristics, issues explored in detail in a related analysis (Striker et al. 2017).

Previous work at the Mantle site suggests that experimentation with local raw materials would have been part of the learning process for pottery making (Striker et al. 2017). In a sample of both standard vessels and vessels previously identified as novice-made, Howie found that a significant amount of the novice pottery was made using pastes that did not match any standard vessel samples, and many of these paste groups were represented by a single sherd (2012). It is likely that raw material selection and processing were group tasks, and so novices likely worked alongside experienced potters

sharing raw materials or even mixed pastes as they worked (Striker et al. 2017). The patterns of variability among vessels in this study further supports our previous conclusions about the Mantle vessel collection, indicating a wide range of practices including experimentation with clay by experienced potters making rough, expedient pots and experimentation by novices while learning. Furthermore, the people living at Mantle and earlier sites would have relocated every 20-50 years at most, with periods of occupation generally decreasing over time. This means that potters would likely live at more than one village in their lifetime. When they moved they likely found new and different clay resources, resulting in experimentation (Striker et al. 2017).

The population of the Mantle site was probably not significantly larger than the population at the Draper or Spang sites. This suggests that the variability in both vessel and pipe production observed at the Mantle site cannot be attributed directly to a simple increase in the number of individuals working within the community. Instead, the increased variability suggests changes in the dynamics of relational identification within the community. The results from Chapter 4 support previous arguments by Birch (2010b, 2012) and Birch and Williamson (2013a, 2013b) that the Mantle community had broader relationships with outside communities than earlier villages, drawing new interaction and potentially even new residents to the Mantle site.

New forms of interaction and introduction of newcomers to the village could lead to increased variability in ceramic pottery and pipe production in two ways. First, external relational ties could bring in pottery made elsewhere by trade, although results discussed above indicate trade was not a major factor in the observed variability. Second, newcomers may arrive in the community and continue to make pottery using their non-local methods, though with local materials. The variability observed here is consistent

with this process. These results also support the hypothesis that the social context of pipe production was different from that of pottery production. This suggests changes in the nature of relational connections among pipe makers.

Efficacy and Limitations of the Methodology

Overall, this methodology effectively characterized variability within these collections. The technique used to develop the methodology – working with existing, detailed petrographic characterizations to help identify variables that would be most useful – was particularly effective. It is important to stress that this methodology was developed with the intention of pairing it with limited qualitative ceramic thin section petrography.

The choice to record the attributes as single variables analogous to the methodology used for ceramic decorative attribute analysis was useful. The original intention was to take a qualitative approach, examining each sherd and creating groups based on shared characteristics as is typical of a qualitative petrographic study. This ended up being a less than ideal method for a few reasons. First, it was clear that I would not have access to all of the site collections together at the same time. For that reason, it would not be possible to, for example, make direct comparisons between groups that I thought were related at the Mantle and Spang sites. Second, after analyzing the Mantle site material, the variability that I identified within the collection was much smaller than anticipated and I was not very confident in the precision of the groups I was creating. One particular problem that caused me much concern was bias created by the small area of the sherd that I was examining. Looking at a small surface of the sherd, I noticed how easy it was to miss less common inclusions, or to incorrectly estimate the density of

inclusions that were mixed into the clay in an irregular manner. I found that when I broke out the variables separately, it was possible to consider these issues when examining the resulting data.

Finally, I found this attribute style approach to be most useful because of the nature of my research question. Creating qualitative groups requires a focused question about variability that necessarily emphasizes some aspects of variability over others. For example, when I was working with the Mantle collection, I found that I could create meaningful qualitative groups based on a number of different factors such as consistency or quality of production, local or non-local materials, or temper choice, among many other options. Each would have been meaningful but none of these approaches would have allowed me to answer questions about the overall variability at each site or make easy comparisons.

Relational Identification

Expectations for patterns of relational identification were developed in Chapter 2 and summarized in Table 5.2. In brief, relational connections among corporate groups within each community were expected to remain consistent over time. The nature of relational connections was expected to change at the Post-Coalescent period Mantle site, where evidence of collective action among the component corporate groups of the village had been identified. The results of the analyses of both pottery and pipes generally conform to the expectations but reveal some interesting nuance regarding changes in relational identification. Overall, the intensity of relational identification did not vary dramatically at the village social scale throughout the process of coalescence. For pottery, attributes related to clay and temper selection, temper processing, and firing suggested

that within each community, pottery was made using fairly consistent production techniques. Pipe production was even more consistent through time, supporting previous arguments that the social context of pipe production was different from pottery production. Together, the data suggest that the intensity of relational identification remained consistent at the village scale in the Pre-Coalescent and Coalescent periods.

Slightly greater variability was observed at the latest Post-Coalescent Mantle site than at the earlier three sites. This is interpreted as resulting from more extra-village relational ties involving trade, information exchange, and possibly the in-migration of newcomers from distant places. At Mantle then, the intensity of relational identification shifted. Historical analogy suggests that the variability observed at Mantle might be attributable to changes in how corporate groups within the community related to one another and with distant communities. In the Pre-Coalescent and Coalescent period sites, the consistent production suggests that social identification among corporate groups that comprise a village may have been prioritized over external ties. In contrast, at Mantle, the greater variability of production suggests that relational connections that extend beyond the village were prioritized over other relational connections.

The variability observed at the Mantle site is attributable to social change but must be understood in terms the context of pottery and pipe production in Iroquoian communities and the nature of the local geological environment. Iroquoian pottery and pipe production was seasonal and episodic. Certain tasks such as raw material procurement and processing were probably accomplished by people working in groups. People who worked with clays and tempers would have known that the local geological environment was diverse, and learning how to find proper clays and tempers would have been an important skill for both potters and pipe-makers. In such an environment, slight

changes in the choice of clay or temper source could have resulted in differences in the finished product. Changes in the way that people worked together to accomplish these tasks, as might be anticipated when the organization of shared work tasks changed in a coalescent community, might have introduced some new variability. More work is required to help sort out the significance of this variability and how it relates to other aspects of social organization.

Overall, patterns of relational identification were consistent with the expectation that the intensity of relational ties would remain relatively constant among corporate groups within each community. A shift in relational identification did occur at the end of the process of coalescence, after the population of the community had already been larger for several decades. The next chapter summarizes the findings about the intensity and scale of categorical and relational identification through the period of coalescence and discusses the significance of these changes as they relate to one another. After a review of the data relevant to the research question, the broader implications of this study and future applications are discussed.

CHAPTER 6
CATEGORICAL AND RELATIONAL IDENTIFICATION
IN COALESCENT COMMUNITIES AND BEYOND

This dissertation asks: 1) how do individual and collective social relationships change through the process of community coalescence? and 2) how do these relationships contribute to coalescence? The preceding chapters have provided a case study of this process among the fifteenth and sixteenth century Wendat, drawing on the cultural background and the analysis of two classes of ceramic artifacts: pipes and pottery. This final chapter synthesizes the information previously presented on the theoretical background, the cultural background, and the ceramic data to answer the research questions and explore what these understandings of relationships and community formation reveal about the social dynamics of coalescent communities. The latter part of this chapter draws from this study to suggest broader applications of the theoretical framework and methodological approaches in archaeology, general anthropology and related fields. The chapter closes with a discussion of the implications of this study for contemporary conceptions of rapid social change.

The Social Dynamics of Coalescent Communities

This section begins with a summary of the argument presented in this dissertation and proceeds to integrate the analyses of categorical and relational identification. This study began with an introduction to the case of community coalescence among the Iroquoian Wendat people, ca. 1400-1550 C.E., near what is now Toronto, Ontario, Canada. The Wendat case is exceptional because the process of

coalescence is evident in the successive occupation of four separate communities, from a small village of a few hundred to an aggregated community of more than 1500 people, and finally to the large and spatially integrated community at the Mantle site.

Coalescence is a special form of aggregation in which village-scale groups aggregate and remain together, creating a socially cohesive community. Many cases of coalescence are discussed in the literature, and commonalities across these cases reveal underlying similarities in the social dynamics of coalescent communities: 1) coalescence is a process of regional social change; 2) coalescence facilitates collective action at a large social scale; and 3) coalescent communities tend to be socially cohesive without social hierarchy. These similarities among coalescent societies suggest that many of the shared changes in social dynamics within these communities are connected to both collective identity and collective action.

Collective identities are created through the dual processes of categorical and relational identification. Categorical identities are drawn from perceived, often abstract, similarities among people. Relational identities are drawn from direct, interpersonal interaction. The potential for a group to engage in collective action depends, in part, on the intensity and scale of categorical and relational identification among group members. One way to conceptualize the changing social dynamics of coalescence is by tracing the intensity and scale of categorical and relational identification. Changes in the intensity (the prominence of one aspect of social identity as compared to others) and scale (the size of the group in terms of population and the social scale of the group – household, village, clan) of categorical and relational identification reveal changes in the nature of social identification within a community and potential shifts in the organization of collective action.

The intensity and scale of categorical and relational identification were assessed at four consecutively occupied communities: The Pre-Coalescent period White site, the Coalescent period Draper and Spang sites, and the Post-Coalescent period Mantle site. Together these sites provide record that spans the process of coalescence, from small dispersed communities (the White site), to aggregated but spatially and socially segmented (the Draper site and perhaps the Spang site), to spatially and a socially integrated community that is the culmination of coalescence (the Mantle site). These communities are part of an exceptional archaeological record of community development in south-central Ontario.

Using the theoretical perspective developed in Chapters 1 and 2, expectations were advanced for the intensity and scale of categorical and relational identification through this sequence. Coalescence is a special form of aggregation that results in a socially cohesive community. This social cohesion develops despite the increase in the population size (scale as in number of people) of the community. Tilly's (1978) work suggests that social cohesion and the potential for collective action would arise via different kinds of social dynamics in the larger community as compared to in the earlier, smaller communities. Specifically, categorical identification is expected to become more important at the scale of the village as the population increases. Categorical identification was expected to be shared at the social scale of the village at the White site, increasing in intensity at the Draper site and the Spang and Mantle sites. The intensity of relational identification was expected to be strongest among corporate groups and to remain relatively consistent through the period of coalescence. Changes in the patterns of relational connections were expected at the Mantle site, where social ties among corporate groups were expected to develop. The results of these analyses are described below and summarized in Table 6.1.

Period	Pre-Coalescent White site	Coalescent Draper and Spang sites	Post-Coalescent Mantle site
Consistency of Pottery Decoration	Baseline	↓	↑
Variability in Pottery and Pipe Production	Baseline	=	↑

Table 6.1 Results of the analyses of categorial and relational identification summarized by site.

The intensity and scale of categorial identification were investigated at three of the four primary study sites (the Draper, Spang, and Mantle sites) with four additional local sites added for context. Categorial identities are often marked symbolically in the form and decoration of material culture (Peeples 2011). Stronger consistency in decorative style is one indication of shared categorial identification. Specifically, in Chapter 4, the intensity of categorial identification was assessed using consensus analysis to measure the consistency of decoration on ceramic vessels. The consensus analysis demonstrated that decorative consistency was greatest in the Pre- and Post-Coalescent periods and at a minimum during the time of initial aggregation. Thus, at the social scale of the village, the intensity of categorial identification was greatest in the sites that are also assumed to be the most socially cohesive.

The population size of the village increased at the time of aggregation that is, in the move from the White site and others like it to the Draper site. These results indicate that the intensity of categorial identification underwent two shifts: 1) there was a reduction in the intensity of categorial identification at the village scale at the time of

the initial aggregation at the Draper site; 2) the intensity of categorical identification at the village scale was greatest at the Mantle site. From that pattern, I draw the first conclusion: *the intensity of categorical identification at the village scale is greatest in the Pre- and Post-Coalescent periods.*

The findings are generally consistent with the expectations, which predicted an increase in the intensity and scale of categorical identification through the sequence. However, the high intensity of categorical identification in the Pre-Coalescent period was not expected. In retrospect, however, the results make sense. That is, it is likely that the small earlier villages would have had a degree of social cohesion represented or reinforced by categorical identification. From this perspective, social cohesion linked to a high intensity of categorical identification at various scales is the norm through the sequence. Thus, the period of coalescence, when people aggregated at sites such as the Draper site but had not yet formed coalescent communities, is unusual. This transitional period was also marked by the lowest degree of categorical identification.

The intensity and scale of relational identification were investigated at four sites, the Pre-Coalescent period White site, the Coalescent period Draper and Spang sites, and the Post-Coalescent period Mantle site. Specifically, in Chapter 5, the intensity of relational identification at various scales was assessed in terms of the variability of ceramic production. Relevant data were collected with microscopic analyses of a series of variables, including characteristics of natural clays, tempers, and material processing. These analyses considered two classes of ceramic artifacts, pottery and pipes, which were thought to have been made and used in different contexts. The results consistently showed more variability in pottery from the Mantle site as compared to earlier communities. Pipes showed a similar but weaker pattern.

The high degree of variability observed at the Mantle site was somewhat surprising. I investigated the possible sources of this observed variability to determine whether it could have been caused by including more imported material in the Mantle assemblage. Results showed that this was not the case; rather, the variability was found to be present in both the locally made pottery and pottery thought to be made elsewhere. This evidence suggests changes in certain steps in pottery and pipe production that would most likely be completed as collective work groups. The evidence also suggests some degree of in-migration to the Mantle site, and these new residents, exploiting the new and varied geology, may have contributed to the observed variability.

From these results, I draw two more conclusions: 2) *the intensity of relational identification at the village scale remains relatively constant through the early part of the sequence, as people move from the small villages to the first aggregated, but not fully coalesced, communities; and 3) the intensity of village-scale relational identification at the large fully coalesced communities is less than that seen earlier in the sequence.* These results are only partly consistent with the expectations. The intensity of relational identification was expected to be strongest at the social scale of the corporate group, and to remain consistent at that scale as the population of villages grew. However, the observed pattern of a reduction in the intensity of relational identification at the village scale is consistent with the observations in the coalescent community literature.

Communities described as “coalescent communities” in the literature, (communities like the Post-Coalescent period Mantle site) are typically socially cohesive without social hierarchy, and the relationships among corporate groups are an important element of these social dynamics. Kowalewski observes that corporate groups are often

the basis of community scale social integration (2006). The observation of a reduced intensity in relational identification at the village scale is likely evidence of a shift in dynamics among these corporate groups within a village. While the basis for shared identification among intra-community corporate groups is likely to be primarily categorical in nature, relational ties would also develop among members of different corporate groups. Relational connections may develop, for example, among potters and pipe makers of different corporate groups within the community, creating an opportunity for shared cooperation across groups. Thus, although it was not possible to isolate relations among corporate groups specifically using the data in this dissertation, the reduction of intensity in relational ties at the village scale at the Mantle site is likely directly related to intensification or possibly changes in the organization of relational ties within corporate groups that comprise the community.

At the start of this study, pipes were expected to be more variable in production than vessels since pipes are thought to have been important trade items and may have moved about on the landscape. However, pipes were also a common everyday item. This dichotomy is evident in many pipe collections, such as from the Draper site. The Draper site collection comprises many pipes that are true works of art – carefully crafted, often burnished pieces that were clearly special. In contrast, there are many that are also comparatively plain, and some that appear to have been expediently made, and imperfectly shaped and not as thoroughly finished. Despite these differences, pipes were less variable than vessels based on the characteristics selected here.

This pattern is probably due to several factors. One, the social context of pipe production was probably significantly different than the social context of vessel production as suggested by the current literature. Two, for the characteristics examined

in this study, there may just not be as wide a range in choices made as there are for vessels. For example, would a very coarse temper size really be expected for pipes? Variables were selected to make the vessel and pipe data comparable, however, other kinds of attributes, such as those that describe the forming of the pipe might reveal more nuance.

Since the methodology used in this study requires only a measure of variability for each collection, it would be possible to compare different characteristics for pottery and pipes if those characteristics were analogous with regards to human behavior. For example, perhaps the shape of the vessel profile, angle of the lip, and height of the collar could be compared with the method of forming a pipe stem, the pipe bowl lip thickness, and the shape of the hole in the pipe stem. If these characteristics were demonstrably analogous, variability across these categories might make a useful comparative study. It would be particularly informative to consider possible differences in variability among characteristics related to different steps in the production process.

Comparing Categorical and Relational Identification

The previous summary of the case, including its suitability, the cultural background, the two forms of ceramic analysis (Chapters 4 and 5), and initial interpretations serve as the foundation for a much broader and deeper understanding of these processes. Three conclusions were noted in the above summary: 1) *the intensity of categorical identification at the village scale is greatest in the Pre- and Post-Coalescent periods; 2) the intensity of relational identification at the village scale remains relatively constant through the early part of the sequence, as people move from the small villages to the first aggregated, but not fully coalesced, communities; and 3) the*

intensity of village-scale relational identification at the large fully coalesced communities is less than that seen earlier in the sequence. This section synthesizes the information from the categorical and relational analyses to make additional observations.

The first point is that changes in the intensity of categorical and relational identification occur after the population of the community had increased and had been larger for several decades. Considering consistency of decoration and production variability among pottery and pipes, the intensity and scale of categorical and relational identification shifted as coalescence proceeded. Interestingly, the most dramatic changes in intensity at the scale of the village occur *after* the population of the community increased dramatically. This suggests that the social dynamics of the Mantle community were different from the social dynamics of Pre- and Coalescent period communities which is consistent with Birch (2010a, 2012) and Birch and Williamson's (2013a, 2013b) argument.

Second, if the data from the Spang site are representative, the intensity of categorical identification increases at the scale of the village prior to changes in the intensity of relational identification following community aggregation. This pattern could be revisited specifically for this sequence if additional data become available from the Spang site.

These two final points have the most significant implications for future studies of coalescence as well as other cases of transformational social change in small-scale societies. The observation that changes in the intensity of categorical identification trailed population growth by a period of decades observable in the archaeological record demonstrates that the approach used here was successful in revealing significant nuance

in social dynamics within these communities. Most importantly, this was done using data that are widely available and already an important part of standard archaeological practice.

Coalescence proceeded first with the aggregation of communities and an increase in the population size at the social scale of the village. Categorical identification intensified at the village scale first, and changes in the organization of relational ties at the village scale were evident only in the fully coalesced village. Considering categorical and relational identification separately makes it possible to observe *how* social changes proceed. Do all cases of coalescence follow this same pattern? In some communities are strong categorical ties developed prior to separate villages settling together in the same place? What other social, political, economic, and historical factors might contribute to differences among cases if they exist?

Together, these statements summarize how and at what point during the process of coalescence the intensity and scale of categorical and relational identification changed. With this foundation, it is possible to discuss some possibilities regarding the processes of social identification and their role in the creation of social cohesion in a coalescent community.

How Do These Relations Contribute to Coalescence?

The Pre-Coalescent and Post-Coalescent period communities examined in this dissertation both had evidence of categorical identification at or beyond (and encompassing) the village scale. The implication is that there was reduced intensity of categorical identification at the village scale during the initial aggregation of the

community at the Draper site. The Draper site appears to have been slowly settled over time with new village segments joining the community. In contrast, the Mantle site appears to have been fully planned and the original village constructed in a single episode coincident with the appearance of intensified categorical identification in the archaeological record. In other words, the creation of the socially cohesive community at the Mantle site appears to coincide with an intensification of categorical identification at the village scale.

While these data suggest that the intensity of categorical identification was greater at the village scale at the Pre-Coalescent and Post-Coalescent period sites, it is not expected that the *extent* of categorical identification would be the same. At the time that coalesced communities (like the Mantle site) developed, decorative style of ceramics also became more homogeneous at a regional scale. This homogenization suggests that the intensification of categorical identification at the White and Mantle communities did not occur in the same manner. Shared categorical identification at the Mantle site was likely shared beyond the village limits with the importance of external connections increasing, as evidenced by broader cultural traditions and expanded exchange networks. At the White site, village-scale categorical identification may not have extended far beyond the community walls.

In contrast, relational connections seem to have changed most during the transition from the aggregated Draper village to the Spang site and the spatially integrated Mantle site. The literature on coalescent communities suggests at the culmination of coalescence, villages are typically socially integrated without social hierarchy. Roscoe's (2009) vision of the social organization of smaller-scale societies suggests that different collective tasks are optimized by larger or smaller groups working

together, providing benefits to communities whose organization can shift to meet these different priorities. The evidence suggests that social cohesion at the Mantle site is associated with 1) intensification of categorical identification (and extending beyond) the scale of the village; and 2) changes to interactions among relational groups within the community.

Previous work by Birch (Birch 2010a, b, 2012) and Birch and Williamson (Birch and Williamson 2013a, 2013b; Birch et al. in press) supports the argument presented in Chapter 3 that the Mantle site community was socially cohesive and engaged in some collective action at the village scale (see Chapter 3). A stronger intensity of categorical identification at the village scale, as well as changes in the organization of relational ties, contributed to this change. At the larger population level (increasing scale in terms of number of people), shared categorical ties at the village scale at Mantle helped to unite people beyond the community. This expansion of categorical ties may be intertwined with the process of developing bonds among once-separate relational groups within the community. Socially integrative mechanisms, such as narratives that explain the relationship among corporate groups within a community and how and why they have come to work together, observed in other cases of coalescence (Kowalewski 2006) might easily be extended to include other corporate groups outside the community. Such relationships would be consistent with the type of cross-cutting clan relationship observed in the historical period among Iroquoian communities.

One possible indicator of new relations among corporate groups at the Mantle site is the presence of “long” longhouses – longhouses that were significantly larger than the typical longhouse in the community. As Birch (2012) observes, historically, these extra-long longhouses may have served as venues for feasts or village council activities.

Birch suggests that these long longhouses may have been the houses of village leaders or prominent clans within the community (Birch 2012, p. 664). If these long-longhouses were shared community spaces, they may have been an important venue for interaction among corporate groups within the community. Corporate leaders may have risen to prominence within the community, playing key roles in managing and facilitating relations among corporate groups. The social dynamics of the Mantle site, as observed in this study, are consistent with this interpretation.

Changing Life in Iroquoian Communities

What do insights reveal about life during this period of rapid, dramatic social change? The results of this study are consistent with the vision of coalescence developed by Birch (2010a, b, 2012) and Birch and Williamson (2013a, 2013b) but they add nuance to the case study. This work suggests that the transition from small, dispersed villages to large socially integrated communities took place slowly and that a fully coalesced social pattern did not arise until the occupation at the Mantle site. When the residents of several small communities aggregated at the Draper site, strong, interpersonal bonds among members of the once-separate villages were probably very important. Once brought into the same village, creating a situation in which these corporate groups would interact with members of other corporate groups daily, the differences between them may have been obvious and emphasized. More variability in pottery decorative styles at the Draper site supports this argument and is just one possible material sign of perceived categorical difference. As these corporate groups continuously interacted, working together to accomplish important tasks that were community priorities such as building defensive palisades, people would get to know one another both as individuals and as

members of different relational corporate groups. As Kowalewski (2006) observes for coalescent societies, the process of defining and making sense of connections among corporate groups within communities is a common feature of coalescent societies. The intensification of village-scale collective identities seems to be an important mechanism for developing cohesion among these corporate groups.

Social cohesion developed among the once-segmented corporate groups of the aggregated communities through changes in the nature of relations among community members. For this village sequence, the transition was probably initiated at the Draper site where once-separate villages would need to make sense of their new relationships with one another. Individuals who were part of these groups would have discovered new relational ties with members of other corporate groups who were once unfamiliar to them. Shared connections among these corporate groups may have been the foundation for the development of a new, shared categorical identity that encompassed all these corporate groups. At the Mantle site, these connections seemed to have extended beyond the village walls, creating shared connections at a much greater distance among far flung neighbors than was experienced before.

For the people experiencing these changes, this transition would have had implications for every element of their social life within the community. As illustrated by Gearing's example of the "structural poses" of Cherokee society (Chapter 2), individual roles and social identities are intertwined with the organization of everyday collective work in smaller-scale societies. As different social groups within the community come together to accomplish priority tasks, such as hunters going on a hunt, potters coming together to gather and process clays, or elders joining to advise on a community issue, individuals experience these events differently through their roles as members of

different groups. Their role(s) (or non-participation) in these different activities contribute not only to differences in experiences among community members but also differences in how they relate to others who had a different role or relationship with the activity. Therefore, when both categorical and relational identification change in a community like the Mantle site, these changes are not simply organizational shifts, but also changes in the way that individuals experience life within the community.

Implications for Archaeological Approaches to Social Identity

Conceptualizing social dynamics in terms of the intensity and scale of categorical and relational identification is a simple but powerful approach that expands the interpretive value of archaeological data. Intensity and scale can be operationalized using a wide range of available datasets and tailored to particular research questions. The approach makes it possible to quantify changes in social identification to facilitate comparisons between cases. For example, in Chapter 4, measures of variability in ceramic decoration were used as a proxy for changes in the intensity of categorical identification. Comparisons could be structured as they were in this study, with the unit of comparison being social scale, and changes in the intensity of social identification compared among cases. Where the intensity of categorical and relational identification is strong at a given scale (either social unit or population size) then social cohesion and the potential for collective action is expected.

It is essential to examine the relationships between collective identities and collective action in a wide range of cases including small and larger-scale societies, small social units, such as corporate groups, and larger ones, such as tribal or state units, and at different periods in the past. Contemporary perspectives are built on a relatively small

sample of contemporary and historical human societies. Does the relationship between collective identity and collective action meet our expectations in these past cases? If not, what can we learn about the diversity of ways in which human societies meet collective challenges? How did people make social cohesive groups in the past?

As was shown in this study, one way to assess intensity is through measures of internal consistency or variability in decoration or production techniques, although this technique could be extended to other areas where the middle range theory exists to draw a strong link between social identification and material culture. The important point is that it is possible to measure consistency or variability in a dataset even without needing to interpret all of the specific social information conveyed. For example, greater consistency in decorative style was used as a proxy for intensification of categorical identification and was identified at the Pre- and Post-Coalescent sites. It was not necessary to identify which specific decorative attributes contributed to greater consistency, although those investigations could certainly be added. These types of comparisons add new levels of meaning to existing narratives and datasets.

Finally, the results of the categorical identification assessment demonstrate an important possible pitfall when assessing scales of categorical identification. Similar patterns of intensity were identified at the Pre- and Post- Coalescent period sites, but these patterns could not be interpreted in the same manner. Shared categorical identification at, and limited to, a social unit, and categorical identification shared at and past that social scale may appear to be the same. Therefore, it is essential to look beyond the social scale of primary interest to contextualize observations, both theoretically and empirically.

Methodological Contributions

This dissertation has made significant methodological contributions. First is the application of cultural consensus analysis as a method for assessing the variability of decorative style within and among assemblages. In Chapter 4, consensus analysis is used to produce measures of the consistency of decoration on the entire pottery assemblage from each site, as well as within categories of pottery (types and groups of types). This approach could easily be tailored for different kinds of datasets where the goal is to identify consistency within and among samples.

This methodology is an extremely powerful tool that produces a lot of analyzable data. Only a small portion of the test output was utilized in the argument made in Chapter 4. Consensus analysis produces many response tables that are useful for identifying the nature of consistency or variability within a response set. So, it would be possible to investigate further, for example, what types or vessels contribute most to the “average” response in a particular dataset. It is also possible to identify whether responses that are most unlike the “correct” response share some similarity. For example, if a subset of pots scores low competence values, do those pots share something in common? Does a subset of pots, “A,” score low values for each variable or just a few? Are those variables related to decorative motif or are they related to decorative technique? Do subset A pots also tend to be incised in a particular way? Consensus analysis makes it simple to examine in detail the nature of consistency or variability among responses.

The second methodological contribution is the microscopy technique developed in Chapter 5. Although several recent studies have used this approach (Braun 2010; Braun 2012; Holterman 2007; Schumacher 2013), the methodology used here was

tailored to fit with the specific kinds of information produced with a qualitative approach to ceramic thin section petrography. The comparative petrographic work was not complete at the time of writing this chapter.

The second feature of this methodology is the strategy of coding sherd characteristics line by line using attributes much as one would code for elements in decorative style, without subsequently attempting to create production groups. These data were used to assess the overall variability in each collection. This approach is useful because it does not rely on the analyst to identify what type of variability is expected in a collection. For example, grouping the sherds by paste types based on temper size, composition, and density would provide meaningful groups to help understand questions about raw material selection and processing and paste recipes, but it would not be useful for answering questions about firing. In many situations this is a perfectly appropriate approach; however, as demonstrated in Chapter 5, it is not always the best approach for a question about the nature of basic variability in a collection or among collections.

Finally, the microscopy approach is one of a growing number of studies of Iroquoian ceramics that include both vessels and pipes. Previous work and this dissertation support the argument that ceramic pottery and pipes were made and used in different social settings in Iroquoian communities. When asking the kinds of big social questions about interaction and social change that have become increasingly important in Iroquoian studies, it is essential to consider multiple lines of evidence. Ceramic decorative style has long been demonstrated to be a useful tool for assessing interaction however, it is important to consider the limitations of these interpretations. Ceramics,

while ubiquitous in everyday life, are not representative of every aspect of Iroquoian social life.

Considering pipes along with vessels adds a critical second dimension to traditional ceramic analyses. What can objects such as vessels and pipes that were made and used in different kinds of social settings reveal about the nature of social life in Iroquoian communities? As objects that were made, used, traded, and discarded in different contexts from vessels, pipes are an excellent source of information about relational ties, and probably also categorical identification although the data were not available to explore that question in this study. Vessels provide a view on broad but still limited portion of Iroquoian daily life, pipes are a complementary artifact class that could and should be explored, beginning with many of the same techniques used with success for ceramic vessels.

Pipes can be a challenge to study because, although they are often typed and their decoration coded, pipe forms are more variable in some respects as compared to pottery. Iroquoian pottery decoration is systematically coded for easy analysis. An approach such as consensus analysis, which would allow the user to identify consistency among collections and groups of collections, may be a useful tool for further exploring the decorative variability of ceramic pipes in a systematic manner. A simple question to start with would be one analogous to the study of vessels in Chapter 4 – are ceramic pipes found in a single community consistent with one another? Are assemblages from some communities more consistent than others? Are pipe assemblages from a single village more internally consistent than pipe assemblages among villages?

Rapid Social Change – Certain Doom or Common Historical Process?

Is the rapid pace of social change in the contemporary world so different from the past? Has technology really driven social change at such a dramatic pace that we are all in for *Future Shock*? When we think about rapid social change, it is easy to imagine that change in past societies must have happened differently. It is easy to assume that people who lived in the past did not experience the kind of fast-paced dramatic periods of change that we do.

For the Wendat, the process of coalescence brought fundamental changes to the nature of social relationships among community members and beyond. During this period of warfare, aggregation, formation of new villages, and the creation of new social identities, people may have felt like everything in their world was changing very quickly. In fact, some people probably did experience an end in the way of life as they knew it. Moving from the small White village with a population of a few hundred, to the Draper village with a population of 1500 or more would have been a transformational experience. However, the coalescent period Wendat, like many societies before and after, moved through this transition and continued to build new communities like Mantle. The people of the White, Draper, Spang, and Mantle villages each experienced dramatic social change and adapted, creating an entirely new way of life in the process.

It may seem like as members of the modern world we are the first to experience such dramatic social change, but the difference between the Wendat experience of coalescence and the rapid changes we face today are quantitative, not qualitative. In terms of how individuals lived their daily lives, coalescence changed the nature of relationships among people within communities, it changed who you worked with to accomplish the tasks of daily life, and along with coalescence came changes in the way

that people thought about themselves and others. Coalescence changed how people defined themselves in relation to others, and contributed to the creation of new, abstract shared social identities that united people as members of communities and beyond. This transformation was far reaching, even contributing to new, expanded contacts with communities outside the local region.

Humans still seek out others who share similar ideologies and use similar practices to identify one another whether that is through appreciation of the same style of pottery or laughing over the same cat meme. Just as the tools for communication and building connections have evolved over time, so have our solutions to the challenges of living in a rapidly changing social world. Communications technologies facilitate relational connections among people who would otherwise never come into contact in previously unknown ways through ride shares, conversations on social media or Internet forums, and peer-to-peer micro loans across continents. Technology helps drive social integration because it makes integration so easy, but the fundamental social processes that drive that integration are the same – categorical and relational connections among people. By looking to how people who lived in the past met the challenges they faced, we can have confidence in our ability to adapt.

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APPENDIX A

TYPE FREQUENCIES BY SITE

Type	Walkington2 (Algu-341) ¹		Gostick (AlGt-65) ²		Pugh (AlGt-87) ²		Jarrett-Lahmer (AlGv-18) ³		Draper (AlGt-2) ⁴		Draper 2016 Data		Spang (AlGt-66) ⁵		Mantle (Algt-334) ⁶		Aurora (BaGu-2) ²	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Huron Incised	31	29.25	2	16.67	46	22.01	153	41.8	339	14.22	639	45.06	342	41.2	1071	55.96	73	60.83
Sidey Notched	2	1.89			1	0.48	29	7.92	132	5.54		0.02	46	5.54	182	9.51	19	15.83
Lawson Incised	4	3.77	1	8.33	1	0.48	33	9.02	88	3.68			14	1.69	144	7.52	2	1.67
Pound Necked	1	0.94			5	2.39	7	1.91	131	5.49	42	2.96	2	0.24	1	0.05		
Black Necked	51	48.11	9	75	133	63.64	71	19.4	885	37.12	576	40.62	365	43.98	39	2.04	1	0.83
Seed Incised	1	0.94					5	1.37	25	1.05	24	1.69	2	0.24	88	4.6	7	5.83
Seed Corded															15	0.78	2	1.67
Sidey Crossed									40	1.68	3	0.02						
Pound Blank					3	1.44	1	0.27							2	0.1		
Lalonde High Collared	3	2.83			5	2.39	10	2.73	39	1.64	1	0.007			1	0.05	1	0.83
Ontario Horizontal							1	0.27	27	1.13			1	0.12	11	0.57		
Middleport Oblique	1	0.94					1	0.27	1	0.04					1	0.05		
Niagara Collared	6	5.66			3	1.44	6	1.64	30	1.26	21	1.48	13	1.57	83	4.34	5	4.17
Ripley Plain							4	1.09	14	0.59	60	4.23	2	0.24	25	1.31		
Ontario Oblique															2	0.1		
Warminster Horizontal	5	4.72			1	0.48	2	0.55	12	0.5	24	1.69	10	1.2	20	1.04	1	0.83
Warminster Crossed									231	9.69	2	0.01						
Ripley Corded															1	0.05		

	Walkington2 (Algu-341) ¹		Gostick (AlGt-65) ²		Pugh (AlGt-87) ²		Jarrett-Lahmer (AlGv-18) ³		Draper (AlGt-2) ⁴		Draper 2016 Data		Spang (AlGt-66) ⁵		Mantle (Algt-334) ⁶		Aurora (BaGu-2) ²	
Roebuck Low Collared					6	2.87	6	1.64	41	1.72	1	0.007	3	0.36				
Roebuck Corn Eared													1	0.12	16	0.84	3	2.5
Durfee Underlined							7	1.91	20	0.84	3	0.02	3	0.36	1	0.05		
Cayadutta-Otstungo Incised							1	0.27							26	1.36		
Rice Diagonal							3	0.82	6	0.25			7	0.84	12	0.63		
Cayuga Horizontal													1	0.12	9	0.47		
Chance Incised									2	0.08					3	0.16		
Neutral Punctate Lip															3	0.16	1	0.83
Dutch Hollow Notched					1	0.48	1	0.27	2	0.08			3	0.36	121	6.32	4	3.33
Fonda Incised															1	0.05		
Hummel Corded															1	0.05		
Onondaga Triangular							1	0.27	39	1.64	7	0.04	1	0.12	1	0.05		
Otstungo Notched									9	0.38	1	0.007			1	0.05		
Richmond Incised															1	0.05		
Thurston Horizontal							1	0.27							1	0.05		
Lawson Opposed							7	1.91	34	1.43			11	1.33				

	Walkington2 (Algu-341) ¹	Gostick (AlGt-65) ²	Pugh (AlGt-87) ²	Jarrett-Lahmer (AlGv-18) ³	Draper (AlGt-2) ⁴	Draper 2016 Data	Spang (AlGt-66) ⁵	Mantle (Algt-334) ⁶	Aurora (BaGu-2) ²	
Copeland Incised										
Iroquois Linear										
Lanorie Crossed					1	0.04	10	0.07		
Syracuse Incised					8	0.34	1	0.007		
Wagoner Incised				9	2.46	2	0.08			
NY Indeterminate									1	0.83

Common types shown in green, less common types in gold, St. Lawrence Iroquoian types in blue, and New York Iroquois types in purple

¹ASI 2010, ² data provided by Rob Wojtowicz of ASI, ³ASI 2003, ⁴ Pearce 1977, ⁵ data provided by Aleksandra Pradzynski of ASI, ⁶ ASI 2012.

APPENDIX B

ATTRIBUTES RECORDED IN MICROSCOPY STUDY

Catnum	Catalog number	
Lip thickness	In mm	
Rim diameter	Estimated in mm	
% complete	% of rim estimated in mm	
Firing Exterior Surface Firing Exterior Margin Firing core Firing interior margin Firing Interior surface	Oxidized, Incompletely oxidized, Irregularly Fired	
Hardness	Hard	Scratched by metal blade but not fingernail
	Medium	Can be scratched by fingernail but not easily
	Soft	Can be scratched easily by fingernail
Compaction	Strong, Moderate, Weak	
Feel/texture	Smooth, Sandy, Granular, Crumbly	
Fracture	Smooth	Flat or slightly curved with no visible irregularities; or a very dense, regular appearance
	Fine	Irregular, small closely-spaced irregularities or porous structure
	Irregular	Larger or widely spaced gaps or porosity
	Hackly	Uneven, rough break typical of sandy fabrics with spaces created between clay matrix and inclusions
	Laminated	Fractures in layers like slate or shale
Voids	Channel Voids (Abundant, Moderate, or Few)	Tunnel-like voids
	Calcite	Voids from rhombs
	Limestone	Voids irregular
	Grass or Straw	Voids elongated with striations down length
Inclusion Max Size	Very fine, silt	up to 0.1mm
	Fine	0.1 to 0.25mm
	Medium	0.25 to 1.0mm
	Coarse	1.0-3.0mm
	Very Coarse	Larger than 3.0mm
Inclusion sorting	Very well, well, moderately, or poorly sorted	

Inclusion Frequency	Very Abundant	50%+
	Abundant	40-49%
	Very Common	30-39%
	Common	20-29%
	Moderate	10-19%
	Sparse	3-9%
	Rare	Less than 3%
Inclusion Sphericity	High or low sphericity	
Inclusion rounding	Angular	Strongly developed faces with sharp corners. Sharply defined, large reentrants with numerous small reentrants
	Subangular	Strongly developed flat faces with incipient rounding of corners. Small reentrants subdued and large reentrants preserved
	Subrounded	Poorly developed flat faced with corners well rounded. Few small and gently rounded reentrants and large reentrants weakly defined
	Rounded	Flat faces nearly absent with corners all gently rounded. Small reentrants absent and large only suggested.
	Well-rounded	No flat faces, corners, or reentrants discernible and a uniform convex grain outline
Rock inclusion ID	Granite, granodiorite	
Inclusion 1-4 ID	Amphibole, Dark brown grain, Dark (Black) grain, Dark Mica, Dark Pink Grain, Feldspar Indeterminate, Feldspar-like gray, Feldspar-like pink, Granite, Granodiorite, Gray grain, Igneous indeterminate, Light mica, Light Pink, Limestone, Mica Indeterminate, Quartz, Sand	
Inclusion 1-4 Frequency	Same as Frequency above	
Clay Inclusion ID, Size, Sorting, Rounding, Sphericity	See Above categories	
Clay Mottled?	Mottled appearance to clay, yes/no	
Mica sheen?	Weak, Moderate, Strong	
Shale?	Present/Absent	
Mudstone?	Present/Absent	
Limestone?	Present/Absent	
Burnt soil	Present/Absent	
Iron	Present/Absent	
Residue	Present/Absent	

Other	Present/Absent see notes for detail
Platy texture	Present/Absent
Clear crystal	Present/Absent
Clay mix or seg	Present/Absent appearance of clay mixing, segregation features, or varved appearance
Blocky feldspar	Present/Absent distinctive very coarse (3mm+) feldspar grains
Notes	

APPENDIX C

EXAMPLE VESSEL AND PIPE DESCRIPTIONS

Vessels



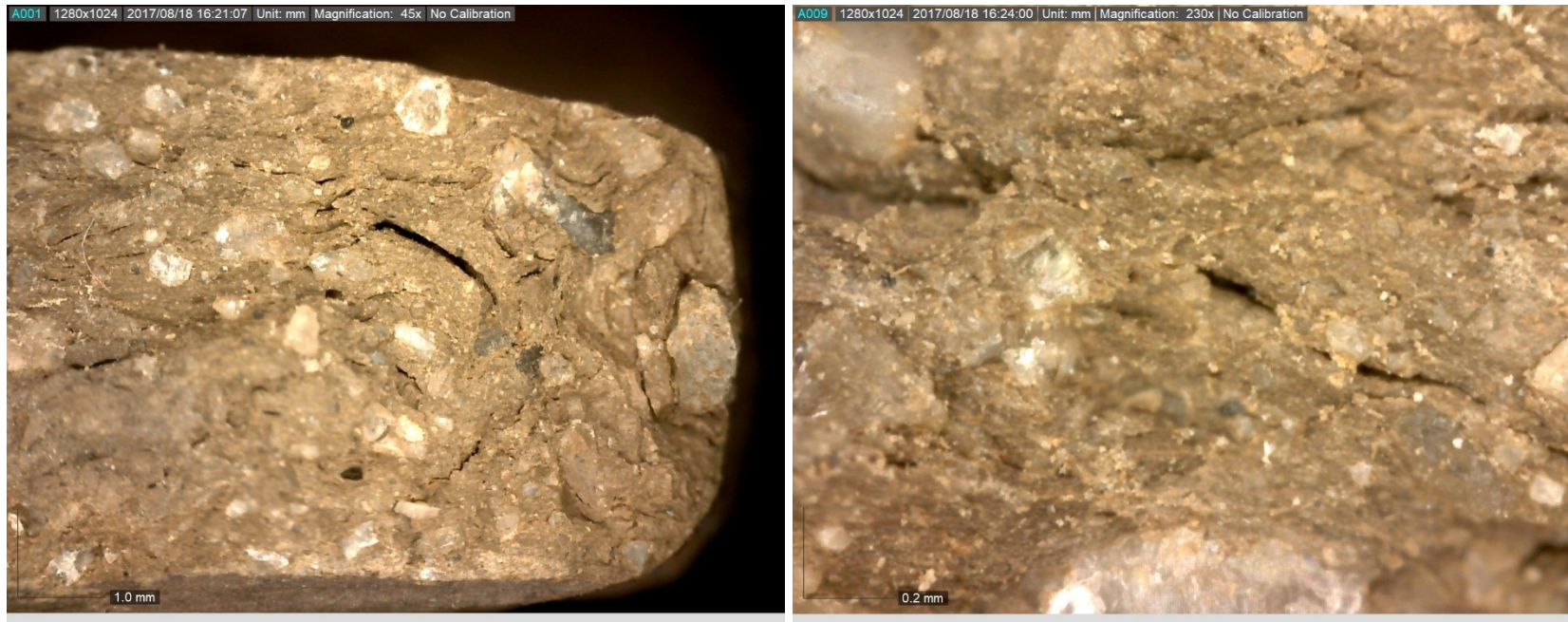
250

ALGt-32 Vessel Catalog #1080. Left photo 30x magnified, right photo 230x magnified. Oxidizing firing, medium hardness, moderate compaction, smooth texture, irregular fracture, moderate channel-shaped voids. Coarse, angular, poorly sorted inclusions of moderate density, and low sphericity. Common gray inclusions likely feldspar or quartz, moderate dark inclusions likely amphibole, sparse mica. Rare granite. Clay inclusions sparse, very fine-silt-sized poorly sorted, subrounded sand. Some mottling visible in clay.

251



AlGt-2 Vessel Catalog #30331. Left photo 30x magnified, right photo 215x magnified. Oxidizing firing, medium hardness, moderately compacted, smooth texture with irregular fracture and few channel-shaped voids. Moderate density of medium-sized poorly sorted angular inclusions with low sphericity. Inclusions primarily light pink grains likely potassium feldspar (very abundant), with moderate dark grained inclusions likely amphibole and sparse mica. Sparse granite inclusions. Clay inclusions sparse, very fine-silt-sized, poorly sorted subangular sand. Clay has lighter colored streaks, perhaps varve-like layering in the natural clay deposit.



AlGt-66 Vessel Catalog #11228. Left photo 45x magnified, right photo 230x magnified. Oxidizing firing, medium hardness, strong compaction, irregular fracture with few channel-shaped voids. Coarse, sparse, poorly sorted angular inclusions with low sphericity. Inclusions include very common light pink (likely potassium feldspar), with moderate dark grains (likely amphibole), and sparse mica. Sparse granite inclusions. Wrap-around construction of the rim is evident in structure of channel-shaped voids.



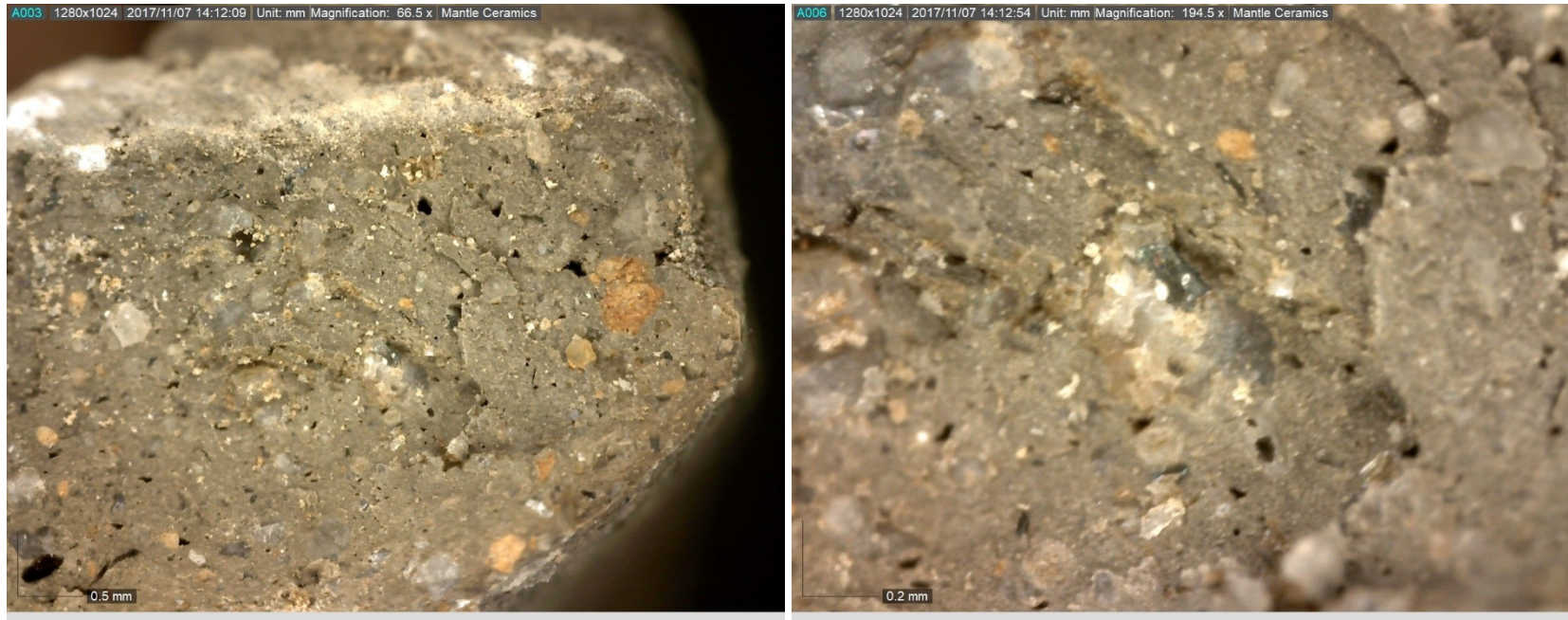
AlGt-334 Vessel Catalog #9837. Photos magnified 30x. Irregular firing, hard with moderate compaction, granular texture, irregular fracture and abundant channel-shaped voids. Coarse, angular, moderately-sorted inclusion of moderate density with low sphericity. Inclusions primarily abundant light colored grains (quartz and/or plagioclase feldspar likely), with moderate dark grained (likely amphibole), and sparse mica. Sparse granodiorite grains. Appears to be two clays with different firing properties mixed together, or could result from layered natural clay deposit.

Pipes

254



AlGt-32 Pipe Catalog #4510. Photos magnified 195x. Oxidized exterior surface with incompletely oxidized margins, core, and interior surface. Medium hardness with strong compaction, smooth texture, irregular fracture and few channel-shaped voids. No crushed rock or mineral temper observed. Rare, very fine silt-sized, poorly sorted subangular sand inclusions. Rare iron nodules. Sparse rounded, coarse, dark clay lumps surrounded by void space.



AlGt-2 Pipe Catalog #68546. Left photo 66.5x magnified, right photo 194.5x magnified. Oxidizing firing. Medium hardness, strong compaction, smooth texture with irregular fracture and few channel-shaped voids. Medium-sized angular, poorly sorted inclusions of moderate density. Inclusions primarily very abundant light pink (likely potassium feldspar) with sparse dark grains (likely amphibole). Sparse, medium-sized subangular inclusions of bright orange burnt soil.



AlGt-66 Pipe Catalog #480. Left photo 51.2x magnified, right photo 189.3x magnified. Oxidizing firing. Soft hardness, strong compaction, smooth texture and irregular fracture with few channel-shaped voids. Common, angular, medium-sized, very fine-silt-sized poorly sorted inclusions with low sphericity. Inclusions comprise very abundant light pink (likely potassium feldspar), sparse dark grains (likely amphibole), and sparse mica. Rare granite inclusions. Clay contains moderate density of very fine-silt-sized poorly sorted, angular sand.

257



AlGt-342 Pipe Catalog #12320. Left photo 35x magnified, right photo 55x magnified. Oxidizing firing. Medium hardness, strong compaction, smooth texture, with irregular fracture. Moderate density of very coarse, poorly sorted, angular inclusions of granite. Very common, poorly sorted, rounded sand inclusions. Clay is slightly streaky with some mottled patches and rare burnt soil.

