LITHIC ORGANIZATION, MOBILITY, AND PLACE-MAKING AT THE FROG BAY SITE: A COMMUNITY-BASED APPROACH

A Thesis
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By

Elizabeth Louise Cheli

In Partial Fulfillment of the Requirements
for the Degree of
MASTER OF SCIENCE

Major Department:
Sociology and Anthropology

May 2020

Fargo, North Dakota

North Dakota State University
Graduate School

Title

Lithic Organization, Mobility, and Place-Making at the Frog Bay Site:
A Community-Based Approach

By

Elizabeth Louise Cheli

The Supervisory Committee certifies that this ***disquisition*** complies with North Dakota State University's regulations and meets the accepted standards for the degree of

MASTER OF SCIENCE

SUPERVISORY COMMITTEE:

Dr. John Creese
Chair

Dr. Sonya Atalay

Dr. Stephanie Day

Dr. Kristen Fellows

Approved:

June 16, 2020
Date

Dr. Christopher Whitsel
Department Chair

ABSTRACT

The Frog Bay site (47BA60) has been excavated for three field seasons. Excavations in 1979 located the site and continued in 2018 – 2019 by the Geté Anishinaabe Izhichigéwin community archaeological field school. This program commenced from a sovereignty initiative surrounding the creation of the Frog Bay Tribal National Park directed by the Red Cliff Band of Lake Superior Chippewa. Within the park, the Frog Bay site represents a multicomponent shore-based camp that was occupied numerous times during the Archaic and Woodland stages (ca. 3000 BC – AD 900). Structured through a community-based Indigenous theoretical framework, lithic analysis and community input are used to research long-term practices of mobility, land use, and place-making associated with the Frog Bay site. These methods offer a "braided interpretation" of the activities and occupation trends at Frog Bay and explore the intrinsic value that the site continues to hold for the present-day Red Cliff community.

ACKNOWLEDGEMENTS

I would like to express my appreciation to those who made this research possible. A special thanks to my advisor, Dr. John Creese who did more than required to persistently keep me on track; spending countless hours reading, challenging, and guiding. Along with Dr. Creese, a special thank you to Dr. Heather Walder and Mr. Marvin DeFoe for their unprecedented work which inspired this research as well as all of their leadership and support through the process and during each field season. Thank you to my amazing committee including Dr. Sonya Atalay, Dr. Stephanie Day, and Dr. Kristen Fellows, all of who contributed their time and knowledge. I wish to thank Alejandro, my parents, friends, and the entire NDSU Department of Sociology and Anthropology of faculty and students who have been immensely supportive and encouraging and helped make this research possible. Lastly, I would like to thank the entirety of the Red Cliff community for welcoming and allowing me the opportunity to step into the community and build this research.

TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

LIST OF APPENDIX TABLES

LIST OF APPENDIX FIGURES

CHAPTER 1. INTRODUCTION

The Frog Bay site (47BA60) has been excavated in three field seasons, first by a Beloit College field school in 1979, and again from 2018 – 2019. Current research at Frog Bay began during the Chequamegon Bay Archaeological Field School in 2018. This program was created out of a sovereignty initiative surrounding the creation of the Frog Bay Tribal National Park directed by the Red Cliff Band of Lake Superior Chippewa. Found within the park, the Frog Bay site represents a multicomponent shore-based camp that was occupied numerous times over several thousand years during the Archaic and Woodland stages. Research led to the creation of the 2019 Geté Anishinaabe Izichigéwin Community Archaeology Project (GAICAP). Both recent field seasons were organized and directed by the Red Cliff Band of Lake Superior Chippewa's Tribal Historic Preservation Officer (THPO) Marvin DeFoe and co-directed by archaeologists John Creese with North Dakota State University and Heather Walder with The University of Wisconsin – LaCrosse.

This thesis is based on the excavations and work done by the directing archaeologists of the site, John Creese and Heather Walder. Constructed through a community-based Indigenous theoretical framework, this research uses lithic analysis and community input to build from the excavations at Frog Bay to offer an interpretation of mobility and land use at the site as well as considerations as to why this site was continually re-occupied and continues to be a place of importance today.

Following Sonya Atalay's concept of "braided knowledge," defined as community knowledge intertwined with archaeological data and methods to create new and richly textured interpretations of the past (Atalay 2012), this thesis hopes to cultivate an approach that braids together different forms of knowledge and practices to understand and interpret Frog Bay in a way that is meaningful and valued by the Red Cliff community.

Interpretation considers three main strands of inquiry: lithic analysis, Indigenous theory and knowledge, and local community participation. Through lithic analysis site activities and regional mobility are addressed in a historically Western scientific approach. This deals with debitage analysis, diversity indices with tool and core assessment, and cortex ratio evaluation. Indigenous theory and knowledge allow for a more holistic interpretation of the archaeological data in terms of human relationships with the land and value of place-making through time. This also places interpretation into a more contextual framework with the aid of Indigenous publications and local descendant involvement. Community participation and methods act as the basis for the program in which this thesis is situated and combined with Indigenous theory and knowledge allows archaeology to act as a decolonizing approach that focuses on relevancy for the local community.

As these strands overlap, they strengthen and build on one other to create a holistic and interpretive understanding of the site's activities and deep-rooted value. Braided together in an encompassing exploration of the Frog Bay site, a connection can be found between the communities who occupied and found importance in the site during its use thousands of years ago – and the continued importance of the site to the local community of the Red Cliff Band of Lake Superior Chippewa today.

CHAPTER 2. THEORETICAL FRAMEWORK

2.1. Introduction

The theoretical framework that will be used to understand mobility, land use, and the importance of place at Frog Bay will be ordered through the use of postcolonial and decolonizing theory, community-based theory, Indigenous theory, and relational landscape theory. These theories will guide the analysis and discussion away from traditional archaeology to an analysis that addresses and informs the understandings and interpretations of the archaeological record through decolonizing and community-relevant methods. These will also include the incorporation of the importance of Indigenous worldviews and histories (Nicholas 2008) with the intention of understanding the site in a way which counters colonial ideologies and opinions. This framework aspires to assist in bolstering Indigenous representation and thought (Bruchac 2014:2069) as much as possible from the author's position as a non-Indigenous ally.

2.2. Postcolonial and Decolonizing Theory

Decolonization is an act and a process that has become a developing necessity in several fields worldwide. Across the globe, colonization has taken a toll on countless societies, cultures, and political entities. Western imperialism and colonization have historically marked communities with destruction and systematic racism towards domination and subordination. Over hundreds of years the process of colonization imposed a structure of imbalance which problematized Indigenous cultural ideas, cosmologies, ways of life, and histories while prioritizing Western viewpoints and established beliefs (Trigger 1980). Focusing on the geographic region of North America, this long affair has become embedded in the thinking of many non-Indigenous Euromericans to their benefit and convenience and has shaped the majority of political, economic, and cultural structures dominating institutions. In doing so, this system has inherently worked to destabilize Indigenous identities for self-gain (Wilcox 2010): "The racialization of Indigenous people and Black people in the U.S. settler colonial nation-state are geared to ensure the ascendancy of white settlers as the true and rightful owners and occupiers of the land" (Tuck et al. 2012:12). Using a postcolonial approach requires the recognition of archaeology's colonial roots and the systems that have been emplaced.

Archaeology in North America has been a settler-colonist endeavor and has historically worked in the favor of colonialism as a way to claim rights to stolen land and legitimacy for abhorrent actions while excluding Indigenous views and voices (McGuire 1992; Trigger 1980). In archaeology, Indigenous people have long been used as informants for Western scientists. Colonial agendas and disregard of traditional intellectual property have controlled and filtered information surrounding Indigenous property, knowledge, beliefs, and ideologies while simultaneously pushing genuine Indigenous concerns and understandings to the margins (Bruchac 2014).

In the late 20th century, Indigenous and non-Indigenous supporters in defiance of the overruling hegemonic bias of Western-based understandings began problematizing colonialism and the longstanding implications that came along with it. Early critics of colonialism such as Edward Said (1978), Frantz Fanon (1961), Gayatri Spivak (1985), Vine Deloria Jr. (1969), and Homi Bhabha (1994) began to critique colonial literature and colonial structures. They launched a conversation to address the many issues of colonialism and initiate a push to restructure scholarship through a decolonizing lens.

Indigenous peoples have become a subaltern group, defined by Spivak as people who are silent and invisible (Spivak 1985). Archaeology has the potential to provide tools to understand colonial forms and give voice to those who have historically been silenced, ignored, and whose stories have become distorted through the colonial nature of the field (Liebmann 2010). Currently, postcolonial studies are still being conducted in a colonial setting dealing with the lasting effects of historical colonialism which continue to persist in the forms of "chaos, coups, corruption, civil wars, and bloodshed" (Hamadi 2014:39).

There are many issues within postcolonial and decolonizing theory that are beyond the scope of this study (e.g. Banerjee 1996; McClintock 1992; Tuck et al. 2012). These issues demonstrate that archaeology continues to be based and generally centered on the values of Western cultures. Practices such as privileging material over relationships and the scientific over the spiritual or religious substantiate the argument that archaeology is grounded in Western ways of knowing the world (Atalay 2006; Smith et al. 2005).

By using archaeology to decolonize, the field must be open and ready to critique and challenge archaeological history which served to legitimize the real powers of domination and exploitation (Van Dommelen 2012:3) as well as recognize that "Native people *must* have a seat at the research table" (Martinez 2006:487). With this being said, decolonization can and needs to be built into the field in ways which emphasize the recognition of multiple knowledge systems, focuses on community needs, delegates fair partnership, and builds community capacity and reciprocity (Atalay 2012:63; Bruchac 2014). This leads into the necessity of community-based and Indigenous archaeology which prioritize community values and ontologies by conducting respectful research by, for, and with the community (Atalay 2012).

2.3. Community-Based Theory

Community-based archaeology works to decolonize the field by creating an archaeology by, for, and with the community (Atalay 2012). Atalay introduced 'community-based archaeology,' defined as "advocate[ing] a partnership approach that is motivated by the rights communities have to be active participants in the creation of knowledge" (Atalay 2012:45). This is a method of decolonization as it strives to accomplish processes and end-products that are unique and beneficial for the community. Often the concept of community archaeology has been elaborated as 'archaeology by the people for the people' (Reid 2012:8). This emphasizes the equality between people in research and highlights the centrality of leading through questions posed by community interest and creating relevant research.

While it could be argued that it would be easier and possibly more organized to research pre-determined academic research questions, doing so would not further the field in decolonizing (Angelbeck and Grier 2014:519) and would not center on community interests and concerns. Scholars and activists have tried to decolonize archaeology in different ways, mainly beginning with challenging the "one-sided focus on representation" (Van Dommelen 2011:3) and exposing the long-lasting effects of colonialism. Scholars have fortunately started to search for alternative methods and research approaches that would be inclusive to Indigenous viewpoints (Atalay 2012:35).

Community-based collaboration in a project means more than working together for a common goal, but doing so with mutual respect, meaningful dialogue, reciprocity, and a long-term commitment of time. While these aspects may be met at different intervals, situating research in this way works to embrace different and unique processes and objectives that may not always be seen as traditionally conducive for scientific knowledge production (Colwell-Chanthaphonh and Ferguson 2008). An example of this is horizontalism: an aspect of community-based projects which "refers to relationships of cooperation, negotiation, alliance, and collaboration embedded in bottom-up organization" (Angelbeck and Grier 2014:523). This is a means of decolonizing through the organization of power forms by natural authority and knowledge rather than dictating research through Western-made institutions such as academia or political and economic title.

In community-based projects, equal partnership has been used as a method of decolonization. Many academic archaeologists come with a scientific-based background and place themselves and their scientific knowledge higher than the non-academic public. This has also been the case when involving Indigenous knowledge and authority. Academic positions and scientific knowledge have never been more valuable than Indigenous traditional knowledge; instead these forms of knowing can work in collaborative expertise following natural authority. This necessitates that when involving Indigenous land or Indigenous materials and artifacts, Elders and Indigenous community members have the authority and control, with non-Indigenous archaeologists working for the community (e.g. Smith and Jackson 2008).

Community-based methods are especially important when working with Indigenous communities as working by natural authority and combining different forms of knowledge and worldviews is a critical component for success of a meaningful project for everyone. While there can be a place for Western scientific analysis and interpretation, an Indigenous setting calls for the centrality of Indigenous thought, theory, and framework. Working from the same plane of thought as community-based theory, Indigenous theory includes an entire system of knowledge and relationships (Wilson 2008:74) that is absent in the Western worldview.

2.4. Indigenous Theory

Indigenous theory has come to refer to the knowledge systems shared by all the original peoples of the world (Wilson 2008:54). This encompasses an expanse of communities and people and accepts their ontology as critical to accurate representation within archaeology and history. Indigenous archaeology can be defined as “an array of practices conducted by, for, and with Indigenous communities to challenge the discipline's intellectual breadth and political economy" (Colwell-Chanthanphonh et al 2010:28). Indigenous archaeology grew alongside community-based archaeology and while linked to one another, Indigenous archaeology adds Indigenous values, knowledge, practices, ethics, and sensibilities (Nicholas 2008: 1660).

Indigenous theory is an essential facet in postcolonial and decolonizing theory which criticizes colonial constructs and utilizes the "power and role of Indigenous knowledge" (Absolon 2010:78). This is predominantly accomplished through degrees of collaborative and community-oriented or community-driven research. Indigenous archaeology therefore follows the same principles as community-based archaeology but goes a step further by furthering self-sustainability of community history and improving how Indigenous materials and knowledge are protected and interpreted through inclusion of Indigenous voices and knowledge systems in productions and publications.

There does not need to be - and should not be - a gap between archaeology and traditional knowledge. Different forms of knowledge can contribute to understandings of the past in connection with the present. Adopted from the field of Indigenous social work, Indigenous Wholistic Theory by Kathy Absolon (2010) creates a framework "to 'indigenize' our thoughts and actions into active healing processes that simultaneously decolonize and indigenize" (Absolon 2010:74; cf. Wilson 2008). As stated by Absolon, "Indigenous knowledge is a lived knowledge…there is no distinction between living and working, Indigenous knowledge is way of life" (Absolon 2010:85). Interpretations of the past in forms other than strictly scientific archaeological knowledge inform people's lives in the present (Colwell-Chanthaphonh 2010:329) and create a more holistic and realistic analysis that relates to Indigenous lifeways.

Research aims are thus improved to benefit Indigenous communities by means of increased cultural views and voices in repudiation of colonial agendas.

A critical component of Indigenous theory is relationality and the emphasis on relationships over material things (Wilson 2008:70). While Western thought focuses on finding answers and searching for truth, Indigenous thought is concerned more with the relationship to truth as described by Shawn Wilson (2008):

"The difference is that, rather than the truth being something that is "out there" or external, reality is in the relationship that one has with the truth. Thus, an object or thing is not as important as one's relationship to it. This idea could be further expanded to say that reality is relationships or a set of relationships. Thus, there is no one definite reality but rather different sets of relationships that make up an Indigenous ontology" (Wilson 2008:73).

The emphasis on relationships rather than on an individual material speaks to the differences between Western and Indigenous systems of life and thought. This difference highlights the lack of understanding and knowledge of Western archaeologists when interpreting Indigenous properties and histories. Employing Indigenous archaeology and theory thus decolonizes and strengthens communities in identifying and addressing limitations and biases of Western science (Nicholas 2008:1665). Indigenous archaeology therefore hopes to contribute meaningfully to present Indigenous descendant communities by strengthening Indigenous cultural endurance and maintaining the importance and value of relationships through space and time.

2.5. Relational Landscape and Hunter-Gatherer Theory

The previously mentioned models of postcolonial, community-based, and Indigenous theories are supportive to decolonizing archaeology. These theories rely upon local community involvement and connect contemporary peoples' relationships to the land to those of the past. Relational landscape and hunter-gatherer theory are further ways of decolonizing through the understanding of relationality in Indigenous ways of life and ontology. Understanding how ancient communities lived through the histories and interpretations of Indigenous communities reinstates research into terms and ontology that is relevant and valued by the local descendant community.

Landscape theory in archaeology encompasses a large range of perspectives. Traditionally, landscape theory takes a more scientific approach and attributes cultural change and lifeways primarily to environmental explanations stemming from extreme concepts such as environmental determinism and cultural ecology (e.g. Morris 2010; Steward 1955), although many scholars have since moved forward from these deteriorating notions. The same is true for hunter-gatherer theory which frequently highlights adaptation and subsistence models – without concern for cultural and traditional motives and human agency (Oetelaar 2014). In a dissimilar approach, relational landscape and hunter-gatherer theory take into account the significance of all of these previously limited concepts and focuses on human relationships, connections, and conceptions to, of, and with the landscape.

As described by Ingold (2000), there are many separate and particular Indigenous beliefs about the land that cannot be ascribed outside of a group although there is a general sentiment about viewing the land as a "congelation of past activity" (Ingold 2000:53) where the "the geography and special features of the land – hills, creeks, salt lakes, trees – are marks of the ancestors activities" (Ingold 2000:52 excerpt from Fred Myers 1986:49-50). This can take the shape of ancestors metamorphosing into the forms of the landscape (Ingold 2000:53) or staying within the land in one way or another. Societal and cultural change in a community become “movement *in* (not *on*) a landscape” (Ingold 2000:54). Identity and culture are interconnected with the physicality of the land rather than a force acting upon the land. Instead of applying dichotomizing categorizations, relational landscape theory and hunter-gatherer theory can be applied to lead research towards an integrative and relational understanding of how past peoples viewed and lived in unison with their landscape.

In minimalist terms, relational landscape theory in archaeology focuses on the relationships between people and land. Relational landscape and hunter-gatherer theory align together in their ability to find an analytical lens as closely related to those of past peoples as possible while actively diverging away from typical Western perspectives that have dominated archaeological research. This can appeal to a wide range of archaeological projects regardless of size or scale, as the integration of humans with their surroundings is always present; there is always interaction between humans and the environment as they interchangeably affect one another.

Relational landscape and hunter-gatherer theory recognize that landscapes, as well as nature and culture, are human constructs; either through physical actions and changes, or through spiritual and mythological creation (Ashmore et al. 1999:1; Ingold 2000:41). “Landscapes are both real and imagined, objective and subjective, past and present, space and place, nature and culture” (Fowles 2010: 461). Because landscapes are constructed through action and perception, it is understood that different “cultural or ethnic groups can hold different and even conflicting images of the same land. The resulting ‘landscape’ is the result of direct experience, received ancestral knowledge (Zedeno et al. 1997), and other culturally self-reflexive perceptions” (Zedeño et al. 2001:234). The subjectivity of landscape can be seen in how one person or group’s views differ from the next in relation to certain places. In order to be a landscape, the land has to be perceived, experienced, and contextualized by people (Ashmore and Knapp 1999:1). This creates a socio-symbolic dimension of landscape and more than a purely economic environment or simple backdrop of an archaeological site, but instead as a place of important significance and special attention.

Relational landscape theory relates back to the significance of relationships within Indigenous theory as "relationships to places are lived in the company of other people…places are sensed *together*" (Basso 1996:57). People and their environments are sensed and created through unique individual and societal cultural relationships. Choices made in the environment, like all others, are made through a cultural lens which contains social values and societal needs. Choices in environment and adaptation can be primarily motivated by the legacy of generations that came before. These social authorities have meaning which impact people and their choices in regard to how to use the land, where to go, what to build, and so on (e.g. Basso 1996; Fowles 2010; Oetelaar 2014; Wilson 2008).

In archaeology, lifeways are dictated by a number of different factors most commonly broken down into the separate categories of the natural environment, cultural environment, and individual agency (e.g. Binford 1965; White 1943). A widespread concept in traditional settlement archaeology is also the dichotomization between mobile and sedentary. In analyzing mobility, landscape and settlement theory frequently bring up the common ranking of people from mobile to sedentary in an approach that carries assumptions and connotations of the superiority of sedentism. This originates from a Western lens which trivializes the complexities within all lifeways and neglects the advantages of mobility. While categorization can be helpful, it is understood that there is a need to "construct more useful approaches than a simple polarization of mobile vs. sedentary societies" (Kelly 1992:60).[1]

Separating ideas into categories and analyzing them individually is a familiar Western understanding that neglects the importance of relationships and contrives a framework that is not suitable for understanding how past communities viewed the world (Wilson 2008). While categorization and classification can be argued to be a necessary system for organization and clarity, these manufactured divisions are disconnected from the realities of past people's lifeways and understandings of the world. Categorizations and the consequential detachment and simplification that follows is important to bring attention to.

In doing archaeology, Western scholars have also created boundaries around aspects of landscape. Separations between marine and terrestrial or "natural" or "empty" (Ashmore and Knapp 1999:2) can be seen as examples of critical language used by archaeologists which classify areas based on their own sensitivities and agendas. Areas without clear cultural material are many times classified as "sterile," implying unimportance and a lesser degree of cultural significance while separating nature and culture as different entities (Cipolla et al. 2018). Many of the places important to Indigenous communities contain histories and evidence of past journeys (Ross et al. 2013:62) but may appear to be simply natural and empty to Euromericans (Smith and Jackson 2008:178). Even the wide employment of the term landscape is a Western conception, as a "cultural construct of modern European society" (Ashmore and Knapp 1999:6).

Place and space are also commonly split when understanding meaning in the environment. Place being somewhere holding a special acquired meaning, and space defining the

[1]Examples of this kind are common in Western archaeology with the constant need to categorize and simplify social interaction and organization with an emphasis on "evolution" and "improvement." This is commonly represented in political organization typologies which rank political and social complexes (band, tribe, chiefdom, state, nation, etc.) with undertones of superiority associated with more modern ways of living and conducting.

abstract other, or the areas that do not hold cultural significance. Indigenous people have known the flaws in the polarization of these terms. Working to connect to this conception, relational hunter-gatherer theory states that there is no set culture and no nature but rather an integrated entity (Ingold 2000:42). Whitridge (2004) follows this concept and states that this boundary creates a nature/culture divide which limits the potential of analyses (Whitridge 2004:213) and again tries to fit understanding of past peoples into an inadequate scholarly classification system. Space is not void of meaning and significance but can be seen as the larger aspect in which place is situated. Many times, what may be categorized as space is culturally significant to Indigenous people and "may exist where people or spiritual beings passed along trails from place to place" (Zedeño et al. 2001:235).

In the area of focus, Ojibwe communities have long lived upon and utilized the shores of the lakes and waterways within their traditional territories, and although there may not be specific traces of this in the archaeological record, "almost every promontory and every bay has an origin story or historical event connected to it" (Zedeño et al. 2001:72). This also applies within the lakes as although "water trails leave no mark, they still vividly exist in the minds of the people who established them" (Zedeño et al. 2001:235). While there may not be material evidence, and these locations may therefore be classified as "spaces," they are nevertheless occupied with significance and importance to those who know of the stories and histories they hold. Birch bark and dugout canoes are physical evidence of the prominence of the lake in Ojibwe life. In a PBS interview, Andrew Gokee, retired director of the Native American Center at UW-Stevens Point, explains the integral aspects of the lake, "It's spiritually significant to us. There's Spirits that live in this lake. It's a part of our oral history. It's a part of our spirituality. It's part of who we are" (PBSb 22:18 – 22:32).

2.5.1. Synthesis: Braiding Theory

Atalay's concept of "braided knowledge" (Atalay 2012) is adopted as a way to intertwine theory. "Braiding theory" describes the weaving of concepts in order to connect the shared aspects of the previously described theories as an encompassing framework for this research. It is no longer – and never was – appropriate to analyze Indigenous property and materials with merely Western perspectives and methods. In general, and especially when the archaeological context is within an Indigenous setting and on Indigenous land (nearly always the case in the United States), it is most appropriate to bring to the forefront the relevance of archaeology for descendant communities (Atalay 2010) and place the theoretical context and interpretation within a relevant worldview and knowledge system. Working under an Indigenous paradigm promises to be source of enrichment to the local and/or descendant community and to create a study that is meaningful and representative.

While archaeology in the academic setting contributes knowledge and information to others within the closed academic sphere, "the challenge remains to find ways to translate that academic value into systems that contribute meaningfully to those descent communities" (Piccini and Schaepe 2014:485). These theories are able to further the field towards decolonization and support community engagement. Thus, braiding theories also brings about accountability of archaeology to Indigenous peoples. This includes righting wrongs of the past and advocating for Indigenous rights and title. It is imperative to establish reflexivity of one's own culture to place data within the correct cultural context and address biases in analysis. Working closely with the ontology of local descendants allows for a more responsible and relevant analysis.

CHAPTER 3. GEOGRAPHICAL, ARCHAEOLOGICAL, AND HISTORICAL CONTEXT OF THE WESTERN GREAT LAKES REGION

3.1. Introduction

The Western Great Lakes Region encompasses the Upper Peninsula of Michigan, northern and western Wisconsin, north central Minnesota and western Ontario on the northern border of Lake Superior. This region is home to a long and diverse history of human occupation and cultural longevity. While throughout this region there is archaeological evidence as far back as Paleoindian times (Zedeño et al. 2001), this research will focus on Early Archaic to Late Woodland stages, encompassing a period from cal. 9500 BCE – cal. ~ 1600 CE (Pleger and Stoltman 2009). There has been considerable archaeological research in this region however, the precontact Indigenous history of the area remains poorly known in comparison to areas south and east. The Archaic is one of the longest cultural stages in the Upper Midwest yet is rather restricted in archaeological information relative to later time stages such as the Woodland and Mississippian. The rarity of known sites from the Archaic and Initial Woodland causes a gap in knowledge about settlement patterns (Mather 2000) that this research hopes to add to. A general overview of these stages will be provided with a rough focus on Wisconsin. Attention will then move to regional Indigenous settlement patterns, subsistence, and lifeways before zeroing in on the focal point of this project, the Frog Bay site.

Figure 1. Great Lakes region. Western Great Lakes Region circled including: The Upper Peninsula of Michigan, north and western Wisconsin, north central Minnesota, and south western Ontario on the northern border of Lake Superior.

3.2. The Archaic Stage

The Archaic is generally noted to begin at the end of the Paleoindian stage with the disappearance/extinction of megafauna and the replacement of large lanceolate spear points by notched and stemmed projectiles. At the end of the Paleoindian stage, hunting strategies broadly shifted towards smaller game and lithic technologies were redesigned for accommodation by scaling down in size for more effective hunting (Harvey 2010:9). The Archaic stage is often characterized by what it is not, rather than what it is (Mather 2000:33; Stoltmann 1997), but according to Pleger and Stoltman (2009), the main properties of the Archaic are “(1) various stemmed and notched chipped-stone bifaces that tipped knives, spears, or darts, (2) broad-spectrum, hunter-gatherer subsistence, (3) the appearance of cemeteries and other evidence of increasing sedentism, and (4) an increase in interregional exchange and social complexity when compared with preceding Paleoindian cultures" (Pleger and Stoltman 2009:697). The end of the Archaic is marked by the transition to Woodland with the appearance of burial mounds, pottery, and – in some areas of the Midwest – horticulture (Mather 2000:33).

Generally, the Archaic is subdivided into the Early, Middle, and Late stages on the presence of distinguishable and defining properties. It is interesting and unclear why, but Early Archaic evidence archaeologically speaking is very rare within the Great Lakes region (Pleger and Stoltman 1997:698) as there are virtually no findings of major sites or villages from this stage. The majority of what archaeologists know about Early Archaic cultures "comes from outside the drainage basin of the Great Lakes" (Mason 1981:128), and much found within the region is discontinuous and only of suggestive association. While this is the case, there is no doubt that Early Archaic peoples existed in the region either through continued local adaptation or peoples entering the area. These communities experienced a time of substantial environmental change with the northward retreat of glacial sheets, fluctuating lake levels, and new plant communities with warming temperatures (Pleger and Stoltman 2009:700). The changes in lake levels and likelihood of high mobility could explain the scarcity of archaeological finds of this stage.

Table 1. Archaic stages with corresponding settlement and subsistence trends.

<table>
<tr><th>Stage</th><th>Wisconsin (calibrated)</th><th>Northern Wisconsin (calibrated)</th><th>Settlement and Subsistence Trends</th></tr>
<tr><td>Early Archaic</td><td>9500 BCE – 5000 BC</td><td>5500 BCE – 4000 BCE</td><td rowspan="3">-Notched and Stemmed projectiles
-Appearance of cemeteries
-Interregional exchange
-Small scattered family groups
-High mobility based on diverse hunting and gathering
-Utilitarian copper
-Ground stone
-Side-notched bifaces
-Red ocher burials</td></tr>
<tr><td>Middle Archaic</td><td>5000 BCE – 1700 BCE</td><td>4000 BCE – 1200 BCE</td></tr>
<tr><td>Late Archaic</td><td>1700 BCE – 400 BCE</td><td>1200 BCE – 100 BCE</td></tr>
</table>

*Dates for these stages may vary, and for this research, general dates will be used based on work by Pleger and Stoltman (2009).

3.2.1. The Early Archaic

The Early Archaic is set approximately between cal. 9500 BCE – cal. 5000 BCE in Wisconsin, and cal. 5500 BCE – cal. 4000 BCE in northern Wisconsin. This stage is represented by sites of "more numerous, larger, and richer material culture than are earlier Paleoindian sites" (Hill 2009:79; Hill 2012). During this time, subsistence of hunting and gathering appear to be similar to that of the Paleoindian stage with diagnostic features relying more heavily on lithic indicators. Diagnostic projectile types include the Hardin Barbed, St. Charles, and Thebes (Harvey 2010:9). Early Archaic sites are scarcely encountered today except for a few recognized in Wisconsin. At the Renier site in Brown County, Wisconsin, uncovered artifacts included a small amount of fire-shattered biface and tool fragments made of mostly local Hixton silicified sandstone originating from Silver Mound in western Wisconsin (Carr and Boszhardt 2010), one fire-fractured, side-notched point, as well as cremated human remains (Pleger and Stoltman

1997:701). The side-notched point is used as an indicator of Early Archaic and Late Paleoindian interaction as there are no C14 dates accompanying the site (Pleger and Stoltman 1997:702).

Through interpretation of association with these points, other sites have been postulated as also exhibiting a mix of these two stages, examples being the Gorto site in the Upper Peninsula, Deadman Slough site in Price County, northern Wisconsin, and the Bass site (47GT25) in Grant County, Wisconsin. All are examples of sites that exemplify aspects of Late Paleoindian – Early Archaic occupation in the Western Great Lakes Region. The Bass site exemplifies the most significant evidence of a pure single-component Early Archaic site with a Galena Chert quarry-workshop (Pleger and Stoltman 2009) and production of the diagnostic Hardin Barbed projectile points (Bakken 2001:207). Even with this evidence, there are still no clear single-component Early Archaic cemeteries or habitation sites identified in Wisconsin (Creese and Walder 2018:20). This suggests that early people lived in “small, widely scattered family or extended family groups that had a highly mobile life based on diversified hunting and gathering” (Pleger and Stoltman 2009:703).

3.2.2. The Middle Archaic

The Middle Archaic stage has presented more sites in the Western Great Lakes region. The environment during the Middle Archaic stage in the region brought a period of warm moist conditions in the upper Great Lakes (Kapp 1999) with conditions similar to the modern climate and environmental zones of today (Hill 2009:63). At this time lake levels were on the rise, referred to as the “Lake Nipissing high-water stage” during the Nipissing Transgression around cal. 2700 BCE (4700 BP) (Hill 2009:80; Pleger and Stoltman 2009:704). This stage dates cal. 5000 BCE – cal. 1700 BCE (Creese and Walder 2018:18; Pleger and Stoltman 2009:704) and around cal. 4000 BCE – cal. 1200 BCE in northern Wisconsin.

This stage includes characteristic evidence of ground stone tools, fishing implements, the beginnings of copperworking technology (Creese and Walder 2018:20), the appearance of cemeteries, evidence of rock shelter occupation, and production of side-notched bifaces (Pleger and Stoltman 2009:704). Biface morphology is a component of the Middle Archaic that is often used as a diagnostic (Pleger and Stoltman 2009:704) with indicators such as Madison, Raddatz, or Reigh bifacial side notched points. Differences in details such as length, form, spatial variants, etc. can be used to differentiate between cultural groups in this stage (Pleger and Stoltman 2009:705).

3.2.2.1. The Old Copper Complex

During the Middle Archaic, the Old Copper Complex technological tradition became prominent. While earlier known as the Old Copper "culture," this is now referred to as a "complex" as in recent times the consideration of old copper as a technological tradition has become the most received interpretation. This grouping within the Archaic was centered throughout the entire Great Lakes Region (Pleger and Stoltman 2009:708) and it is notably concentrated in Wisconsin and eastern Wisconsin in particular (Mather 2000:34).[2] This complex represents a number of related societies throughout the region with shared technology in copper work and burial ceremonialism (Hill 2009:80; Hill 2012).

The dates for this complex are roughly cal. 5000 BCE – cal. 1000 BCE (Pleger and Stoltman 2009:707) and in northern Wisconsin cal. 4000 BCE – cal. 1000 BCE (Creese and Walder 2018). The associated copper objects encompassed a variety of utilitarian types such as points, crescents, knives, awls, beads (Mather 2000:36), hooks, harpoons, gorges, adzes, celts, spuds, chisels, gouges, drills, and more (Pleger and Stoltman 2009:708) which were crafted and

---

[2] In Wisconsin, "a study of some 2,600 selected Old Copper Artifacts, Wittry (1957) documented that the vast majority occur in the eastern half of the state" (Pleger and Stoltman 2009:708).

fabricated through the processes of cold hammering and annealing (Quimby 1960:52; Robertson et al. 1999:115).

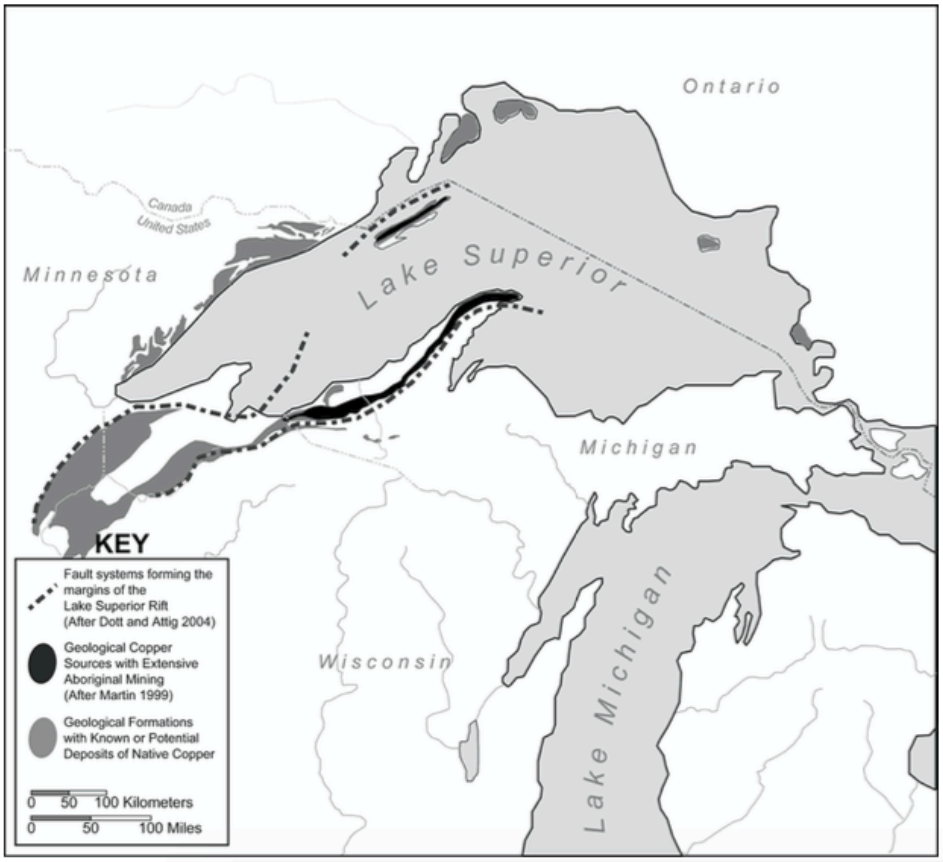


Figure 2. Great Lakes region showing glacial movement and areas of known native copper and float copper. Source: Hill 2009:59.

This complex "was a wide-ranging phenomenon, centered in the Great Lakes region, stretching across Michigan's Upper Peninsula, throughout northern Wisconsin, and into Minnesota as well as western Ontario" (Creese and Walder 2018:21). Sites near Mille Lacs seem to be the western margin of significant Old Copper Complex components, as "copper artifacts are also known to the west, but primarily as isolated finds" (Mather 2000:40). The Lake Superior basin is an area of immense copper industry (Hill 2009:80; Mason 1981:181) especially on the Keweenaw Peninsula and on Isle Royale. As ice moved southward during the Pleistocene, native copper was brought down and generally dispersed within the western Upper Peninsula of

Michigan during the Wisconsin episode. The Bayfield Peninsula in northern Wisconsin is home to this glacially transported native copper, also known as float copper (Bornhorst 2016:1).

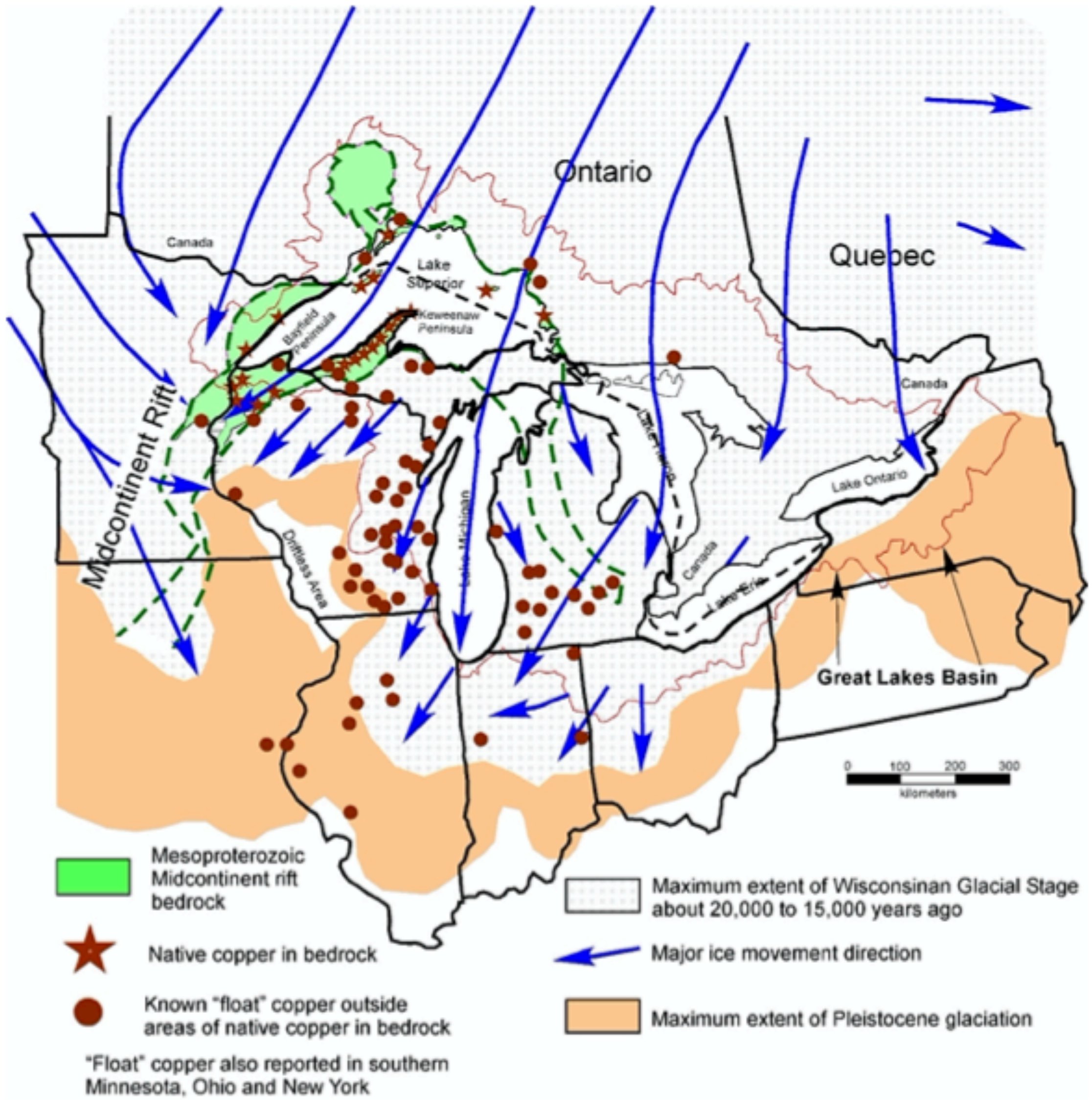


Figure 3. Sources of copper. Depicts areas of Indigenous copper extraction along the Keweenaw Peninsula and Isle Royale as well as areas of known copper deposits. Source: Bornhorst 2016:2.

When the use of copper began during the Middle Archaic in northern Wisconsin, it is assumed that native copper material from both the Keweenaw Peninsula and Isle Royale were exploited (Bornhorst 2016:3). While Lake Superior is home to an abundance of copper resources, there are of course geologic sources outside of the region including the Ohio River

Valley and the Pacific Northwest (Creese and Walder 2018:22) that were possibly involved in copper extraction, manufacturing, and trade. Within Wisconsin, copper artifacts are typically diagnostic of the Old Copper Complex.

The sites in Wisconsin that exemplify the Old Copper Complex are Osceola in Grant County, Oconto in Oconto County, Reigh in Winnebago County (Mason 1981:189), the Rainbow Dam sites (47ON179 and 47ON180) in Oneida County (Pleger and Stoltman 2009:708), Little Rice Lake rice site (47VI272) in Vilas County, (Pleger and Stoltman 2009:708), and the Price III site (47RI4) in Richland County (Pleger and Stoltman 2009:710; Price 1985:452). The Raddatz (47SK5) and Durst (47SK2) rock shelter sites in central Wisconsin are also representative of the Middle Archaic in northern Wisconsin (Creese and Walder 2018, 20). Old Copper evidence is seen at the Sandy Lake Dam site in northeastern Minnesota, "a multi-component site with occupations from the Old Copper Complex phase of the Archaic period, as well as the Late Woodland and Historic periods" (Bradford 2013). Old Copper is also found in the Apostle Islands at Stockton Island at the Ebob (47AS38) and Quarry Bay (47AS41/42) sites (Creese and Walder 2018:21). Between these sites there is a great deal of differentiation and diversity that implies multiple societies shared distinctive characteristics in copper use and this complex was not a uniform cultural tradition (Hill 2009:87).

Figure 4. Middle and Late Archaic sites in Wisconsin. Source: Hill 2009:86.

3.2.3. The Late Archaic

During the Late Archaic the environment especially in southern Wisconsin, became increasingly moister as the Nipissing high-water stage began to decline in the Lake Michigan basin and slowly the area became more aligned with current climatic conditions (Pleger and Stoltman 2009:713). In the northern woodlands the temperate hardwood mesic forests shifted to more boreal or transitional forests (Zedeño et al. 2001:27) that withstand long winters and short summers. This stage is especially “time-transgressive in northern Wisconsin” (Creese and

Walder 2018:19; Pleger and Stoltman 2009) as the transition from Middle to Late can be regionally variable and while it dates about cal. 1700 BCE – cal. 400 BCE (Pleger and Stoltman 2009:712), northern Wisconsin dates around cal. 1200 BCE – cal. 100 BCE (Creese and Walder 2018).

With the development of this stage, "side-notched biface technology declined and corner-notched, expanding-stem, and straight- and contracting-stemmed types gained prominence" (Pleger and Stoltman 2009:712). Indications of a larger trade network is shown through the presence of different materials such as Hornstone, Burlington cherts, Knife River flint, marine shell, and obsidian (Pleger and Stoltman 2009:712).

3.2.3.1. The Red Ocher Complex

The end of the Late Archaic stage, around cal. 1200 BCE to cal. 100 BCE "is associated with the Red Ocher Complex, seen as transitional between Early Woodland and Archaic lifeways" (Creese and Walder 2018:22). This mortuary tradition uses red ocher in "hematite-covered burials and associated artifacts…identified primarily by the presence of red ocher powered or a mixture of red ocher and red sand (Mikkola 1970) placed on burials" (Pleger and Stoltman 2009:715) mainly recovered from the Illinois River valley. Diagnostic of the Red Ocher Complex are Turkey Tail bifaces (Krakker 1997:8) and decorative copper. This transition demonstrated a change from predominantly utilitarian to more ornamental and artistic uses of copper (Creese and Walder 2018:22; Harvey 2010:10) as during the Old Copper Complex stage, the copper artifacts appear more functionally focused rather than personal adornment or status items (Pleger and Stoltman 2009:708).

Red Ocher sites are generally associated with burials and "over 20 probably Red Ocher sites have been reported in Wisconsin and the Upper Peninsula" (Harvey 2010:10; Pleger and

Stoltman 2009:712) although "there are no known Red Ocher burials in northern Wisconsin" (Creese and Walder 2018:23). The two most prominent sites are Convent Knoll in Waukesha County Wisconsin, and Riverside Cemetery in Menominee County on the Upper Peninsula. Convent Knoll contained the remains of eight individuals and four Red Ocher burial features, and Riverside Cemetery contained over 75 individuals and 80 features. The Riverside Cemetery site represents elements of both Old Copper and Red Ocher (Pleger and Stoltman 2009:715-716; Robertson et al. 1999:120) with deposits of copper celts and beads, exotic chert bifaces, and copper projectile points (Hill 2009:96). Similar to the Riverside Cemetery site is the Andrews site in central Michigan which contained Turkey Tail bifaces, "copper artifacts, beads, celts, and awls" (Krakker 1997:10). Representative of Red Ocher are exotic burial artifacts and mortuary patterns indicative of a more stratified, class-conscious social paradigm (Pleger and Stoltman 2009:716).

The increase in trade and exchange brought increased status gradation in family groups. This complex is known solely from mortuary sites and rather than representing a single invariable culture, it is most likely that the Red Ocher Complex represents an interaction sphere of local societies highlighting the complex trade network and exchange of goods through a shared ritual practice (Hill 2009:93-94). Social status changes are shown through burials which contain a greater frequency of exotic materials and a shift from utilitarian to status and prestige artifacts.

3.2.3.2. The Archaic Overview

In the Early Archaic, while still quite rare, sites became larger with more abundant material culture, indicating larger populations as compared to the little known about Paleoindian times. Lifeways are assumed to be egalitarian with a focus on hunting and gathering in small bands (Zedeño et al. 2001:27). The Middle Archaic was a time of higher population densities with a continued egalitarian life way, copper technology, ground stone implements, and the beginning of cemeteries. The Late Archaic continued the trend of higher population numbers and has shown an increase in site preservation as more sites have been found. Cemeteries in this time become more elaborate with higher intensity and socially stratified grave goods and increasing differentiation of status –recognized through the Red Ocher Complex and exotic materials from increasingly elaborate trade and exchange systems.

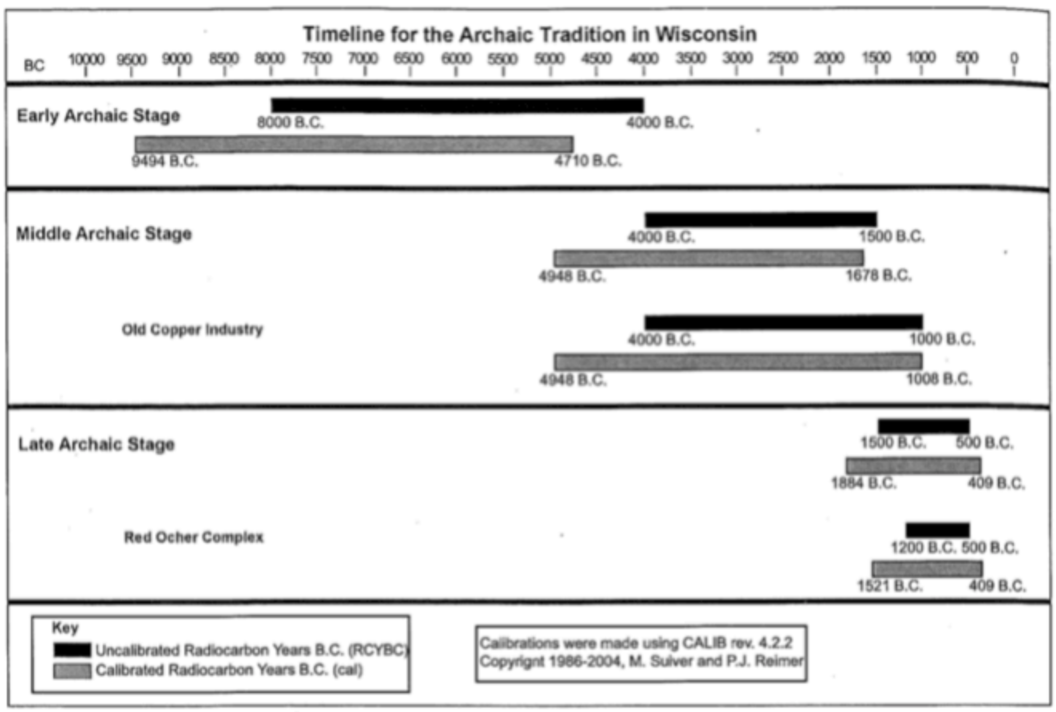


Figure 5. Timeline for the Archaic Tradition in Wisconsin. Source: Pleger and Stoltman 2009:698.

3.2.3.3. The Squirrel River Phase and the Burnt Rollways Phase

Surveys in 1965 and 1966 during Salzer's Wisconsin North Lakes Project identified components of stages including the Late Paleoindian, Archaic, Woodland, and Late Historic (Salzer 1974:42). In this project, phases were identified local to the Great Lakes region. Two phases were identified for the Archaic, the Squirrel River phase and the Burnt Rollways phase.

The Squirrel River phase is represented by a highly distinctive assemblage different than seen previously in other parts of Wisconsin (Salzer 1974:46). This is seen at the Squirrel Dam site. The site includes varieties of small side- and corner- notched projectile points and early forms of gravers and end scrapers as well as large multipurpose bifacial tools (Salzer 1974:46). The Burnt-Rollways phase is named for the Burnt-Rollways site in Oneida County, Wisconsin. This site includes corner-notched projectile points with basal grinding, straight drills/perforators, scraper tools, flake knives, unifaces, wedges, bipolar cores, utilized flakes, and evidence of copper (Salzer 1974:46). Analysis of the lithics from this site indicate heavy use of locally available quartz (Salzer 1974:46) which is similarly seen at The Rodney Clark site (47MR146) located near Wausau, in central Wisconsin around 200 miles southeast of Frog Bay and an hour south of the Burnt-Rollways site. The Rodney Clark site also represents a heavy use of quartz as the assemblage yielded over 4,000 lithic artifacts from "only a few test units, 99% of which were quartz" (Spott 2005:115). Similarly, in 1981 Salzer and Birmingham interpreted a predominantly lithic assemblage from the salvage excavations at the Marina site on Madeline Island within the Apostle Island National Lakeshore which (94%) of the 428 debitage flakes were quartz (Spott 2005:121-122).

3.2.3.4. Archaic Stage Settlement Patterns and Land Use

With temperatures, lake levels, and a climate more similar to current times, fishing became increasingly important during the Archaic along with hunting and gathering. The Archaic in the western Great Lakes was a time of increasing social organization and interaction, adaptation to environmental changes and lake levels, and use of different technology and ritual practices (Hill 2009:99) such as cemeteries, Red Ocher burials, and copper utilization.

During this time, while larger than Paleoindian times, settlement was still generally small-scale and spread out as egalitarian groups focusing mainly on generalized hunting and gathering for subsistence. Archaic riverine sites are relatively large while the sites along the lake were smaller (Cleland 1982:772). With little archaeological information of sites besides burials and cemeteries, it is difficult to know exactly how people lived and moved across the land. Generally, people are thought to have lived in groups larger than during the Paleoindian in kin-based groups that moved frequently or seasonally for resources and culturally traditional activities.

3.3. The Woodland Stage

The Woodland stage in the Upper Peninsula and northern Wisconsin is generally "subdivided into two broad cultural-historical periods, the Initial Woodland and the Terminal Woodland" (Drake and Dunham 2004:135) or also in a tripartite as Early, Middle, and Late Woodland. The Woodland stage in northern Wisconsin is estimated around cal. 100 BCE – cal. 1600 CE (Creese and Walder 2018:23).

Table 2. Woodland stages with corresponding settlement and subsistence trends.

<table>
<tr><th>Stage</th><th>Wisconsin (calibrated)</th><th>Northern Wisconsin (calibrated)</th><th>Settlement and Subsistence Trends</th></tr>
<tr><td>Initial Woodland</td><td>100 BCE – ~1 CE</td><td>100 BCE – ~1 CE</td><td rowspan="2">-Burial mounds
-Pottery
-Small-scale horticulture
-Growing trade networks
-Increased and intensified fishing with settlement corresponding to fish harvest
-Wild ricing
-Larger seasonal sites
-Larger aggregate populations</td></tr>
<tr><td>Terminal Woodland</td><td>1400 CE– 1600 CE</td><td>400 CE– ~ 1600 CE</td></tr>
</table>

The beginning of the Woodland is anything but abrupt and can be entwined with components of Late Archaic occupation. It is usually recognized through the incorporation and beginnings of pottery, burial mounds, changing cultivation of local plants with small-scale horticulture. Later the cultivation of corn was common around southern Michigan and the Lower Great Lakes (Zedeño et al. 2001:42). New techniques for harvesting fish such as the gill net (Cleland 1982) were also developed as throughout the Upper Great Lakes populations developed a seasonally based "subsistence economy involving multiple strategies for hunting, fishing, collecting, and horticulture, with an increased emphasis on exploiting aquatic resources" (Drake and Dunham 2004:133).

3.3.1. The Initial Woodland

The Initial Woodland or Early Woodland (cal. 100 BCE – cal. ~1 CE) (Creese and Walder 2018) is characterized by the emergence of pottery as well as evidence for seasonal patterns emphasizing the harvest of spring-spawning fish (Drake and Dunham 2004:133). The Middle Woodland, or the convergence of the Initial and Terminal Woodland dates between cal. 1 CE– cal. 400 CE (Creese and Walder 2018:24). There are not many Early or Middle Woodland sites found within the vicinity of northern Wisconsin. Surveys in the 1970s-80s indicate that the Morty Site at Stockton Island could possibly be dated to this stage, but a lack of diagnostic artifacts leaves room for further interpretation (Zedeño et al. 2001:167).

Trade and interaction spheres continued to expand from the networks of the Late Archaic as well as the beginning of wild rice procurement. Wild ricing became more important, especially in northwestern Wisconsin (Creese and Walder 2018:24). Wild rice was a prominent food source in northern Wisconsin and Minnesota which thrived in the extensive lake system (Arzigian 2000:245). In Wisconsin, it has been speculated that extensive ricing increased during the Late Woodland in and around the lakes of northern Wisconsin. Archaeological evidence has pointed to wild rice first appearing in Wisconsin during the Middle Woodland, along the Hunter Channel, within the floodplain of the Mississippi River at Prairie du Chien (Arzigian 2000:259).

3.3.2. The Terminal Woodland

The Terminal Woodland lasted cal. 1400 CE– cal. 1600 CE (Zedeño et al. 2001) and cal. 400 CE– cal. ~ 1600 CE in the northern Great Lakes. Northern Wisconsin and the Upper Peninsula are characterized by the continuation of a flexible and diverse subsistence economy including hunting, gathering, and fishing. It has been argued that the development of the gill net in the Terminal Woodland fostered increased population (Cleland 1982:780), although others argue of earlier evidence of the gill net (Martin 1989) and greater continuity between the Initial and Terminal Woodland stages. Broadly there was "a shift in settlement patterns toward the formation of large, seasonal aggregation sites; and the maintenance of permeable social boundaries through interaction and trade with neighboring and distant groups" (Drake and Dunham 2004:136). Archaeological data suggests that relationships and interactions heightened with groups to the west, southwest, and the southeast, which brought about more diversity in trade and the development of local cultural expressions in pottery (Drake and Dunham 2004:136) of the "Mackinac, Juntunen, and Sand Point ceramic wares" (Drake and Dunham 2004:136).

During this time, Late Woodland settlement data from the upper Great Lakes region tends to show that people shifted towards a shore-oriented settlement system (Cleland 1982:772). Even though people inhabited the shores of lakes from Early Archaic to Terminal Woodland (Cleland 198:772), between the two general stages, the sites were probably of "different character in terms of season and lifeway" (Cleland 1982:772) as Archaic sites along inland rivers tend to be larger than Woodland sites, yet along the coast of the Great Lakes, Archaic sites tend to be smaller than Woodland sites (Cleland 1982:772).

Late Woodland sites along the coasts of the Great Lakes are thought to be summer sites, or possibly representing small spring fishing sites and larger fall fishing sites (Cleland 1982:772). In both the Initial and Terminal Woodland stages, sites in close proximity to fish habitats exhibit multicomponent use throughout multiple seasons, indicating continual use and reuse throughout the Woodland stage (Drake and Dunham 2004:137).

3.3.2.1. The Woodland Overview

Shifting from the Archaic into the Woodland, there is more to be seen of Woodland sites in the Western Great Lakes region, as population continues rising. Woodland sites began to emphasize fishing and site locations are mainly found along lakes, shores, and rivers. Curated tools and bifaces tend to shift towards expedient tools. Both curated bifacial tools and expedient tools were used in all time periods and the shift is gradual (Griffin 2013:73). The creation of pottery and the subsequent styles created progress along with extended trade and exchange of raw materials from distant parts of North America. Included in this stage is the beginning of consistent plant cultivation and horticulture and changes to mound cemeteries.

3.3.2.2. The Nokomis Phase and the Lakes Phase

In the Woodland stage of the North Lakes Project, Salzer identifies two phases, the Nokomis phase during the Early and Middle Woodland, and the Lakes phase during the Late Woodland. The Nokomis phase is constructed of evidence from the Robinson and Squirrel Dam sites (47ON21) in Oneida County, Wisconsin. The Nokomis phase most notably presents the first indication of pottery vessels in the area, a variety of projectile points of exotic materials, and extensive use of copper (Salzer 1974:48). Copper tools include awls, possible fishhooks, harpoons, conical awls, flat-stemmed projectile points with beveled edges, rolled conical projectile points, small chisels, punches, rolled beads, and ingots or blanks (Salzer 1974:49). Deposits from this phase “appear to reflect an increase in aggregate population size, more intensive utilization of the area, a heavy reliance upon trade for exotic ceramic and lithic raw materials, and an important copper industry” (Salzer 1974:49).

During the Late Woodland, the Lakes phase burial mounds become present in the form of conical, linear, and tapering linear forms (Salzer 1974:49). Pottery includes jars and vessels that are grit-tempered, cord-marked and locally stylized as well as the “arrival of shell-tempered ceramics via trade from the Oneota of Mississippian populations from the south” (Howell 2006:10). The lithic industry is characterized by a shift to smaller triangular projectile points with a continuation of scraping and cutting tools, wedges, bipolar cores, and flakes. While long-distance trade has risen, locally available quartz is still high in use (Salzer 1974:49). Overall, while copper usage is still seen and debris is recorded, a decline of the role of the industry is indicated (Salzer 1974:50).

3.3.2.3. Woodland Stage Settlement Patterns and Land Use

Woodland sites are more known in the archaeological record than Archaic. At this time burials shifted to burial mounds, small-scale horticulture rose, and trade networks grew across the continent. Wild ricing became an important staple and fishing camps became more prominent. There are several different kinds of Woodland sites; small interior camps that were occupied winter and summer, moderately larger settlements along interior lakes or rivers occupied in the summer, and large villages occupied in the summer along Lake Superior. In the fall there were large fishing villages and in the spring small fishing camps assembled (Cleland 1982:772). Settlement along the lakes increased in size and duration in the Terminal Woodland during the warmer months from spring to fall (Cleland 1982:775). Woodland riverine sites are recognized as smaller than those along the lakes which are larger. As the Archaic shifted to the Woodland, populations and family groups grew in size.

3.4. Ojibwe Endurance in the Western Great Lakes

In northern Wisconsin, there is less known archaeologically in comparison to the rest of the state and region, yet there is still a large amount of wide-ranging information about the area and how people may have once lived. It is not clear who first occupied the Frog Bay site, but it is clear that the local Ojibwe communities have deep ties and connections to the area and the ancient occupants. Oral tradition led the Ojibwe to this region and places them along the shores of Lake Superior and the Upper Peninsula of Michigan by cal. 1500 BCE (Zedeño et al. 2001:27-28). The Ojibwe have been a diverse people spread out over a large geographic area from the St. Lawrence river to western Ontario. Over this huge area communities relied upon wide-ranging kin-based networks to stay connected (Zedeño et al. 2001:26). Long before accounts of “Ojibwe” or “Chippewa,” Algonquian-speaking clans weaved histories and lifeways throughout this expanse of land. Although there may not be definite physical or written evidence of Ojibwe roots in the Great Lakes area (Zedeño et al. 2001:26), ancestors of these communities are entwined in the histories and stories of the land and identify this place as home.

Several hundred years ago, the Anishinaabe people began their migration toward the Upper Peninsula of Michigan (Zedeño et al. 2001:27). The Ojibway migration lead the Anishinaabe out of the St. Lawrence area through the Seven Fires. Along this journey and with the help of the different fires, the Anishinaabe separated to follow three paths. A group of Ojibwe migrated to Madeline Island or Moningwunakauning (PBSb 8:51). Andrew Gokee of Red Cliff details that Moningwunakauning became the final migration point and place of the

Seventh fire as well as the “economic, spiritual, cultural, political center of the Ojibwe nation, the Anishinaabe people around the Great Lakes” (PBSb 8:56-9:06). In Ojibwe ontology, the lands around Lake Superior were created by the Creator who manifested as the Megis shell (Zedeño et al. 2001:21, 124, and 249; Benton-Benai 1988; Warren 1885:52). While maintained by written documents, this history is more importantly supported by other spiritual Elders and Indigenous leaders. Elder Eddie Benton-Benai describes the significance of history – specifically Ojibwe history – through means other than writing,

“I teach my children, my grandchildren, and soon my great grandchildren, and all people that I come in contact with that the true history of the original people of this part of the world has never been written. It’s been written about but the history, the true history of our people has been recorded in our genetic memories and is acted out via our songs, our stories, our rituals, and via our original religions (PBS 3:30-4:09).

While various lines of evidence can point towards lifeways during these periods, oral histories, accounts, experience, and documentation by descendants of this migration of Ojibwe tell how ancestors were known to live. Today there continue to be many Ojibwe communities throughout the Great Lakes region including Red Cliff, the landowners of Frog Bay. The correlation between Ojibwe communities today and the ancient occupants of the land extends deep in time as described by Mr. DeFoe. In a video publication of Red Cliff Ojibwe history, Mr. DeFoe comments that,

“right here where I live right here today in Red Cliff, go back 10,000 years. Our people…way back then walked upon this land 10,000 years ago. 12,000 years ago, probably right here in this spot, I don’t think we could site here because we’d be a half mile of ice on top of us would be half mile” (PBSb 5:16-5:49).

The enduring connection to the land and to the communities that first inhabited the area depicts the perseverance of generational traditional values and learning through built histories and lived experience. Traditional routes of seasonal movement around and within Lake Superior hold oral histories of human interactions that are weaved into the cultural significance of places in and around Lake Superior.

3.4.1. Historic Lifeways of the Western Great Lakes

Historic lifeways are commonly understood through the description of an annual cycle or "industrial year." Time moves through cycles and within these cycles are more cycles of activities that are based on epistemologies, subsistence tasks, life markers, familial traditions, and more. Focusing on subsistence tasks, seasons were important indicators of traditional activities. Year-round hunting, trapping, and fishing were important and seasonal staples such as wild rice and maple sugar were integral to the diversified subsistence strategy (Zedeño et al. 2001:41). Fishing was an important and sustainable year-round activity and every year groups returned to traditional spring and fall fishing grounds.

According to Quimby (1960), "a band of 600 Ojibways could have about 30 families of about 20 persons each. Such a band would have used an area of at least 12,000 square miles during their annual rounds and probably much more" (Quimby 1960:122). This exemplifies the vast expanse of land utilized by groups as well as the thoughtful planning that seasonal rounds entailed. Because resources varied over the region, subsistence patterns were locally adapted with great subsistence variability across space (Zedeño et al. 2001:26).

In autumn, communities would divide into small groups for the season and partake in storing wild rice, maple sugar, and dried fish would for the upcoming winter season. This involved setting camp, storing supplies, and adjusting materials as needed. In preparation for the cold, women would prepare cordage for fishing (Cleland 1982:762) as this season was especially important for trout and whitefish (Zedeño et al. 2001:42). Fishing was a "predominantly female industry, except in the coldest winter" (Zedeño et al. 2001:63). Archaeological evidence shows that autumn and spring fishing grounds were returned to yearly (Zedeño et al. 2001:63) as fish and fishing were central to lifeways and subsistence (Cleand 1982:764) and commonly took place to some extent year long.

When winter arrived, groups reconnected for travel to the winter camp, "this camp would be located in the woods, where the men would clear the snow to build the winter wigwam and collect wood. At this time, the women would set the meat drying racks" (Zedeño et al. 2001:42) as hunting and trapping in the area became predominant subsistence means. Many times groups of men would set out on long hunting trips, sometimes not returning until spring. In the spring, groups traveled to camps specific to maple sugar processing and fishing. Line and hook fishing were practiced by men and women as well as the catching of waterfowl (Zedeño et al. 2001:43). Spring-spawning species such as lake sturgeon, northern pike, bass, white sucker, northern redhorse sucker, northern channel catfish, perch, and several more were some of the primary fish depended upon (Cleland 1982:766).

Spring was also distinctive as a time for the harvesting of specific materials such as birch and cedar bark (Zedeño et al. 2001:43). Later in the season, groups would relocate to garden camps of small vegetables and potatoes. These were mainly located along the lakeshores or other water sources (Zedeño et al. 2001:42). Often fishing camps in the spring led into the summer as large fishing camps otherwise similar fishing camps were set up in the summer season in order to support the reuniting of people into a larger village setting. Plants and seasonal resources were gathered in the summer months such as mushrooms, honey, berries, and other plants. Late in summer, wild rice gathering would begin and groups would break for these camps in groups.

It is clear that traditional lifeways integrated mobility into subsistence, moving in activity-based groups or as whole communities depending upon community needs. All during this time there were other important activities occurring, such as the gathering of important resources: tobacco, sage, sweetgrass, and many more (Zedeño et al. 2001:56) that were important culturally and traditionally. People were not just living on the land but were imbedded in a fruitful relationship with the land and environment.

3.4.2. The Red Cliff Reservation

Figure 6. General area of the Red Cliff Reservation and the Frog Bay site.

The Frog Bay site (47BA60) is located within the boundaries of the Frog Bay Tribal National Park on the Red Cliff Reservation. Red Cliff is situated on the southwestern shore of Lake Superior on the Bayfield peninsula in northern Wisconsin. Across from the peninsula, 22 islands known as the Apostle Islands are located at varying distances from the mainland including Madeline Island. This area has long been home to the Ojibwe people who have occupied large areas of land as a part of a larger kin-based network of people across the boreal region of southern Canada and northern United States (Zedeño et al. 2001:26). Today the Red Cliff Band of Lake Superior Chippewa continue to reside within their territory on the southern shore of Lake Superior.

3.4.2.1. Chief Buffalo

The Red Cliff Reservation was created through the efforts of Chief Buffalo. In 1850, President Taylor revoked the treaty made with the Ojibwe in Wisconsin, ordering them to move to Minnesota. In the process of this removal attempt, at least 350 Ojibwe people lost their lives (Child 2012; Norrgard 2009:40) in the Sandy Lake Tragedy. Chief Buffalo and the people refused. To speak on behalf of the people, a petition and delegation were sent to Washington headed by Chief Buffalo. Through the efforts of Chief Buffalo, President Fillmore was ultimately convinced to rescind the order and forced to allow the people to stay on their rightful land (Silvern 1995:271). This came after a time of "intense treaty negotiation with tribes" that characterized the Indian Removal Act of 1830 (Child 2012:49). During this time policymakers worried about immigration in the western Great Lakes and began "assigning names to groupings of Ojibwe for governmental convenience" Child 2012:49). Amidst treaty negotiations from 1837 and 1854, Anishinaabeg leaders "refused to agree…until it was made explicitly clear that they would retain rights to use the land… the Ojibwe and the Ottawa did not remove west but continued life in their Michigan homelands" (Child 2012: 52; Silvern 1995:270).

The 1854 Treaty of La Pointe attempted to again separate and identify people by groupings and assign peoples to reservations from Madeline Island. This treaty identified permanent reservations in Wisconsin and established Bad River, Red Cliff, Lac Courte Oreilles, and Lac du Flambeau (Silvern 1995:171). This treaty “affirmed Ojibwe hunting, fishing, and gathering rights” (Child 2012:60) both on and off the reservation. Utilizing this right, Ojibwe peoples in Wisconsin were ideally able to continue to depend on traditional subsistence activities (Silvern 1995:171).

3.4.2.2. Ojibwe Land Rights

In the 1870s and 1880s, reservation land began to be allotted (Norrgard 2009:41). During this time, people of northern Wisconsin continued to live and practice traditional activities. Because of the heavily wooded environment, little farming was introduced, and people were able to continue maintaining traditional seasonal activities. Yet with time, off-reservation activities were increasingly made difficult as Euromericans moving into the area imposed improper regulations on the Ojibwe.

In the early 1900s the Conservation Department began to enforce state game and fish laws on Ojibwe peoples. Between 1908 and 1983 the state of Wisconsin actively imposed these laws on Wisconsin Ojibwe enforcing unjust fines, jail, impounded cars, and confiscation of possessions (Silvern 1995:273). Ojibwe rights continued to be questioned and persecuted through organizations such as Rights for Everyone (ERFE), Protect American’s Rights and Resources (PARR), and Stop Treaty Abuse (STA) (Silvern 1995:276). These organizations inhibited Ojibwe exercising their rights through protests, harassment, and ultimately denying Ojibwe autonomy, land rights, and cultural heritage. These tensions rose to the U.S. Supreme Court in the 1990s as access and use of lakes and resources continued to be blockaded and protested. In the case of Minnesota vs. Mille Lacs Band of Chippewa Indians, this was an ongoing battle and it wasn’t until 1999 that the court ruled in the favor of the nation’s sovereignty and right to be unimpeded by state laws and regulations (Treuer 2012). This ruling maintained that the Mille Lacs had the right "to hunt, fish, and gather both on and off the reservation" and that the Mille Lacs Band would police its own members (Treuer 2012).

Comfortably and safely utilizing Indigenous land and resource rights is an ongoing issue that has afflicted people in the region; "Ojibwe living within the borders of new states, including Wisconsin and Minnesota, were steadily and systematically harassed for more than a century by citizens and local law authorities when they exercised treaty rights by hunting, fishing, and gathering in their homelands" (Child 2012:xxii). Despite these hardships, "Indigenous people persist and resist" (Silvern 1995:286) and recently the re-establishment of Indigenous land at the Frog Bay Tribal National Park has been a powerful victory. The Frog Bay Tribal National Park is the first tribal national park in the United States. Eighty-nine acres were originally reacquired from the previous landowners, and in 2017 eighty-two more acres were added. These lands are now restored to tribal ownership and protected by tribal staff and council (Red Cliff Band of Lake Superior Chippewa 2019).

3.4.3. Frog Bay (47BA60)

Within the park, the Frog Bay site is located just east of the mouth of Frog Creek, although the boundaries of the site are still not clear. The 1979 Beloit College field school indicated that site boundaries may extend from the east side of Frog Creek further along the shoreline to somewhere around Frog Bay Point (47BA62) (Creese and Walder 2018:28). The 1979 surveys were part of a wider archaeological investigation run by Robert Salzer and David Overstreet (Creese and Walder 2018:27) – The Apostle Lakeshore Survey – which lasted for the field seasons of 1974, 1975, 1979.

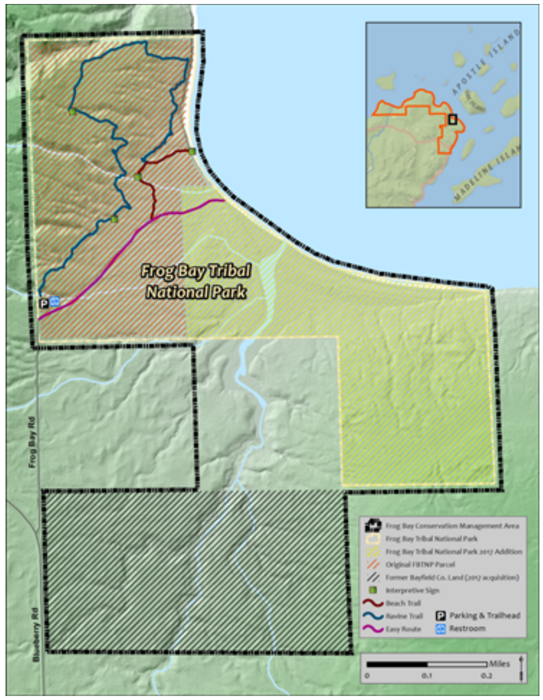


Figure 7. Frog Bay Tribal National Park. Added indicator of general Frog Bay site region.
Source: Red Cliff Band of Lake Superior Chippewa 2019.

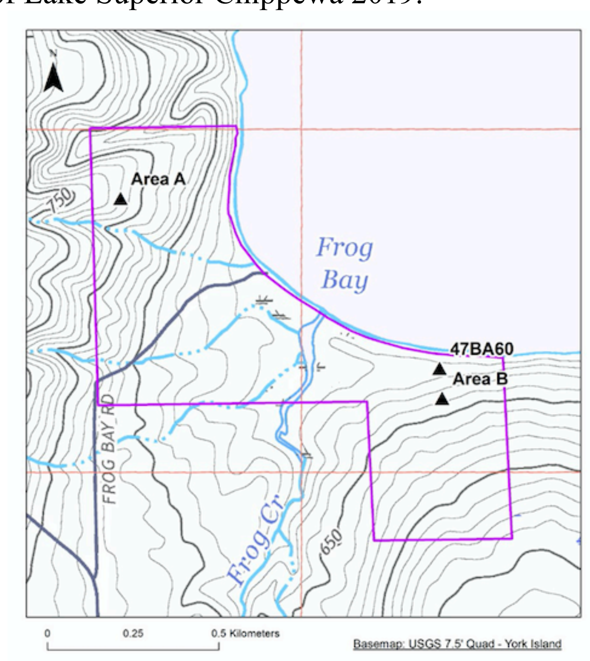


Figure 8. Areas of A and B from 2018 field surveys. Includes marker of the Frog Bay Site.
Source: Creese and Walder 2018:17.

In the attempt to re-locate the site from the 1979 field school, shovel test pits (STPs) were completed in designated Area A and Area B (Creese and Walder 2018:13). In Area B STPs and unit excavations during the 2018 field school seasons placed the site very near that of the 1979 excavation. In 2018, 54 STPs were completed as well as the beginning of 3 units: Unit 1, Unit 2, and Unit 3. In 2019, Unit 1, Unit 2, and Unit 3 were re-opened and excavated to completion and new units were started, Unit 4, Unit 5, Unit 6, and Unit 7. Three units, Unit 4, Unit 5, and Unit 6 were opened on the perimeters south and west of Unit 1 to create Block A.

Radiocarbon (C14) dating from 2018 and 2019 indicate that Frog Bay (47BA60) is a multicomponent site. Three distinct periods of occupation are indicated by C14 dates from the 2018 field season. Dates from Unit 1 Feature 6 designate occupation between cal. 3327-2931 BCE which is coeval to the Middle Archaic in northern Wisconsin and contemporary with the Reigh Site (Creese and Walder 2018: 92). Unit 1 Feature 2 dates to cal. 1215-1112 BCE. These dates are contemporary with Late Archaic (Creese and Walder 2018:92). Unit 3 Feature 4 yielded dates of cal. 722-764 CE, which fall within the Late Woodland stage (Creese and Walder 2018: 93). These units (Unit 1, Unit 2, and Unit 3) were further excavated and completed in the 2019 season, and Units 4, 5, 6, and 7 are still in process.

3.4.4. Conclusions

Interpretation of the Frog Bay Site is hoped to be understood through the framework of braided theory. This will incorporate a merging of local Red Cliff knowledge on traditional lifeways with conventional archaeological scientific methods. Local Indigenous knowledge and interpretation is central for understanding what activities were occurring at the site as well as in the region. With this information, lithic analysis and models of settlement patterns intertwine to create a holistic interpretation.

With a combination of this evidence, it can be inferred what type of site Frog Bay may have been and what importance it held for re-occupation to continue over these different stages of time, as well as what significance it continues to have for local people today. Long-term settlement and subsistence trends of the region along with cultural interpretation and lifeways lead to the questions posed in this thesis as to why the site was important and continued to draw people back.

The Frog Bay site is remarkable in that it is able to offer archaeological information on mobility and land use in the Western Great Lakes region and in northern Wisconsin, but also as an embodiment of a larger cultural landscape. Red Cliff community's knowledge on Indigenous ontology, subsistence, and lifeways can be added to these understandings of the site – while the site can simultaneously provide "a focus by which people engage with the world and create and sustain a sense of their social identity" (Ashmore and Knapp 1999:15) in connection to the land and ancestors.

CHAPTER 4. RESEARCH QUESTIONS

In formulating this thesis, I was interested in researching a topic that would be relevant and of interest to the Red Cliff community. In contact with Marvin DeFoe, Red Cliff THPO, and after receiving permission to center my thesis on the Frog Bay Site and within the Red Cliff community, he encouraged the research to follow personal interests with relevance to the community and its regional cultural continuity. The questions that arose were: *What does the Frog Bay Site (47BA60) indicate regarding regional settlement systems, site function, mobility, and enduring site and land significance? What is the importance of Frog Bay for the Red Cliff community and why is collaboration and Indigenous knowledge and theory important? What does the Frog Bay Site (47BA60) tell about mobility and land use during the Archaic and Woodland stages?*

In answering these questions, I hope to understand the overarching question of: *How can a "braided knowledge" of lithic analysis, Indigenous knowledge and theory, and community-based methods be used to interpret place-making at Frog Bay?* To answer these inquiries, this analysis will rely on the theories, geographical, archaeological, and historical context presented above. Sub-questions are also critical in answering the larger ideas. These sub-questions include:

a. What can we learn about this site from Red Cliff community members? How do Indigenous knowledge and worldviews connect with Western ideologies and scientific analysis?
b. What does cortex ratio and lithic analysis tell about mobility and land use? What is the level of tool diversity in the assemblage?

c. How does the information from this site compare to nearby sites during this time period? How does this region differ from other nearby areas during the same time? Was the site occupied short-term or long-term or combination?

One presumption of this research is the importance of community engagement in creating an analysis that is holistic and relevant to the local Red Cliff community. As a multicomponent site, there is evidence that Frog Bay is a place of importance that has continued to be reoccupied and revisited. As Elder and community member visits to the site continue, the site endures in connecting Indigenous peoples to the land and to Indigenous ancestors.

This research hopes to use archaeology to explore Frog Bay as a place embodying the histories and stories embedded in Ojibwe ancestral lands. Knowledge about previous mobility and land use at the site hopes to be beneficial and of interest to Red Cliff community members and all Indigenous people in the region through the reinforcement of continual Indigenous identity held in the land and the physicality of Frog Bay as a place within the wider cultural landscape.

CHAPTER 5. METHODOLOGY

5.1. Introduction

This research is focused on long-term patterns of mobility, land use, and place-making at the multicomponent Frog Bay site in Northern Wisconsin. Three general forms of lithic analysis will be used to assess the nature of ancient Indigenous settlement at the Frog Bay site: (1) debitage analysis, (2) tool diversity analysis, and (3) cortex ratio analysis. All of these measures shed light on how the site fits into wider patterns of mobility and landscape use between the Middle Archaic and Late Woodland stages in the Northwestern Great Lakes region.

In pursuing the questions at hand, this research seeks to follow a methodology that aligns with the interests of the Red Cliff community and incorporates local knowledge and participation. While lithic artifacts can communicate aspects of site function, descendant and local participation adds an invaluable element that would be absent otherwise. The methodology will incorporate collaboration in the context of a recently established community-based archaeological field project organized and directed by the Red Cliff Band of Lake Superior Chippewa's Tribal Historic Preservation Office (THPO) and co-directed by archaeologists at North Dakota State University and The University of Wisconsin – LaCrosse. The methods of community-based research implemented by the directors[3] during the 2018 and 2019 field school will be touched upon as they cultivated community input and interest into the methods of the process. These will also be expanded upon in the form of recommendations for future research and additional projects in order to change the dynamic of how archaeological work is carried out.

For this thesis in particular, site significance and past/present relationships to the land were questions supported by Mr. DeFoe. After being a part of the 2018 and 2019 field schools

---

[3] John Creese (NDSU); Marvin DeFoe (THPO); Heather Walder (UW-LaCrosse)

and experiencing community engagement, I found an appreciation for collaboration. In designing this thesis, I understood that community archeology was not something to be implemented by choice, but an essential element of archaeology that is fortunately becoming a more standard practice. Embracing a community-based project furthers the notion that the field is moving in the right direction by including community members, opening interpretation beyond academia, and restructuring the colonial agenda.

In speaking to Mr. DeFoe about doing research that aligns with the interests of the community as well as my own, community-based methods and lithic analysis came to the fore. There are many questions relating to site significance and place-making, one in particular being that of site mobility and the importance of Frog Bay both then and now. The concept of place-making refers to practices which create "hybrid socio-natural assemblages with recursive long-term consequences equally for lands, bodies, and technologies as for narratives, ontologies, and identities" (Creese 2018:47). Place-making invests meaning and importance to particular locations in a social and cognitive process in which space is not an empty backdrop (Whitridge 2004). Place-making becomes a constant active process which consciously or unconsciously shapes the landscape through on-going histories of communal activity molded by personal and cultural heritage (Whitridge 2004:243).

Community interests and lithic analysis are linked as lithic interpretation contributes to the understanding of site continuity and long-term land use at the site within the bigger community-based project. Lithics are also important in community involvement as they can be interactive and accessible. Tools and even debitage act as a physical reminder of the continuity and long-lasting relationship Indigenous people have had to this region for thousands of years.

In order to answer the questions presented by this thesis, specific data are needed. Measurements of chipped lithic artifacts (comprising tools, cores, and debitage) uncovered at the Frog Bay Site (47BA60) from the excavations led by DeFoe, Creese, and Walder during the 2018 and 2019 field seasons will constitute the majority of quantitative data collected and analyzed. Along with analyzing lithic artifacts, community-based archaeology contains several models and methods that will be investigated. Combining multiple lines of evidence from lithics, site and regional histories and data, Indigenous knowledge, and community input, I hope to understand more clearly what kind of settlement the Frog Bay site represents and how this information can be productive and beneficial to Red Cliff tribal citizens today.

5.2. Lithic Analysis Methods

Initial research at Frog Bay began during the Chequamegon Bay Archaeological Field School in 2018. This field school led to the 2019 Geté Anishinaabe Izichigéwin Community Archaeology Project (GAICAP). On returning from the 2018 field season with permission and in consultation from Mr. DeFoe, I was given the opportunity to follow a route of research at Frog Bay using lithics to understand site function and mobility. While site function can be looked at from a number of different perspectives, lithic analysis will be used here as chipped lithics represent the majority of artifacts excavated.

Lithic data was collected from the findings of the 2018 and 2019 field seasons conducted at Frog Bay.[4] As the question is that of land use and mobility, debitage analysis, tool diversity indices, and cortex ratio analysis are the methods applied. These methods are chosen as they can provide inferences about site function that apply to the broader question of regional mobility and

[4] This research did not include artifacts from the Beloit College Field School 1979 Apostle Lakeshore Survey. The research completed in 2018 and 2019 did not relocate the exact context of the Frog Bay site from the 1979 season and therefore is not applicable for this analysis.

how people were using the site and re-occupying the site through a seasonally and/or traditionally oriented movement system. Aggregated lithic data at the site can be assessed on a macroscopic level to make inferences from artifact function to site function (Andrefsky 2005:201).

Information about site use can be attained from lithic debitage, the material left from tool production and tool maintenance (Andrefsky 2005:222). As debitage embodies the majority of the lithics found, its analysis provides insights about the particular production activities associated with "site function, and probably linked very closely to the other activities performed in the site area" (Andrefsky 2005:222). As the "trash" left behind, debitage characterizes a sliver of what people were doing. It has been observed that the amount of material discarded at a site can be directly related to population size and occupation span (Gallivan 2002:537). Using these variables, researchers have been able to "estimate site occupation span, to reconstruct patterns of sedentism and mobility" (Varien and Mills 1997:142).

Studies from ethnographic and archaeological contexts have shown that hunter-gatherer tool production varies between expediency and necessity in the moment, to curated tools with "tasks and activities … anticipated well before the activity" (Andrefsky 2005:223). The relative emphasis on expediency vs. curation in the lithic industry at Frog Bay will be studied through a diversity analysis of the tool assemblage as well as by examining tools individually by function.

Cortex ratio analysis, on the other hand, looks at both tools and debitage to understand the stages of tool production occurring at the site. This provides information on specific stone reduction activity occurring on site and permits inferences about the relationship between tool production and mobility within the regional settlement system.

5.3. Methods of Debitage Analysis

Debitage analysis focuses on the debitage, or the waste of core reduction. This analysis was conducted on the entirety of the Frog Bay lithic assemblage including the STPs and units but focusing on the 1x1m units. The lithics recovered from the site were inventoried by unit, level, class, and raw material. There seemingly were activities occurring that dealt primarily with tool production focusing on the local quartz material. Because of this, much of the debitage research relies upon quartz as this is the dominant raw material found at the site. Quartz assemblages have been found to contain a large amount of debitage in relation to tools. “When quartz cobbles are reduced, whether a bipolar or a bifacial technique is used, large amounts of waste are produced” (Spott 2005:123). While there is a great imbalance of debitage to tools, quartz manufacture produces less flakes and more shatter and the high debitage to tool ratio has led archaeologists to believe that large amounts of quartz are needed to produce a few tools. (Spott 2005:123). This may be due to the fact that quartz cobbles from the beach are not generally of high quality, and because quartz generally contains veins, cracks and other flaws (Spott 2005:116) that mean that quartz tools “are more prone to breakage than tools made of many other raw materials” (Tallavaara et al. 2010:2447).

5.4. Tool Diversity Indices

Diversity research uses tools in order to understand occupation duration and community size. As this research is interested in mobility and land use, it is important to recognize that while the concepts of mobile and sedentary are seen to lie on either end of the mobility continuum, this is a is a multidimensional scale with no definitive definition of either extreme (Gallivan 2002:536). In diversity research, the dynamics of tool richness and evenness are used to understand site occupation duration and population size. These variables are achieved with the

Shannon Weiner Diversity Index. This index relies upon richness outcomes to generate diversity and evenness indices.

Before utilizing the Shannon Weiner Diversity Index, stone tools are categorized by broad classifications. Stone tools are generally divided into the categories of chipped stone and ground stone based on material and technological differences. This classification has been implemented in this research as well. Chipped stone tools are categorized as those "made from a limited range of raw materials like chert, quartzite, and obsidian by percussion and pressure flaking" (Morrow 2016:2) including hard hammer, and soft hammer methods. Ground stone tools are generally created from grainer rock types and are made through varying combinations of pecking, grinding, cutting, drilling, and polishing (Morrow 2016:2).

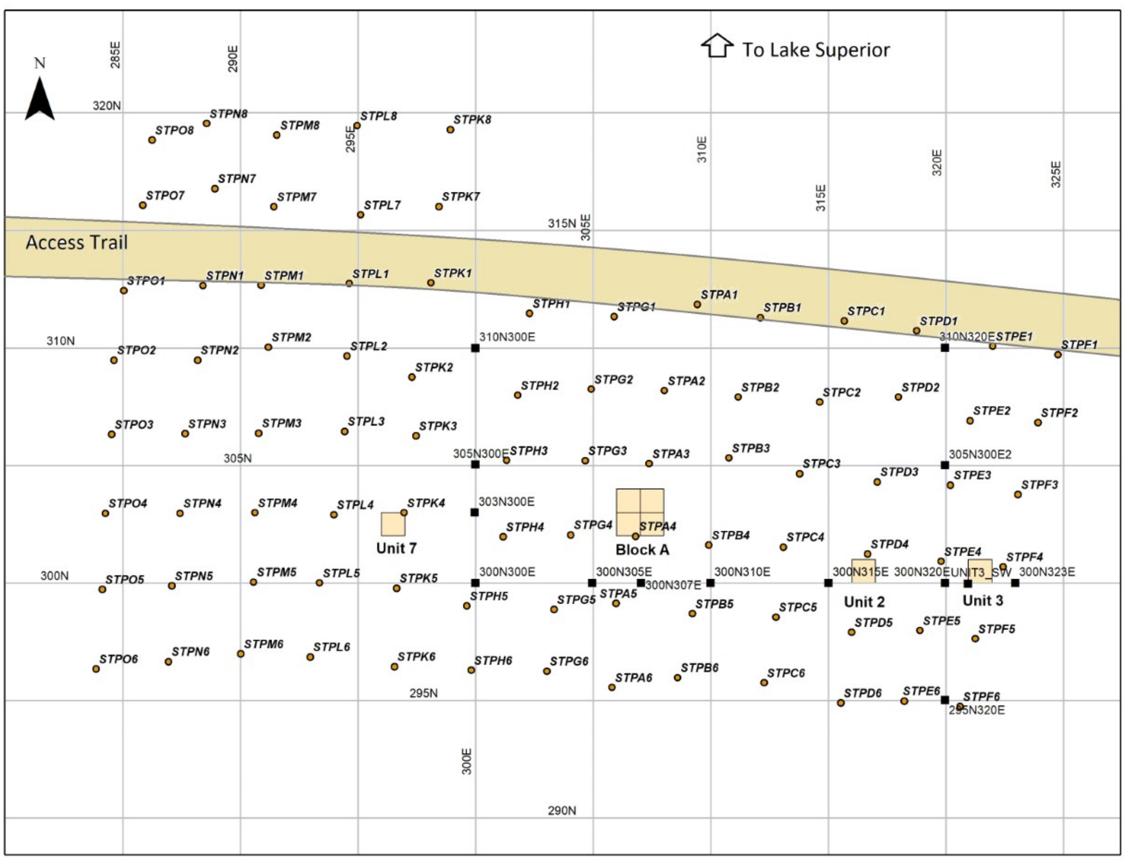


Figure 9. Overview of site shovel test pits and units. Source: Creese and Walder 2020:50.

Once tools were identified from the assemblage and categorized by chipped or pecked/ground stone, they were further separated by raw material, perceived function, technology, and context. While tools normally are made and used for different activities and functions, these tools have been categorized broadly by main culturally identified task. Examples include chert scraper, quartz bifacial flake, copper awl, etc. This categorization allows tools to next be calculated by richness and provide an overview of the tools in the assemblage spatially as well as by material/function. The Shannon Weiner Diversity Index is a quantitative measure of diversity combining species (class) richness and evenness (relative abundances). The calculations for proportion and percent of each class of tool within the tool population is used in the Shannon Weiner Diversity Index to ascertain the diversity and evenness.

The Shannon Weiner Diversity Index: $H=\sum[(pi)\times\ln(pi)]$

This formula is a quantitative measure of diversity combining richness and evenness. Richness refers to the number of classes in the artifact assemblage by material and function (i.e. chert scraper, copper projectile point, etc.). Evenness signifies the frequency of these different classes within the assemblage or within a particular context (unit, feature). Together these are computed as diversity (Eren et al. 2016:175; Grayson and Cole 1998:927).

5.5. Methods of Cortex Ratio Analysis

Cortex ratio can be a useful proxy for "interpreting questions of curation, primary exploitation, and transport, and site use" (Dibble et al. 2005:545). I will be generally following the experimental design laid out by Dibble et al.'s 2005 article "The Measurement and Interpretation of Cortex in Lithic Assemblages." This method will be used to calculate the expected cortex present in an assemblage, given that the elements produced remained in situ or at the site. Natural cobbles from the area will be used to calculate the expected cortex value in the natural state before reduction. The expected cortex value will then be compared to the observed cortex value found in the assemblage at the site to determine which stages of reduction are occurring at the site.

5.5.1. Measurements and Data Collection

To compute cortex ratio, data was collected during the 2019 field season at Red Cliff. In preparation, a recording sheet was developed to include a series of observations and quantitative measures for the selected chipped lithic artifacts recovered from the site. Measurements were taken to first identify and classify each lithic artifact by technology, raw material, and type before further analyzing the assemblage as a whole. While there is more information that could be gathered, it was established that only pieces greater than 15 mm would be analyzed as well as only those excavated from the fully excavated 1x1m units: Units 1, 2, and 3. Reasoning was that artifacts of these dimensions would consist of a significant sample size in the amount of time reasonable for this research. These excavation units were chosen for consistency as they provide the most complete information and were the units started in 2018 and completed in 2019.

Lithics or other artifacts were not analyzed from the 1979 excavations, the 54 STPs excavated in 2018, STPs in 2019, or Units 4, 5, 6 or 7. The data set for cortex ratios all originate from Unit 1, Unit 2, and Unit 3 from 2018 and 2019 excavation. While analysis relies on the remaining cortex to infer behavior and activities, human agency plays a role in the ways that stone tools are produced as reduction trajectory systems differ with culture, material, and end product. Although the amount of cortex observed in any given assemblage is the product of a number of different behavioral components, cortex ratio is not affected as the method relies upon solid geometry to understand cortex percent. This is "because the measurement is a ratio variable standardized by assemblage size… and the applicability of the method is not constrained by variability introduced through technological differences, such as knapping technique and reduction intensity" (Lin 2014:145). Cortex ratios simply summarize the cortex composition of lithic assemblages without behavioral explanations (Lin 2014:155).

Lithic Analysis Form - Geté Anishinaabe Izhichigewin Community Archaeology Project

Site Name: FROG BAY Site No: 47BA60

Catalogue No: 2018.0294 PP no (if applicable): 0099 63N 38E

Unit: 3 Feature (if applicable): n/a Feature zone (if applicable): n/a

Unit Level: 7 Depth:

Recovery Method:

Analyzed By: L.C. Date Analyzed:

Photograph No(s):

Technology:
- Chipped stone
- Ground stone

Thermal Alteration:
- Y
- N
- Unknown

Raw Material:
- Quartz
- Chert
- Silicified Sandstone
- Sedimentary
- Igneous or metamorphic
- Other

Artifact Type:
- Finished Tool (see box 1)
- Bifacial Preform
- Core (see box 2)
- Shatter
- Flake (see boxes 3-5)
- Other

1. Finished Tool
   - Projectile
   - Drill
   - Perforator
   - Scraper
   - Celt
   - Other

Comments:

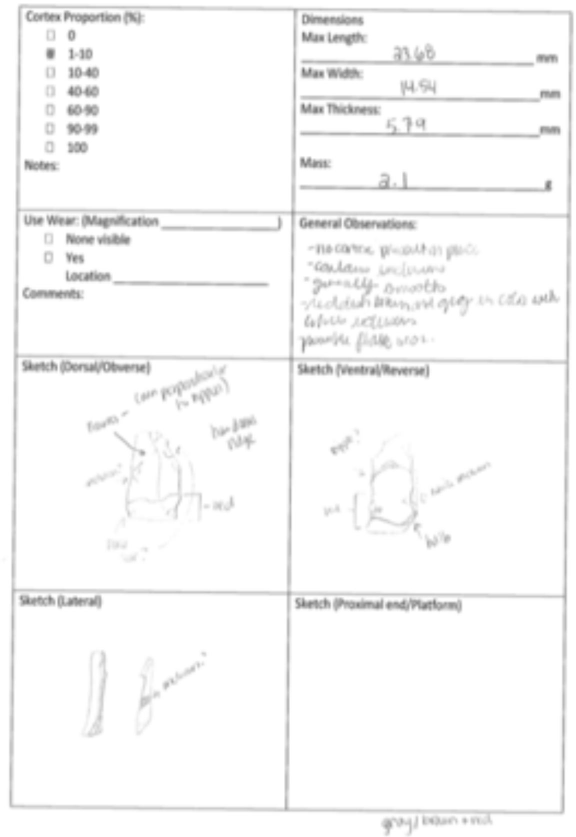
2. Core Type
   - Unipolar
   - Bipolar
   - Other

3. Flake Completeness
   - Complete
   - Proximal
   - Medial
   - Distal
   - Unknown

4. Flake Retouch:
   - N
   - Y, Type & Location:

5. Flake Cortex
   - Cortical (primary)
   - Cortical (secondary)
   - Cortical (tertiary)
   - ~~Non-cortical~~

Figure 10. Front portion of the form used in 2019 lithic data collection.



Cortex Proportion (%):
- 0
- 1-10
- 10-40
- 40-60
- 60-90
- 90-99
- 100

Notes:

Dimensions
Max Length: 23.68 mm
Max Width: 14.54 mm
Max Thickness: 5.79 mm
Mass: 2.1 g

Use Wear: (Magnification)
- None visible
- Yes
  Location

Comments:

General Observations:

Sketch (Dorsal/Obverse)

Sketch (Ventral/Reverse)

Sketch (Lateral)

Sketch (Proximal end/Platform)

Figure 11. Reverse portion of the form used in 2019 lithic data collection.

Data was collected from artifacts equal to or greater than 15 mm in at least one maximum dimension, based on the experimental design presented in Dibble et al. (2005:548). From this selection the recorded elements include provenance, recovery method, technology, evidence for thermal alteration, raw material, artifact type and accompanying attributes, cortex proportion interval, cortex proportion percent, dimensions of maximum length, width, thickness, and mass.

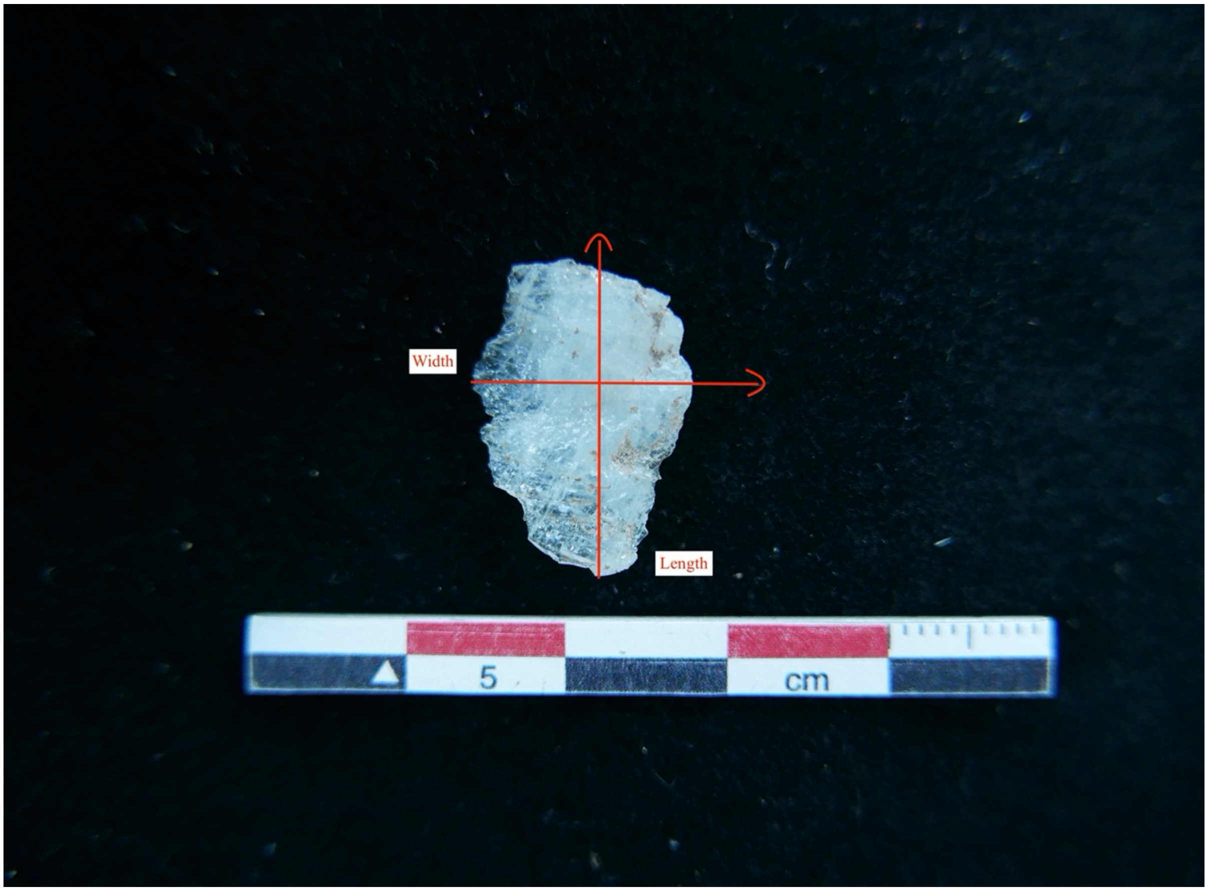


Figure 12. Example of max dimensions taken for length and width. At the thickest area between dorsal and ventral sides the thickness measurement was taken. Quartz flake from Unit 1 Level 12. Catalogue #2018.0195.

The dimensions of maximum length, width, and thickness were measured with digital calipers to the nearest hundredth of a millimeter (mm). Measurements were taken the same way for all artifacts regardless of class to ensure consistency. The maximum length measured the distance between the two points farthest apart, and maximum width was measured perpendicular to the length axis at the widest point, and maximum thickness was measured at the thickest point along the third dimension, generally from ventral to dorsal (Douglass et al. 2008:518).

Mass was measured using an electronic balance scale to the nearest tenth of a gram. All of these measurements were taken on site during the 2019 field season in the lab at Red Cliff, Wisconsin. In classifying flakes, complete or proximal flakes were those with an identifiable bulb of percussion and distal flakes were classified as those showing where the force of the original point of impact terminated. This includes hinge, stepped, plunging, or feathered termination (Andrefsky 2005; Odell 2004). Other flakes without these characteristics were classified as unknowns. Shatter included pieces lacking a platform, bulb, or recognizable interior/exterior differentiation. Materials that had multiple flakes removed from the surface and were large enough to have been the nucleus of production were classified as cores. Accompanying these measurements, photos were taken of all sides using the Leica D-LUX (Type 109) camera and reference drawings were completed.

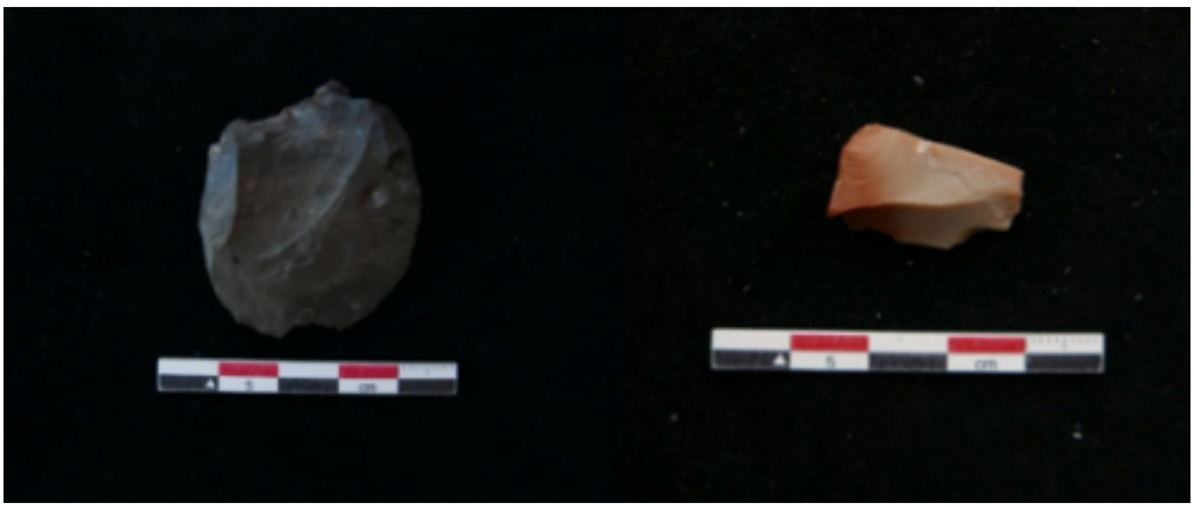


Figure 13. Chert scraper from Unit 1 level 6 matrix (2019.0085) and a chert flake from Unit 3 level 7 (2018.0294).

Original natural quartz nodules were collected from Madeline Island at Big Bay State Park by students during the 2019 field school. Forty natural quartz nodules were collected from Lake Superior for measurements based on Dibble et al.'s 2005 experimental design as a sample size that would be statistically significant. Cobble mass ranged from 38.8g to 649g, with average mass of the measured natural nodules 139.5g.

5.5.2. Dibble et al. Cortex Ratio Method

After measurements and natural cobbles were collected, the Dibble et al. (2005) cortex ratio method could be applied. Dibble et al. (2005) presented three solid forms to describe nodule shape (natural cobbles): cube, sphere, and right cylinder (Dibble et al. 2005). The shape of the natural quartz nodules collected from Big Bay State Park generally represented a spherical form which also coincided with the preferred shape in the study. Each solid has a different formula for surface area and the expected cortical surface was found by applying the cobble measurements to the most appropriate solid form formulas (Dibble et al. 2005:549). The formula for the surface area of a sphere was utilized:

$$S = 4\pi\,(3V/4\pi)^{2/3}$$

To determine percent of observed cortex, Dibble et al. analyzed their artifacts on a 7-part scale: 0, 1-10, 10-40, 40-60, 60-90, 90-99, and 100% (Dibble et al. 2005:548). This scale calculates the cortex percent of the exterior (dorsal) surface in artifacts classified as flakes. On cores, shatter, and bifaces, the entirety of the artifact is used to calculate the cortex percent. Once these measurements are made, the cores, shatter, and bifaces are then multiplied by two to reflect the total of two surfaces – the two sides (Dibble et al. 2005:560). To establish the cortex ratio for the Frog Bay sample, a preliminary estimate was used on site with this 7-part scale, and a later and more precise measurement was taken using photographs and the application Image J. This application allows a more precise measurement by tracing the cortex to determine the exact cortical area. The sum of all cortex in the archaeological debitage sample represents the *observed* cortex. This is then divided by the sum of *expected* cortex calculated from the natural cobbles. This provides the cortex ratio for the artifact assemblage sample.

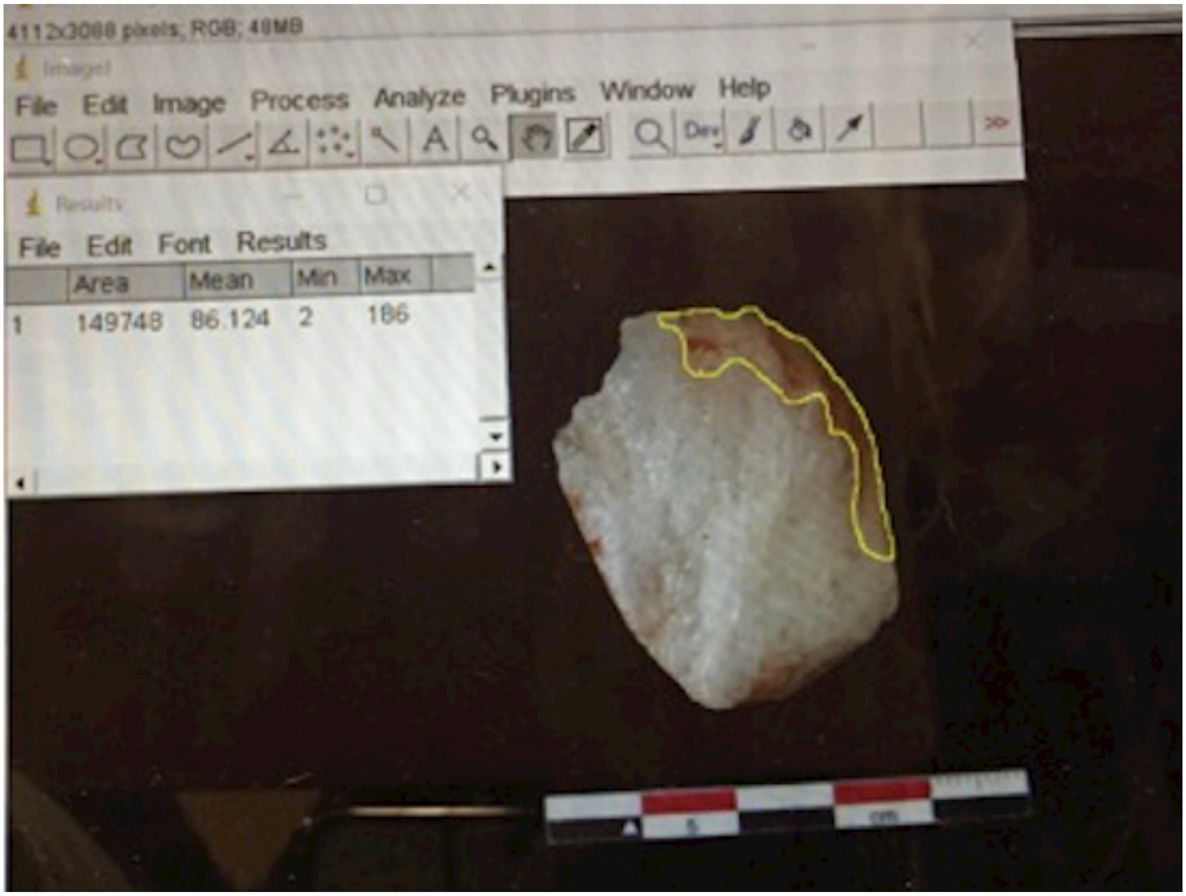


Figure 14. Example of the use of Image J to find the cortex percent. Measurement of one area of cortex on a quartz core. Catalogue #2019.0016 from Unit 3 level 12.

5.5.3. Cortex Ratio Outcomes

Interpretation of the cortex ratio is reliant upon the outcome of the equation previously described. As a cobble is reduced the mass becomes distributed in the products and debitage. This is affected by behavioral biases such as transport (import/export) and therefore can detect particular points in the reduction sequence. It is not affected by “the degree to which core reduction took place…subsequent retouching… technological variation and different rock types” (Dibble et al. 2005:558). This concept is described as “a nonlinear relationship between the degree of reduction and average cortex” (Dibble et al. 2005:546) since it is not affected by non-cortical flake reduction. “The average cortex will always remain greater than zero no matter how many non-cortical flakes are ultimately removed” (Dibble et al. 2005:546).

Table 3. Cortex Ratio interpretation indicator.

Cortex Ratio	**Indication**	**Inference**	**Behavioral Interpretation**
< 1	Less cortex than expected	Net loss in cortex; cortical flakes have been removed from assemblage, non-cortical flakes added, or both	Reduction is biased towards later stages, such as biface thinning, re-sharpening, and recycling; early stage reduction occurs more rarely or elsewhere
1	Cortex equal to expected	No net gain or loss in cortex	All reduction stages take place on site without bias; little material is removed or added from elsewhere; or, removal and addition is cortex-neutral
> 1	More cortex than expected	Net gain in cortex; cortical flakes have been added, non-cortical flakes removed, or both	Reduction on site is biased toward early stages, such as initial shaping; late stage reduction occurs more rarely or elsewhere

If the technology being used deals mostly in non-cortical pieces being produced post-core preparation, there will be relatively more non-cortical pieces present (Dibble et al. 2005:546) and a lower percent of cortex. This would be represented by a cortex ratio less than 1, indicating the removal of cortical flakes or the addition of non-cortical flakes from elsewhere (Table 3). A lower cortex ratio could be attributed to a site where the later stages of reduction are occurring. In this case, the primary reduction would have happened at a previous site, excluding those cortical pieces from the assemblage at the next location of reduction. An underrepresentation can also indicate “repeated raw material extraction and individuals gearing up with mobile toolkits” (Lin et al. 2015:178). In Lin et al.’s research, the assemblage they were working with was primarily composed of similar technology – expedient flakes and cores – in which they used cortex ratio to understand artifact transport in the absence of abundant curated tools (Lin et al. 2016:173).

If the cortex ratio is at 1, then little net gain or loss is shown to have occurred in the assemblage (Table 3). In a study by Douglass et al. (2008) it is shown that locally available materials tend to display less of a discrepancy between observed and expected cortical surface area than those represented by nonlocal materials (Douglass et al. 2008:521). This may indicate that the full manufacture sequence is occurring close to resource outcrops.

If the emphasis is switched, and production is dealing with large flakes from the early stages of processing, the cortex percent will be higher than 1 (Dibble et al. 2005:560). This suggests that there is more cortex than is expected and there is the removal of non-cortical flakes or the addition of cortical flakes of the same material from elsewhere (Table 3). A higher cortex ratio could point to the removal of non-cortical artifacts, as in the case of initial primary reduction at one site and further reduction at another. The site of primary reduction would have a higher concentration of cortical pieces compared to the next site with later stages.

Once the ratio has been recorded, it can be applied to understanding curation, mobility, land use, etc. during the occupation stage. As Frog Bay is a multicomponent site, with C14 dates from the Middle Archaic, Late Archaic, and Late Woodland, cortex ratio can be applied to single out these areas in relation to the C14 samples to look at how lithic reduction may have changed or stayed the same through these different occupation spans. While cortex ratio can be used to infer a great deal about the site, it is important to note that cortex ratios can only explain the cortex composition of lithic assemblages and are not able to offer behavioral explanations (Lin et al. 2015). However, the knowledge retrieved from the cortex ratio equation combined with traditional lifeways and historical information can inform on the lithic technological system to "articulate associated dimensions of human behavior such as subsistence, settlement, and mobility strategies" (Carr and Boszhardt 2010:24-25).

5.6. Community-Based Methods

In doing research, especially research with a community and and/or with people who have been historically oppressed and marginalized, it is important, as made apparent by Hermes (1997), to shift the emphasis from "'research for research's sake' to research which serves some specific purpose or need of the community within which it is situated" (Hermes 1992:2). The goal is to align the methodology of this project with the theory and goals of community archaeology, as well as with the Red Cliff community. The study design relies on incorporating the community in the methods, in addition to incorporating methods which are community oriented. These aspects act as a nexus between archaeology and the present, linking past mobility and place to present conceptions of place-making and identity. As this research is situated within a wider community-based field project, it's essential to first outline the importance of community-based archaeology and the components that are involved.

Community-based projects are able to achieve many important objectives – decolonizing the governmentalization of archaeology through diffusion of authority, empowering community and descendant groups, and all together enriching the discipline. Because of this, it is important to refine the parameters and methods that form this 'sub-discipline' of archaeology. While for some, community-based work may be synonymous with 'consent-based archaeology' (Greer et al. 2010:265) or even seen as an unnecessary obstacle, others have realized the significance and necessity of community-based archaeology (Atalay 2012). Because community-based archaeology is wide ranging, different projects and scenarios will certainly look different with some facets less emphasized for individual community dynamics and requests (Thomas 2017:30).

5.6.1. Examples of Community-Based Methods in Archaeology

Although there are many, some successful examples of community-based archaeology projects (completed and ongoing) include the Ozette Archaeological Project (Angelbeck and Grier 2014; Samuels and Daugherty 1991), Janet Spector's work at Little Rapids (Spector 1993; Marshall 2002:212-213), The Sedgeford Historical and Archaeological Research Project (Faulkner 2003), The Community Archaeology Project at Quseir (Moser et al. 2010), Martin Gallivan's research with the Werowocomoco (Gallivan 2011), The Kitikmeot Heritage Society's Iqaluktuuq Project (Stoughton 2011), The Levi Jordan Plantation Project (McDavid 2002), as well as several projects by Atalay including The Çatalhöyük CBPR Project (Atalay 2010; Atalay 2012), The Waapaahsiiki Siipiiwi Mound Project (Atalay 2012), The Ziibiwing Repatriation Research Project (Atalay 2012), The Ziibiwing Sanilac Petroglyph Intellectual Property Project (Atalay 2012), and The Flint Stone Street Ancestral Recovery and Site Management Project (Atalay 2012).

Several archaeology projects incorporate elements of community-based archaeology but do not fully attain success as a community-based project. Supernant and Warrick (2014) describe two case studies of attempted community-based archaeology projects in which opposing land histories and conflicting community rights barred the process. In these cases, the authors describe the attempt of community-based archaeology as bringing more harm than good. In cases such as this, the authors suggest refraining from engaging in research and instead supporting Indigenous archaeologists and communities (Supernant and Warrick 2014:582).

From the field of natural resource management, Twyman (2000) describes another example of a fruitless community-based project. In this case issues arose as the traditional landowners, the Basarwa, were expecting more participation and voice than was provided by the Department of Wildlife and Natural Parks (DWNP). The power dynamic made community members uncomfortable and reluctant to voice their ideas and overall brought difficulty in bringing about equal standing (Twyman 2000).

There are a multitude of issues that arise within community-based projects which can be avoided through careful research, communication, and respect. Review of past mistakes and blunders can bring awareness for the future. Some instances of such include scheduling without prior communication or research, such as during seasonal or cultural community events which members have prior commitments and responsibilities to. Such was the case in the research of Kersel and Chesson (2013) which commenced during the busy tomato harvesting season (Kersel and Chesson 2013:164), and the research of Konwest and King (2012) which coincided with the busy activities of the feast days of both Nejapa de Madero and Santa Ana Tavela's patron saints (Konwest and King 2012:504). Unintentional oversights can lead to issues that are ultimately resolvable and/or learning moments and insight for the future.

5.6.2. Methods of Community-Based Archaeology

Moser et al. 2010 developed a 7-component strategy for collaborative practice which is explicit in the methodology for community archaeology (Marshall 2002:211; Moser et al:2010). The methodology includes communication and collaboration, employment and training, public presentation, interviews and oral history, educational resources, photographic and video archive, and community-controlled merchandising (2010:229).

While this is a very encompassing guide, Stoughton (2001) makes the remark that "it is noticeably silent regarding the issue of co-management in terms of authority and control" (Stoughton 2011:85). Authority is a principal aspect in both community-based archaeology and working to decolonize. Betz (2007) builds on these concepts at states that all community projects must at the minimum include "an emphasis of multivocality and genuine, two-way dialogue between archaeologists and the affected public, and an investment in empowering involved communities in political, social, and/or material ways" (Betz 2007:3).

Atalay's community-based participatory research model (CBPR) speaks to this lack of emphasis and problematizes the power imbalance created in traditional archaeology (Atalay 2012). Five primary concerns of the CBPR model are to pursue a fully collaborative process, involve community participation, build community capacity, achieve reciprocity in benefits, and use multiple knowledge systems (Atalay 2012:45). Through a combination of these models and guidance from past projects, complied below are several methods which can be employed depending upon the needs and wants of the community. These include (but are not limited to):

i. Define the community, whether descendants of the area, stakeholders, or those who are local to the region and understand the organization of said community without pre-conceived notions of what the community may be (Neogi 2011:30). It is important to collaborate and research following a particular community's structure. This can mean first speaking with Elders, political leaders, or committee members depending upon the community.

ii. Either in collaboration and consultation with the community or through request, identify one or more research problems or hypotheses that will focus the project (Banning 2000:74). This can be accomplished through multi-stage designs or through first agreeing upon a pilot or preliminary stage to refine the research questions, methods, and expectations (Banning 2000:75). It is important to have projects and questions designed by the community as it establishes local interest (Neogi 2011:31) and allows authority to remain with the people. This also shows the willingness of archaeologists to give up authority from the beginning. Communities should feel empowered to use archaeology and archaeologists as a resource for their own questions. This begins to create an “archaeology from below” which is characterized by fieldwork framed by community wants and needs and open to volunteer contribution (Faulkner 2003).

iii. Initiate proactive consultation and participation with the community from beginning to end. Rather than beginning with a reactive approach, Greer et al. 2002 describes community-based archaeology as having the central aspect of being *interactive* which allows “for localized shifts in the power balance” (Greer et al. 2002:268). Community members should be encouraged to be involved in research questions, setting up the project, data collection and analysis, storage, publication, and continued preservation. (Colewell-Chanthaphonh et al. 2010:230; Marshall 2002:211). It is also very important to establish opportunities to physically work and dig at the site. Either with Elders, volunteers, school groups, interns, employed members, etc. digging and being physically present can be a momentous and emotional experience. Importantly it is also paramount to have an open, respectful, and excited demeanor to create a healthy and educative environment that community members are encouraged to visit and work in. This is beneficial for all and maintains a good relationship between everyone.

iv. Involve communication and collaboration with the community through methods such as partnering with local organizations, providing work updates and strategies, creating easily understandable reports and analyses, and establishing long term social interactions. (Moser et al. 2010). Community-based archaeology requires long-term commitment and communication which requires trust and rapport between the leading archaeologist, archaeology team, community leaders (Elders, mayors, etc.) and the community.

v. Enact a design plan which enables local people to serve as custodians of their own heritage (Betz 2007). During each step in a project, full or partial control should remain within the community (Marshall 2002:212). Gaudry (2018) calls for sustainable projects as developing Indigenous community research self-sufficiency is "the next stage in community-engaged research, one that calls upon researchers from universities and Indigenous communities to work towards a deeper and more transformative level of community empowerment" (Gaudry 2018:258). This can aid in creating a sustainable project which can endure in the hands of the community.

vi. Include dynamics of Indigenous or community concepts. This is necessary in order to make archaeology more relevant for and responsible to the heritage communities. Collaboration consists of two-way communication and interpretation (Moser et al. 2010:229) but despite promising work, very few researchers have acknowledged the intellectual contributions that local groups can make to research, nor how collaborative practice can transform the understanding of sites under investigation (Moser et al. 2010:224).

vii. Initiate people-centered or transformative participation rather than planner-centered or nominal participation (Twyman 2000). This leads to development which is truly empowering and keeps from ushering local people into being passive recipients (Twyman 2000:324). Involvement of community members in excavations means that "community-perspectives were becoming entangled with archaeological practices and interpretations" (Greer et al. 2010:272). The incorporation of new and different perspectives addresses the inequalities in archaeology and creates new holistic interpretations (Colwell-Chanthaphonh et al. 2010:229; Nicholas 2008:1660).

viii. Techniques to share information need to be formed. Archaeology is a form of knowledge creation and it is important to have this knowledge spread through forms of education that meets the needs of multiple peoples including multiple age ranges and abilities. It is important that local residents have access to the knowledge and benefits that come from research within their community. Atalay has made apparent that this means more than academic writing, as "archaeologists must become more involved with and must make their work relevant to wider, nonacademic audiences" (Atalay 2012:3).

ix. Give back to the community. This can be through funding for the employment of local people or providing other information that would benefit the community regardless of relation to the main project. This is also possible do within the project through employment of community members and aiding in local and Indigenous education and/or training. Community archaeology can involve a number of different people which are catered to through several kinds of outreach (Corbishley 2011:104) that may look different for each project and community.

5.6.3. Community-Based Methods in GAICAP (2018 – 2019)

Built from these qualities and in speaking with the project collaborators (John Creese, Marvin DeFoe, and Heather Walder) of GAICAP, Table 4. has been created to present community-based methods that have been accomplished and/or in process in GAICAP as well as ideas for the future. As mentioned previously, these community-based methods are not be any means all-encompassing but provide a general framework for what could happen.

Table 4. Community-Based Methods in GAICAP (2018 – 2019)

(Adapted from Moser et al. 2002, Hogg, 2012, 29, Atalay 2012).

*Methods bolded in the center column indicate actions were met during the project, although they may not be touched on in the GAICAP methods column for the sake of space and depth.

Community-Based Component	**Methods Developed to Complete Larger Component of Community-Based Research**	**GAICAP Methods Used**
Communication	**-Build an open and receptive foundation for collaboration – example being the social cognitive psychological approach and disposing of the "fixed pie myth" and "loss aversion and status quo bias" (Martinez 2006).** **-Foster social relationships between community and archaeological team.** **-Maintain long-term contact.** **-Partner with local organizations.** **-Maintain open collaboration and notifications on work updates and status of progress.** **-Plain language reports.** **-Two-way dialogue in social interaction.** **-Work within a framework governed by community values (Atalay 2012).** **-Respect for community hierarchy.** **-Collaborate through Interactive vs reactive paradigm (Greer et al. 2002).**	-Different communication forms used at appropriate times: prior to project, weekly conference calls were necessary, while during the project as well after, different modes of communication are used such as phone calls, email, text, Facebook, video chat, and conference calls. -Ongoing informal socialization during the field season, such as reciprocal invitations to host dinners. -Connect through the community's preferred mode of communication – ex. Facebook, email. -Available and helpful through processes that were new but necessary for the project. -C14 dates and quotes run through the Tribal Historic Preservation Officer Assistant Edwina Buffalo. -Partner with organizations: Tribal Natural Resources, Ginanda Gikendaasomin: Red Cliff Library.
Indigenous and Local Thought	-Structured and non-structured ethnographic interviews which create relationships and seek to understand local ideas, opinions, perspectives, and learn vital information. (Greer et al. 2002:271). **-Respect and utilization of local ideologies and knowledge.**	-Invited indigenous speakers, such as William Kurtz, BIA archaeologist -Events: curation weekend, foodways day. -Communication and learning in the field about history, local opinions, thoughts, etc.

Table 4. Community-Based Methods in GAICAP (2018 – 2019) (continued)

Community-Based Component	Methods Developed to Complete Larger Component of Community-Based Research	GAICAP Methods Used
Indigenous and Local Thought	**- Activities and events surrounding Indigenous lifeways and values.** -Speak with and conducting interviews with Elders and community members in the area of context (Stoughton 2011; Zendeño 2001). **-Incorporate Indigenous knowledge into archaeological methods and surveys.** -**Incorporate language.** **-Incorporate rituals, ceremonies and other traditional forms of respect for the land and ancestors.**	-Excavation opened and closed with ceremony let by Marvin DeFoe. -Language incorporated in student syllabus -Anishinaalogy (Marvin DeFoe) -Language camp: participation in traditional crafts, games, feast, and examination and interpretation of artifacts with elders.
Education and Giving Back	**-Retention of archaeological collection and information.** **-Public presentations.** -Creation of exhibits. -Children's books or children's resources. **-Site visits.** -Artifact database. -Information presented as useful resources for the community such as an online artifact database, photographic and video archive, collaborative video and news programs (Damick and Lash 2013) or exhibits and public spaces to find information. **-Assist the community through aiding with different needs such as repatriation of artifacts from past projects, documenting oral histories, translating documents, etc.** **-Educational programs (Greer et al. 2002:271; Atalay 2012).** **-Volunteer time for community efforts.**	-Educational Programs: 2018 Kid's camp, curation days, open lab during field season as well as events after, and lifeways day. -THPO Internship for youth. -Work to keep grant money in the community (Wisconsin Humanities Council Grant). -Public presentations: presentations at curation day, Elder day. -Frequent and open site visits from community tribal members. -Repatriation of 1979 artifacts from Beloit College. -Volunteer students for maintenance and cleanup at the 41st Annual Red Cliff Tribal Pow Wow.

Table 4. Community-Based Methods in GAICAP (2018 – 2019) (continued)

Community-Based Component	**Methods Developed to Complete Larger Component of Community-Based Research**	**GAICAP Methods Used**
Employment and Training	**-Employment funding.** **-Training to support the local economy and bring about community engagement (**Mire 2007:55). -Employment for community members.	-THPO high school interns -Archaeological training: training of Tribal Historic Preservation Officer Assistant to prepare samples for C14 dating. -Employment for community members. -Archaeology education for youths -Grant money used in community as much as possible. -Hiring and training for tribal members. -Role modeling for children archaeology as career possibility.
Decolonizing	-Co-authorship authorship. **-Tribal ownership.** **-Cultural respect.** **Decolonizing interpretation and analysis.** **Horizontalism (Angelbeck and Grier 2014: 523).** -**Promote Indigenous archaeology among youth and adults.**	-Artifacts permanently curated at Red Cliff. -Research on tribal land and run by THPO. -Community always first. -Emphasizing respect and authority of community and Elders to students.
Sustainable	**-Project developed with community and/or developing methods with community through the process.** -Ability to be continued in the community – community building is essential (Silverman 2011:157). -Encourage community development – support the foundation of local heritage groups (Neogi 2011:32). -Other endeavors of significance to the community that aid in specific needs.	-Project designed with sustainability in mind. -Grant run through Red Cliff. -THPO interns. Encouraging and working towards community building and development. -Grant run through Red Cliff Tribal Historic Preservation Office.

As a new project, collaborators have all expressed the continual growth and learning that has come from each season and are confident about the benefits to come from incorporating more community methods and progressing for further community engagement. Additional prospects for the future have been voiced such as the incorporation of an end of the season survey, exhibit possibilities, a children's book, a collaborative project video, a scholarship for tribal members in college, and a grant from Wisconsin Department of transportation for a week of training with students and tribal members to become site monitors of archaeological excavations, open and free to all tribal members in the state.

The collaboration between field directors allowed this research to be developed in a framework premised by the importance of Indigenous leadership and management. During the field seasons (2018 and 2019) Mr. DeFoe offered valuable knowledge for participating students and community members through informal teaching, cultural event coordination, and sharing of experience and history at the site and in the lab. Throughout this research, Mr. DeFoe graciously offered his time and interpretations one on one through formally recorded interviews and email exchanges as well as through informative and exciting public presentations at the Midwest Archaeological Conference (2019)[5]. With support and communication from Mr. DeFoe, this project gained an invaluable amount of knowledge, guidance, and wisdom.

5.7. Conclusion

To find answers for the research questions posed, the methods of lithic analysis and incorporation of community-based principles will be braided together. Community-based methods create a decolonized Indigenous-centered framework for this archaeological research. Lithic analysis is ideal as a means to understand the assemblage as lithics are the main source of archaeological evidence at Frog Bay. Woven together with Indigenous knowledge and theory, a holistic interpretation can be built that entwines qualitative and quantitative ways of thinking and understanding. Especially when working with communities and groups whose direct history is

[5] These presentations included "Connecting People, Past and Present: Collaborative Archaeology in Red Cliff, WI" (part 1 and Part 2) with Dr. Creese and Dr. Walder, as well as "A Perspective from Red Cliff."

being uncovered and whose relationship with archaeology has historically been anything, but collaborative or respectful, community-based archaeology and Indigenous archaeology are necessary.

CHAPTER 6. ARCHAEOLOGICAL DATA AND RESULTS

6.1. Introduction

The archaeological results presented here are organized around three studies: lithic debitage analysis, tool diversity indices, and cortex ratio analysis. These areas of lithic analysis are distinct but also complementary to one another in providing a broad picture of the lithic assemblage at the site. Together, these techniques create a strong line of evidence for site function and land use at Frog Bay. Analysis concentrated on lithic and copper, since faunal preservation at the site is poor (Creese and Walder 2020:31) due to soil conditions. This data acts as one strand of braided knowledge which will be later incorporated with Indigenous theory and Indigenous knowledge through community input.

6.2. Debitage Analysis

An overview of the lithic assemblage at Frog Bay (Table 5) shows that lithics are a very substantial portion of the artifacts found, totaling at 97.6%.[6] Of the lithic assemblage found at Frog Bay, debitage (microdebitage and unmodified debitage) composes nearly the entire assemblage at 98.97% (Table 5). Debitage is useful for analyzing the full scope of lithic production, as it is the result of chipped stone tool reduction in one way or another. Tools are very telling of life activities but only represent around 1% of the lithic assemblage uncovered. Debitage is analyzed in conjunction with finished tools to provide a greater picture of the technological organization occurring on site. Studies of debitage (e.g. Hallson 2017; Magne 2001; Pecora 2001; Rasic and Andrefsky 2001; Sullivan and Rozen 1985) have begun to illustrate the usefulness of analyzing lithic byproducts in lieu of analyzing only finished tools (Seddon 1992:198).

[6] Excluding soil samples, charcoal samples, non-artifact catalogued objects, and FCR from the artifact total.

In order to understand differences across the site as well as between contexts with dated material, the lithic assemblage was separated by level, unit, raw material, and technology for clarity and comparison. In this analysis, copper was included to show a comparison in distribution and to analyze the importance of copper utilization at the site. Of the seven units excavated, debitage analysis focused on Units 1-3. These units were excavated to completion and therefore provide full observation of lithic activity in these locales (as opposed to partially excavated units).

Table 5. Breakdown of catalogue and lithic assemblage (and copper) by raw material and biface technology.

Material	N	Percent from Lithic Total (%)
Artifact Total	2988	(Lithics are 97.62% of the Artifact Total)
Lithics	2917	100
Chert	103	3.5
Sandstone	10	0.34
Granite	6	0.21
Quartz	2773	95.06
Copper	9	0.31
Bifaces	5	0.17
Cores/Core Fragments	22	0.75
Tools	33	1
Debitage/non-tool	2883	99

*table and artifact total exclude soil samples, charcoal samples, copper, non-artifact objects, and FCR.

There have been 20 features detected at the site[7], four of which contain tools and one feature (Feature 4, Unit 3) understood to be a midden. The amount of debitage at the site suggests Frog Bay was a place where people made and rejuvenated tools with a certain degree of focus on tool production. Debitage is found in abundance in all of the units and in a handful of STPs. Assuming that debitage would not be moved from where it had fallen (unless swept into a refuse pile such as Feature 4, Unit 3), tool creation and the associated activities can be inferred to

[7] Feature 5 and Feature 9 are not included in the numbered features as they were found to not be features.

have been occurring at multiple places on the site. Even with the possibility of debitage overrepresentation from low-quality quartz, the rich profusion of debitage still suggests that tools were being made at the site quite frequently or extensively over time.

6.2.1. Unit 1

The lithic assemblage of each unit was assessed by level as well as by raw material and technology. Unit 1 (303N307E) was located west of Units 2 and 3 and 1-meter north. Unit 1 continued 36 3-cm levels to a maximum depth of 88 centimeters below datum (cmbd). During the field season of 2019 Unit 1 was expanded upon to create Block A.

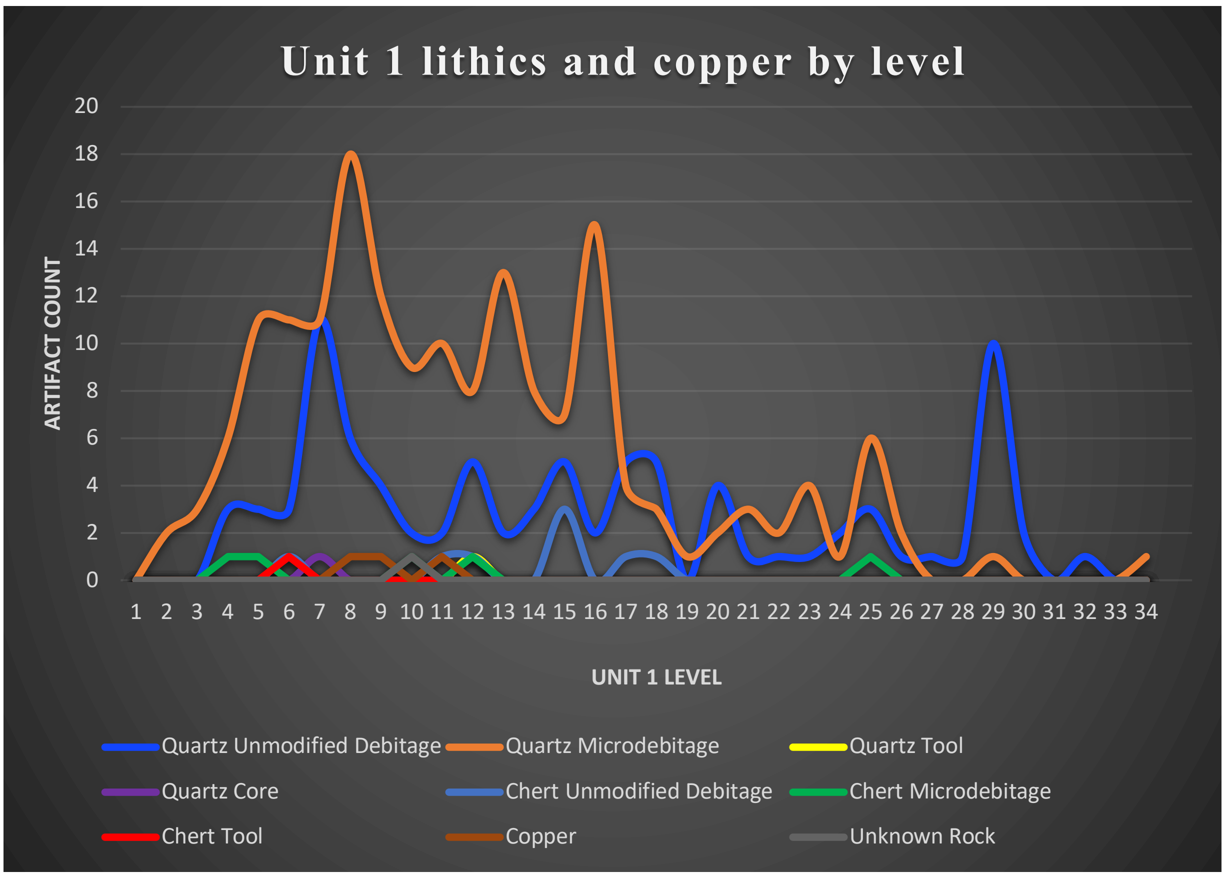


Figure 15. Unit 1 lithics and copper by level. Split by raw material and technology. Total: 360 Lithic Artifacts. Includes flotation (does not include 1 feldspar non-artifact/11 FCR/lithics not specified by level).

Unit 1 showed a great concentration of quartz microdebitage as well as quartz unmodified debitage with a small number of tools (chert tool n=1, and quartz tool n=1). Quartz microdebitage begins to climb steadily in numbers until the highest concentration at level 8 with 18 artifacts, where after the numbers continue to fluctuate relatively high (level 9: n=12 artifacts, level 16: n=15 artifacts) before decreasing. Quartz unmodified debitage is similar, with a spike of 11 artifacts at level 7 after which the number fluctuates until spiking again at level 29 with 10 artifacts. Chert begins to show at level 4 and is last found at level 25.

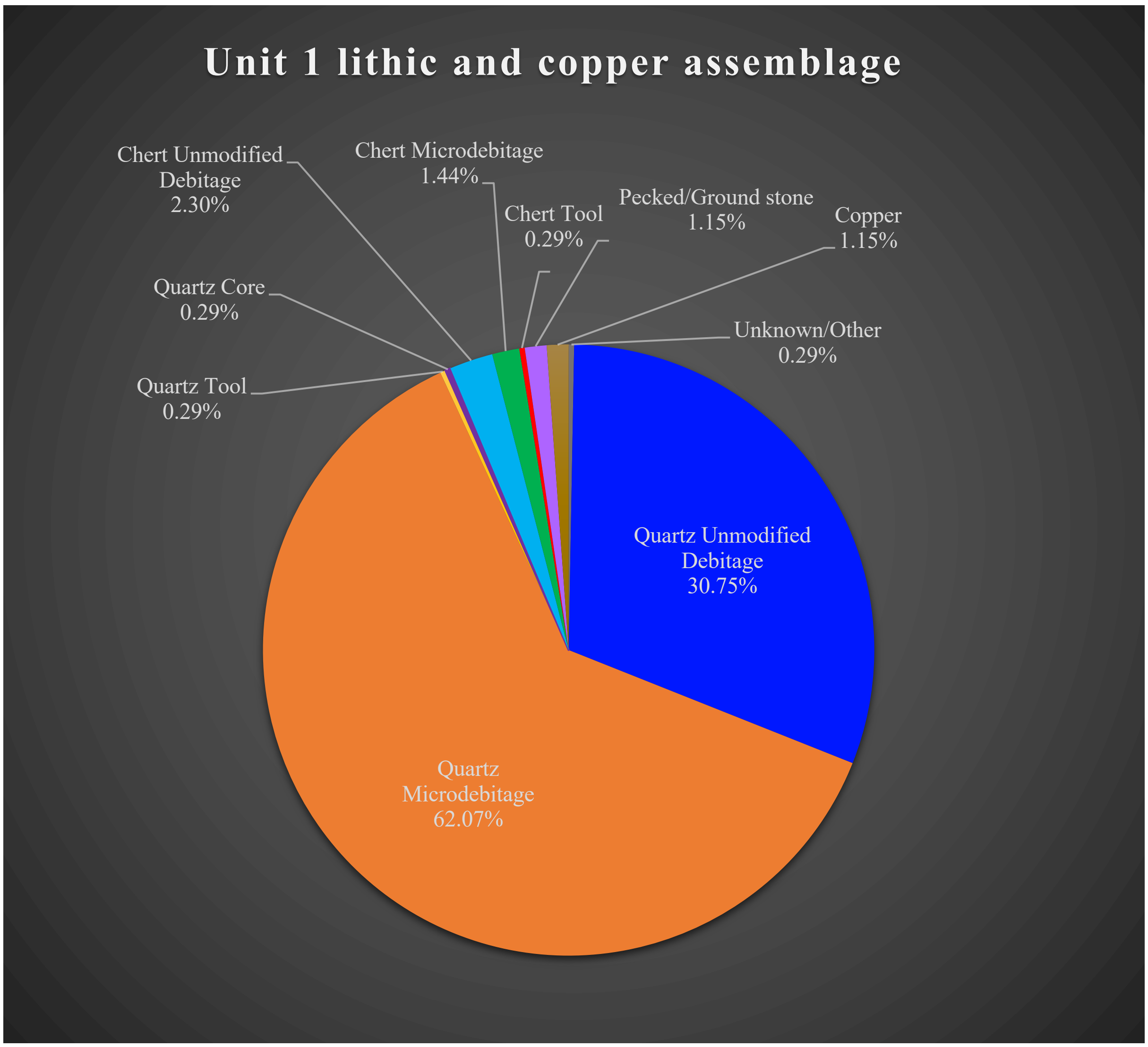


Figure 16. Unit 1 lithic and copper assemblage. Total: 348 Lithic Artifacts. Includes flotation (does not include 1 feldspar non-artifact/11 FCR).

Analyzing Unit 1 in categories of raw material and technology, it is apparent that quartz overshadows the other raw materials within the unit. Quartz constitutes 93.04% of the lithic assemblage with the majority coming from microdebitage (62.07%) and unmodified debitage (30.75%).

Table 6. Lithic raw material proportions (including copper) within Unit 1 lithic assemblage.

Unit 1 Lithic/Copper Artifact (Material/Technology)	n	Percent from Unit 1 Lithic Assemblage (%)
Unknown/Other	1	0.29
Quartz Unmodified Debitage	107	30.75
Quartz Microdebitage	216	62.07
Quartz Tool	1	0.29
Quartz Core	1	0.29
Chert Unmodified Debitage	8	2.30
Chert Microdebitage	5	1.44
Chert Tool	1	0.29
Pecked/Ground stone	4	1.15
Copper	4	1.15
Total:	348	100

6.2.1.1. Feature 2 and Feature 8

Within Unit 1, Feature 2 and Feature 8 show the same trend that is presented throughout the entirety of Unit 1 as quartz constitutes the bulk of each feature lithic assemblage. Quartz microdebitage is the highest percentage in the unit as well as in each of these features with quartz unmodified debitage second.[8]

Feature 2 contains more categories of lithics than Feature 8, containing copper and ground stone as well as chert and quartz. Feature 8 contains only the two materials of quartz and

[8]Feature 6 included in Appendix C.

chert. Feature 2 presents a greater assortment than the other two features in Unit 1 and provides indispensable information about the activities around the unit. Pecked and ground stone tools were used in activities such as grinding and pounding in the preparation of food and medicine.

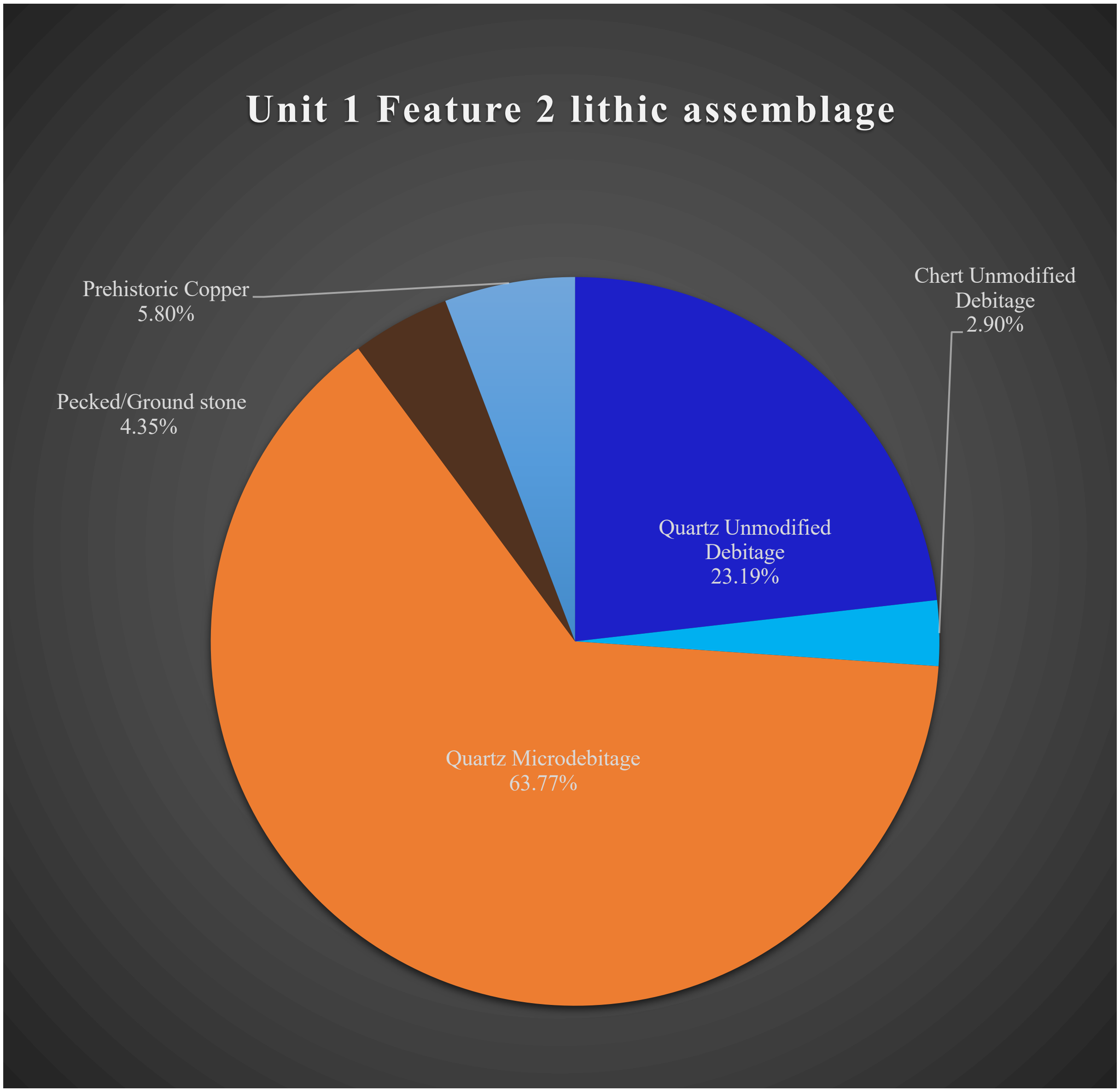


Figure 17. Unit 1 Feature 2 lithic assemblage. Separated by raw material and technology. Total: 69 Lithic Artifacts. Includes flotation (does not include 11 FCR).

Copper indicates a form of transport, specialized knowledge and skill, and possible cultural or economic considerations of value (Ehrhardt 2009:219). Outside of the lithics within Feature 2, soil flotation processed in the lab at NDSU recovered twenty-six turtle bone fragments

(2018.0394b) from heavy fraction samples (Creese and Walder 2019; Creese and Walder 2020:31). In context with the copper, additional lithics, and C14 dates from the Late Archaic, these samples indicate simultaneous procurement and use of turtle by the community at the site.

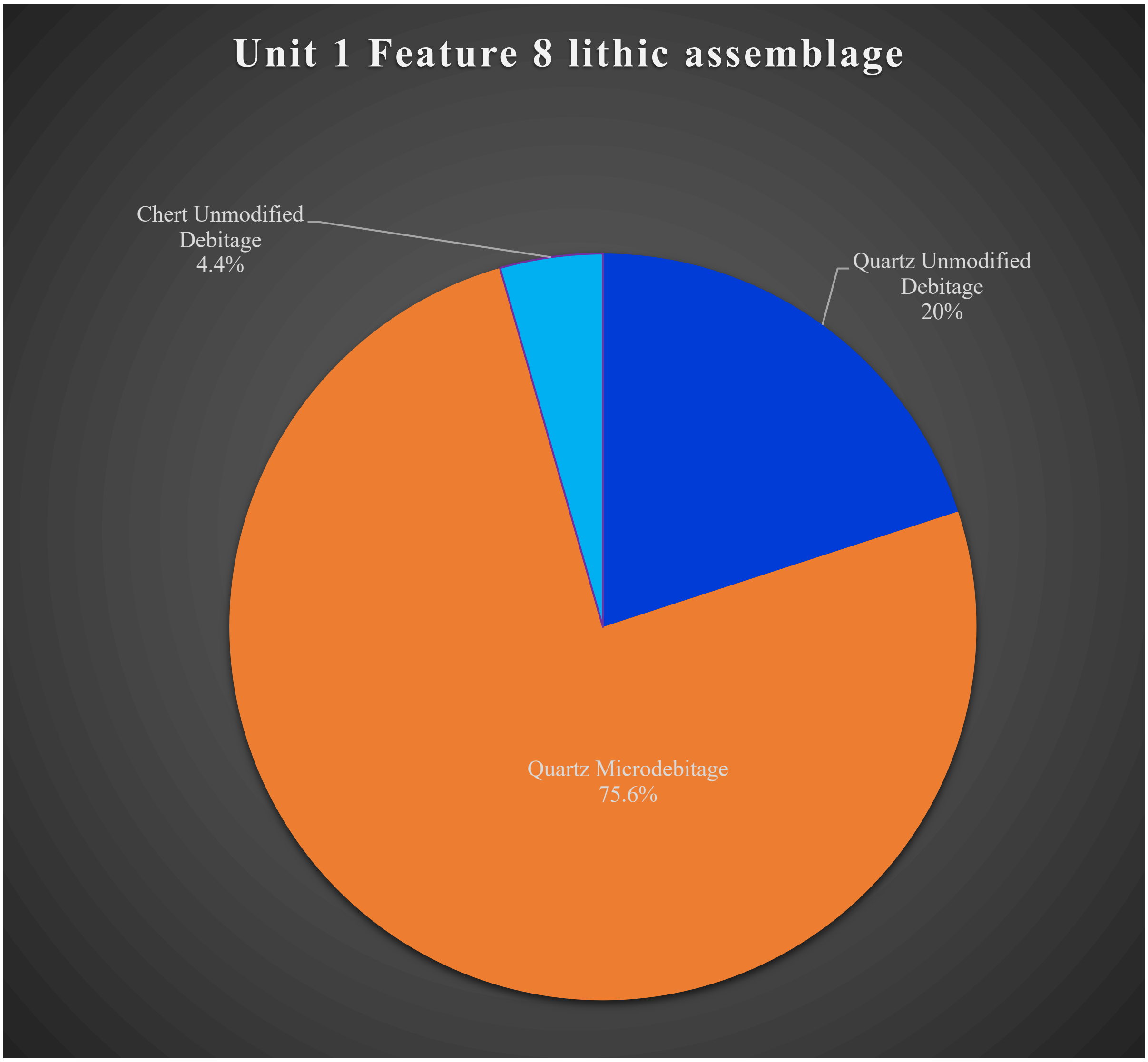


Figure 18. Unit 1 Feature 8 lithic assemblage. Total: 45 Lithic Artifacts. Includes flotation.

6.2.2. Unit 2

Unit 2 (300N316E) was excavated in 23 levels and reached a depth of 57 cmbd, with level 19 containing the end of discernable human activity through artifacts. Compared to both

Units 1 and 3, Unit 2 yielded the lowest number of artifacts as well as the lowest number of lithics (Table 7). Quartz microdebitage accounts for the majority of the unit closely followed by quartz unmodified debitage.

Table 7. Comparison of lithics between Units 1, 2, and 3.

Total Lithics	**n**
Unit 1	348
Unit 2	162
Unit 3	950

Unit 2 continues a pattern recognized throughout the site with high amounts of quartz and lower numbers of exotic lithic materials. Quartz unmodified debitage and quartz microdebitage follow the same trends by level. Quartz unmodified debitage and quartz microdebitage are found at almost every level and spike in levels 3-7, before both rising a bit again in Level 11 and Level 12. As these materials are often created through similar, if not the same events, it is reasonable that this is indicative of quartz reduction fluctuating with manufacture events.

The quartz debitage (including 1 quartz core) accounts for 96.03% of the lithics in Unit 2. This large amount suggests that local quartz was the top choice or preference for core reduction with a focus on quartz rather than long-distance imported materials. Unit 2 presents a more limited use of materials in comparison to Unit 1.

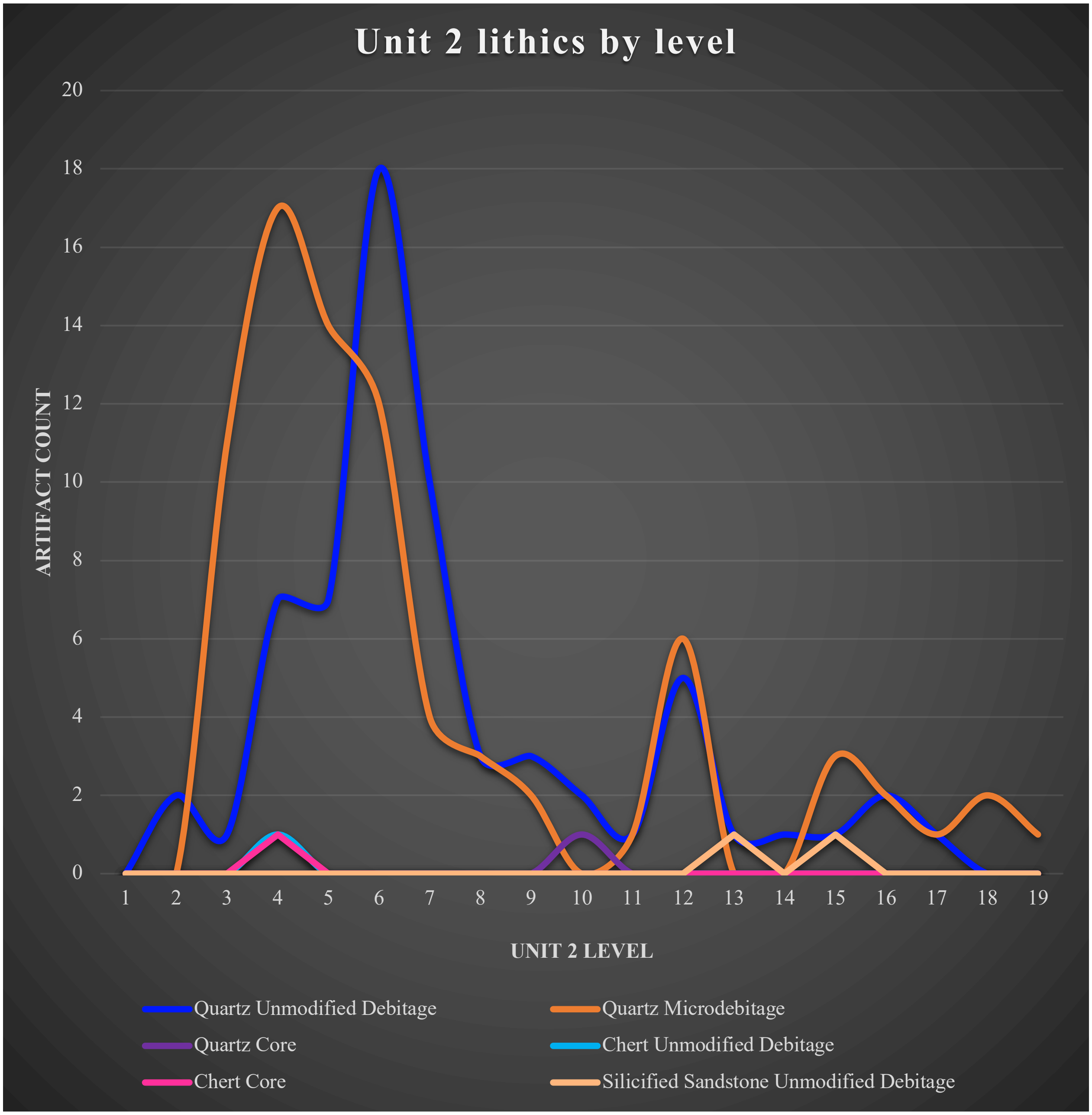


Figure 19. Unit 2 lithics by level. Split by raw material and technology. Total: 162 Lithic Artifacts. There was no flotation for this unit. (does not include lithics not specified by level) aftermath total: 149.

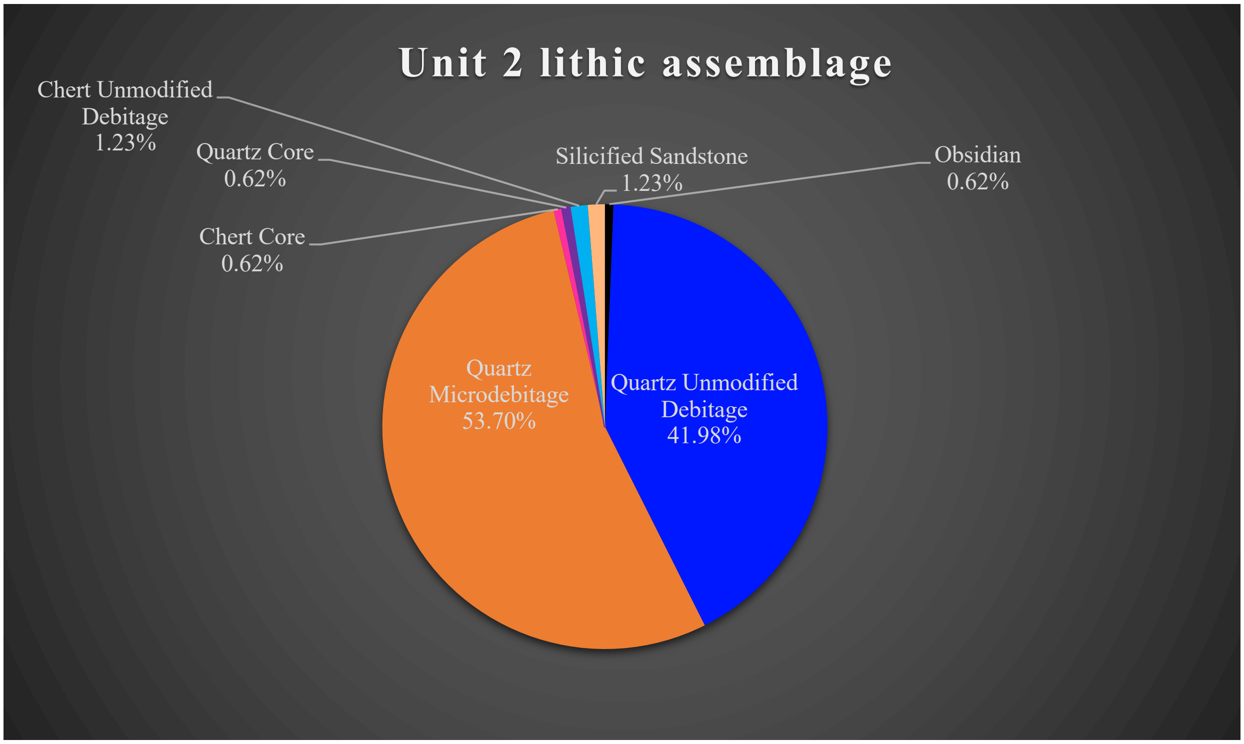


Figure 20. Unit 2 lithic assemblage. Separated by raw material and technology. Total: 162 Lithic Artifacts. There was no flotation for this unit as well as no FCR.

Unit 2 yields less chert, about 1/3 the amount of quartz microdebitage of Unit 1, and no presence of copper or finished tools. The raw materials found in Unit 2 continue to correspond to the rest of the site as comparably this unit has a much less diverse array of raw materials, containing only quartz, chert, silicified sandstone, and a questionable obsidian artifact[9].

[9]An obsidian piece (4.9mm) (2019.0011) was excavated in Unit 2 at the re-opening of the unit during the 2019 field season. The piece was found cleaning levels 1-13. The context was not secure, and this was the only piece of obsidian within the unit much less the site, so it is doubtful that the piece is from the context of the site. It may have been unknowingly carried into the field and dropped unintentionally following student experimental flint knapping activities.

Table 8. Lithic raw material proportions with Unit 2 lithic assemblage.

Unit 2 Lithics Artifact (Material/Technology)	n	Percent from Unit 2 Lithic Assemblage (%)
Quartz Unmodified Debitage	68	41.98
Quartz Microdebitage	87	53.70
Quartz Core	1	0.62
Chert Core	1	0.62
Chert Unmodified Debitage	2	1.23
Silicified Sandstone	2	1.23
Obsidian	1	0.62
Total:	162	100

6.2.3. Unit 3

Unit 3 (300N321E) was by far the most concentrated unit, with 950 lithics throughout 25 levels. Unit 3 was located East of Units 1 and 2 and was excavated to 49 cmbd.

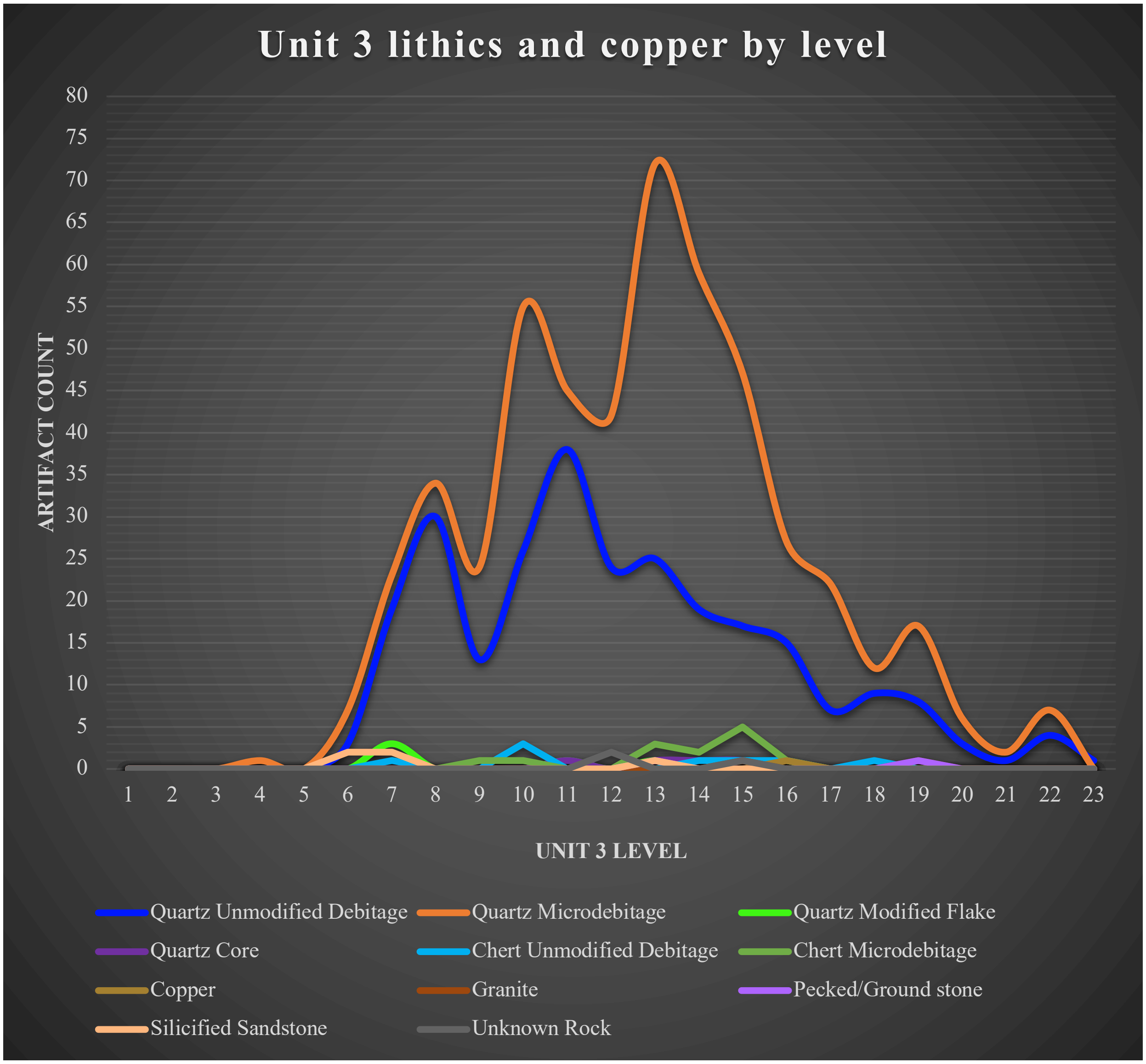


Figure 21. Unit 3 lithics and copper by level. Split by raw material and technology. Total: 807 artifacts. (Excluding 1 chert not specified by level, 1 un-cultural granite, and 138 FCR) *Pecked/ground stone includes ground stone mortar at Level 13.

This unit is comparatively different than Units 1 and 2 with a greater concentration of lithics as well as a higher number of raw materials and tools. Level 7 contained 3 quartz modified flakes which is dense when compared to other levels within Unit 3, and also in comparison to levels within Units 1 and 2.

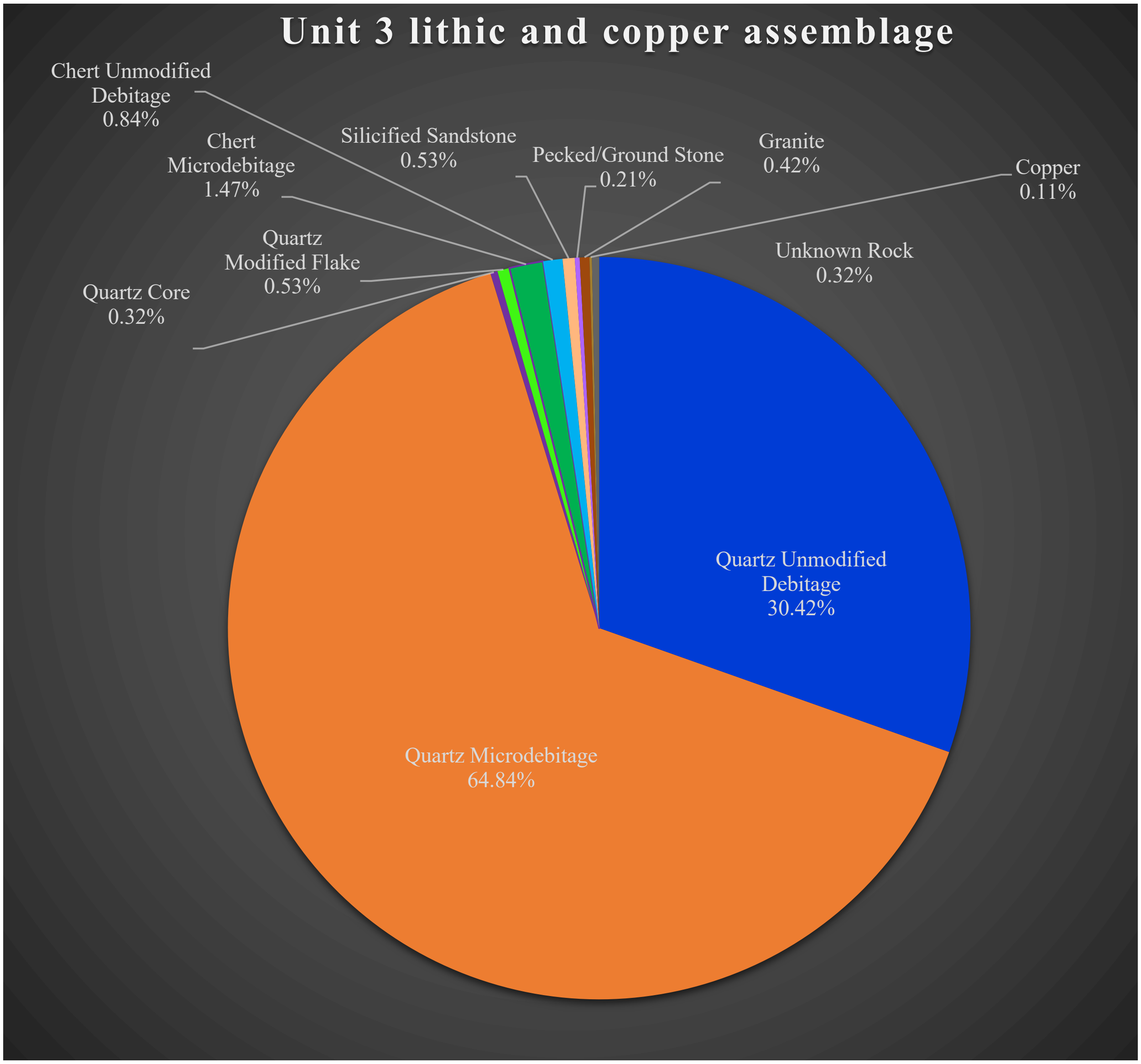


Figure 22. Unit 3 lithic and copper assemblage. Total: 950 Lithic Artifacts. (Does not include 138 FCR) Flotation included. Total: 950.

Unit 3 maintains the pattern of high quartz unmodified debitage and quartz microdebitage that is seen across the site. Quartz makes up 96.11% of the lithic assemblage of Unit 3. Although this is high, there is more variety found within this unit in raw material as well as in technology. Dissimilar to the other units, Unit 3 shows an increase in quartz at later levels, which may be caused by a thicker O horizon from placement of the unit on an area of thick roots. Around Level 6, quartz microdebitage begins a stepped incline followed by quartz unmodified debitage. Quartz microdebitage peaks at Level 13 with 72 artifacts. Level 11 contains the highest amount of quartz unmodified debitage with 38 artifacts. From these two spikes, the number slowly begins to decline.

Table 9. Lithic raw material proportions with Unit 3 lithic assemblage.

Unit 3 Lithics Artifact (Material/Technology)	n	Percent from Unit 3 Lithic Assemblage (%)
Quartz Unmodified Debitage	289	30.42
Quartz Microdebitage	616	64.84
Quartz Core	3	0.32
Quartz Modified Flake	5	0.53
Chert Microdebitage	14	1.47
Chert Unmodified Debitage	8	0.84
Silicified Sandstone	5	0.53
Pecked/Ground Stone	2	0.21
Granite	4	0.42
Copper	1	0.11
Unknown Rock	3	0.32
Total:	950	100

Unit 3 is more complex as this unit includes several features and artifacts. Within the unit there are 7 features: Feature 3, Feature 4, Feature 10, Feature 11, Feature 12, Feature 15, and Feature 16[10]. Each feature is highly monopolized by quartz microdebitage which maintains the trend across the three units. Quartz is the highest in number, after which comes chert and silicified sandstone. There are 22 chert artifacts spread between the matrix, Feature 4, and Feature 11.

[10] Features 12, 15, and 16 were not analyzed as graphs as they did not provide a significant sample.

6.2.3.1. Feature 4 and Feature 11

Compared to the other features in Unit 3, Features 4 and 11 have the most diversity of artifact types. Unit 3 no doubt appears to have had a great deal of everyday activity occurring nearby during the Late Woodland. The variety in materials as well as types of lithics suggests that there were different activities being performed which entailed certain tools.

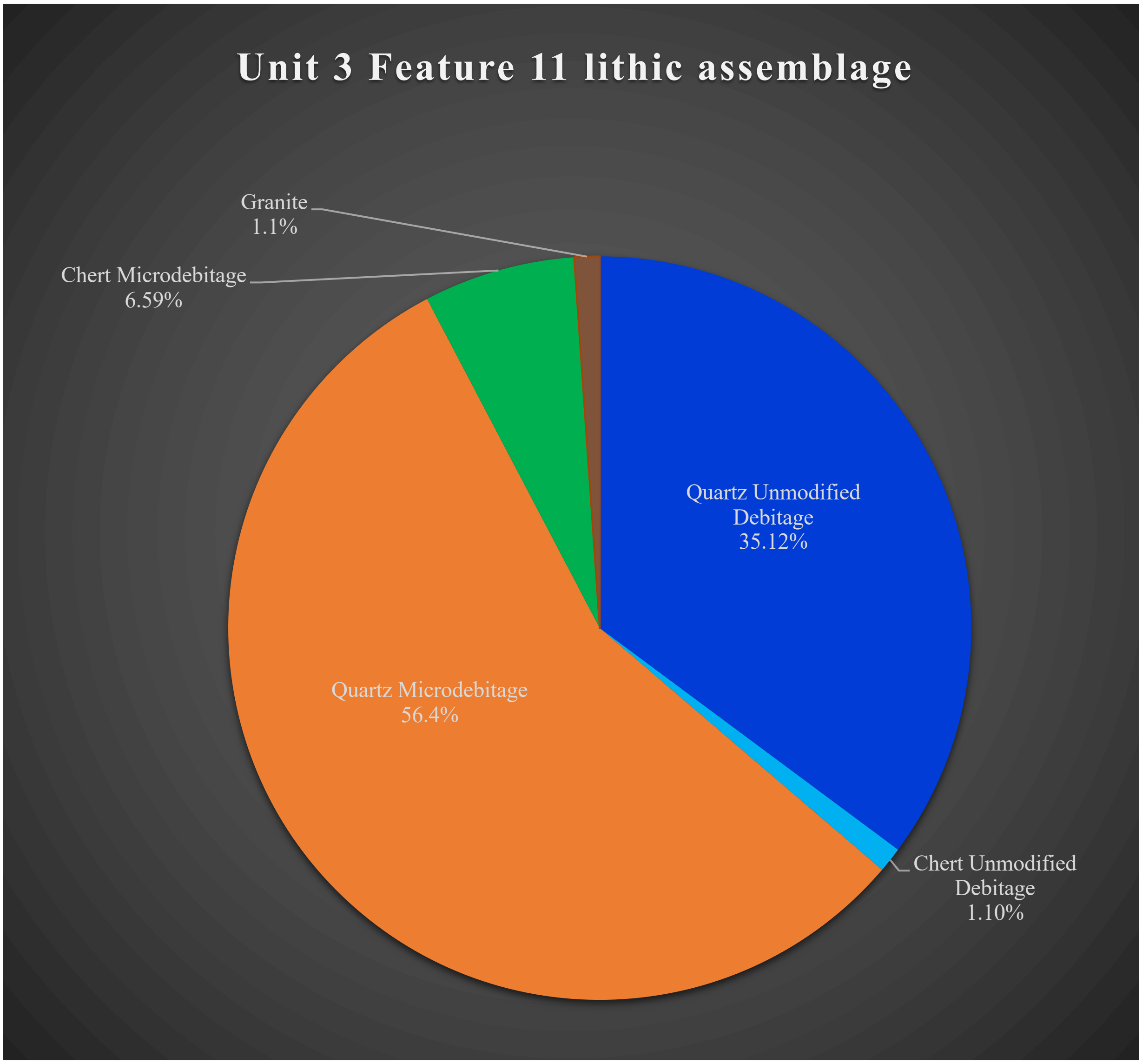


Figure 23. Unit 3 Feature 11 lithic assemblage. Total: 91 Lithic Artifacts. (Does not include FCR) Flotation included.

The high number of artifacts in Unit 3 (n=950) – vastly higher than the other two units – suggests that this may have been a place of intense lithic reduction or spatial organization around lithic disposal. Distribution of lithics and other artifacts can be an indicator of site occupation duration. Settlement spatial organization becomes more essential with long-term occupation or the intention of such (Kent 1995). This is seen in internal site differentiation and space specific activity areas – correlating with decreasing residential mobility (Kelly 1992:56). Feature 4 is a significant part of the unit; oval shaped and stratified. It has been interpreted as a trash midden based on "its sloping shape, dark carbon-rich sediment, and high quantities of FCR, feldspar, and lithic debitage" (Creese and Walder 2018:68). Feature 4 is very dense in artifacts, of the 950 lithics within Unit 3, 372 or 39.16% were within Feature 4. This equates close to half of the lithics within the unit and can be assumed to have been purposefully deposited or left in-situ. A midden suggests a longer occupation as communities are identifying the need for organization.

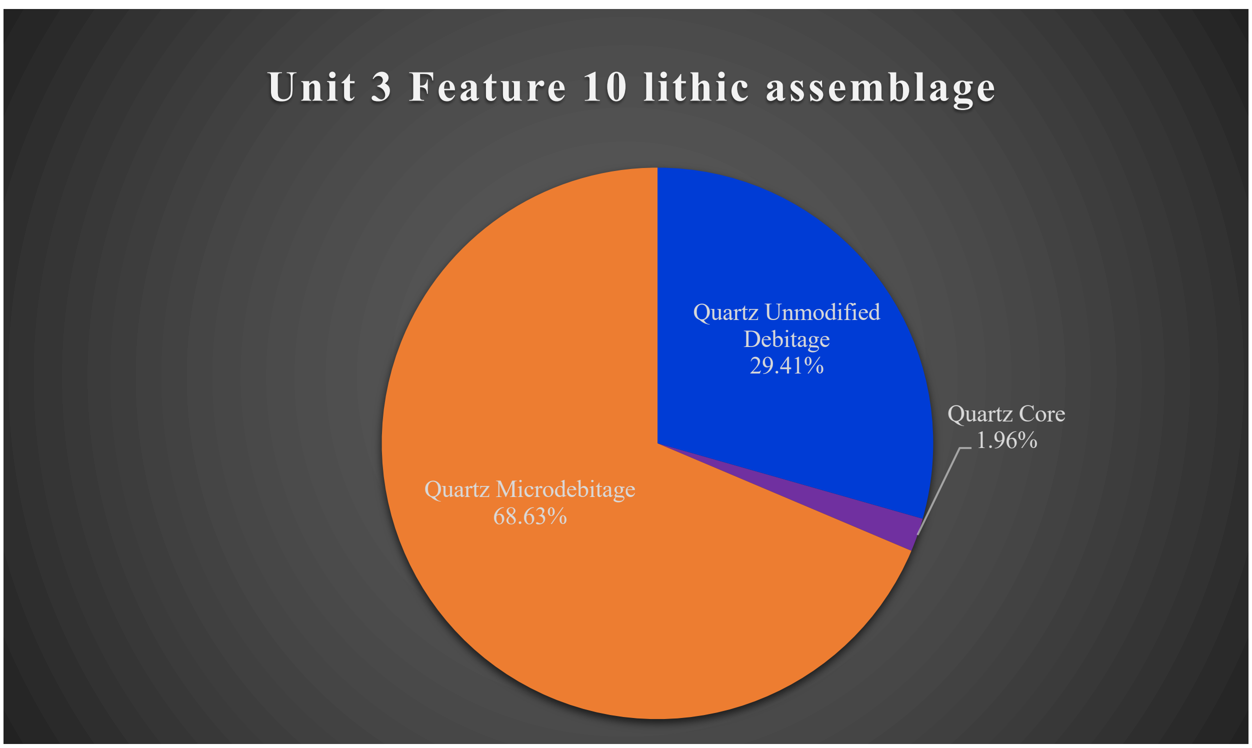


Figure 24. Unit 3 Feature 10 lithic assemblage. Total: 51 Lithic Artifacts. (Does not include FCR) Flotation included.

Fire-cracked rock (FCR) at the site is largely composed of granite and sandstone and was found throughout the site (Creese and Walder 2018:82). This material is generally associated with cooking food and boiling stones. FCR could also be attributed to forest fire or culturally associated blueberry burning. FCR was not collected systematically during 2018, although particular concentrations were noticed indicating significant spatial patterning (Creese and Walder 2020:75) and during 2019 FCR from features were weighted and counted before being returned to the back dirt (Creese and Walder 2020:126). In Block A, Feature 2 included abundant FCR while FCR within Unit 5 was uncommon in comparison to the rest of the block and adjacent units (Creese and Walder 2020:75). Feature 2 is significant in the high amount of FCR with 130 pieces (Creese and Walder 2020:126).

It is noted that Unit 3 Feature 3 contained a high amount of FCR consisting of a rectangular concentration of burned sandstone (Creese and Walder 2020:87). The FCR found within this feature is interpreted as non-random and is suggested to evidence "cooking or heating activity" (Creese and Walder 2020:103). Also located in Unit 3, Feature 4 contained high amounts of FCR in comparison to the associated Features 12, 15, and 16 which only contained one per feature (Creese and Walder 2020:126).

In with Unit 7, Feature 21 had a very distinct concentration of FCR shaped in a circular form containing quartz flakes and small amounts of microdebitage (Creese and Walder 2020:95). Feature 21 contained the second largest amount of FCR collected with 71 pieces (Creese and Walder 2020:126). The differences of FCR across the site suggest culturally related instances that demonstrate a diverse use of the site with a variety of activities (Creese and Walder 2020:126).

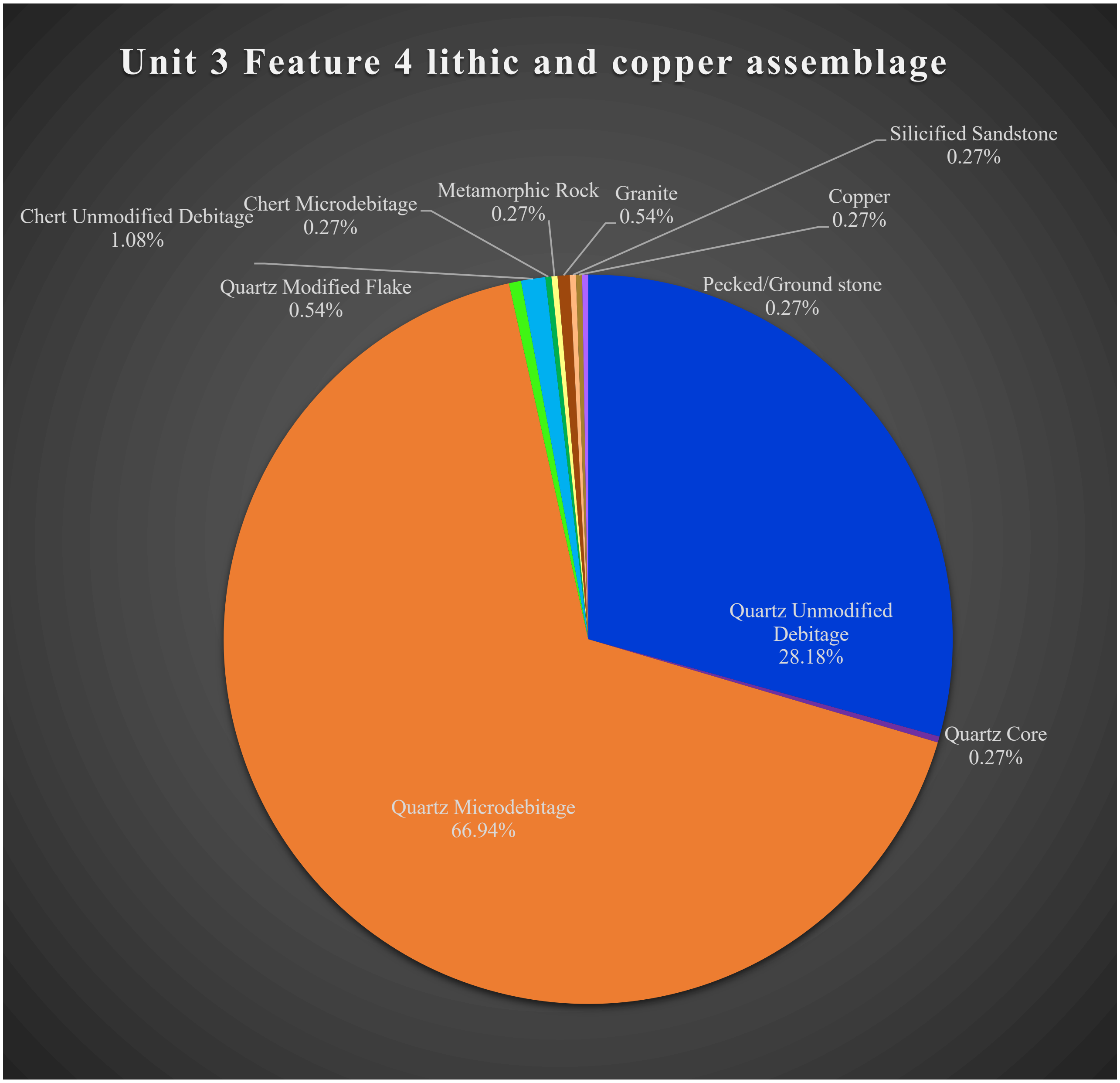


Figure 25. Unit 3 Feature 4 lithic and copper assemblage. Total: 372 Lithic Artifacts. (Does not include FCR) Flotation included.

6.2.4. Unit Comparisons

Analysis of the lithic assemblages of Units 1, 2, and 3 give greater insight to the debitage at the site. While something that can be thought of as debris may seem inconsequential, refuse remains are as interesting and expressive as exploring the trash from any context through time.

Waste and garbage represent a portion of what people are doing and gives insight as to the reasons why.

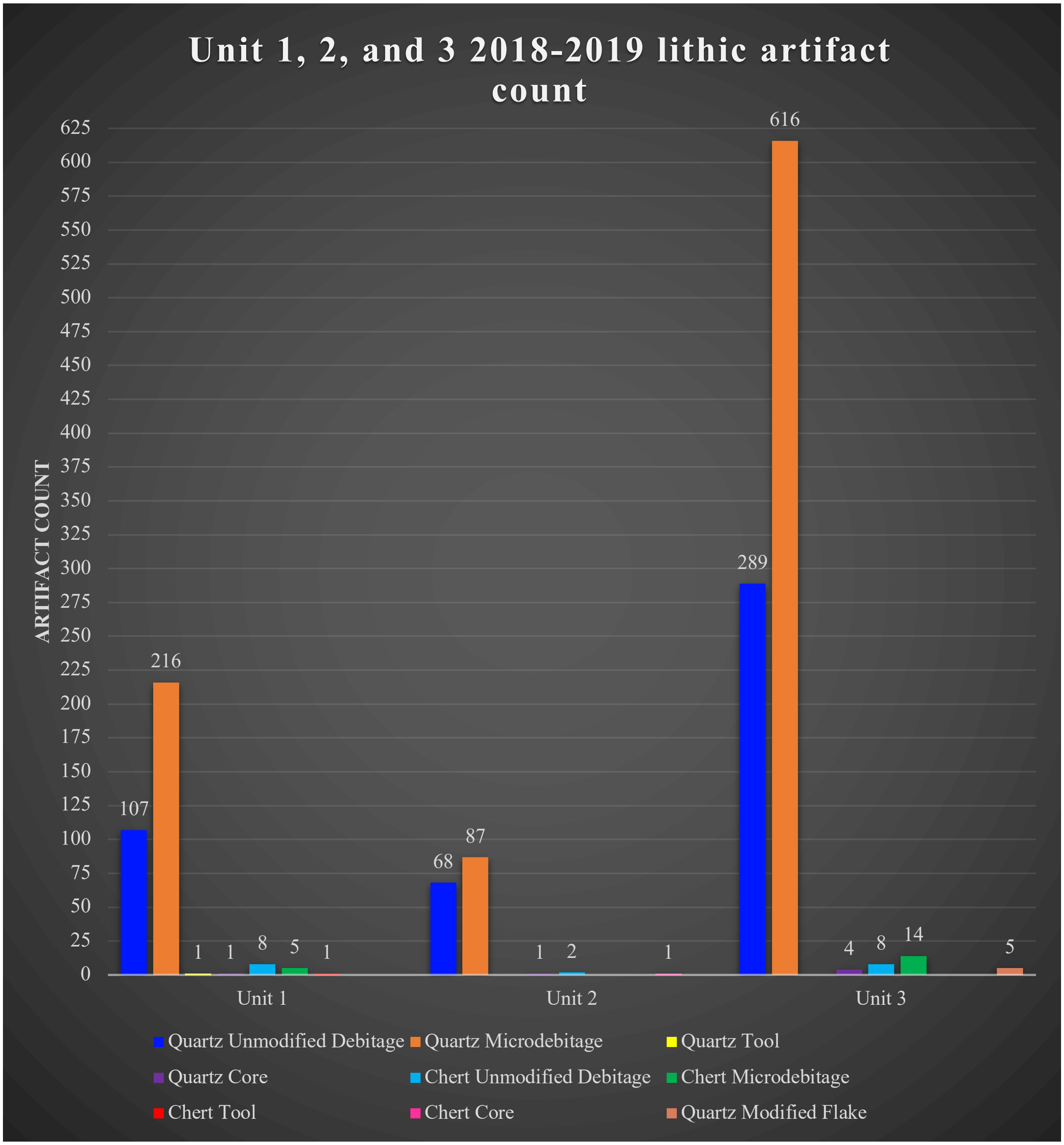


Figure 26. Unit 1, 2, and 3 (2018-2019) lithic artifact count. Comparison of Unit 1, 2, and 3 lithic assemblages. 1434 artifacts total.

The discovery of ground stone technology and copper metallurgy in the contexts of Unit 1 and Unit 3[11] correlate with other research dating these technological innovations to the Middle Archaic stage in Wisconsin which is coetaneous with cultural developments of the Old Copper Complex (Harvey 2010:9). Both Unit 1 and Unit 3 date to stages contemporary with or later than the Middle Archaic (Middle and Late Archaic and Late Woodland). The context for the findings of copper and pecked/ground stone in Unit 3 are inside Feature 4, the trash midden. Outside of the feature a ground stone mortar was found within the matrix. Unit 1 contains a possible grinding stone from the matrix. A copper projectile point and 3 pecked/ground stone fragments were found in Feature 2 – the context from which dates of the Late Archaic were taken (Creese and Walder 2019).

Comparison between units shows that Unit 3 has the highest amount of lithics and debitage in comparison to Unit 1 and Unit 2. This is reasonable with the inclusion of Feature 4 as a probable trash midden. Besides the high number of quartz, there is existence of non-local material types throughout the units as well as different technological innovations. The presence of chert and copper indicates a form of transport with artifacts coming into the site from other places, and the presence of pecked and ground stone suggests a variety of activities.

The extensive interaction spheres that developed during the Late Archaic and expanded into the Terminal Woodland allowed lithics to be transported hundreds of miles. At Frog Bay, it is noticeable that less than 5% of the lithic artifacts recovered from the site would be considered exotic. Of this, chert comprises 3.5%. The chert artifacts found are comprised of several varieties distinguished based on characteristics of color, texture, banding, and cortex (Creese and Walder 2020:115). Of the chert artifacts, specific pieces are thought to be a mix of Hudson Bay Lowland

[11] Pecked and ground stone artifacts were also found in Unit 4, Unit 4 Feature 2, Unit 6, and Unit 7 Feature 21. Copper also discovered in Unit 4, Unit 6, and STPK4. Currently there are no C14 dates taken at these contexts.

Chert (HBLC), Red River Chert (RRC), and Knife River Flint (KRF) (Crese and Walder 2020:118). HBLC would have been imported from northern Ontario, RCC would have been imported from the Red River basin in western Minnesota and eastern North Dakota, and KRF would have been sourced from western North Dakota (Crese and Walder 2020:118). Chert is found to be consistent across the site and is located in several STPs (STPB4, STPD5, STPF5, STPK4) as well as each of the 7 units. This reflects a degree of artifact movement developing from the extensive trade networks although does not necessarily indicate extensive mobility or movement. The large amount of debitage, combined with a heavy reliance on local raw materials at the site may indicate a longer and/or intensive occupation at Frog Bay.

6.3. Tool Diversity

Although the lithic assemblage found at Frog Bay is not high in formal tools, these implements can be perceived as direct evidence of human activity and complement the proceeding lithic analysis of debitage. Stone tools are important and "represent much of the earliest evidence for human behavior" (Morrow 2016:2) as they characterize site function and cultural subsistence activities. Diversity can partially measure the potential range of activities from the presence or absence of tools as well as consideration of tool material and function. Tools are often tied to mobility (Binford 1979) as limited-activity and specialization in tools can point towards particular subsistence activities or specialized site function (Young 1994a; Young 1994b:166) as compared to long-term community residential sites.

Short-term occupations and sites of high mobility have shown low artifact density and limited tool forms (Zedeño et al. 2001:204) as compared to camps with longer term occupation which include a wide range of tools (Zedeño et al. 2001:203). Highly diverse tool inventories can reveal an array of residential activities, while very mobile hunting and gathering groups demonstrate distinct tool kits of characteristically portable, durable, and multifunctional lithics (Ehrhardt 2009:221).

6.3.1. Curated and Expedient Tools

Mobility has been tied to lithic tools through aspects such as weight, functionality, raw material availability, reliability, utility, and time (Griffin 2013:66). Ideas such as these, that tie stone tools to movement and sedentism evolved from Lewis Binford's concept of curated and expedient technologies of lithic toolkits. From work with Nunamiut Eskimo technology, Binford (1977; 1979) acknowledged that different types of settlement-subsistence systems shaped sites through different technological characteristics (Binford 1979:256). From this research, stone tools[12] were categorized as curated (formal) – anticipatory in character, or expedient (informal) – situational and responsive in character (Binford 1979:261).

Curated tools are associated with high mobility and are produced and maintained in anticipation for future usage. These are classified as any projectile points, bifaces, scrapers, drills, bifaces, or other tools made with extensive labor and skill. Expedient tools are "produced when needed and are discarded after use" (Binford 1979:269; Nash 1996:82). Expedient tools and assemblages are "characterized by high proportions of amorphous cores and tools with minimal retouch or obvious signs of utilization" (Young 1994:146) including retouched/modified pieces and utilized flakes. Expedient technology is based on tools "that are manufactured, used, and discarded according to the needs of the moment" (Bamforth 1986:38). These terms have been used to describe individual artifacts as well as entire assemblages, placing "curated" and "expedient" as dichotomous terms on a continuum (Bamforth 1986:38; Binford 1979).

[12] Curated and expedient tools in this use excludes pecked/ground stone tools.

However, the characteristics of each of these terms do not act on their own, as manufacture, transport, maintenance, and recycling do not always occur together as suggested by Binford. For this reason, while it is helpful to label the assemblage as one or the other, this is only one aspect of interpretation. In settings of raw material abundance, communities use expedient flake tools almost exclusively. However, as communities generally did not stay in one place continuously, preparation would be necessary for the situations where no material is available (Griffin 2013:72). The ratio of curated tool classes compared to expedient tools “can help shed light on how populations are positioning themselves on the landscape” (Carr and Boszhardt 2010:24). Frog Bay yields a mixed assemblage that is mostly expedient, but also contains curated tools. This can be representative of community anticipation of movement with lesser resources available. However, this pattern is also seen to be common in multicomponent sites as emphasis on tool needs shift (Parry and Kelly 1987).

Table 10. Lithic and copper tools distributed by context (unit, feature) and function.

Feature		**2**	**5**		**4**		**2**		**4**	**21**		
Unit	**1**	**1**	**1**	**3**	**3**	**4**	**4**	**6**	**6**	**7**	**Unknown Context**	**STPK4**
Chert	Scraper											
Quartz			Bifacial Scraper	•Modified Flake •Bifacial Flake •Modified Flake	•Modified Flake •Modified Bifacially Worked Flake	•Modified Flake •Unifacially Worked Scraper	•Modified Flake •Projectile Point	•Modified Flake •Bifacial Fragment (possible drill) •Unifacially Worked Scraper			•Modified Bifacially Worked Flake •Projectile Point	Modified Flake
Copper		Projectile Point			Unfinished Tool	Finished Tool (V Shaped)		Awl				Awl/Perforator
Metamorphic Pecked/ Ground Stone					Pecked/Ground Stone Fragment							
Igneous Pecked/ Ground Stone									Pecked/Ground Stone Fragment			
Sedimentary Pecked/ Ground Stone						Sandstone Pecked/Ground Stone Fragment						
Unidentified Pecked/ Ground Stone	Possible Grinding Stone	•Fragment •Fragment •Fragment		Ground Stone Mortar			•Hammerstone •Fragment			Hammerstone		
Total	2	4	1	4	4	4	4	4	1	1	2	2 Overall Total: 33

Tools were first categorized by their raw material, perceived function, and context. Classification followed the curated and expedient model laid out by Binford (1979) and expanded upon by others (Bamforth 1986; Nash 1996; Young 1994). Continuing to assess Units 1, 2, and 3, but expanding to the remaining units, it becomes apparent that the majority of the distribution of tools is coming from Unit 1, Unit 3, and the rest of Block A (Units 4-6). This is consistent with debitage analysis of the three units as Unit 2 showed less in terms of stone manufacture through the debitage frequency. Across the site there is a total of 23 chipped stone tools, 15 curated and 8 expedient. Curated tools are spread across Unit 1 (n = 4), Unit 3 (n = 2), Unit 4 (n = 3), Unit 6 (n =3), and STPK4 (n = 2) as well as one in context outside of the site. Expedient tools are found in Unit 3 (n = 4) Unit 4 (n = 2), Unit 6 (n = 1), and STPK4 (n = 1). These two categories of tools are found together in the same contexts with the exception of Unit 1 which includes only curated tools.

Whereas technological changes from curated to expedient can be an indicator of more sedentary behavior, there are many factors that affect technological shift. Normally there is a gradual "replacement of one technology by the other, or the abandonment of formal tools" (Parry and Kelly 1987:296) with shift in emphasis as the proportion of curated tools may decrease but generally never vanish (Parry and Kelly 1987:296). This is important as tools are signs of activity and intention but are not necessarily culturally encompassing without other lines of evidence.

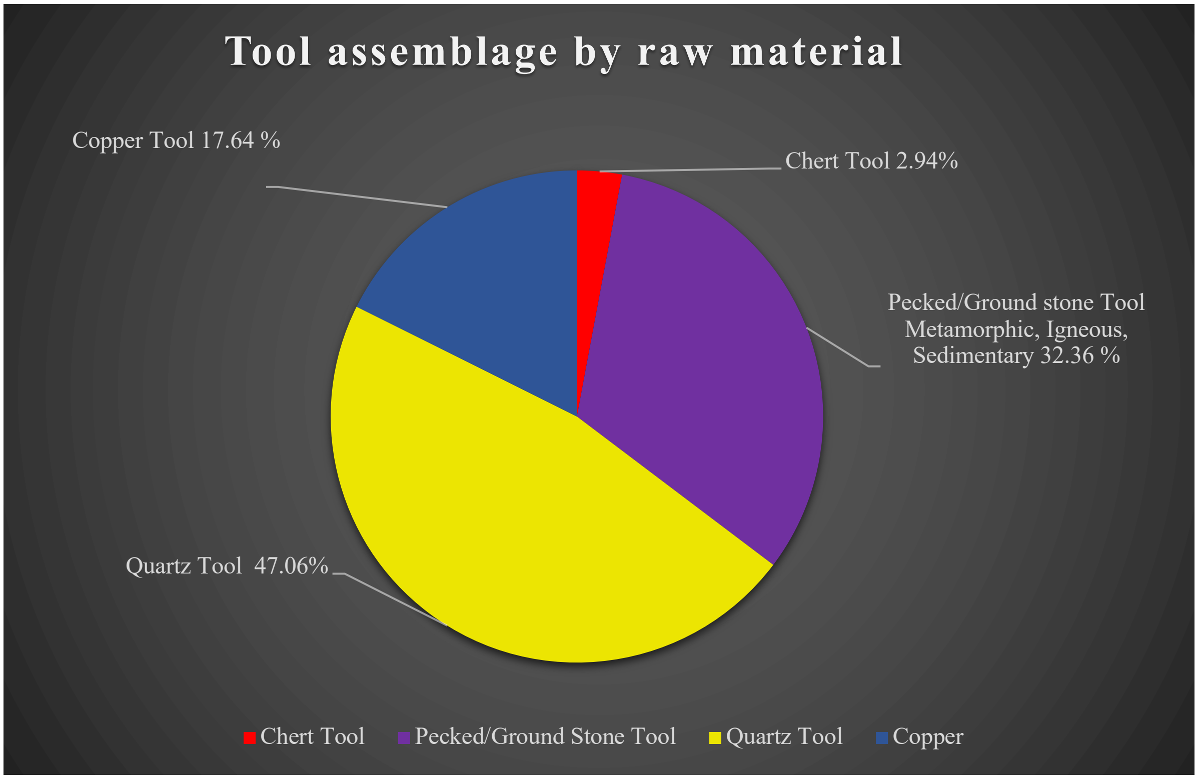


Figure 27. Tool assemblage by raw material.

There is a strong indication of reliance on local quartz regardless of heightened residential or mobile occupation. The bulk of tools from the site are thought to be from local material, as almost half are represented by quartz (n = 16). The majority of expedient tools are made of quartz (expedient n = 7), although the majority of quartz are curated (curated n = 9). One chert scraper from Unit 1 is curated and all of the copper tools (n = 6) excluding 1 unfinished tool from Unit 3 Feature 4 are curated. Tools separated by raw material coincide with the data from the lithic debitage, showing the majority of tools and debitage seem to be coming from local quartz.

6.3.2. Quartz Cores and Bifaces

Quartz represents the majority of the lithic assemblage (94.7%), and it is logical to accept that people were collecting and utilizing the accessible quartz beach cobbles which are predominately found from glacial outwash and till around the Apostle Islands (Spott 2005:117). The size of the debitage and flakes that are found at the site provide data to confirm quartz cobbles were a significant benefit of occupation near the shore. Cobbles could be used as a primary source of material for stone tools as cores. While the abundance of a workable raw material can greatly influence settlement and even an entire technological tradition (Magne 2001:27), this may not have been an impactful reason for continued use at the site as nearby islands and the shore of Lake Superior would have similar resources (Hallson 2017:37). While consistent re-use and return to the site may indicate knowledge of the local quartz cobbles, this is a questionable leading factor regardless of the fact that lithic production appears likely to have been a focus, or at least a considerable part of life at the site.

Figure 28. Quartz bifacially worked flake from Unit 3 matrix (2018.0158).

Table 11. Cores separated by context (unit, feature) and by raw material.

Cores Feature				**4**	**10**		**2**		**Matrix B**				
Unit	**1**	**2**	**3**	**3**	**3**	**4**	**4**	**5**	**6**	**7**	**STPN1**	**STPN3**	**STPO3**
Chert		1											
Quartz	2	1	2	1	1	4	1	2	1		1	1	
Unidentified			2							1			1
Total	2	2	4	1	1	4	1	2	1	1	1	1	1
													Overall Total: 22

To examine whether quartz cores on site could be derived from local beach cobbles, data from 40 natural cobbles was used for comparison. Cores were separated by context (unit, feature). The mass of the reduced cores found at the site does not seem to be a burden for people to carry, even for long distances (Maximum ~ 0.17 lb). The accessibility of cobbles abundantly on the shore as well as the fact that small cores would not be suitable for reliably producing sizeable tools suggests that theses cores do not appear to be appropriate for highly mobile toolkits. Another factor is that in comparison, quartz cores contain less usable tool-making material which makes it risky in terms of transportation costs and reliability (Tallavaara et al. 2010:2446-2447). Most quartz found in northern Wisconsin is derived from glacial till and only occurs as small cobbles, which makes obtaining a blank a difficult task (Spott 2005:123). It is likely that while some debitage is useable, some pieces are too small or unsuitable as blanks.

Table 12. Mass measurements of cores.

Weight Measurements of cores from Frog Bay (47BA60) (N:22)	(g)
Total Core Weight	430.0
Total Core Mean	20.3
Core Median Weight	17.1
Core Max Weight	76.0
Core Minimum Weight	4.9

Roughly comparing natural beach cobble and archaeological core size it appears that cores are significantly smaller than the cobbles, which validates their exploitation as the main source of lithic material. The largest dimension of a quartz artifact is measured at 56mm (Accession # 2019.0170) and the average is ~14.4mm. As for mass, the heaviest artifact with a known location on site is 9.0g (Accession # 2018.0344). The average mass of quartz artifacts in the assemblage is ~1.70g. The outlier measurements are much greater than the averages, but the sizes nevertheless consistently correlate with the size of nearby quartz beach cobbles.

Cores seem to be quite spread out across the site, the majority being found in Block A (n = 10) with half of this amount situated in Unit 4 within Block A. Unit 3 contains the next highest number (n = 6). Otherwise cores are found at least 1 per unit, averaging about ~2 per unit. In the assemblage the number of cores and core fragments appears high in comparison to highly mobile assemblages from what has been discovered in previous research (Bamforth and Becker 2000; Parry and Kelly 1987).

Table 13. Mass measurements of local quartz cobbles.

Mass of cobbles from the shore (n=40)	(g)
Total Cobble Mass	5579.8
Cobble Mean Mass	139.45
Cobble Median Mass	123.1
Cobble Maximum Mass	281.5 (649 outlier)
Cobble Minimum Mass	38.8

There are many factors that affect tool production, use, and discard but there are some general parameters that have been followed in past lithic research: "bifacial tools or cores are generally associated with frequent and/or lengthy residential or logistical movements while expedient flake tools and bipolar reduction are associated with infrequent residential moves" (Kelly 1992:55). Highly mobile assemblages are commonly represented in low core/biface ratios. These low ratios are "often linked to high mobility, and high ratios [are linked] to more sedentary lifestyles" (Bamforth and Becker 2000:273). Biface technology reduces a core blank on both faces from two parallel but opposing ends through percussion and/or pressure flaking (Kelly 1988:718). This technology was utilized by highly mobile groups throughout North America (Young 1994:145) as blades and bifacial cores are the most common core strategies employed in transported personal toolkits of mobile foragers (Rasic and Andrefsky 2001:63). It is advantageous for highly mobile groups to invest in bifaces and formalized tools as these "can be repeatedly reused and provide much more potential cutting edge per unit weight, and thus are more portable" (Parry and Kelly 1987:303).

Although the time and skill investment are greater, the use of portable curated tools allows mobile populations to meet both anticipated and unanticipated needs (Parry and Kelly 1987:303). Longer occupation settlements have conversely produced relatively more cores than bifaces (Bamforth and Becker 2000:274; Parry and Kelly 1987) as the need for portable and durable technology diminishes

Table 14. Comparisons across raw material, context, and lithic technology.

Comparison by Raw Material, Context, and Technology	Ratio
Chert Tool: Quartz Tool	1:15
Chert Core: Quartz Core	1:17
Tool: Core	33:22
Biface: Core	5:22
Formal: Core	14:22
Unit 1 Tool: Core	7:2
Unit 2 Tool: Core	0:2
Unit 3 Tool: Core	7:6
Unit 3 Feature 4 Tool: Core	3:1
Unit 3 Quartz Tool: Core	5:3
Unit 1 Quartz Tool: Core	1:2
Unit 1: Unit 3 Tool	7:7 (1)
Unit 1: Unit 3 Core	1:3
Block A Tool: Core	20:10 (2/1)
Unit 4 Tool: Core	7:5
Unit 5 Tool: Core	0:2
Unit 6 Tool: Core	4:1
Unit 7 Tool: Core	1:1 (1)
Unit 4 Tool: Core	7:5
Unit 5 Tool: Core	0:2
Unit 6 Tool: Core	4:1
Feature 2 Tool: Core	8:1

Looking at Figures 19 and 20, Unit 2 contains no tools but does contain 2 cores. Unit 1 contains the highest ratio with 8 tools and 2 cores. Unit 3 Feature 4 contains only 1 core although the rest of Unit 3 contains a more even account with 7 tools and 6 cores. In Unit 3, almost half of the tools and cores are quartz with 5 quartz tools and 3 quartz cores. Block A contains a high ratio with almost double the number of tools to cores (19:10). The assemblage also contains 0 identified blades and 1 bifacial core, which is a bifacial scraper created from a water worn quartz cobble. This may imply that tools are being made at the site and not just re-sharpened or maintenanced.

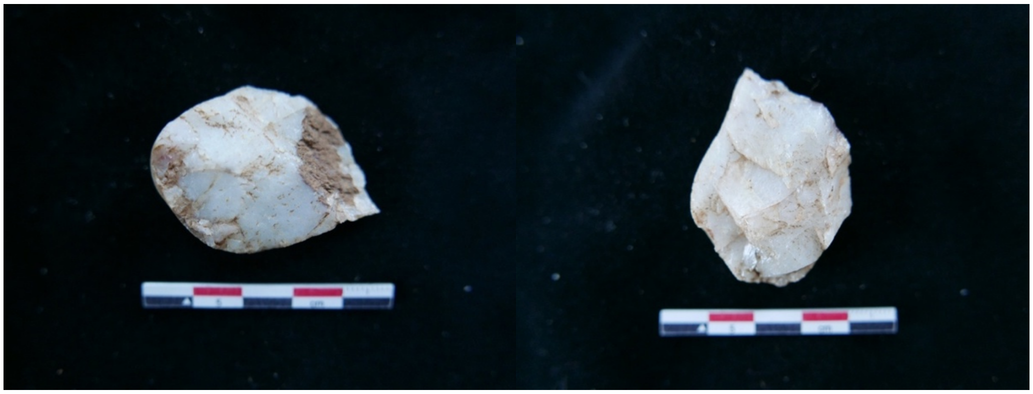


Figure 29. Quartz bifacial scraper recovered from Unit 1 Feature 5. (2018.0200).

At Frog Bay, the lithic assemblage yields 22 cores and 5 bifaces. Work from Parry and Kelly (1987) as well as Bamforth and Becker (2000) present a scale of mobile to sedentary centered on core and biface ratios. Frog Bay produces a core:biface ratio of 4.4[13] which on the basis of Bamforth and Becker (2000) falls into a more sedentary group. While interesting and informative, this premise would be more illuminating when compared to the assemblages of local and contemporaneous sites around the Great Lakes.

Table 15. Tools separated by category.

Tool Type	N
Curated	15
Expedient	8
Core/Core Fragments	22
Bifaces	5

In North America "wide areas witness a shift from industries dominated by bifaces and other curated tools to an almost exclusive use of expedient tools struck from unstandardized cores" (Parry and Kelly 1987:285). It is proposed that the adoption of expedient core technology

[13] The ratio follows the method from Bamforth and Becker (2000) although the reverse ratio is used in the work done by Parry and Kelly (1987). The biface:core is 0.23.

in North America may have been in response to a shift in decreased mobility and more residential stability which may have been occurring at Frog Bay.

6.3.3. The Shannon Weiner Diversity Index

The Shannon Weiner Diversity Index was borrowed from ecology (Eren et al. 2016:180) as a quantitative measure of diversity combining species (class) richness and evenness (relative abundance). To do so, tools were separated by material and function as well as by area (unit, feature) to calculate richness and develop an overview of the tools in the assemblage by material/function and spatial relation to C14 dating. The calculations for proportion and percent of each class of tool within the tool population is used in the Shannon Weiner Diversity Index to ascertain the diversity and evenness.

The Shannon Weiner Diversity Index: $H=\sum[(pi)\times \ln(pi)]$
H = diversity = Shannon Diversity Index
∑ = sum
pi = proportion of total sample represented by species
ln(S) = Maximum diversity possible
S = number of species
E = Evenness
Hmax = maximum species, or species richness

The term diversity is this context refers to the richness, or number of classes in the artifact assemblage combined with evenness or heterogeneity (Eren et al. 2016:175; Grayson and Cole 1998:927). Evenness refers to the frequency of different classes that make up the assemblage. This measurement is complementary to richness in understanding diversity.

Richness is grounded in tool function and while the function of artifacts can generally only be properly informed through known comparisons and descendant input, it is important as it provides information on the type of use and activity for which artifacts were employed and also provides a way to examine changes in artifact functionality (Lin 2014:6). Fortunately, in the wider project, tool use and examination by community members included a multitude of information. In the field, there were several community members involved in the finding of artifacts as well processes in the lab. This has been an essential aspect in the process for understanding tools at Frog Bay. Through community engagement and interaction, tool function can be interpreted more accurately and effectively.

The Shannon Weiner Diversity Index relies first on richness. Richness separated lithic tools by raw material first, and function second.

Table 16. Richness of Frog Bay (47BA60) lithic tools.

Richness (N = 15)
Scraper (Chert)
Bifacial Scraper (Quartz)
Unifacial Scraper (Quartz)
Modified Flake (Quartz)
Bifacially Worked Flake (Quartz)
Bifacially Worked Fragment (Possible Drill) (Quartz)
Projectile Point (Quartz)
Projectile Point (Copper)
Unfinished Tool (Copper)
Finished Tool (V Shaped) (Copper)
Awl/Perforator (Copper)
Pecked/Ground stone Fragments (Metamorphic/Igneous/Sedimentary)
Pecked/Ground stone Hammerstone (Metamorphic/Igneous/Sedimentary)
Pecked/Ground stone Mortar (Metamorphic/Igneous/Sedimentary)
Pecked/Ground stone Grinding Stone (Metamorphic/Igneous/Sedimentary)

Once richness is established, diversity and evenness can be calculated. The diversity and evenness were computed for areas with significant tool assemblages (Table 17). This included Block A, Unit 1 and Unit 4 Feature 2, Unit 3, Unit 3 Feature 4, and the entirety of the site.

Table 17. Diversity and evenness calculations of Frog Bay tools by unit and site entirety.

Test Area	Diversity	Evenness	Indication
Block A	**2.34**	**0.89**	med/high diversity and high evenness
Unit 1 and 4 Feature 2	**1.21**	**0.83**	low diversity and high evenness
Unit 3	**1.50**	**0.93**	low/med diversity high evenness
Unit 3 Feature 4	**1.39**	**1**	low diversity and perfect evenness
Entire Site	**2.40**	**0.88**	med/high diversity and high evenness

High diversity is indicative of a more sedentary lifestyle or multipurpose residential site, while lower diversity is more attuned with mobility or specialized site function. This is based on the understanding that sedentary communities would yield more diverse activities and would therefore contain a multitude of tools to encompass the many daily activities occurring. Sites with limited activity and low diversity point to more mobile populations with higher assemblages of curated multifunctional tools and less variety of tool types. The idea is that mobile toolkits contain decreased diversity and functionality and portability concerns there increase (Young 1994:145). Sedentary or long-term occupations with knowledge of abundant nearby resources appear to contain more expedient tools as activities are less controlled by raw material availability.

Table 18. Diversity variables and indication.

Diversity Variables (H)	Interpretation
< 1.5	Low diversity
1.5 – 2.5	Medium diversity
> 2.5	High diversity

Evenness is similar in that high evenness indicates the spread of individual tools across the represented range of tool types. An assemblage with an even spread of artifacts across tool categories is considered more diverse, since no single category is dominant. While areas of a site with high diversity and evenness might be interpreted as activity areas, discard of tools does not necessarily occur at the place of use. For example, “a site where hide working occurred could show no indications of such” (Hallson 2017:38) as tools are not always left where they are used. Binford’s work found that the discard of curated tools is generally unrelated to the activities that took place at the location of discard; and that expedient tools are in fact more indicative of the activities taking place as they were produced, used, and discarded at the same location (Griffin 2013:67). With this in consideration, it can be assumed that while the tools found may not have been used directly where recovered they are telling of activities that were occurring in one form or another. Higher evenness points to a wider range of activities occurring on site and in turn a longer occupation span and interaction with the land, a larger or more diverse social aggregation, or both.

Table 19. Evenness variables and indication.

Evenness Variables (E)	Interpretation
0 – 1	Evenness range
0	No evenness
1	Complete evenness

6.3.3.1. Unit 3

The diversity of Unit 3 is low to medium at 1.5. There is a total of 8 tools, 1 ground stone mortar, 1 pecked/ground stone fragment, 1 unfinished copper tool, 3 modified quartz flakes, and 2 modified bifacially worked quartz flakes. Of the tools, over half are quartz and none are chert. Evenness is high at 0.93. Richness is 5.

Table 20. Unit 3 tools by raw material.

Artifacts by Material (generalized)	Count (n)	Proportion (from tools of Unit 3)
Pecked/ground stone artifact	2	0.25
Copper artifact	1	0.13
Quartz flake	5	0.62

6.3.3.2. Unit 3 Feature 4

Unit 3 Feature 4 has low diversity at 1.39 and richness of 4. The assemblage includes 1 modified quartz flake, 1 modified bifacially worked quartz flake, 1 unfinished copper tool, and 1 pecked/ground stone fragment. Of these tools, 62% is comprised of quartz flakes. Evenness is 1 which represents complete evenness as each category is equal with 1 per class. The diversity and evenness are fairly similar to the remaining area in Unit 3, both have fairly low/medium diversity and high evenness.

6.3.3.3. Unit 1 and Unit 4 Feature 2

Feature 2 is spread across Unit 1 and Unit 4. Diversity of the feature is low at 1.21 with the lowest diversity recorded for the site. The feature contains 8 tools: 1 copper projectile point, 4 pecked/ground stone fragments, 1 quartz modified flake, quartz projectile point, and 1 hammerstone. In this feature, there are 8 tool artifacts with a richness of 4. Of this, pecked/ground stone makes up half of the tools not including the hammerstone. Quartz makes up 25%. Evenness of Feature 2 is 0.83 which is high although it happens to be the lowest at the site. As the lowest evenness at the site this indicates that the site as a whole as well as split into units and features is rather even.

Table 21. Feature 2 (Unit 1 and Unit 4) tools by raw material.

Artifacts by Material (generalized)	Count (n)	% (from tools of Feature 2)
Pecked/ground stone fragment	4	50
Hammerstone	1	12.5
Quartz flake	1	12.5
Quartz projectile point	1	12.5
Copper projectile point	1	12.5

6.3.3.4. Block A

Block A is made up of Unit 1, Unit 4, Unit 5, and Unit 6 and contained 21 tools. This block had medium to high diversity at 2.34. The evenness of Block A is a bit higher than Feature 2 at 0.89. Richness in Block A is 14 and within the block, richness is the same in Feature 2 and Feature 4 with richness at 4. Richness for Block A shows an encompassing range of classes at the site as it includes all classes except for 1 (a copper unfinished tool). Block A is very rich compared to Unit 3 and Unit 3 Feature 4 which could possibly point to a transition in technology between the two dates taken from Unit 1 and Unit 3. Block A is also 4 times the size of the area of a unit as it includes 4 units and therefore covers more space in comparison to a single unit.

6.3.3.5. Entirety of Frog Bay (47BA60)

The entire site of Frog Bay (47BA60) has a fairly high diversity of 2.4. This shows a large variation of artifact classes and represents more activities occurring. This could point to a lengthier stay encompassing a range of activities rather than a more specialized or single activity-oriented occupation. Evenness of the site is high at 0.88, indicating that tool type is generally fairly evenly spread across the assemblage.

Table 22. Richness indices of the analyzed areas.

Test Area	Richness
Block A	14
Unit 1 and 4 Feature 2	4
Unit 3	5
Unit 3 Feature 4	4
Entire Site	15

As stated earlier, the site shows fairly high evenness across the units and features. This is the case because many of the tools represent a count of 1, 2, or 3. Modified quartz flakes and pecked/ground stone fragments represent the largest proportion, both with 7 per class, although modified quartz flakes could understandably be more significant in number as the latter are fragments. In the calculations, ground stone includes fragments although they do not represent the equivalent of one complete tool. In doing this, the evenness of the site becomes artificially reduced. This cannot be easily worked around at the moment,[14] although the calculations do not change drastically as the evenness would continue the trend that is seen at this point.

Between features (Feature 2 and Feature 4), diversity is consistent as medium to high. Unit 3 presents the lowest diversity as well as shows the most significant difference from Block A in diversity as well as richness. While only a small part of the site is excavated thus far, it can be discerned that the consistency of evenness and diversity could be generalized across the rest of the site. Evenness is shown as largely high with a range of 0.17.

Diversity fluctuates as it is medium/high in Block A and for the entirety of the site but is low/medium elsewhere. Working from the interpretation of diversity as a proxy for mobility, diversity is not typical of mobile hunter gatherers represented by a collectively low diversity.

[14] It would be most useful to re-fit the fragments, or to estimate the minimum number of individual tools represented by the fragments (MNIT).

The diversity found across the site may signify different scales of occupation through time which consisted of several similar activities, but also different events across occupations.

Table 23. Tool Richness calculations.

Class	**N**	**Proportion**	**Percent from Tool Assemblage (%)**
Scraper (Chert)	1	0.03	3.03
Bifacial Scraper (Quartz)	1	0.03	3.03
Unifacial Scraper (Quartz)	2	0.06	6.06
Modified Flake (Quartz)	7	0.21	21.21
Bifacially Worked Flake (Quartz)	3	0.09	9.10
Bifacially Worked Fragment (Possible Drill) (Quartz)	1	0.03	3.03
Projectile Point (Quartz)	2	0.06	6.06
Projectile Point (Copper)	1	0.06	3.03
Unfinished Tool (Copper)	1	0.03	3.03
Finished Tool (V Shaped) (Copper)	1	0.03	3.03
Awl/Perforator (Copper)	2	0.06	6.06
Pecked/Groundstone Fragments (Metamorphic/Igneous/Sedimentary)	7	0.21	21.21
Pecked/Groundstone Hammerstone (Metamorphic/Igneous/Sedimentary)	2	0.06	6.06
Pecked/Groundstone Mortar (Metamorphic/Igneous/Sedimentary)	1	0.03	3.03

Table 23. Tool Richness calculations (continued)

Class	N	Proportion	Percent from Tool Assemblage (%)
Pecked/Groundstone Grinding Stone (Metamorphic/Igneous/Sedimentary)	1	0.03	3.03
Total	33	1	100

Within diversity research, the types of tools are also important individually. Along with diversity calculations, the tools uncovered at the site depict a wide variety of technology and form. Within the assemblage there are examples of quartz bifacial reduction and unifacial reduction which may have had similar cutting uses. The hammerstone, grinding stone, and mortar in the pecked/ground stone categories are telling of activities involving the processing of organic botanicals. The chert scraper from Unit 1 Feature 6 is described by Mr. DeFoe as useful for skinning. The scraper is small and fits in a hand and Mr. DeFoe specified that it would be very useful for softening the hide of a small animal before the hide begins to harden (M. DeFoe, personal communication, 4/24/2020).

The copper awl may be used for sewing and punching holes through different materials. The quartz drill may have been used to make holes in a "variety of substances like wood, bone, antler, shell, and stone" (Morrow 2016:98). A copper tool from Unit 4 shaped like an uneven V was detailed by Mr. DeFoe as having been used as an implement for fishing. This tool is could have been used very impressively to catch fish that at the time were much bigger and abundant that Mr. DeFoe describes as being as large as 50 to 500 lbs (M. DeFoe, personal communication, 4/24/2020). In the field, the copper implement was also suggested to have possibly been a hook on an atlatl. Mr. DeFoe also described that the projectile point found in Unit 1 Feature 2 is an example of tools that could have been hafted and used to hunt as well as to fish. With this one tool a single person would be able to catch a huge fish or an angry bear (M. DeFoe, personal communication, 4/24/2020).

Figure 30. Copper projectile point (Unit 1 Feature 2). Source: Creese and Walder 2018:82.

Activities related to these tools such as those provided by Mr. DeFoe undoubtedly are examples of what people were doing during each occupation for the time the site was used. The longer the occupation, the more necessary tools such as these become as objects need to be remade, replaced, or fixed. Largely the tool assemblage thus far leans towards an expedient nature and a more long-term seasonal aggregation focus.

6.4. Cortex Ratio Analysis

Cortex ratio is used to interpret questions of curation, raw material exploitation and transport, as well as site use. This can represent models of reduction sequencing at the site to understand what stages of reduction are occurring on site as well as movement within-site and between sites. On site, it is important to uncover the particular reduction stages occurring. This includes on-site spatial organization of technological process, or intra-site spatial technological process. The presence or absence of certain stages in reduction can begin a discussion about where these processes may be occurring within the region. Cortex ratios were calculated for all units and Feature 4.[15]

6.4.1. Cortex Ratio Interpretation

Table 24. Frog Bay 2018 – 2019 cortex ratio calculations.

Sample Area	Total Artifact Count	Total Mass (g)	Observed Cortex Surface (cm2)	Expected Cortex Surface (cm2)	Cortex Ratio
Unit 1	43	93.9	42.19	44.13	0.96
Unit 2	27	100.9	44.63	47.42	0.94
Unit 3	119	398.8	160.51	187.44	0.86
Unit 3 Feature 4	42	128	58.67	60.16	0.98
Units combined	189	593.6	247.33	278.99	0.89

*33 pieces are non-cortical: 33/189 or 17.5% of Quartz > 15 mm from Unit 1, Unit 2, and Unit 3 had no cortex.

Cortex ratios range from 0.86 to 0.98 (Table 24) which suggest a considerable amount of cortex remained in the assemblages. At the site, Units 1 and 2 are similar with ratios near 1 (0.96; 0.94) while Unit 3 is much lower relative to Units 1 and 2 (0.86). They are all fairly close to 1 but Unit 3 seems to be significantly reduced in cortex in comparison to the other units. Units 1 and 2 suggest an interpretation that debitage reduction is occurring locally – cobbles come in from the beach as needed for tasks and are fully reduced on site.

[15] The other features' assemblages measured for cortex calculations were not significant in size for analysis. Unit 3 Feature 11 (n = 11), Unit 3 Feature 10 (n = 6), and Unit 4 Feature 15 (n = 3).

Table 25. Cortex Ratio interpretations.

Cortex Ratio Indication	Explanation
< 1	-As identified previously, a ratio <1 indicates underrepresented cortical surface area (Douglass et al. 2008:520) and higher in non-cortical surface area. - The smaller the number, the less cortex is observed in relation to the sample. -This ratio is seen in assemblages where cortex is taken from the assemblage, or where non-cortical pieces are added to the assemblage. Within a site, this can be seen in examples of middens where non-cortical pieces are added. -This can also be explained by the absence of earlier stages of reduction.
1	-A ratio of 1 indicates expected and observed cortex are equal -A ratio of 1 specifies that generally all stages of reduction are being represented in the assemblage and the observed and expected cortex are relatively equivalent, indicating "that the selection and movement of artifacts occurred in ways that did not cause imbalance in the original assemblage cortex composition" (Lin 2014:159). This implies that quartz cobbles stayed on-site through acquisition, preparation, reduction, use, re-use (or re-touch), and discard and were not exported (or imported). -Another explanation for a ratio of 1 is through circular or less linear movement of artifacts between places which returned cortex to the site in a way that would cause the cortex composition at the site to remain relatively balanced overtime (Lin 2014:59).
> 1	-A cortex ratio >1 specifies more cortex observed in relation to the sample. This means the assemblage is higher in cortical pieces and lower in non-cortical pieces. -This presents evidence that primary stages of reduction could be occurring while later stages are not. -This could also imply that quartz cobbles are reduced – leaving cortical pieces – while the non-cortical pieces are taken from the assemblage. Examples of this could be through reduction of cores into smaller blanks or bifaces that are lighter and easier to carry and continue to shape and prepare elsewhere. -Another explanation could be cortical pieces are being brought and added to the area.

As a whole on the assemblage level, it seems that tools and reduced cores are not being exported or imported in significant numbers. Mainly people are producing and using expedient tools on site. The ratios of Units 1 and 2 are very near 1 which is considered consistent with a more residentially stable lifestyle involving expedient tools and relatively unspecialized site functions. Mobile communities of hunters and gatherers show a very unique distribution of debitage at different sites that is distinctive to each site and its specialized function. Limited-activity sites would be thought to have unique and identifiable assemblages.

Unit 3 represented less cortex than expected and less cortex than Units 1 and 2. The ratio of Unit 3 could be interpreted as people transporting more non-cortical pieces to the unit area or taking away pieces with more cortical surface areas such as larger flakes that are more cortical. It would be more likely that non-cortical pieces are being added than cortical pieces being taken away as generally cortical pieces are taken off as debitage in reducing a core and creating a tool. This premise could explain the high ratio of Unit 3 Feature 4.

Table 26. Unit 3 and Unit 3 Feature 4 broken down from lithics to quartz.

Unit and Feature	Artifact Count
Unit 3	1103 (includes everything)
Unit 3	1088 Lithics
Unit 3	911 Quartz
Unit 3 Feature 4	380 Lithics
Unit 3 Feature 4	351 Quartz

Within Unit 3, the Feature 4 cortex ratio is the closest to 1 (0.98). Although Unit 3 is the most non-cortical, Feature 4 represents the highest cortex ratio at the site. Feature 4 is thought to be a midden, and this could be a place where debitage was rounded up and dumped and therefore represents all the stages of reduction as it contains debitage combined. This would coincide with Feature 4 as an interpretation of site organization.

In Middle and Late Archaic occupations areas of the site (Unit 1) the activity specialization in space seems to be slightly different that in the Late Woodland (Unit 3). In Unit 1 all stages of reduction are represented which points to a more sedentary occupation. Unit 1 and Unit 2 do not show specialized/limited activity occurring which is commonly seen in highly mobile forager sites.

Unit 3 dates to the Late Woodland and yields a high cortex ratio in general but significantly lower than Unit 1. Unit 3 although containing the largest amount of debitage and lithics total, contains the least amount of cortex. Feature 4 – the refuse feature – presents a high ratio and shows more cortex than elsewhere on the site. This feature is also important as it represents a sort of spatial organization through the association with maintenance and collection linked to increasing sedentism. Refuse collection shows the intention of long-term commitment to a site and suggests that elsewhere on the site are selected activity areas. This collection process could be what is selecting preferentially cortical flakes within the feature.

Overall the cortex ratio for each of these areas (Unit 1, Unit 2, Unit 3, Unit 3 Feature 4, and combined) does not suggest a highly mobile occupation, logistical mobility, or specialized group for any of the periods. Although there are differences across the units Unit 1, 2, and 3, all continue to express the trend of long-term residential stability, whether that be a month, a season, multiple seasons, or longer. This data supports the interpretation that people were spending a significant amount of time at Frog Bay although each of these occupations most likely varied in duration and social group size. In total, all of the ratios calculated are close to 1 and do not indicate significant excess or deficit in cortex relative to artifact volume (Lin 2014:1).

6.5. Lithic Data Results

The combination of data from debitage analysis, tool diversity, and cortex ratio are significant sources of information for understanding Frog Bay. Together these aspects of lithic analysis create a strong argument for site function. There appears to be a trend line for incrementally increasing residential stability or increasing commitment to the site. There is little indication throughout the data of a highly mobile specialized occupation. Evidence such as high tool diversity in areas of Middle and Late and Archaic dates, cortex ratios indicative of complete manufacture sequence, and high core to biface ratios, signify an expedient-orientated lithic technology and extended and/or longer-term stays at the site. This pattern continued into Unit 3 (a Late Woodland context) which provides a relatively high cortex ratio, high evenness, high amounts of debitage, and evidence of spatial organization with the inclusion of Feature 4 as a trash midden. Feature 4 points towards change in spatial organization as site maintenance may have been indicative of longer occupation in the Late Woodland. Across this time period there appears to be more continuity than change within the lithic assemblage. This does not mean site function was necessarily the same throughout every occupation, but intent and site activities must have been similar and continually meaningful. Across the site evenness is high and depicts that although sample sizes may be small, there is representation of many different tasks and activities on site.

While lithic analysis is informative about how communities lived and used the landscape, lithics cannot communicate the importance of Frog Bay to the people who made the site into a place that was returned to and built upon over a 5,000-year span. While there currently are no dates for the Early and Middle Woodland found at the site and therefore it cannot be assumed to have been used continuously, the site was certainly not forgotten and place-making at Frog Bay may have had a meaning and place within community history and life.

While the lack of dates during the Early and Middle Woodland may suggest that people traveled elsewhere, this notion nevertheless bolsters the significance of Frog Bay as communities still continued to come back during the Late Woodland. An explanation for the lack of dates in the Early and Middle Woodland may be justified when considering the lake levels of the time. The Middle Archaic saw the lake phases of Nipissing I and Nipissing II (Anderton 2004:117) as the Lake Nipissing formation occurred around cal. 3400 BCE. During the Late Archaic, the Lake Nipissing high-water stage followed "the high levels of the Nipissing Phase" (Anderton 2004:126).

The water level declined after the Nipissing, after which the Algoma phase slowly rose the lake until the present water level (Phillips 1979:11). The time during the Early and Middle Woodland would have seen considerably lower lake levels which may have persuaded communities to move camp an equal distance to the lake level as the current site is now. A similar distance from the water during the Early and Middle woodland would place the site under the current lake levels. As the water began to rise, people continued to camp based off the lake level and were again situated at the current site of Frog Bay during the Late Woodland.

Frog Bay became a meaningful place on the landscape where communities worked together and with the landscape in amazingly similar ways to create a lifestyle linked to the site. Frog Bay continued to attract communities either generationally or across communities. The site presents an example of cultural continuity where social memory, learning, and particular ways of using the landscape were transmitted down through generations for thousands of years. Through social memory practices, intergenerational communities weave past and present by interacting with and illuminating the memories held at the Frog Bay site. (Cipolla 2008).

CHAPTER 7. DISCUSSION AND INTERPRETATIONS

This interpretation of Frog Bay braids together lithic analysis, Indigenous theory and knowledge, and community insight. Frog Bay is a site that not only aids in knowledge of the past, but functions to connect Red Cliff and other Anishinaabe communities to their ancestral history and traditional land. Frog Bay archaeologically builds on the local Indigenous knowledge and relationship with the land. Mr. DeFoe accepted this study of lithics as a furtherance of evidence for the knowledge Indigenous people have known (M. DeFoe, personal communication, 2/7/2020).

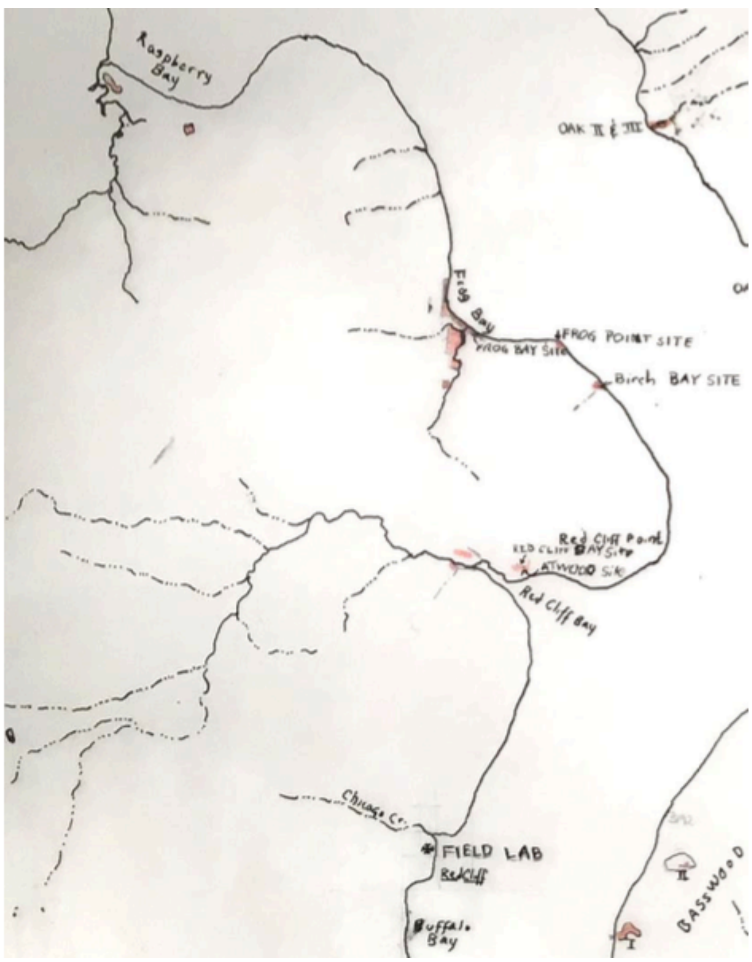


Figure 31. Master map of Beloit College 1979 field season. Shows locations and names of sites recorded. Source: Creese and Walder 2018:30.

Although this site is interpreted materially through lithics, choices in environment and adaptation are not always motivated or encompassed by the attributes provided by artifacts. Much of the information provided through Indigenous writings and communication with Mr. DeFoe were essential. My analysis of lithics at Frog Bay hopes to use Western methods to present physical data in opposition of settler-colonist endeavors and substantiate Indigenous claims and connections to land. Inclusion of cultural views and voices is necessary and a critical component of analysis. While this research emphasizes the material, it hopes to break from the Western way of viewing the world and incorporate the importance of relationality and the relationship Indigenous communities have to the land and Indigenous ancestors.

Radiocarbon dating from multiple occupation stages indicate that Frog Bay was a known location and important place that people continued to come back to over a period of 5,000 years (Creese and Walder 2019:89). Frog Bay's close proximity to the islands and nearby locations with evidence of human occupation presents many unknowns as for the unexcavated areas between sites. As this study focuses predominantly on lithics as archaeological evidence, many of the aspects of organic decomposable materials cannot be integrated into the analysis although people were most certainly utilizing environmental materials such as birch bark, balsam fir, tobacco, bone, fish, and other animal and plant traditional and cultural resources in everyday life.

Debitage analysis revealed high quantities of quartz by-product and a small amount of exotic debitage. The lithics exhibit a focus on local resource use for quartz cobble reduction. This aspect develops as a continuing trend across the site spatially as well as temporally, as high amounts of debitage appear to be relatively consistent in all areas of the site, and between units representing different periods of occupation. Along with the quartz debitage, evidence of ground stone technology and copper metallurgy are found in the contexts of Units 1 and 3 providing evidence of sustained use of copper implements as well as pecked/ground stone technology in the Middle and Late Archaic as well as the Late Woodland. Chert is also spread across the site, found in each of the seven units as well as four STPs.

Diversity and tool analysis may indicate a gradual shift in technology from curated to expedient tools. In general, the high core: biface ratio at the site is typical of expediently oriented lithic industries. Again, this does not describe the replacement of one technology by the other, or the abandonment of curated tools but instead a shift that may indicate changes in residential stability, and traditional and cultural activity needs (Parry and Kelly 1987:296). Overall, diversity and evenness measures are medium to high, which is not typical of highly mobile hunter gatherers. There is not a great change between the Archaic and Woodland contexts although the higher proportions of curated tools in context of the Archaic (Unit 1) suggests higher mobility associated with earlier occupation stages.

Figure 32. Quartz bifacially worked flake from Unit 3 Feature 4. (2018.0348).

Across the units there is a substantial variety among tools in form and function. The range of tool types combined with high quantities of debitage points to a longer commitment to the site and a substantial population size. Mr. DeFoe judged group size to include families of children, women, and men which could range in size from a few to multiple families (M. DeFoe, personal communication, 4/24/2020).

Cortex ratio analysis yielded results very close to 1 for the entirety of the site denoting a match between expected and observed cortex. This finding indicates that generally all stages of reduction are being represented in the assemblage and quartz cobbles stayed on-site through the reduction sequence. Comparing contexts, Unit 3 generated the lowest cortex percent along with the inclusion of a midden feature (Feature 4). This could be indicative of on-site spatial organization with a higher proportion of cortical pieces swept into Feature 4. Although Unit 3 had the lowest cortex, in relation to 1, the number was still fairly high.

Results from debitage analysis, diversity indices, and cortex ratio analysis support the inference of comparative residential stability with a full lithic reduction sequence occurring on site. The high core: biface ratio, moderate to high tool diversity and evenness scores, and high cortex ratio combined with a heavy reliance on local raw materials at the site indicate a longer and/or intensive occupation at Frog Bay as people created tools as needed. The utilization of quartz also suggests less mobility as cobbles used were not of reliable quality and were not generally of a size suitable for the creation of portable blanks. The extent of expedient tools and high cortex ratios do not coincide with lithic organizational patterns observed at highly mobile sites which would be characterized by later stages of tool maintenance and more specialized activity.

Although excavation has been limited, an interpretation of an increase in occupation span towards longer occupation could be interpreted through the evidence of spatial organization represented through features and the high evenness across the site. Mobility strategies influence the abonnement and use length of site as “people who plan to stay at a camp for a short period of time will have a smaller artifact inventory than those who anticipate a long occupation; and (2) groups who plan a short occupation also invest less effort in site construction and perform fewer camp maintenance activities than those who anticipate a long occupation” (Kent 1995:55). During the Late Woodland, a larger social group could equally account for the indications seen at the site as depicted through diversity and evenness as well as the refuse of Feature 4 in Unit 3.

Frog Bay exhibits similarities with nearby sites with multiple occupations and similar quartz assemblages. The Frog Bay site currently yields dates from three different stages, which is typical of shoreline areas where Woodland cultures are able to re-occupy former coastal sites once utilized by Archaic foragers (Creese and Walder 2018:20). An example of re-occupation is seen at the Rodney Clark site (47MR146) near Wausau, in central Wisconsin. This site produced similar dates; the Middle and Late Archaic as well as Late Woodland. Similar to the Frog Bay site, the Rodney Clark site is composed of a lithic industry representing a quartz biface workshop (Boszhardt 2015:15; Creese and Walder 2018:22; Spott 2005).

While Frog Bay does not appear to be solely a quartz workshop, it does contain high amounts of quartz flakes, cores, and other debitage. The Old Copper Complex is exhibited at Frog Bay; however, there are no artifacts diagnostic of the Red Ocher Complex. The Red Ocher Complex transitioned to ornamental uses of copper, burials, and associated red ocher. As burials are absent, it is difficult to comment on the social structure although it could be assumed that the collective structure of the community could look different during different seasons of the year (McNally 2009:54).

Some research has described the Terminal Woodland as much more sedentary than the Archaic and even the Initial Woodland (Cleland 1982), while others argue for greater continuity in subsistence strategies and site use during the entirety of the Woodland (Drake and Dunham 2004:158; Martin 1989). Evidence at Frog Bay appears to support this latter argument, as well as a considerable degree of consistency between the Middle Archaic and Terminal Woodland.

While past living conditions are commonly placed on a scale from mobile to sedentary, it is known that communities generally oscillated between these two poles and followed a seasonal round that included mobility as well as intermittent sedentism for short to medium periods following the time frames for seasonal and cultural activities. Locations occupied continuously for a substantial period of time yield a diverse array of features and artifact classes (Gallivan 2002:538). Although Feature 4 is the only cultural feature recognized by function, there is a pattern of more spatial organization occurring in the Late Woodland component.

It is surprising to find such consistency between the Middle Archaic to Late Woodland occupations of the site. At Frog Bay, the artifact assemblage from Block A signals patterns of residential stability which are not completely consistent with previous research. Studies of the Archaic stage offer evidence of higher mobility based around hunting and gathering in small scattered family groups. In the Woodland stage research has pointed to larger sedentary style activities such as horticulture and increased and intensified fishing and wild rice harvesting. The lithic assemblage around Unit 1 and Block A supports the notion that Archaic occupations were more sedentary than has often been supposed. Investment in spatial organization is expressed in Unit 3, with the Late Woodland suggesting longer occupation, such as an extended warm season sojourn. Lithic reduction on site also presents a pattern of marked continuity, with local quartz cobbles utilized in very similar ways over some 4000 years.

The activities associated with certain seasonal resources produce very different physical remains. It is very likely that the Frog Bay site falls into a similar scenario and inhabitants may have been at the site for several weeks or months at a time at particular times of year. Settlement models from the Archaic and Woodland stages suggest a smaller kin-based occupation at Frog Bay during the Middle and Late Archaic and a larger kin-based or village group occupation during the Late Woodland. These occupations are thought to be a part of a larger subsistence sequence within a seasonal movement cycle during the spring and/or summer.

Congregated fishing villages along the shore in the Archaic tend to be smaller, while Woodland sites tend to be larger. Woodland stage fishing villages often "exhibit multicomponent use throughout multiple seasons" (Drake and Dunham 2004:137) with groups meeting for autumn and spring fishing. Mr. DeFoe described that people traditionally followed the seasons, each of which entailed many activities. In the spring, fishing was very important, and people would stay a few weeks or a month before travelling to the islands to pick berries and other resources. Communities would continue this cycle following the seasons yearly (M. DeFoe, personal communication, 4/24/2020).

This model would fit Frog Bay as both spring and summer involve longer stays for fishing, hunting, and gathering resources. Turtle bone from Unit Feature 2 demonstrates cultural use of turtles which would be accessible in the warm season, as turtles hibernate under the mud so in the winter their acquisition would be more difficult. Also recovered from Unit 1 Feature 6 were dense concentrations of fish bone (Creese and Walder 2020:31) indicating fishing activities. In conversation with Mr. DeFoe, he expressed that Frog Bay could certainly be camp base during the winter although it would take much preparation and thought. Occupation during multiple seasons could be likely (M. DeFoe, personal communication, 4/24/2020).

Within the seasonal round, communities did continue to move and come back to the site likely for more than convenience or environmental factors. The seasonal activities described previously are integral to broader cultural practices, although in this report spiritual and ceremonial activities were not explored. Traditional activities that align with the individual life cycle, importance of place, and Ojibwe ontology greatly affect movement and activity. Just as ceremonies can be activity-specific, they can also be resource-specific, place-specific, etc. Sites located in powerful locations such as cliffs, dunes, waterfalls, etc. can be places of multiple activities ranging from daily functions to ceremonial.

Because of the social sense of place-making, places come to be through cultural activities and a kind of "imaginative experience" (Basso 1996:55) that leads to "thoughts of other places, other people, other times, whole networks of associations" (Basso 1996:55). This continual molding of both landscape and people reconstructs a history of social engagement within the landscape through remembrance, time, and relationships (Basso 1996). The communal aspect of place-making links one place to others in a web of relationships (Smith and Jackson 2008:178) that intersect with and influence mobility and site management strategies.

Euromericans tend to view vast expanses of water such as Lake Superior as unknown and distinct from the mainland. For Indigenous communities, Lake Superior is much more than a mode of transport or a survival resource, but a "defining feature in all Ojibwe landscapes, shaping our culture and history" (Child 2011:25). Indigenous communities have lived on and around Lake Superior with respect and expertise. Marvin DeFoe, a Red Cliff Elder, teacher, Red Cliff Tribal Historic Preservation Officer, and expert canoe builder describes that there are a number of dugout canoes found at the bottom of Lake Superior, and undeniably many more still undiscovered (M. DeFoe, personal communication, 4/24/2020). Birch bark and dugout canoes are physical evidence of the prominence of the lake in Ojibwe life and although these as well as other physical cultural markers may not always be discovered and known by archaeologists, traditional territories hold history and significance for the Anishinaabe communities.

The lake has persisted in ways of place-making through time. Indigenous communities continue to have great respect for the lake and are familiar with the ancestral significance it holds. The long-term use of lake-derived quartz at the Frog Bay site can be interpreted as a connector to the Indigenous cultural value of Lake Superior and the animacy of the resources provided. In a PBS interview, Andrew Gokee, retired director of the Native American Center at UW-Stevens Point, explains the integral aspects of the lake, "It's spiritually significant to us. There's Spirits that live in this lake. It's a part of our oral history. It's a part of our spirituality. It's part of who we are" (PBSb 22:18 – 22:32). Indigenous ancestors created mental maps that allowed them to live and move through the lake with deep-rooted knowledge of the area (Herrera and Chapanoff 2017:166). Elder and co-founder of the American Indian Movement (AIM), Eddie Benton-Benai comments that, "when you look around the state of Wisconsin you see our place names in many places. And it indicates how well we know and what we felt about the land" (PBS 20:26-20:38).

The importance of place-making is prominent through the region as well as at Frog Bay. Within the Anishinaabe cultural landscape, Lake Superior holds special meaning and significance as a place of Indigenous ancestral cultural activity. Situated on the shore of Lake Superior, Frog Bay was certainly a significant place within the wider network and cultural landscape connected through the lake. The Frog Bay site was a place of continued reoccupation over 5,000 years during the Archaic and Woodland stages. Remembrance through time must have been an essential draw for continued reoccupation. Oral histories and memory transfer cultural meaning and significance contextualized within the larger regional setting of the land, the islands, and the lake. Still today, the Red Cliff community continues to add new layers of place-making at the site as Elders and community members visit and re-visit the site as well as aid in the physical archaeological investigation and provide key knowledge and narration that leads interpretation and understanding of the site.

While settlement models are key in understanding the site, traditional reasons were influential factors for mobility,

> *"People returned to the same places at regular intervals to (1) renew their ties with the local spirits and with their ancestors; (2) remember and transmit the names of the places and the associated narratives, songs, and rituals; and (3) regenerate the land and its resources (Oetelaar and Oetelaar 2011). More- over, each group of households were responsible for specific places and their associated narratives and rituals"* (Oetelaar 2014:25).

Throughout work at the site, Mr. DeFoe many times communicated the importance of Frog Bay as a place of learning and education for ancient children. Children were definitely involved and were learning through watching and experiencing (M. DeFoe, personal communication, 4/24/2020). Not only were children learning "knowledge about objectified things", such as lithic reduction, they were learning the relationships of things to one another and one's own relationality to other subjects (McNally 2009:48). "Such learning requires humility, economy, restraint. It requires listening, watching, and learning of proper ritual relations that markedly distinguish Anishinaabe idioms of learning" (McNally 2009:48).

In this process of learning and teaching, memory functions as a social process drawing upon both individual and communal interpretations of the past (Cipolla 2008:197).

Intergenerational learning and memory rely upon the relationship with the past and the "extent to which practices repeat earlier practices as a form of memory of them" (Hodder and Cessford 2004:18). The continuity at Frog Bay depicts the role of learning through the practice of everyday activities, specifically the use of local quartz materials. Memory is transmitted generationally, but also is able to be generated through "landscapes and material culture" (Cipolla 2008:197).

During the Archaic and Woodland as well as today, communities endure to regenerate memories and histories held at Frog Bay. Just as children learned at Frog Bay thousands of years ago, children and adults alike are able to learn at Frog Bay today. Site visits by Elders and other community members offered important wisdom to the students working, but more importantly to younger generations and children. At the site, children were able to learn through the physical uncovering of history and also experience learning from Elders at a place where thousands of years ago the same learning and education was occurring.

This study unfortunately was not large enough to include community-based methods in the entirety of the process but is embedded in a project that is currently accomplishing archaeology through a multitude of community methods, much of the information was cultivated in a community-based environment through the collaborative efforts of the directors Marvin DeFoe, John Creese, and Heather Walder.

In the process, community methods that are both accessible to and engaging for community members are key as participation provides archaeological information and connections for the community which reveal the long and continuous Indigenous occupation and relationship to the land. This is specifically relevant as the Tribal National Park is land that has been recently re-acquired by the community. Archaeology by community methods has allowed this re-acquired land to express meaning through continued place-making. Lithic analysis has been helpful for archaeologically understanding past lifeways but also as a tangible means for community members to be a part of the process of interpretation and preservation. Through community-based archaeology, community members are fully immersed and are able to visit the places their ancestors visited and continue to respect and protect the area “so that future generations can enjoy the homeland and its resources” (Oetelaar 2014: 27).

Braiding lithic analysis with Indigenous knowledge reveals the tremendous significance of Frog Bay. Situated within the Red Cliff Reservation as well as in the Tribal National Park, the site has been able to remain undisturbed and protected. The land within the Tribal National Park was used by Indigenous peoples for thousands of years, as generations of communities used the land and water as “a teaching ground for plant medicine, a place for sitting out (fasting), and as a beautiful, scenic area for canoeing” (Bergin 2012).

Fortunately protected, Frog Bay brings to mind the many other important places systematically destroyed and looted as they were forcibly detached and privatized following allotment. Frog Bay acts as a marker that Indigenous relationships are continually strong and vigorously held in the land regardless of archaeological findings. Although there is not always tangible evidence for a cultural landscape, the memories of ancient and more recent events throughout the landscape remain (Ross et al. 2013:67). Colonial attempts to distance Indigenous people from the land works to weaken and even destroy the connections between people and traditional places (Zedeño et al. 2001:238). The relationship between Indigenous communities thousands of years ago, as well as communities now, to one another and to the land is powerful and momentous as heightened interaction and access are important for Ojibway people to interact with their cultural landscapes.

Frog Bay is important for this reason and for the place that it was and continues to be for Indigenous people. Place-making occurs strongly in the presence of others. Community-based methods have brought people together at the site to experience the place together. Place-making occurs as excavation has allowed Frog Bay to become a place of specific importance that is now revisited by Elders and community members daily during the field season. Place-making relies on Indigenous theory and knowledge and the importance of human relationships and connections to the land. Archaeology at Frog Bay has helped to build connection between generations who found importance in the site during its use thousands of years ago; it has become an important location for place-making and continues to hold importance to the community today.

CHAPTER 8. CONCLUSIONS AND FUTURE RESEARCH

Through excavation of the site, natural and human-made features have gained new and culturally significant meanings (Barrett et al. 1991:8) important to place-making. The routine occupancy of the site continues as people are now reconnected to Frog Bay and are able to learn more about Indigenous ancestors and why Frog Bay was valued over thousands of years. Mr. DeFoe describes how visiting the site and learning about past lifeways allows community members to travel back in time. The people who occupied this region thousands of years ago during the Archaic and the Woodland stages are Indigenous ancestors and, more probable than not, are the ancestors of current Indigenous people in the region (M. DeFoe, personal communication, 4/24/2020). Because Frog Bay presents a site that has been occupied abundantly over time by Indigenous ancestors and reflects past Indigenous lifeways, it "needs to be properly described and explained in the context of its relationship to a particular cultural system" (Chartkoff 1995:28) which is why the inclusion of Red Cliff voices is so central.

The reasons for community-based archaeology and the principle inclusion of Indigenous theory and knowledge is a primary aspect to engage community members in a process which is not only respectful but heals and educates (Smith 1999:127-128). The continuity of Indigenous occupation at Frog Bay was sustained for 5,000 years and it is a remarkable record of the perseverance of Indigenous tradition and culture which has built communities that are working for the future on the same principles and values. Community-based methods can be incorporated as a sustainable community-led project that can continue into the future. In a PBS film, Mr. Benton-Benai states that:

> *"what we do in our lifetimes has to reflect seven generations into the future. When you really, really think about that, the dominant has no such concept. They have no such value. And I wonder, we have been together some 500 years and we still haven't learned enough*

about each other. I don't think white society knows anymore about us today than they did in 1492… and they have never bothered to learn. Only assumptions have been made" (PBS 13:08-13:52).

This is an incredibly powerful statement which embodies the necessity for Indigenous knowledge and theory in any endeavor of Indigenous history or lifeways. The relationship though time is vital as the cyclical nature disassembles the Westerns linear notions of past, present, future (McNally 2009:54). The future is integral to the present and the past continues to have influence and meaning in the present. The responsibility of the future is no different than it was thousands of years ago. Mr. DeFoe explains "Our ancestors were very wise. Chief Buffalo. They were very wise. They had to make decisions on the survival up ahead, generations ahead…we are faced, today, no different for the future ahead." (PBSb 22:56-23:25)

This thesis has aimed to generate information about the Frog Bay site that will be beneficial and informative to the Red Cliff community. This data and analysis will hopefully be beneficial to the sovereignty initiative run by the Red Cliff community and add to Indigenous regional continuity and identity. Using Atalay's concept of "braided knowledge" (Atalay 2012), lithic analysis, Indigenous knowledge and theory, and community-based engagement I have linked together new information and connections regarding place-making at Frog Bay. At the moment, there are no well-documented or significant Archaic sites in the counties (Douglas, Bayfield, Ashland, and Iron) surrounding Red Cliff along Lake Superior (Creese and Walder 2018:19) and Frog Bay therefore adds new knowledge about the wider cultural landscape and regional continuity of Indigenous peoples in the Western Great Lakes.

From the units excavated, four units (4, 5, 6, and 7) are still in process and three (1, 2, and 3) are complete. This gives a wide range of information for analyses but also leaves room for more interpretation and data to be explored. Further research at Frog Bay could follow many avenues involving more community input, outreach, and engagement with Indigenous ontology and history. Lithic analysis can expand to include residue analysis, use-wear research, and understanding additional contextual factors affecting cortex ratio.

In future directions, this information must come back to the community in ways that are valuable and educational, taught through belief and education systems of Red Cliff control. In the past and still up to the present, there have been issues in Indigenous access, control, and ownership of cultural and traditional history and knowledge (Anderson 2005:83). Indigenous communities have been framed as "subjects" rather than authors and owners (Anderson and Christen 2013:105) and ownership has therefore tended to lie with the non-Indigenous researcher (Anderson 2005:85). It is important to state that this information is not owned by the researcher, but rather has been graciously made available for research but is fully the history and property of the Red Cliff community and all Indigenous people.

Specific options to make this information easily available for the community include the possibility of an online database including this information and more, in a format that is easily accessible to the community and identified in ways which help in education and significance. Inspiration is taken from Anderson and Christen, who's work with Indigenous community intellectual property agreements (Anderson 2005:83) developed a system of Traditional Knowledge (TK) Labels. The creation of the webpage Local Contexts, supports Native, First Nations, Aboriginal, Metis, Inuit and Indigenous communities to manage "their intellectual property and cultural heritage specifically within the digital environment" (Anderson et al. 2018). TK Labels are a tool created for Indigenous communities "to add existing local protocols for access and use to recorded cultural heritage that is digitally circulating outside community contexts" (Anderson et al. 2018). These labels could be adapted to the information from this research and be expanded upon with further ethnographic data. These labels add information that is most important for the community, providing data to correct the public historical record and include “the name of the community who remains the creator or cultural custodian of the material, and how to contact the relevant family, clan or community to arrange appropriate permissions” (Anderson et al. 2018). TK Labels offer a community-based tool that is educative and informative offering labeling “designed to identify and clarify which material has community-specific, gendered, and [contains] high-level restrictions (Anderson et al. 2018).[16]

More options include construction of a trail nearby the site with information about the site in Ojibwe and English for the community as well as add for tourism. This information could also be dispersed through an interactive day of experimental knapping and activities with the aid and leadership of community Elders with an emphasis on educating and engaging children. Traditional lifeways could be explored through experimental cooking and research of the impact and display of spiritual and ceremonial activities. With continued community-based research at Frog Bay, it is promising that younger generations within the community will feel encouraged to explore archaeology and pursue their own interests and research either within the community or elsewhere.

[16] For more information on Traditional Knowledge Labels and Local Contexts, an initiative to support Native, First Nations, Aboriginal, and Indigenous communities in the management of their intellectual property and cultural heritage specifically within the digital environment, please visit https://localcontexts.org.

REFERENCES

Absolon, Kathy

2010 Indigenous Wholistic Theory: A Knowledge Set for Practice. *First Peoples Child and Family Review* 5(2):74-87.

Anderson, Jane.

2005 Indigenous Knowledge, Intellectual Property, Libraries and Archives: Crises of Access, Control and Future Utility. *Australian Academic and Research Libraries* 36(2):83-94.

Anderson, Jane and Kim Christen

2013 "Chuck a Copyright on It": Dilemmas of Digital Return and the Possibilities for Traditional Knowledge Licenses and Labels. *Museum Anthropology Review* 7(1-2):104-126.

Anderson, Jane, Kim Christen, James Francis Snr, and Maui Hudson

2018 Traditional Knowledge (TK) Labels. https://localcontexts.org/tk-labels/, assessed May 27, 2020.

Anderton, John B

2004 The Geoarchaelogical Context of Grand Island. *Midcontinental Journal of Archaeology* 29(2):113-132.

Andrefsky, William Jr

2005 *Lithics: Macroscopic Approaches to Analysis Second Edition*. Cambridge University Press, NY.

Ashmore, Wendy, and A. Bernard Knapp

1999 *Archaeologies of Landscape: Contemporary Perspectives.* Blackwell Publishers. Hoboken, NJ.

Atalay, Sonya L

2006 Indigenous Archaeology as Decolonizing Practice. *The American Indian Quarterly* 30(3/4):280-310.

Atalay, Sonya

2010 We Don't Talk About Çatalhöyük, We Live It: Sustainable Archeological Practice Through Community-Base Participatory Research. *World Archaeology* 42(4):418-429.

Atalay, Sonya L

2012 *Community-Based Archaeology: Research with, by, and for Indigenous and Local Communities.* University of California Press. Oakland, CA.

Arzigian, Constance

2000 Middle Woodland and Oneota Contexts for Wild Rice Exploitation in Southwestern Wisconsin. *Midcontinental Journal of Archaeology* 25(2):245-268.

Bakken, Kent E

2012 Lithic Raw Material Use Patterns in Minnesota. PhD dissertation, Department of Anthropology, University of Minnesota, MN.

Bamforth, Douglas B

1986 Technological Efficiency and Tool Curation. *American Antiquity* 51(1):38-50.

Bamforth, Douglas B., and Mark S. Becker

2000 Core/Biface Ratios, Mobility, Refitting, and Artifact Use-Lives: A Paleoindian Example. *Plains Anthropologist* 45(173):273-290.

Banerjee, Dabjani

1996 Review of Connecting the Local and the Global: The Imbrication of Histories, Theories, and Literatures in Post-Colonial Studies. *Rocky Mountain Review of Language and Literature* 50(1):55-61.

Banning, E.B

2000 *The Archaeologist's Laboratory: The Analysis of Archaeological Data*. Kluwer Academic, NY.

Barret, John, Richard Bradley, and Martin Green

1991 *Landscape, Monuments and Society: The Prehistory of Cranborne Chase.* Cambridge University Press, Cambridge, UK.

Basso, Keith H

1996 *Wisdom Sits in Places: Notes on a Western Apache Landscape.* University of New Mexico Press, Albuquerque, NM.

Benton-Benai, Edward

1988 *The Mishomis Book: The Voice of the Ojibway*. Indian Country Communications. Hayward, WI.

Bergin, Mary

2012 Rustic Frog Bay, First Tribal Park Opens in Red Cliff. Roads Traveled (blog). July 28, 2012. http://roadstraveled.com/rustic-frog-bay-first-national-tribal-park-opens-in-red-cliff/, accessed March 18, 2020.

Betz, Barbara

2007 Putting the Past to Use: A Plea for Community Archaeology. *Safe Corner/Saving Antiquities for Everyone.*

Bhabha, Homi K

1994 *The Location of Culture*. Routledge, NY.

Binford, Lewis R

1965 Archaeological Systematics and the Study of Culture Process. *American Antiquity* 31(2/1):203-210.

Binford, Lewis R

1979 Organization and Formation Processes: Looking at Curated Technologies. *Journal of Anthropological Research* 35(3):255-273.

Bornhorst, Theodore J

2016 Float Copper in Michigan. *A. E. Seaman Mineral Museum* 1-3.

Bradford, Michael

2013 Radiocarbon Date for the Old Copper Component at Site 21AK11. *The Minnesota Archaeologist* 72:5-14.

Carr, Dillon H. and Robert F. Boszhardt

2010 Silver Mound, Wisconsin: Source of Hixton Silicified Sandstone. *Midcontinental Journal of Archaeology* 35 (1):5-36.

Chartkoff, Joseph L

1995 A Nester Hierarchy of Contexts: An Approach to Defining Significance for Lithic Scatters. *A Journal of California and Great Basin Anthropology* 17(1):28-40.

Child, Brenda J

2011 The Absence of Indigenous Histories in Ken Burn's "*The National Parks: America's Best Idea." The Public Historian* 33(2):24-29.

Child, Brenda J

2012 *Holding Our World Together: Ojibwe Women and the Survival of Community.* Penguin Group Publishing, NY.

Cipolla, Craig N.

2008 Signs of Identity, Signs of Memory. *Archaeological Dialogues* 15(2):196-215.

Cipolla, Craig N., James Quinn, and Jay Levy

2018 Theory in Collaborative Indigenous Archaeology: Insights from Mohegan. *American Antiquity* 1-16.

Cleland, Charles E

1982 The Inland Shore Fishery of the Northern Great Lakes: Its Development and Importance in Prehistory. *American Antiquity.* 47(4):761-784.

Collins, Michael B

1975 Lithic Technology as a Means of Processual Inference. In *Lithic Technology: Making and Using Stone Tools,* edited by Earl Swanson, pp. 5-13. Mouton, Paris, France.

Colwell-Chanthaphonh, Chip, and T. J. Ferguson

2008 *Collaboration in Archaeological Practice: Engaging Descendant Communities: Things are Not Always What They Seem: Indigenous Knowledge and Pattern Recognition in the Archaeological Interpretation of Cultural Landscapes,* edited by Norm Sheehan and Ian Lilley. Altamira Press, Lanham, MD.

Colwell-Chanthaphonh, Chip, T. J. Ferguson, Dorothy Lippert, Randall H. McGuire, George P. Nicholas, Joe E. Watkins, and Larry J. Zimmerman

2010 The Premise and Promise of Indigenous Archaeology. *American Antiquity* 75(2):228-238.

Colwell-Chanthaphonh, Chip

2010 Intersecting Magisteria: Bridging Archaeological Science and Traditional Knowledge. *Journal of Social Archaeology.* 10(3):325-346.

Corbishley, M

2011 *Pinning Down the Past: Archaeology, Heritage, and Education Today.* Boydell Press, Woodbridge, UK.

Creese, John and Walder, Heather

2018 Geté Anishinaabe Izhichigéwin Community Archaeology Project: Report of 2018 Investigations at Frog Bay Tribal National Park Red Cliff Band of Lake Superior Chippewa, Wisconsin. 1-103.

Creese, John and Walder, Heather

2020 Geté Anishinaabe Izhichigéwin Community Archaeology Project: Report of 2018-2019 Investigations at Frog Bay Tribal National Park Red Cliff Band of Lake Superior Chippewa, Wisconsin. 1-157.

Damick, Alison, and Ahmad Lash

2013 The Past Performative: Thinking through the Azraq Community Archaeology Project. *Near Eastern Archaeology* 76(3):142-150.

Deloria, Vine Jr

1969 *Custer Died for Your Sins: An Indian Manifesto.* Macmillan Publishing Company, NY.

Dibble, Harold L., Ustav A. Schurmans, Radu P. Iovita, and Michael V. McLaughlin

2005 The Measurement and Interpretation of Cortex in Lithic Assemblages. *American Antiquity.*70(3):545-560.

Douglass, Matthew J., Simon J. Holdaway, Patricia C. Fanning, and Justin I. Shiner

2008 An Assessment and Archaeological Application of Cortex Measurement in Lithic Assemblages. *American Antiquity* 73(3):513-526.

Drake, Eric C., and Sean B. Dunham

2004 The Woodland Period Occupation of Grand Island. *Midcontinental Journal of Archaeology* 29(2):133-165.

Ehrhardt, Kathleen L

2009 Copper Working Technologies, Contests of Use, and Social Complexity in the Eastern Woodlands of Native North America. *Journal of World Prehistory* (22):213-235.

Eren, Metin I., Anne Chao, Chun-Huo Chiu, Robert K. Colwell, Briggs Buchanan, Matthew T. Boulanger, John Darwent, and Michael J. O'Brien

2016 Statistical Analysis of Paradigmatic Class Richness Supports Greater Paleoindian Projectile-Point Diversity in the Southeast. *American Antiquity* 81(1):174-192.

Fanon, Frantz

1961 *The Wretched of the Earth.* Grove Press, NY.

Faulkner, Neil

2000 Archaeology from Below: A Socialist Perspective. *Public Archaeology* 1(1): 21-33.

Fowles, Severin

2010 The Southwest School of Landscape Archaeology. *Annual Review of Anthropology.* (39):453-468.

Gallivan, Martin D

2002 Measuring Sedentariness and Settlement Population: Accumulations Research in the Middle Atlantic Region. *American Antiquity*. 67(2):535-557.

Gallivan, Martin, Danielle Moretti-Langholtz and Buck Woodard

2011 Collaborative Archaeology and Strategic Essentialism: Native Empowerment in Tidewater Virginia. *Historical Archaeology* 45(1):10-23.

Gaudry, Adam

2018 Next Steps in Indigenous Community-Engaged Research: Supporting Research Self-Sufficiency in Indigenous Communities. In *Towards a New Ethnohistory: Community-Engaged Scholarship Among the People of the River,* edited by Keith Thor Carlson, John Sutton Lutz, David M. Schaepe, and Naxaxalhts'i (Albert "Sonny" McHalsie), pp. 254-259. University of Manitoba Press, Winnipeg, MB.

Grayson, Donald K. and Stephen C. Cole

1998 Stone Tool Assemblage Richness during the Middle and Early Upper Paleolithic in France. *Journal of Archaeological Science* (25):927-938.

Greer, Shelley, Rodney Harrison and Susan McIntyre-Tamwoy

2002 Community-based archaeology in Australia. *World Archaeology* 32(2):265-287.

Griffin, Joe S

2013 Toward an Understanding of Prehistoric Mobility in the Tahoe Sierra: Optimization Theories and Chipped Stone. M.A. thesis, Department of Anthropology. California State University, Sacramento, CA.

Hallson, Jennifer

2017 Using Debitage Analysis to Investigate an Alberta Archaeological Site. *Compass* 1(1):25-41.

Hamadi, Lutfi

2014 Edwards Said: The Postcolonial Theory and the Literature of Decolonization. *European Scientific Journal* 39-46.

Harvey, Jennifer R

2010 Phase I of Archaeological Investigations of Areas of Meacham Family Trust Property, Village of Howard, Brown County, Wisconsin. Great Lakes Archaeological Research Center, Inc. Project No. 10.025. 1-42.

Herrera, Jorge M., and Miguel Chapanoff

2017 Regional Maritime Context and the *Maritorium:* A Latin American Perspective on Archaeological Land and Sea Integration. *Journal of Maritime Archaeology* (12):163-178.

Hill, Mark A

2009 The Benefit of the Gift: Exchange and Social Interaction in the Late Archaic Western Great Lakes. PhD Dissertation. Washington State University, Pullman, WA.

Hill, Mark A

2012 Tracing Social Interaction: Perspectives on Archaic Copper Exchange from The Upper Great Lakes. *American Antiquity* 77(2):279-292.

Hodder, Ian and Craig Cessford

2004 Daily Practice and Social Memory at Çatalhöyük. *American Antiquity* 69(1):17-40.

Hogg, Erin A

2012 Community Engagement in British Columbia Archaeology. M.A. thesis, Department of Archaeology. Simon Fraser University, Burnaby, BC.

Howell, Ryan J

2006 A Phase I Archaeological Survey of the Proposed Town of Garfield Park Expansion, Polk County, Wisconsin. Black River Archaeology LLC, pp. 1-30.

Ingold, Tim

2000 The Perception of the Environment: Essays on Livelihood, Dwelling, and Skill. Routledge, New York, NY.

Kapp, R. O

1999 Michigan Late Pleistocene, Holocene, and Presettlement Vegetation and Climate" In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State: Bloomfield Hills, Michigan, Cranbrook Institute of Science*, edited by J. R. Halsey, pp. 31-58.

Kelly, Robert L

1988 The Three Sides of a Biface. *American Antiquity* 53(4):717-734.

Kelly, Robert L

1992 Mobility/Sedentism: Concepts, Archaeological Measures, and Effects. *Annual Review of Anthropology* (21): 43-66.

Kent, Susan

1995 Models of Abandonment and Material Culture Frequencies. In *Abandonment of Settlements and Regions*, edited by Catherine M. Cameron and Steve A. Tomka, pp. 54-73.

Kersel, Morag M. and Meredith S. Chesson

2013 Tomato Season in the Ghor Es-Safi: A Lesson in Community Archaeology. *Near Eastern Archaeology* 76(3):159-165.

Konwest, Elizabeth and Stacie M. King

2012 Moving Toward Public Archaeology in the Nejapa Valley of Oaxaca, Mexico/Hacia una Arqueología Pública en el Valle de Nejapa, Oaxaca, México. *Chungara: Revista de Antropología Chilena* 44(3):499-509.

Krakker, James J

1997 Biface Caches, Exchange, and Regulatory Systems in the Prehistoric Lakes Region. *Midcontinental Journal of Archaeology* 22(1):1-41.

Liebmann, M

2010 The intersections of Archaeology and Postcolonial Studies. In *Archaeology and the Postcolonial Critique*, edited by M. Liebmann and U. Rizvi, pp. 1-22. Altamira, New York.

Lin, Sam Chieh-Heng

2014 Experimentation and Scientific Inference Building in the Study of Hominin Behavior through Stone Artifact Archaeology. PhD Dissertation. University of Pennsylvania, Philidelphia, PA.

Lin, Sam C., Shannon P. McPherron, and Harold L. Dibble

2015 Establishing statistical confidence in Cortex Rations within and among lithic assemblages: a case study of the Middle Paleolithic of southwestern France. *Journal of Archaeological Science* 59:89–109.

Lin, Sam C., Matther J. Douglass, and Alex Mckay

2016 Interpreting MIS3 Artefact Transport Patterns in Southern Africa Using cortex Ratios: An Example from the Putslaagte Valley, Western Cape. *The South African Archaeological Bulletin* 71(204):173-180.

Magne, Martin P.R

2001 Debitage Analysis as a Scientific Tool for Archaeological Knowledge. In *Lithic Debitage: Context, Form, Meaning,* edited by William Andrefsky Jr, The University of Utah Press, Salt Lake, UT.

Marshall, Yvonne

2002 What is Community Archaeology? *World Archaeology* 34(2):211-219.

Mason, Ronald J

1981 *Great Lakes Archaeology*. Toronto, Academic Press.

Mather, David J

2000 Archaeological Overview of the Mille Lacs Locality: Loucks Project Report 96506·2. https://www.leg.state.mn.us/docs/2017/other/170772.pdf , pp. 1-20, assessed February 21, 2020.

Martin, Susan

1989 A Reconsideration of Aboriginal Fishing Strategies in the Northern Great Lakes Region. *American Antiquity* 54:594-604.

Martinez, Desireé Reneé

2006 Overcoming Hindrances to Our Enduring Responsibility to the Ancestors: Protecting Traditional Cultural Places. *American Indian Quarterly* 30 (¾): 486-503.

McClintock, Anne

1992 The Angel of Progress: Pitfalls of the Term 'Post-Colonialism.' *Social Text* 31/32: 84 – 98.

McDavid, Carol

2002 Archaeology that Hurt; Descendants that Matter: A Pragmatic Approach to Collaboration in the Public Interpretation of African American Archaeology. *World Archaeology* 34(2):303-314.

McGuire, Randall H

1992 Archaeology and the First Americans. *American Anthropologist* 94(4):816-836.

McNally, Michael D.

2009 Aging and the Life cycle Imagined in Ojibwe Tradition and in Lived History. In *Honoring Elders: Aging, Authority, and Ojibwe Religion.* Columbia University Press, NY.

Mire, Sada

2007 Preserving Knowledge, Not Objects: A Somali Perspective for Heritage Management and Archaeological Research. *The African Archaeological Review* 24(3/4):49-71.

Morris, Ian

2010 *Why the West Rules – For Now: The Patterns of History, and What They Reveal About the Future*. Farrar, Straus and Giroux, NY.

Morrow, Toby A

2016 *Stone Tools of Minnesota.* Wapsi Valley Archaeology, Inc. Anamosa, IA.

Moser, Stephanie, Darren Glazier, James E. Phillips, Lamya Nasser el Nemr, Mohammed Selah Mousa, Rascha Nasr Aiesh, Susan Richardson, Ander Conner, and Michael Seymour

2010 Transforming Archaeology Through Practice: Strategies for Collaborative Archaeology and the Community Archaeology Project at Quseir, Egypt. *World Archaeology* 34(2):220-248.

Nash, Stephen E

1996 Curation a Useful Heuristic? In *Stone Tools: Theoretical Insights into Human Prehistory*, edited by George H. Odell, pp 81-97. University of Tulsa, Tulsa, OK.

Neogi, Tathagata

2011 The Concept of Community Archaeology and Heritage Management in India. *Chitrolekha International Magazine on Art and Design* 1(3):30-33.

Nicholas, George P

2008 Native Peoples and Archaeology. *Encyclopedia of Archaeology* 3:1660 -1669.

Norrgard, Chantal

2009 From Berries to Orchards: Tracing the History of Berrying and Economic Transformation among Lake Superior Ojibwe." *American Indian Quarterly.* 33 (1): 33-61.

Oetelaar, Gerald A

2014 Better Homes and Pastures: Human Agency and the Construction of Place in Communal Bison Hunting on the Northern Plains. *Plains Anthropologist* 59(229):9-37.

Odell, George H

2004 *Lithic Analysis.* Kluwer Academic/Plenum Publishers, NY.

Parry, William J., and Robert L. Kelly

1987 Expedient Core Technology and Sedentism. In *The Organization of Core Technology,* edited by Jay K Johnson and Carol A. Morrow, pp. 285-304. Westview Press, Boulder and London.

PBS (Public Broadcasting Service)

2000 “Tribal Histories, Ojibwe History.” *Public Broadcasting Service (PBS),* August 31, 2000. https://www.pbs.org/video/wpt-documentaries-ojibwe-history/ , assessed March 8, 2020.

PBS (Public Broadcasting Service)

2016 “Tribal Histories, Red Cliff Ojibwe History.” *Wisconsin First Nations,* December 15, 2016. https://wisconsinfirstnations.org/tribal-histories-red-cliff-ojibwe-history/ , assessed March 8, 2020.

Pecora, Albert M

2001 Chipped Stone Tool Production Strategies and Lithic Debitage Patterns. In *Lithic Debitage: Context Form Meaning*, edited William Andrefsky, Jr., pp. 173- 190. The University of Utah Press, Salt Lake Press, UT.

Phillips, Brian A. M

1979 Shoreline Inheritance in Coastal Histories. *Science* 195(4273):11-16.

Pleger, Thomas C., and James B. Stoltman

2009 The Archaic Tradition in Wisconsin. In *Archaic Societies: Diversity and Complexity Across the Midcontinent*, edited by T. E. Emerson, A. C. Fortier and D. L. McElrath, pp. 697-723. SUNY Press, Albany, NY.

Piccini, Angela, and David M. Schaepe

2014 The Messy Business of Archaeology as Participatory Local Knowledge: A Conversation Between the Sto:lo and Knowle West. *Canadian Journal of Archaeology/Journal Canadien d’Archéologie.* 38(2):466-495.

Price, Douglas T

1985 Late Archaic Subsistence in the Midwestern United States. *Journal of Human Evolution* (14):449-459.

Quimby, George Irving

1960 *Indian Life in the Upper Great Lakes: 11,000 B.C. to A.D. 1800*. The University of Chicago Press. Chicago, IL.

Rasic, Jeffrey, and William Andrefsky Jr

2001 Alaskan Blade Cores as Specialized Components of Mobile Toolkits: Assessing Design Parameters and Toolkit Organization through Debitage Analysis. In *Lithic Debitage: Context, Form, Meaning, e*dited by William Andrefsky Jr., pp. 61-79. The University of Utah Press, Salt Lake, UT.

Red Cliff Band of Lake Superior Chippewa

2004 Origins and History. http://redcliff-nsn.gov/Government/history.htm. accessed November 10, 2019.

Red Cliff Band of Lake Superior Chippewa

2019 Frog Bay Tribal National Park. http://redcliff-nsn.gov/Government/history.htm. accessed November 10, 2019.

Reid, P

2012 Performance or participation: The relationship between local communities and the archaeological domain." In *Community Archaeology: Themes, methods and practices*, edited by G. Moshenska and S.Dhanjal, pp.18–27. Oxford University Press, Oxford, UK.

Robertson, James A., William A. Lovis, and John R. Halsey

1999 The Late Archaic: Hunter-Gatherers in an Uncertain Environment. In *Retrieving Michigan's Buried Past,* pp. 95-124, Wayne State University Press, Detroit, MI.

Ross, Anne, Sean Ulm, and Brian Toban

2013 GUMMINGURRU – A Community Archaeology Knowledge Journey. *Australian Archaeology* (76):62-68.

Silvern, Steven E

1995 Nature, Territory, and Identity in the Wisconsin Treaty Rights Controversy. *Ecumene* 2 (3):267-292.

Said, Edward W

1978 *Orientalism*. Pantheon Books, NY.

Salzer, Robert J

1974 The Wisconsin North Lakes Project: A Preliminary Report. In *Aspects of Upper Great Lakes Anthropology: Papers in Honor of Lloyd A. Wilford*, edited by E. Johnson, pp. 40-54. Minnesota Historical Society, St. Paul, MN.

Samuels, S.R., and R. Daugherty

1991 Introduction to the Ozette Archaeological Project. In *Ozette Archaeological Project Research Reports Volume 1, House Structure and Floor Midden*, edited by S.R. Samuels, pp. 1-27, Vol. 1 of the Reports of Investigations 63. Washington State University, Pullman, Washington.

Seddon, Matthew T

1992 Sedentism, Lithic Technology, and Debitage: An Intersite Debitage Analysis. *Midcontinental Journal of Archaeology* 17(2):198-226.

Silverman, Helaine

2011 Epilogue: Perspectives on Community Archaeology. *Historical Archaeology* 45(1): 152-166.

Smith, Linda Tuhiwai

1999 *Decolonizing Methodologies: Research and Indigenous Peoples.* University of Otago Press, Dunedin, NZ.

Smith, Claire and H. Martin Wobst

2005 *Indigenous Archaeologies: Decolonizing Theory and Practice*. Routledge, New York, NY.

Smith, Claire and Gary Jackson

2008 The Ethics of Collaboration: Whose Culture? Whose Intellectual Property? Who Benefits? In *Collaboration in Archaeological Practice: Engaging Descendant Communities,* edited by Chip Colwell-Chanthaphonh and T.J. Feerguson, pp. 171-199. Altamira Press, Walnut Creek, CA.

Spector, Janet

1993 *What this Awl Means: Feminist Archaeology at a Wahpeton Dakota Village*. Minnesota Historical Society Press, St. Paul, MN.

Spivak, Gayatri

1985 "Can the Subaltern Speak?" In *Colonial Discourse and Post-Colonial Theory: A Reader,* edited by Williams, Patrick, and Laura Chrisman, pp. 66-111. Columbia University Press, NY.

Spott, Elizabeth

2005 Analysis of Quartz in Northern Wisconsin: Deficiencies, Misconceptions and Goals. *Nebraska Anthropologist* (10):115-128.

State Historical Society of Wisconsin

1911 Map of Wisconsin. Within the *Map Collection.* https://www.wisconsinhistory.org/Records/Image/IM8968 , assessed April 8, 2020.

Steward, Julian

1955 *Theory of Culture Change: The Methodology of Multilinear Evolution.* University of Illinois Press, Urbana, IL.

Stoughton, Sean

2011 Community Archaeology: The Kitikmeot Heritage Society's Iqaluktuuq Project. *Totem: The University of Western Ontario Journal of Anthropology* 14(1):83-90.

Sullivan, Alan P. III, and Rozen, Kenneth C

1985 Debitage Analysis and Archaeological Interpretation. *American Antiquity* 50(4):755-779.

Supernant, Kisha, and Gary Warrick

2014 Challenges to Critical Community-Based Archaeological Practice in Canada. *Canadian Journal of Archaeology/Journal Canadien d' Archéologie* 38(2): 563-591.

Tallavaara, Mikka, Mikael A. Manninen, Esa Hertell, and Tuija Rankama

2010 How Flakes Shatter: A Critical Evaluation of Quartz Fracture Analysis. *Journal of Archaeological Science* 37:2442-2448.

Thomas, Suzie

2017 Key Concepts in Public Archaeology. In *Key Concepts in Public Archaeology*, edited by Gabriel Moshenska, pp. 14-30. UCL Press, California.

Trigger, Bruce G

1980 Archaeology and the Image of the American Indian. *American Antiquity* 45(4) 662-676.

Tuck, Eve and Wayne K. Yang

2012 Decolonization is not a metaphor. *Decolonization: Indigeneity, Education and Society.*1(1):1-40.

Twyman, Chasca

2000 Participatory Conservation? Community-Based Natural Resource Management in Botswana. *The Geographical Journal* 166(4):323-335.

Van Dommelen, Peter

2011 Postcolonial Archaeologies Between Discourse and Practice. *World Archaeology* 43(1):1-6.

Varien, Mark D. and Barbara J. Mills

1997 Accumulations Research: Problems and Prospects for Estimating Site Occupation Span. *Journal of Archaeological Method and Theory* 4(2):141-191.

Warren, William W

1885 *History of the Ojibway People*. Ross and Haines, Inc., Hudson, WI.

White, Leslie

1943 Energy and the Evolution of Culture. *American Anthropologist* 45(3/1):335-356.

Whitridge, Peter

2004 Landscapes, Houses, Bodies, Things: "Place" and the Archaeology of Inuit Imaginaries. *Journal of Archaeological Method and Theory* 11(2):213-250.

Wittry, Warren L

1957 A Preliminary Study of the Old Copper Complex. *The Wisconsin Archeologist* 38:204-221.

Wilcox, Michael

2010 Saving Indigenous Peoples from Ourselves: Separate but Equal Archaeology is Not Scientific Archeology. *American Antiquity* 75(2):221-227.

Young, Lisa C

1994 Lithics and Adaptive Diversity: An Examination of Limited-Activity Sites in Northeast Arizona. *Journal of Anthropological Research* 50(2):141-154.

Young, Lisa C

1994 Logistic Mobility and Expedient Technology: A Response to Sullivan. *Journal of Anthropological Research* 50(2):165-167.

Zedeño, M. Nieves, Richard W. Stoffle, Fabio Pittaluga, Genevieve Dewey-Hefley, R. Christopher, and Basaldú María Porter

2001 Traditional Ojibway Resources in the Western Great Lakes: An Ethnographic Inventory in the States of Michigan, Minnesota, and Wisconsin. Bureau of Applied Research in Anthropology, University of Arizona, Tucson.

APPENDIX A. MAP OF WISCONSIN INCLUDING COUNTY IDENTIFICATIONS

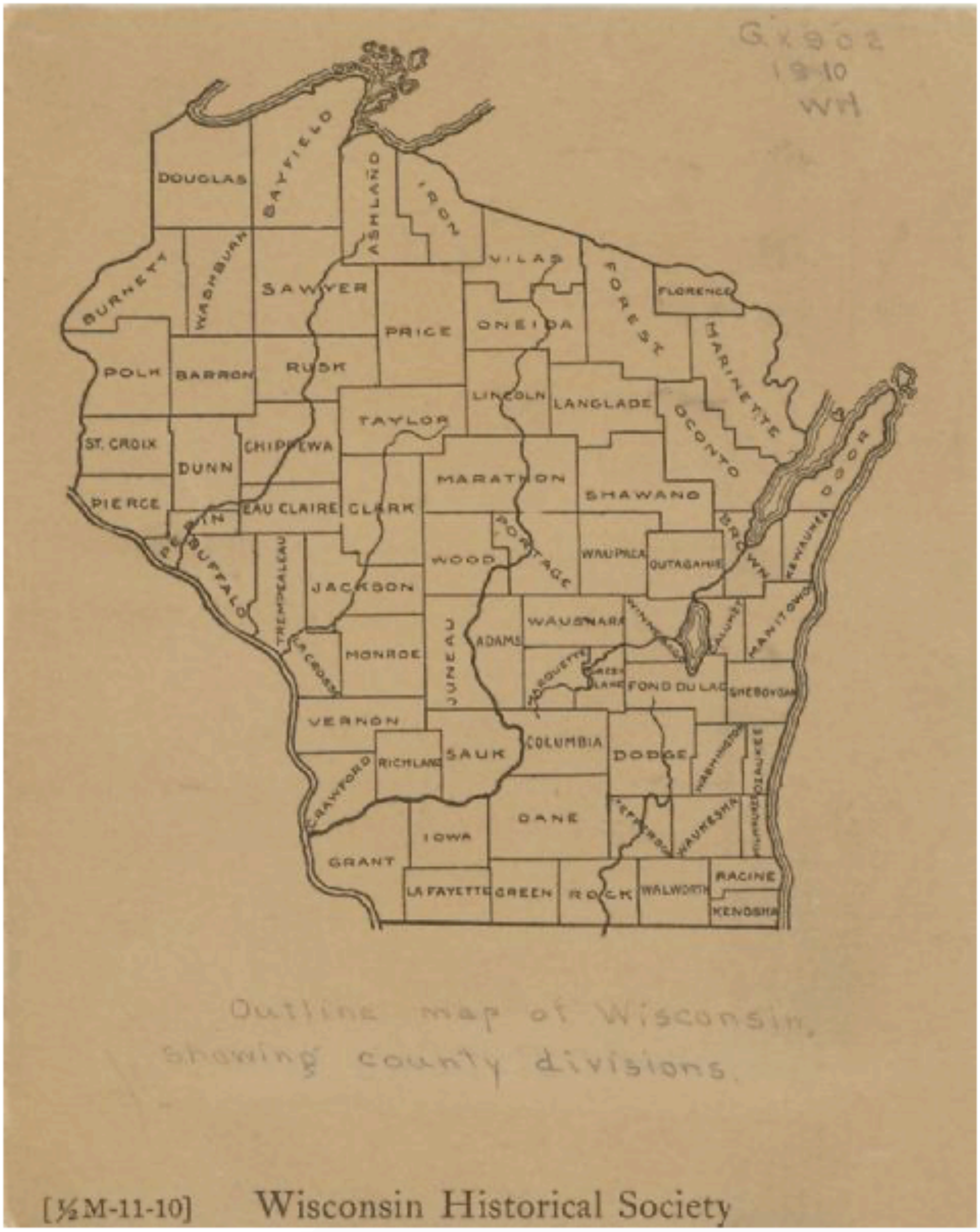


Figure A1. Map of Wisconsin including county identifications. Source: State Historical Society of Wisconsin.

APPENDIX B. UNIT 1 LITHIC ASSEMBLAGE BY LEVEL

Table B1. Unit 1 lithic and copper assemblage by level.

Unit 1 Level	Quartz Unmodified Debitage	Chert Unmodified Debitage	Quartz Tool	Chert Tool	Quartz Core	Quartz Micro debitage	Chert Micro debitage	Copper	Unidenti fied Rock
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	2	0	0	0
3	0	0	0	0	0	3	0	0	0
4	3	0	0	0	0	6	1	0	0
5	3	0	0	0	0	11	1	0	0
6	3	1	0	1	0	11	0	0	0
7	11	0	0	0	1	11	0	0	0
8	6	0	0	0	0	18	0	1	0
9	4	0	0	0	0	12	0	1	0
10	2	0	0	0	0	9	1	0	1
11	2	1	0	0	0	10	0	1	0
12	5	1	1	0	0	8	1	0	0
13	2	0	0	0	0	13	0	0	0
14	3	0	0	0	0	8	0	0	0
15	5	3	0	0	0	7	0	0	0
16	2	0	0	0	0	15	0	0	0
17	5	1	0	0	0	4	0	0	0
18	5	1	0	0	0	3	0	0	0
19	0	0	0	0	0	1	0	0	0
20	4	0	0	0	0	2	0	0	0
21	1	0	0	0	0	3	0	0	0
22	1	0	0	0	0	2	0	0	0
23	1	0	0	0	0	4	0	0	0
24	2	0	0	0	0	1	0	0	0
25	3	0	0	0	0	6	1	0	0
26	1	0	0	0	0	2	0	0	0
27	1	0	0	0	0	0	0	0	0
28	1	0	0	0	0	0	0	0	0
29	10	0	0	0	0	1	0	0	0
30	2	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0
32	1	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	1	0	0	0
Total: 283	**89**	**174**	**1**	**1**	**8**	**5**	**1**	**1**	**3**

Table B2. Unit 2 lithic assemblage by level.

Unit 2 Level	Quartz Unmodified Debitage	Chert Unmodified Debitage	Quartz Micro debitage	Silicified Sandston e	Quartz Core	Chert Core
1	0	0	0	0	0	0
2	2	0	0	0	0	0
3	1	0	11	0	0	0
4	7	1	17	0	0	1
5	7	0	14	0	0	0
6	18	0	12	0	0	0
7	10	0	4	0	0	0
8	3	0	3	0	0	0
9	3	0	2	0	0	0
10	2	0	0	0	1	0
11	1	0	1	0	0	0
12	5	0	6	0	0	0
13	1	0	0	1	0	0
14	1	0	0	0	0	0
15	1	0	3	1	0	0
16	2	0	2	0	0	0
17	1	0	1	0	0	0
18	0	0	2	0	0	0
19	0	0	1	0	0	0
Total: 149	**65**	**1**	**79**	**2**	**1**	**1**

Table B3. Unit 3 lithic and copper assemblage by level.

Unit 3 Level	Quartz Unmodified Debitage	Chert Unmodified Debitage	Quartz Micro debitage	Chert Micro debitage	Quartz Modified Flake	Quartz Core	Copper	Granite	Silicified Sand stone	Pecked/ Ground stone	Unidentified Stone
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0
4	0	0	1	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0
6	3	0	7	0	0	0	0	0	2	0	0
7	19	1	23	0	3	0	0	0	2	0	0
8	30	0	34	0	0	0	0	0	0	0	0
9	13	0	24	1	0	0	0	0	0	0	0
10	26	3	55	1	0	0	0	0	0	0	0
11	38	0	45	0	1	1	0	0	0	0	0
12	24	0	42	0	0	0	0	0	0	0	2
13	25	0	72	3	1	1	0	0	1	1	0
14	19	1	59	2	0	1	0	0	0	0	0
15	17	1	47	5	0	1	0	1	0	0	1
16	15	1	27	1	0	0	1	0	0	0	0
17	7	0	22	0	0	0	0	0	0	0	0
18	9	1	12	0	0	0	0	0	0	0	0
19	8	0	17	0	0	0	0	1	0	1	0
20	3	0	6	0	0	0	0	0	0	0	0
21	1	0	2	0	0	0	0	0	0	0	0
22	4	0	7	0	0	0	0	0	0	0	0
23	1	0	0	0	0	0	0	0	0	0	0
Total: 807	**262**	**8**	**502**	**13**	**5**	**4**	**1**	**2**	**5**	**2**	**3**

APPENDIX C. UNIT 1 FEATURE 6 LITHIC ASSEMBLAGE

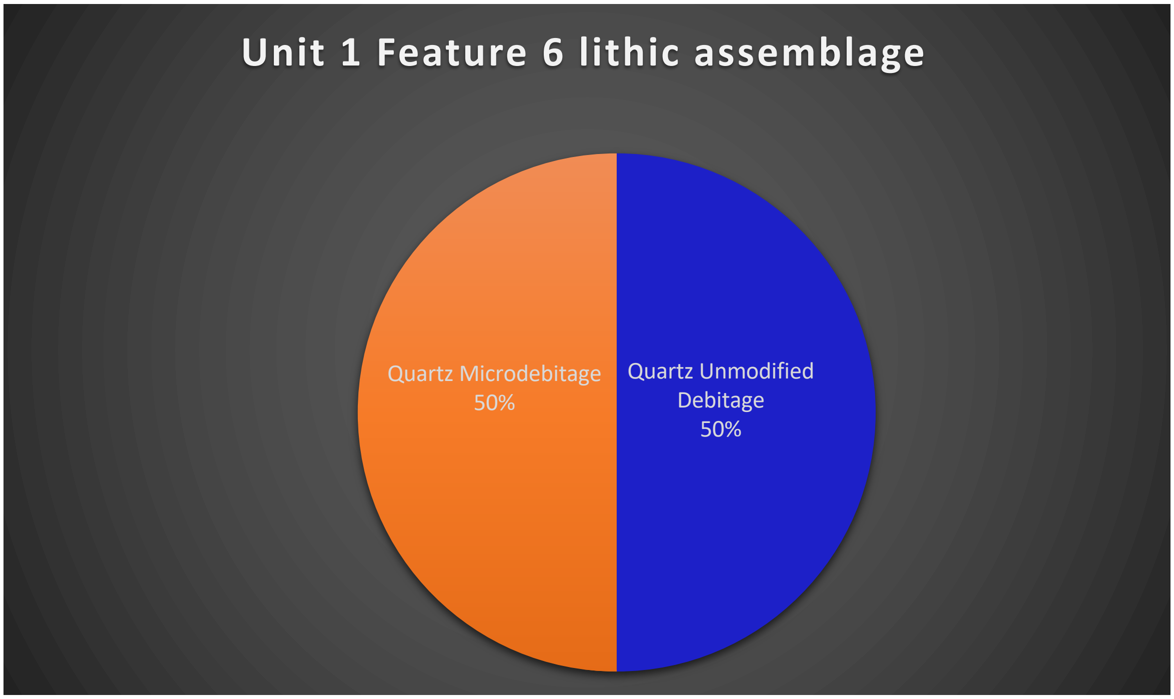


Figure C1. Unit 1 Feature 6 lithic assemblage. Artifact Total: 6

APPENDIX D. UNIT 3 FEATURE 3 LITHIC ASSEMBLAGE

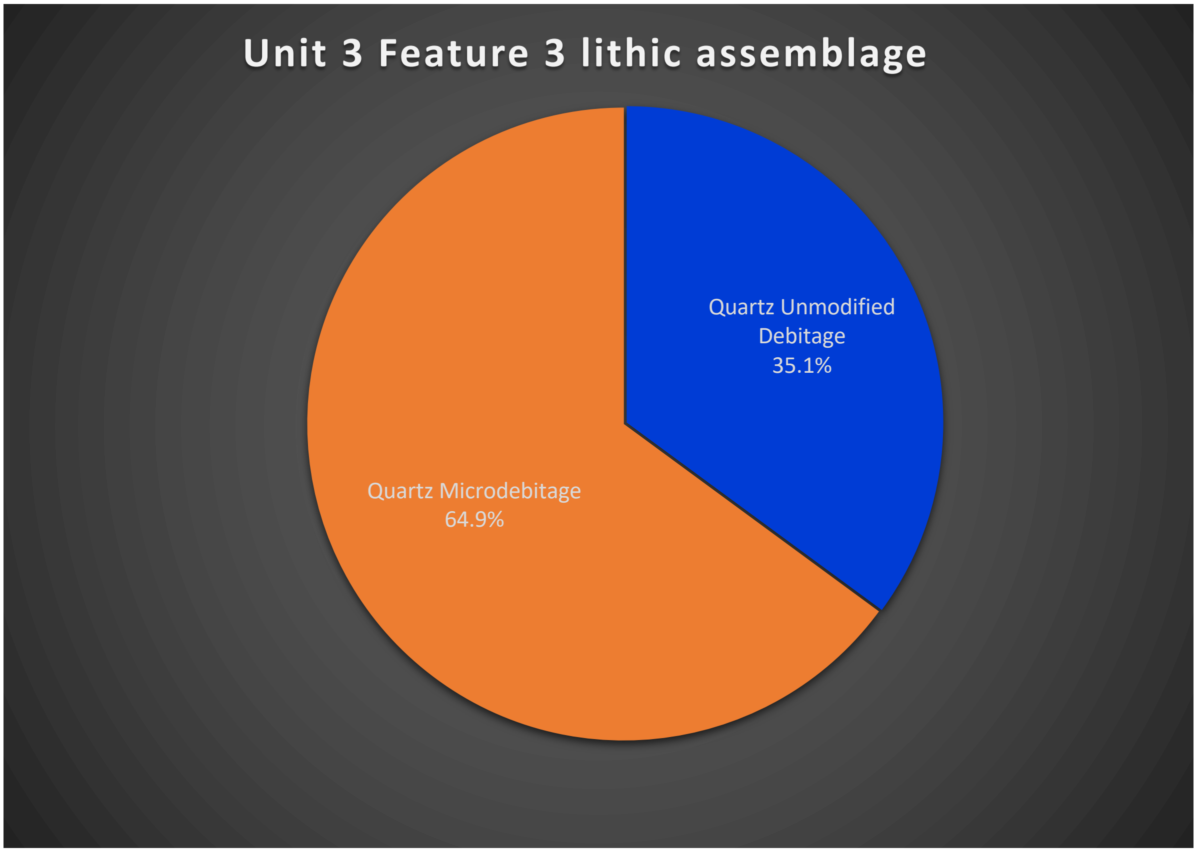


Figure D1. Unit 3 Feature 3 lithic assemblage.
Artifact Total: 57