Power and Provisions in Anishinaabewaki: Re-Contextualizing Human-Environment Interactions During the Great Lakes Fur Trade

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Anthropology)
in the University of Michigan
2023

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Dedication

To Kylista Geiger

Thank you for being my foil and greatest ally.

Miigwetch

Acknowledgements

Starting at the beginning, which I hear is a very good place to start, I need to thank my family for supporting the road I walked since I was eight years old. My mother Cynthia Geiger didn't laugh at her child when she said she wanted to be an archaeologist. Instead, she supported her eight-year-old. My sisters Kylista Geiger and Margaret Geiger kept my ego in check and unwavering in their cheerleading efforts.

However, those foundations would have been nothing without Bradley Ensor at Eastern Michigan University (EMU). He gave me a coveted place on his crew in Mexico, taught me the realities of archaeology, and guided me through my first wobbly steps into academia. Other key figures from EMU include my fellow anthropologists and life-long friends Alex Boughton, Jessica Tenbusch, Toni Dallas, Tracy Knoeller, and Georgia Richardson. And I can't forget to thank the incomparable Dr. Karen Sinclair.

My community at Wayne State University was instrumental in forming the germs of this dissertation. My advisor Tamara Bray and thesis committee member Krysta Ryzewski exercised extreme patience as I grew out of my academic naiveté. Sherri Briller, Kelsey Cross, Jen O'Hare, and Kim Shay were inspirational figures during this phase of my life.

Once at Michigan, my advisor Rob Beck and committee members Joyce Marcus, Mike Galaty, and Michael Witgen offered me invaluable guidance. In particular, Joyce Marcus and Rob Beck offered me grace in the face of the inevitable setbacks and struggles that accompany graduate school. Not to outshined, the logistical help I received from Amy Winchester, Jim

Moss, Lauren Fuka, and Andrea Blaser meant I kept on track. Without them, we all might lose our heads.

Other support for this research came from the Repatriation & Historic Preservation Department and Inland Fish and Wildlife Department at the Sault Ste. Marie Tribe of Chippewa Indians. Encouragement and feedback from Susan Kooiman, Bill Lovis, Sean Dunham, and David Brose. Along the way, Kyle Whyte, Wes Andrews, Scott Herron, Henry Wright, Raven Garvey, and Carla Sinopoli provided me feedback, support, and inspiration. Additionally, thanks go out to Mark Horrocks and Craig Chartier for their critical expertise. Additionally, I literally wouldn't have been able to complete my work without Eloise Janssen, Emma Creamer, and Trevor McKinney as crew members for the 2019 field season.

On a personal level, there are many people who helped create the version of "me" that went on to develop this research. Linda Cypret-Kilbourne, Marsha Traxler Reeves, Andrea Pierce, and Karen Schaumann-Beltran taught me what it was to be *Kwe*. My cohort mates in "The Coven" Bree Doering, Jordan Dalton, and Jo Osborn provided me with friendship, wisdom, and shoulders to lean on, and so many bad movie nights. Of the many people I met at Michigan Anna Antoniou, Chelsea Fisher, Jess Beck, Colin Quinn, Ashley Schubert, Lisa Sonnenburg, Sandhya Narayanan, Christina Perry Sampson, Lacey Carpenter, Nick Trudeau, Györgyi Parditka, Iride Tomažič, Jenny Larios, Laura Bossio, Kimi Swisher, Tim Everhart, Angie Feak, and Lauren Pratt provided me with stability, emotional support, professionalization, and validation. Two people in this category require special attention. Alex Beaudin, you have been with me since my master's degree. I couldn't have asked for a more supportive and selfless person to share this road with. Much of this work much is owed to you. And Marty Menz, thank you for being "my person" on this leg of my journey. The intellectual enrichment you provided me has been matched by the love and affirmations you shared with me.

Finally, Lisa Young deserves particular thanks. She has been a generous and thoughtful guide throughout my graduate career. The professional and spiritual growth you provided can never be repaid. Here is to paying it forward to all my other-than-human relatives.

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Abstract

Research on the French fur trade during the seventeenth and eighteenth centuries highlights the unique political environment of the early French period in the Great Lakes (1650-1760 AD). The Anishinaabe found ways to leverage their transportation, location, relationships, and goods to their advantage. Despite feedback loops between the social and ecological, the role of relationships with the natural world are not often put into conversation with theories of power and control. Be it provisions or beaver, French interests were rooted in products accessible through Indigenous peoples. In this dissertation, I use political economy and political ecology as frameworks to characterize the role of social-ecological systems in the French period. Macrobotanical and microbotanical data from my 2019 fieldwork at the Cloudman site on Drummond Island, are used to examine the roles of Anishinaabe human-environmental interactions on the St. Mary's River. I argue that socio-ecological practices like intentional forest management played a role in the avoidance of coercion, resource support for travel, and as a method of maintaining a territorial claim. Outcomes of this research support previously hypothesized connections between mobility and resistance and reveal that Anishinaabe people continued the sustainable practices of intentional forest management into the historic period. These results suggest alternative modes of engaging within a market economy that doesn't develop into extractive methods.

Chapter 1 - Introduction

> The Outaouacs claim that the great river belongs to them, and that no nation can launch a boat on it without their consent. Therefore all who go to trade with the French, although of widely different nations, bear the general name of Outaouacs, under whose auspices they make the journey.
>
> — Jean Claude Allouez, 1666[1]

1.1 "The Most Advantageous Post in Canada"

In 1679 the chief financial officer of New France, Jacques Du Chesneau poured his concerns into a letter to the minister of marine. With the growing British presence around the colony, he worried France's economic and political rival would disturb alliances in the "new world." He wrote of his fears that, "This will eventually ruin our trade with the *Outawacs* (Odawa), which is most considerable, and constitutes the subsistence and wealth of the colony." This sentiment does more than stress the tensions between France and Britain, it emphasizes the importance of the Odawa to French designs (M. Du Chesneau to M. de Seignelay: New York Colonial Manuscripts [NYCM]: 138; Witgen 2012).

By the seventeenth century, the European appetite for felted hats contributed to the westward push of Europeans into the Great Lakes. Many were drawn to the prospect of seemingly untapped beaver populations that could supply the raw materials for furthering the felted hat craze. Northern Michigan and Canada were understood to yield superior furs (Eccles 1983; McDonnell 2015). Reports from the emissary François Clairambault D'Aigremont make a point to address the quality of Northern fur. Clairambault felt that the fort at the Straits of

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[1] Thwaites 1896–1901:51:21

Mackinac was “the most advantageous post in Canada” and the source of thick pelts from colder climates (D’Aigremont, Report 1708: Michigan Pioneer and Historical Collections, Lansing 40:424–52; McDonnell 2015b). However, access to the coveted beaver pelts called “*castor gras*” was not easily theirs for the taking (White 1991; Brown 2004).

During the Great Lakes fur trade, the tribes comprising Anishinaabe cultural groups (plural Anishinaabek), which include the Odawa, Ojibwe, and Potawatomi*,* were positioned politically and geographically to afford themselves economic and protective advantages (Berthelette 2016; Brandão 2019). This territory was the Mackinac region birthplace of the culture hero *Nanaboozho* (American Philosophical Society: Creation of Mackinac Island by Nanabojo, Jane Willets, 1949; Johnston 1995). It was home not only to Anishinaabe like the Odawa and Ojibwe, but it was also the refuge for the Iroquois-speaking Huron people (also known as the Wendat[2]). It remains an Anishinaabe homeland to this day (Bohaker 2020). More relevant though, it was the center of an expansive Anishinaabe networking system. Fittingly, this region was home to the village *"Obtawaing*”, meaning “the halfway place” (Sherburne 2021). As the name implies, this Anishinaabe territory was located at a strategic geographic choke point between the western country and Montreal (Figure 1-1). From this position they could restrict access to the fur supply as well as France’s hopes for control of the fur trade (Brown 2004; Widder 2013). Essentially, if the Straits of Mackinac were the lock on a figurative treasure chest, then the Anishinaabe were the key (Dunnigan 2020; Peyser and Brandão 2008; McDonnell 2015b).

[2] Often the term Wendat refers to more than one Huron associated group. It may be a broader cultural identity. Some suggest that the two are separate groups while others insist the proper name is Wendat. See McCullen t2015

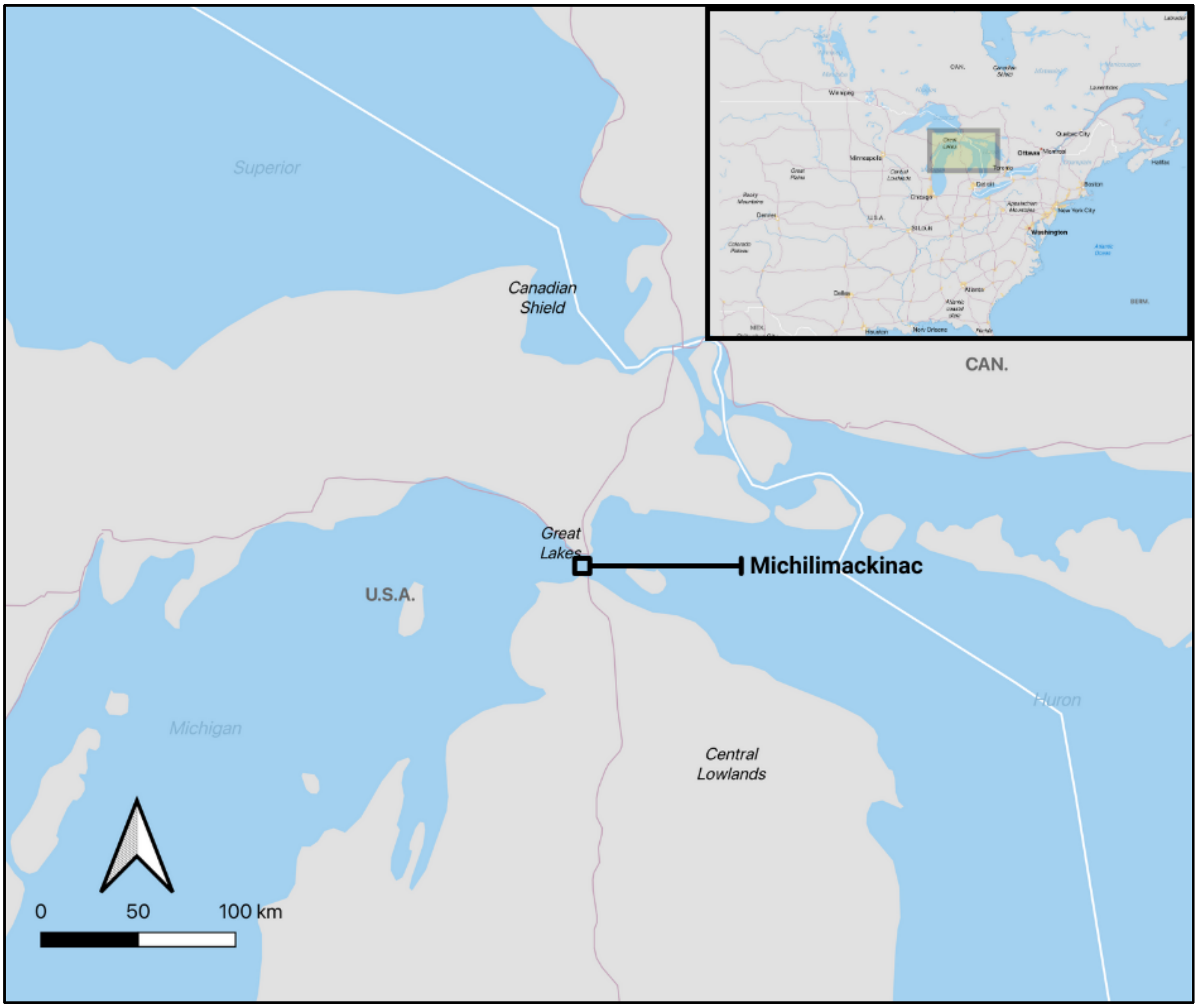

Figure 1-1: Broad Mackinac region. Michilimackinac at the Straits of Mackinac

Though the French recognized the absolute necessity of their Indigenous allies, for the Anishinaabe, the French were not necessarily the center of their concerns (Berthelette 2016; Bohaker 2020). For example, only a decade after Du Chesneau's letter, the Anishinaabek at Michilimackinac (Mackinac Island) led by Nissowaquet, "The Fork" were busy weighing the benefits of aiding the French. In Nissowaquet's position as a clan chief of the "nation de la Fourche," the Odawa leader ultimately chose a pro-French route. However, long held rivalries between Anishinaabe and Iroquoian groups were older, more deadly, and more pressing (Jordan 2008). But more than simply being an unequal love affair, a closer examination of the French and Anishinaabe relationship has revealed that the French were often dependent on the Anishinaabe. These facts counter narratives of inevitable conquest because while the French set up shop in the Mackinac region, European occupancy did not mean European power.

To the above point, research on the seventeenth and eighteenth centuries in northern Michigan has rejected a domination interpretation for the early French presence (Anderson 1992; Sleeper-Smith 2001; White 1991; Witgen 2012). For example, Richard White's (1991) now famous conceptualization of the "Middle Ground" brought into relief the uniquely balanced relationships between the Indigenous peoples of northern Michigan and the French. As allies to the French, Anishinaabe forces could be depended upon to guard New France's borders from Haudenosaunee (Iroquoian-speaking confederacy) incursions. In the same letter by Du Chesneau, he claims that war with the British would favor the French. His opinion is illustrated by his description of the Indigenous inhabitants of the Great Lakes as "hardy, intrepid, and naturally warriors" (NYCM:138).

Another example of White's claim can be seen through an account of a difficult diplomatic situation involving a few Ojibwe men and a Menominee[3] man (McDonnel 2015b; White 1991). These men had killed two Frenchmen near Sault Ste. Marie. The outcome of the murder was that the guilty parties each departed to stay with their various kin among the Sable, Kiskakon, and other Odawa clans. The French authority at Michilimackinac desired justice but instead of having the means of extracting said justice for France, the French agent was in the delicate position of needing to tread carefully with the Odawa clan leaders who were now thrown into the mix. Justice became the jurisdiction of the Anishinaabe. To avoid war, the clan leaders decided that only two of the accused party would be executed for the crime and paid the French and the accused men's families with wampum to cover their dead. This situation demonstrates the ability of the Anishinaabek to self-govern and impose their own order. Their role in diplomacy for the region was arguably as powerful as their ability to go to war.

On a smaller scale, carrying goods became a valuable skillset that could be leveraged. When the French began formalizing trade in the Great Lakes, they were not equipped to handle the logistics of procuring and carrying goods across the monstrous inland seas (Gross 1990; Kinietz 1940). They had no choice but to forge trading partnerships with Indigenous groups who would collect furs and bring them to the St. Lawrence settlements. The Odawa in particular, took advantage of their superior transportation skills and geographic position at the edge of the major French trade routes. There are several court documents that refer to the Odawa being hired to transport or specified as the people of interest for trade (Peyser and Brandão 2008). One example comes from a 15 May 1685 – Partnership Agreement. The document outlines the legal agreement between Olivier Morel, écuyer, seigneur de La Durantaye and Jean Morneau and Jean

[3] An Algonquin group allied to the Anishinaabe clans

Lariou. Sieur de La Durantaye hired Morneau and Lariou to take the canoe he provided and go among the Odawa to trade merchandise. The contract outlines the profit the two traders might expect and includes language specifying that they should, "convert the trade goods into pelts."

Initially, it was the Wendat groups who took on the role for which the Odawa would become famous. Before the "Huron diaspora" in 1615, the Huron people traded fish nets, food, and game animals all while working hard to prevent other local groups like the Neutral, Petun, Odawa, or Ojibwe from traveling directly to French trading posts in the St. Lawrence River Valley (Heidenreich and Ray 1976; Trigger 1965, 1969). Instead, they used intertribal trade networks. The Wendat and their allies would gather furs through trade with other Amerindian groups and move those goods directly to the French (Eccles 1983). However, it was not to last. By the end of 1650 Wendat groups were driven from their homeland by the Seneca and the Odawa replaced the Huron as the primary trading partners of the French (Appendix B). As the Odawa grew in influence, several factors played a role in the economic power of Anishinaabe agents:

1) *The Anishinaabe had decentralized governments preventing the French from brokering a full-scale alliance*
2) *They provided military power derived from advanced networking and kinship systems*
3) *They were positioned as "middlemen" who facilitated maneuvering across the landscape and movement of goods*
4) *They used their superior ecological knowledge to provision the French with native foods.*

The above factors are by no means exhaustive, but they highlight the ways the Anishinaabe, in particular, the Odawa, wielded power (i.e., by leveraging their own skills, alliances, and labor). However, it is the third and fourth points on the list that have not received as much attention from an archaeological perspective. Fur trade logistics required expert navigators with the ecological and political knowledge to survive. These elements require a closer examination.

In recent years, the role of the landscape has become a research focus for fur trade archaeology. For example, Allard (2020) points out that the role of foodways and the "waterscape" helped mediate relationships between the Ojibwe and European traders at Réaume's Leaf River Post. In the case of the Odawa, their political economy took shape after the diaspora of the Huron. The displacement provided an opportunity for a middleman position in the region. In Kooiman and Walder (2019) they describe Drummond Island as an important resource procurement area as well as trade center. The Odawa would have been able to leverage their access to fur bearing mammals and fish, provisioning and hosting Frenchmen, and placement by the historic trade routes that went through the St. Mary's River towards St. Ignace. It was, as Lietner (2005) puts it a "commodity frontier". Thus, the role of the landscape within the Mackinac region remains fertile ground for investigation and we can turn our attention to ecological data for further insight.

1.2 Dissertation Organization

What this dissertation seeks to do is to better understand the mechanisms of Anishinaabe power during the French period (Table 1-1). At its broadest, my research will contribute to a better understanding of the complexities inherent in Indigenous responses to European colonization across North America, expanding our knowledge of Indigenous social and economic systems. While acknowledging the political power of the Odawa and Ojibwe, I explore the articulation between ecological practices and local power.

French Period Divisions	
Early Phase	AD 1600-1650
Transitional Phase	AD 1650-1715
Expansion Phase	AD 1715-1760

Table 1-1: Divisions of the French fur trade as constructed by Anderson 1992

Within the remainder of Chapter 1 I will set up the historical and cultural context of the Straits of Mackinac as it relates to my research focus. Following the historical context, I use the frameworks of political economy and political ecology as research strategies. These frameworks will be discussed in depth in Chapter 2. I will then outline my research questions, the evidence, and the analytical methods I will use to answer them in Chapter 3. My research questions will address how the landscape was occupied and changed. I combine what is known from primary sources along with data from recent archaeological excavations at the Cloudman site (20CH6) of Drummond Island, Michigan (Figure 1-2). I use this information to interpret the power of the Anishinaabe through their ecological and landscape relationships. Such data will include macrobotanical and microfossil data primarily from hearth contexts. Seasonal mobility, forest niche construction, communal labor, and the prioritizing of high yielding foods (e.g., seasonal fish spawns or wild rice) are a major focus of this dissertation.

Figure 1-2: Location of the Cloudman site on Drummond Island.

Chapters 4 and 5 that will cover the environmental setting of the region and a summary of previous work. Chapters 6 and 7 will summarize my research expectations, results, and conclusions. Finally, Chapter 8 will cover the ways this work intersects with contemporary Indigenous issues like food sovereignty.

1.3 Study Area

Archaeological data for this dissertation comes from samples collected during my 2019 dissertation fieldwork at the Cloudman site (20CH6) on Drummond Island (see Chapter 3). Additionally, the Cloudman data are compared with evidence from three archaeological sites that encircle the northern tip of Michigan's Lower Peninsula, the eastern edge of the Upper Peninsula, and surrounding islands (Figure 1-3). Data from the O'Neill, Summer Island, and Providence Bay sites will be incorporated into my conclusions along with references to the work done at Rock Island and Hunter's Point. The Late Woodland components from the supplementary sites have received the most attention. However, what data are available for the historic components provide needed context when primary documents lack detail. Previous work at the other three sites provides contextual evidence for understanding the place of the Cloudman site within the northern Michigan fur trade. Most of my discussion and analysis is focused on the Cloudman site.

Three sites are located within the state of Michigan, with one other site located on Manitoulin Island in the Canadian province of Ontario, only 100 kilometers by water from the straits. Cloudman, and Providence Bay were selected for inclusion on the basis of: a) associations with Anishinaabe Odawa and Ojibwe historic territory; b) the presence of French period historic components; c) associations with known trade routes; d) proximity to the Straits

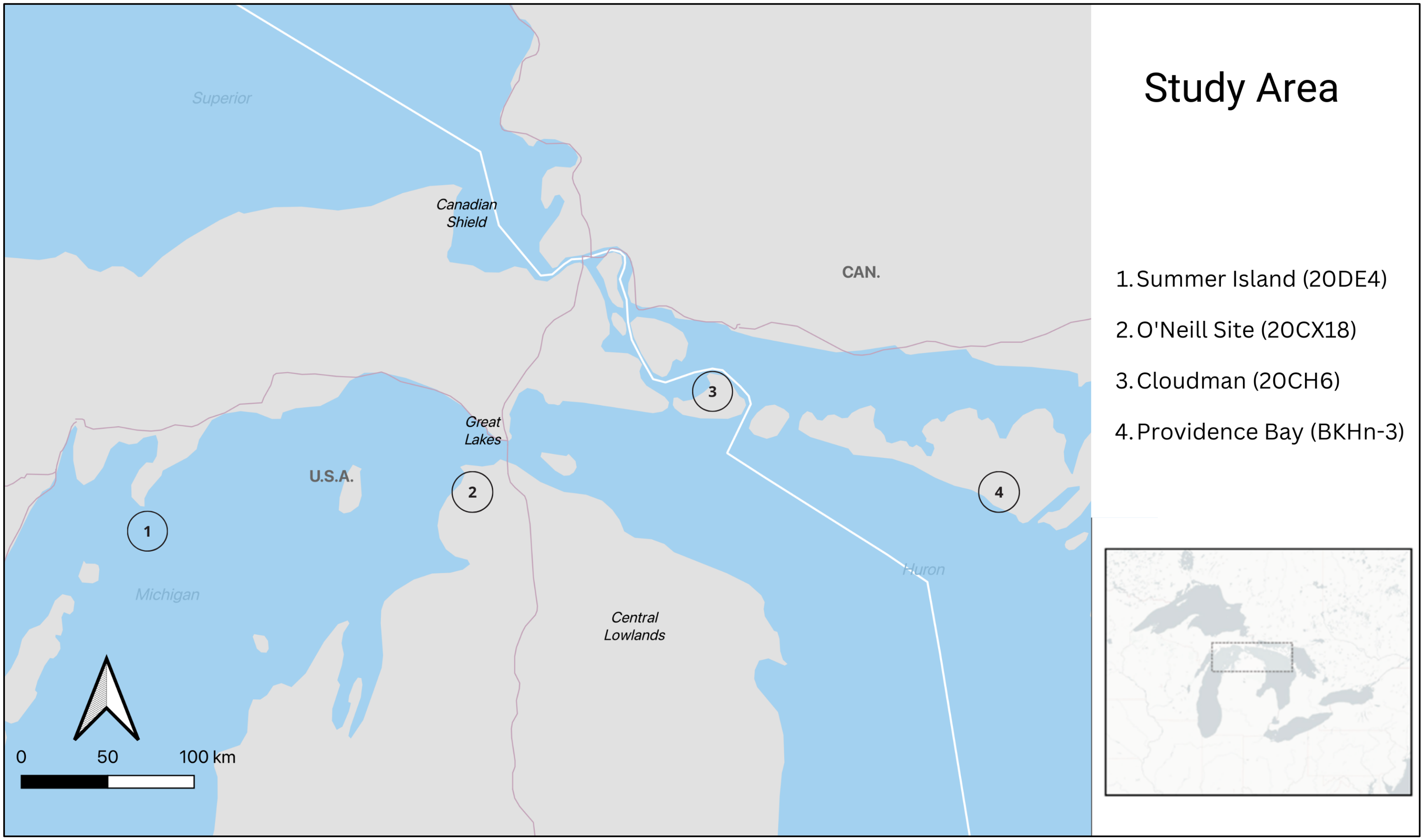

Figure 1-3: Primary sites referenced in this study

of Mackinac; and e) the presence of Late Woodland components for comparison (Figure 1-3). The Summer Island site was also selected for its comparative value. However, it deviates from the other sites in that it is located the farthest from the Straits of Mackinac (ca. 150 km) at the edge of ethnographically identified Odawa and Ojibwe territories. Summer Island will be used to examine the extent of the cultural trends identified at the other sites and to frame what can be seen from excavations on Drummond Island. Similarly, Providence Bay is on the Bruce Peninsula, which marks the easternmost boundary of the study area. Each of the sites is used to outline the region in which major trade routes and French interactions took place. I must make a note that while the Hunter's Point site is also located on Manitoulin Island and contains a French component, I am limiting its use within this dissertation since it does not share as many characteristics with the Cloudman site as Providence Bay and the complicated presence of a human burial sets it apart from the other kinds of sites used in this study.

1.4 Anishinaabewaki (Anishinaabe land)

The Anishinaabek are a cultural group comprised of the Odawa, Ojibwe, and Potawatomi tribes belonging to the larger Algonquian language family. These tribal subgroups are then further broken down into patrilineal clan identities called *doodem* (PL *doodemag*). The clan is the core unit of identity during the early historic period. The *doodem* is also a major source of social organization since it dictates one's kinship and marriage partnerships (i.e., exogamy and patrilineal kinship networks). *Doodem* leadership is handled by the *Ogimaag* (clan leaders). These were non-hereditary leadership roles that were "elected" from the *doodem*'s membership. Not only were these positions not descent based, but they were also not necessarily permanent either. If a *doodem* felt that it would be better served by another person in the role, then the *Ogimaa* would be replaced. However, each tribe made up of clans was then a part of the larger

Anishinaabe cultural identity. Vizenor (1984) has described this organization as a common consciousness, highlighting the ways that Anishinaabe can have nested levels of belonging. The practice of intermarriage with the Wendat and the French only added to those extensive networks (Sleeper-Smith 2001).

Based on ethnographic and historic data, the east portion of northern Michigan was home to the *Nasauketon*, *Kiskakon doodemag*, or Sable (Sand Beach people) affiliations. This eastern part of the region overlapped with what is traditionally Huron-Wendat territory (Cleland 1992; Fox and Garrad 2004; Labelle 2013). These *doodemag* centered themselves in and around Mackinac Island, which at the time was called Michilimackinac, and the village *Waganawkezee,* that the French called L'Arbre Croche, or "Crooked Tree" in English. *Waganawkezee* was one of the most important Odawa villages during the time of French expansion (McDonnell 2015a). For the Odawa in particular, there is both evidence of them seeking out trade opportunities and using the goods to strengthen their relationships with other clans and allied Anishinaabe groups such as Ojibwe and Potawatomi (McCullen 2015). The Ojibwe hold similar cultural patterns as the Odawa and together they occupied overlapping territories across the landscape.

The Anishinaabe are ethnographically known as hunter-gatherers who also practiced a combination of horticulture and agriculture, and it has been suggested that they were able to forge trade relationships with their Native allies to obtain corn (Brose 1970; Holzkamm et al.1988). Among the well-studied traditional Anishinaabe subsistence strategies, communal fishing, maple sugaring in the spring, and collecting wild rice were a major focus of seasonal life. Despite many food sources, mitigating the cold climate of Michigan required specific adaptations. First, many foods collected during the warm months were storable, like nuts, berries, and maple sugar. Second, seasonal mobility allowed Anishinaabe to move according to resource availability and into the interior of Michigan to avoid the more intense winters on the coasts.

1.5 "Contact" and Colonialism

The nature of "contact" between two vastly different cultures is a key component of this research. There has been a long and constantly shifting history of engagement with the study of intercultural interactions. Several concepts and definitions have been corrected or removed from the debate over time. Among early studies of European trade in the Americas, acculturation theory was one of the first approaches to become a standard feature of intercultural research and to face a harsh critique (Lightfoot 1995; Nassaney 2018; Quimby 1966a). Acculturation theory examined culture contact as it related to the adoption of European goods by Native peoples. Many of the underlying assumptions of this approach conflated technological change with social change (Cooper 2005; Lightfoot 1995; Lightfoot and Martinez 1995; Walder and Yann 2018; Walder 2015).

As the use of acculturation theory fell from favor, the concepts of culture contact and colonialism began to incorporate a newfound recognition that European imperial ambitions caused a wide range of diverse reactions and interactions within the New World (Nassaney and Martin 2017). By the 1970s and 1980s, the interpretations of European and Native cultural dynamics assumed less innate passivity on the part of Indigenous peoples (Barnd 2017; Wesson 2008).

The arrival of the Columbian Quincentenary in 1992 launched a renewed interest in concepts like contact and colonialism (Trigger 1991). Scholars began work to directly confront the broad assumptions of oppression that were woven into the field (White 1991). As of the 2000s, there has been a push to reframe contact situations by pulling away from the resistance and power binary (Gosden 2004; Silliman 2001, 2014; Scaramelli and de Scaramelli. 2005;

Scarry 2010; Wilcox 2010). It was also during this time that approaches involving hybridity, entanglement theory, renewed interest in world-system perspectives, and agency theory became relevant (Rice 1998; Wallerstein 1974). Of particular note, the work of Stephen Silliman (2005) provided a critique of the very notion of "contact". His work emphasized the distinction between colonialism and contact. He then placed these concepts within a larger spectrum of lived experiences (Silliman 2005).

Previous archaeological and historical research provides a strong case for Odawa resistance to French coercion and supports an interpretation for mastery of the fur economy (Sommerville 2014). Despite the adoption of certain goods, the French did not socially acculturate the Odawa. Instead, the Odawa are cited as savvy traders, networkers, and negotiators. Cross-cultural exchanges are heterogeneous processes where ideology as well as political economy can feed into each other in diverse ways. This work will directly contribute to a better understanding of this intricate historical process.

Following the ongoing trend of reframing native sovereignty, new research has investigated the exact limits to European power (Jordan 2008). Resilience and survivance have also been taken up to conceptualize Native agency (Allard 2016, 2018; Morrissey 2013; Silliman 2014; Walder and Yann 2018). Recent work at Fort St. Joseph, for example, employs resilience theory to reframe the events of the seventeenth and eighteenth century as mutual (Nassaney 2018). These new approaches work to undermine what Ferris calls an "archaeology of anticipation" that describes the propensity for research to assume that later political domination was inevitable (Brown 2004; Ferris 2014:378).

1.6 Historical Context

The Odawa met the French in 1615 when the Samuel de Champlain expedition made its way into an area on or near Manitoulin Island. Venturing into the west on Champlain's behalf, Etiene Brule may have been the first French man the Ojibwe and Odawa ever set eyes on. It is unclear what the Anishinaabe would nickname the French upon this initial visit, but we know that Champlain at first labeled them as *Cheveux Relevez* (Standing hair) named for their distinctive hair style (Biggar 1937). On the other hand, Jean *Nicolet,* would identify the groups surrounding Manitoulin Island and the Georgian Bay as *Nassauaketon*, *Baouichtigouian*, *Outchougais*, *Atchiligouans*, *Noquets*, *Mantoues*, and *Ouasouarim* (Bellfy 2011). It is unclear if Nicolet and others on his mission were fully aware of the differences between the groups. Nevertheless, those groups are usually thought of as the peoples that would eventually be largely identified as Ojibwe or Odawa. An example of this confusion is the description of the *Nassauaketon* (People of the Fork). In the journal entries covering his return journey to Quebec in 1634 Nicolet describes the *Nassauaketon* as a distinct tribe (Clifton 1977). However, they are also widely considered a clan of broadly Odawa identity. Despite these historical inconsistencies, *Outaouac* (Odawa) or *Saulteaux (Ojibwe)* would become the monikers most often used in primary sources. Given that *Outaouac* or Odawa is generally believed to mean "traders", it is unsurprising that this latter name would be the one that stuck (Miigwech Inc. 2022; Pflug 1990).

After the 1618 expedition of Étienne Brulé, the French began to expand their excursions into Michigan (Ross 1938). Northern Michigan and in particular the Straits of Mackinac encompassed a critical region for French access to furs in the seventeenth and eighteenth century (Figure 1.) Additionally, the straits straddled the political divide between territories of the Anishinaabe groups and their frequent enemies, the Meskwaki and Dakota. Fort

Michilimackinac, for example, was opened in this strategic area to capitalize on both political and geographic advantages (Brown 2004; McDonnell 2015a; Widder 2013). In this position, the French hoped to situate themselves within the heart of fur country (Ferris 2009; Richter 2013).

1.6.1 Congé and the Coureurs des Bois

By the time of the Native-French Council in 1610, French traders were beginning to venture into the interior, establish trading posts, and conduct trade directly with Indigenous peoples in their own territories (McDonnell 2015a). The French did not have the luxury of waiting for Indigenous traders to come to them. When Samuel de Champlain, the famed founder of Quebec was unable to be in New France in 1612, his return was met with the revelation that Indigenous groups had refused to trade that year. In his absence they felt that the French did not treat them with the respect they deserved, and many chose to stop working with Champlain's men (Saunders 1939). The tensions from that lack of contact worried Champlain, as the British were known to pay better than the French and could entice their potential trading partners into "switching sides" (Anderson 1992). Struck by this development, Champlain expanded what had worked before and sent more Frenchmen into Native territories to learn, develop good relations, and explore. Based on those successful experiments he felt he needed to send more men into Huronia (Wendat land) and Anshinaabewaki to cultivate good relations and ease tensions.

The practice of bringing "payment" directly to Native peoples came with advantages as well as risks. Taking goods to the source not only allowed the French to prevent other Europeans from luring away their Native suppliers, but it also provided the opportunity for building trust with suppliers by taking part in Anishinaabe rituals (Sommerville 2005). However, travel down the St. Lawrence and Ottawa Rivers meant vulnerability to attack by the British or rival Native nations and logistical strain. Despite the risk and the expense of transport, trade routes as far inland as Wisconsin were forged.

This protocol initiated the habit of Frenchman living with Indigenous communities and working as interpreters for pro-French groups (Gross 1990). Those who had gained the necessary knowledge for surviving in the wilderness did so through cross-cultural interactions with Indigenous peoples. These men quickly picked up the languages and customs of the groups they lived with; the most famous of these men was the aforementioned Étienne Brule.

Due in part to Champlain's methods, the young men of New France began "disappearing" into the "wilderness". Of the reasons for this phenomenon, marriage was a major factor (Mann 2017). It didn't take long before French men began marrying Indigenous women. Anishinaabe groups were exogamous and marrying meant an expansion of their kinship networks. Anishinaabe marriages functioned to make strong bonds with other groups. While children of a marriage would become a part of the husband's clan, the wife would continue to represent her father's *doodem* (Noel 2006). Since she stayed tied with her father's family, she could use her connections to her kin to gain access to their resources. A good example is the 1709 marriage of Daniel Villeneuve first with Marie Kapiouapnokoue, an Odawa woman, and later with another Odawa woman named Domitilde (McDonnell 2015b). Villeneuve's second wife was the sister of the man who would later become an *Ogimaa* of the *Nassauaketon*. The alliance by marriage meant a direct line of trade for Domitilde and her kin through Villeneuve. This made wives an important economic opportunity for Frenchmen and beneficial to their Anishinaabe families. A French man connected through kinship was able to take advantage of those relationships and leverage them for better access to furs, safer travel, and better prices (Sleeper-Smith 2001; White 1999; Witgen 2012). While the trade of furs on a free market was legally permitted, there were gains to be made by wintering with Anishinaabe affinal kin. This phenomenon was discussed by Jesuit Superior-General François-Joseph Le Mercier. Mercier wrote:

> All our young Frenchmen are planning to go on a trading expedition, to find the Nations that are scattered here and there; and they hope to come back laden with the Beaver-skins of several years' accumulation. [Thwaites 1896–1901:40: 215]

However, the political winds in New France would change (Tesdahl 2017). Once France had its foot in the proverbial door, politicians pushed for their own interests. From those on high in Montreal, the goal was consolidation (Miquelon 1993). Jean-Baptiste Colbert, the French minister of finance, desired a grand French industry in New France. He wanted to take advantage of lumber and other natural resources. This meant needing those young French men as a labor force. In 1681 the *congé* system was initiated and with it, the *coureur des bois* were born (Gross 1990). A *congé* was a permit to trap and trade. Within the *congé* system, the French government began to limit the number of permits they would provide. The fur traders that continued to trade regardless of their legal status became nicknamed *coureur de bois*, translating to "Runners of the Wood" or "Bush-Lopers". The major distinction between a *coureur de bois* and a *voyageur* was the possession of a *congé*. Other obstructions to continuous trade were in part due to King Louis XIV. Due to a surplus of furs, in 1696 the king ordered Great Lakes posts and forts to close. However, it was not more than one year before he changed his mind. The main point is that all trapping and trading was not sanctioned by the crown.

Despite legal efforts to limit trade, with profit to make, not much would prevent independent traders from remaining active. Furthermore, both *voyageur*s and *coureur des bois* frequently married Indigenous women and tied themselves to Native families. The favor and status gained through kinship was threatened by the sudden requirement of permits, it was not so easy to tell your new family that you didn't have the correct piece of paper to hold up your end of the bargain.

To complicate matters more, not all European interactions were created equal. Even among exclusively French actors, there were competing goals and methods. The *coureurs des bois* famously flew in the face of French policy by intentionally overwintering and marrying into Indigenous families, much to the dismay of French officials. There were also the Jesuits playing a role in the region. They were the Catholic arm of the French empire. However, they were not concerned with the economic interests of the trade. Conversion was the goal of the Jesuits, and their approach was one in which they actively “translated” their religion into terms that were recognizable to their Indigenous audiences (Gueno 2004; McMurtry 2009). Jesuits were intent on not only converting the Indigenous peoples of Turtle Island[4], but they also wanted to “civilize” the Natives (Morrissey 2013).

1.6.2 Sagamité and Other Provisions

According to historic accounts, it was not uncommon for Indigenous locals to provide supplies to European traders (Beck et al. 2016). While it has been established that fur bearing animals were highly sought after, ethnographic reports have noted that Anishinaabek sometimes sold their redundant catches of fish to the French or to other tribes (Kinietz 1965; Molnar 1997). For *voyageur*s, provisions became a particularly fraught affair since the long trip from Montreal to Michilimackinac meant that canoe space was limited. There was tension between using valuable space for trade goods and provisions (Anderson 1992; Brandão 2019). Indigenous allies provided a solution to the issue. Historic references to provisioning and hosting suggest that the

[4] Turtle Island is the Indigenous term used to define North America. It is still common practice to use this term.

Anishinaabe would sell food to the French in addition to furs. Naturally, provisions for a *coureur des bois* would have no paper-trail, they most likely took advantage of this service as well, perhaps they needed it more than a well-stocked trader supported by the crown.

One of the most well cited examples of Native provisioning involves corn, specifically, *sagamité* (Gilmore 2004; Peyser and Brandão 2008). *Sagamité* is a boiled corn meal that is a relative of succotash, as well as many other corn dishes. Generally, s*agamité* is considered a mishearing of that Algonquian term. The first historical references to the meal come from the 1886 *Lexique de la Langue Algonquine* by Father Jean André Cuoq. In it he mentions the term "*kijagamite*" which is a word in the Algonquin language family he translates as "*l'eau est chaude*" or "the water is hot" in English (Campanella 2013). Cuoq suggests in his account that the term is used broadly by native speakers to describe anything using boiling as the preparation method. Depending on the specificity of the francophone sources, *sagamité* is also made by boiling the corn meal with greens or other vegetables when in season. Meals of this kind were offered to visitors. In another source Sagard describes the "*Andataouats*" as people who are primarily mobile but, will plant food in villages (Wrong 1939).

Many of the Algonquin related groups like the Anishinaabe did not necessarily live in one of the microclimates that provided enough frost frees days for corn to grow (Howey et al. 2014; Lovis et al. 2012). In these cases, berries, fish, meat, bark for making canoes, or completed canoes were traded to the French (White 1991). Primary sources note several groups were known to forage specifically for provisions for their European partners. In the writing of Bacqueville de la Potherie, he provides an account of the foods eaten by Anishinaabe people and those foods that were given or traded as provisions. During La Potherie's time in the Lake Huron area there is a specific reference to strawberries being an element of trade in an exchange for beads at

Michilimackinac (La Potherie 1753: 28-82). He also notes the large quantities of fish, which he describes as firm and delicious. Outside of cooking and eating the fish, he notes that the Indigenous carried out "an extensive traffic in this fish at Michillimakinak, where both the s****s[5] and the French buy it at a high price." Those same descriptions also make a point of noting Anishinaabe hosting. He claims they are proud of being good hosts and will provide guests with excessive food. While hosting is a behavior described by other sources, La Potherie seems to attribute this generosity to frivolity about the future. However, cache pit evidence provides a counter to this opinion (Dunham 2000; Hambacher and Schaetzl 2021).

Some observations by European visitors have somewhat taunted scholars. In particular, the references to mass berry collection and their subsequent trade. La Potherie provides descriptions of some of the seasonal migration on the part of the "Sauteur" or Ojibwe. La Potherie noted that in June they would diffuse towards the small islands in Lake Huron to take advantage of blueberries that grew in large numbers on rocky shorelines. While no doubt his account is biased towards coastal activity given that they were mid travel, he describes a variety of coastal resources heavily utilized by the "Sauteur." Champlain provides another reference to berry trade. In 1615, Champlain describes the Odawa as great hunters and fishermen, but made a point to discuss that they would dry blueberries and raspberries that they used to trade with other nations in exchange for beads, fur, and other trade goods (Biggar 1937). While his description includes evidence of Odawa men wearing said beads as part of their nose piercings, the accuracy of his statement about the berries is still in question. Champlain did not witness the trade himself, instead taking his informants at face value.

[5] La Potherie uses a pejorative for Native Americans that the author has chosen to omit.

The shorelines were excellent places for hunting beaver and other animals drawn to the emergent marshes and the small islands were used as sources of tree bark in the repair of their canoes (La Potherie and Johnson et al. 2018). It is also from the La Potherie source that the planting of domestic crops is described. By his estimation coasts were important areas for growing squash and corn. Coasts were also a source of wild rice that were a potential source of provisions. One of the earliest written references to wild rice is from an account by LaVerendrye in 1732 (Surette 2008). While writing to the Marquis of Beauharnois, he presents an anecdote about the Cree who presented him with ten or twelve bags of rice (LaVerendrye 1968). However, there are more direct references to the Anishinaabe providing support with canoes. Canoe making was an economic endeavor for the Odawa residing at Michilimackinac, as was the trade of bark for making and repairing canoes (Johnson et al. 2016; Nute 1955).

Yet, there is still the matter of furs. The Anishinaabe also famously provided access to these prized goods. (La Potherie 1753: 283). Despite grand adventurous narratives of *voyageurs* and *coureur de bois*, the vast majority of the trapping and fur collecting was accomplished by indigenous labor. A surface reading of this scenario may make is seem as though the indigenous were akin to a wage labor workforce. However, as I have established earlier in this chapter, the Anishinaabe were able to withhold access to furs to gain a better bargain.

1.6.3 Travel and Navigation

Outside of references to food, the trade routes require attention. The flow of the trade with Montreal was highly influenced by the continuous legal status of trade, warfare, and long distances. The landscape in which the French found themselves was dominated by vast expanses of fresh water. The waterways of the Great Lakes were a marvel for the European traders (Biggar 1937). The sheer expansiveness of them was a useful source of travel rather than the hinderance their size might suggest. Albeit they were routes filled with potential danger. Extensive river systems, and lakes connected the inland locations to open waters. The Great Lakes themselves provided one medium by which Great Lakes populations were mobile. Innis in their 1924 volume noted the fur trade owed its success as much to the Canadian waterways as it did to the plentiful beaver. In another example of trade intermediaries utilizing waterways, Tartaron (2013) developed the concept of a "coastscape." This is a framework that emphasizes the network qualities of a political and geographic landscape. While Tartaron used the concept to explore the maritime networks in the Mycenaean world, it is an example of water travel and navigation as a means of economic power.

Very quickly the European transplants adopted Native style canoes. These were primarily birch bark sealed with prepared pine pitch. Other forms of canoe included dugout, and cedar. While the canoe was a technological marvel, it was not without limitations. Canoes required constant maintenance. Frequent stops on the coast of Michigan and its islands were necessary to repair damage. The pitch from red pine would be extracted from peeled bark and used to patch the birch canoe (Johnson et al. 2018). These stops also help solve another drawback of the canoe, the cargo. Packing provisions was a tricky feat and stops provided the opportunity to replenish food.

As noted, travel was not without danger or issue. Outside of the coasts, the weather and waves proved to be dangerous even for experienced paddlers. The Great Lakes had the added challenge of lacking the buoyancy of salt water. What's more, malevolent water spirits threatened the autonomy of travelers. The danger of this landscape is exemplified by the powerful *manitous* (spirits) that reside there.

One hundred and fifty kilometers north of Sault St. Marie, Agawa Rock depicts one of the most powerful *manitou,* Mishipeshu (Lenik 2010). He is a great *manitou*, a water spirit, called the Underwater Panther or Lynx. He is a powerful being that claims the Great Lakes as his domain. Part of Mishipeshu's role is as an intermediary between the water realm and land. He is vengeful, protective, and represents the unpredictability of nature (Howard 1960; Schaumberg 2019; Smith 1995). As the personification of the deadly waterways in northern Michigan, Mishipeshu simply drives home the danger of navigating the lakes. However, Anishinaabe people had generations of experience on the waters. It put them in the position to guide and transport (Allard and Cipolla 2021).

Chapter 2 - Theoretical Background

Concepts like "landscape" or "environment" are defined in wildly different ways depending on the scholar. Treading on this conceptual ground requires careful consideration. With that in mind, there are several frameworks and theorizations that are relevant to my research and two main components that must be accommodated within them. First, the kin-based organization of the Anishinaabe defied French attempts at authority-based rule. French expectations for authority and control were rooted in completely different political system (Cohen 2002). Second, this research involves two vastly different economic and ontological systems coming into contact and conflict with each other. In this dissertation, I use the frameworks of political economy and political ecology to identify and characterize the role of social-ecological systems in French period. Here I will discuss the two theoretical frameworks and provide a background for the specific ways I will employ them to grapple with the often obscured and interwoven nature of power.

For the purposes of this dissertation, I operationalize the concept of power in terms of self-determination and sovereignty on both a community wide scale and individual scale. Sovereignty in this case is defined as, "the capacity of individuals and corporate actors with the diverse cultural meanings that they espouse, to play an independent causal role in history" (McLaughlin and Dietz 2008). Additionally, I recognize that the conditions under which sovereignty is kept "in the black" are holistic. I will center my work on the resources and actions through which sovereignty is maintained or increased. I will operate under the assumption that techno-socio-ecological spaces provide the material conditions for political action (Kane 2012).

2.1 Theorizing power

The constant companion of research on European-Indigenous interactions is the concept of power. This is for good reason, as Gosden (2004) claims, power is what differentiates colonialism from other forms of culture contact. However, it is also an incredibly nebulous idea that does not have utility unless it is carefully defined and situated within a particular study (Berndtson 1970; Martin 1971). As will be discussed below, there are many vantage points through which a scholar can use the idea.

Intellectual engagement with power has had its growing pains. In anthropological theory, it is very common to study power through agent-based approaches (Comaroff and Comaroff 1992; Svarstad et al. 2018). Thanks in part to the legacy of Isaiah Berlin, agents were thought to be torn between obedience, on the one hand, and coercion, on the other (Berlin 1969). Berlin thought that there were two types of freedom, the absence of obstacles and capacity to act. However, more recent theorizations have shown that there are multiple dimensions to power that go beyond the Rousseauesque focus on willpower. For example, there are different sources of power, modes of implementation, and power resources (Table 2-1). Additionally, agents may have different capacities for acting. This includes the extent to which power is enabled, as in the "power with" or "power over" models. It is also important to highlight that power can be negotiated, undermined, reinforced, and contested (Morrison et al. 2019). Among all of that variety, this work focuses on the role of power resources and modes of implementation from a relational approach.

An unfortunate quirk of writing about power in English is that it is difficult to describe it without implying that power is akin to a commodity. Despite those descriptive issues, power has been understood to be relational (Sherman 1993). A relational approach treats power as part of a web of relationships. Foucault and Engels provide two discussions of power as relational (Engels 1940 [1883]; Hartigan 2020; Sherman 1993). Foucault says, "power in the substantive sense, "le" pouvoir, doesn't exist…power means…a more-or-less organised, hierarchical, co-ordinated cluster of relations" (Foucault 1980). Seeing as this dissertation needs to accommodate the role of ecology and human-environmental relationships, an appropriate approach is found by operating within a holistic framework to explore power resources.

But why frame this work through power rather than through resilience or survivance[6]? As mentioned in "Chapter 1", both concepts have been utilized to interpret fur trade dynamics and potentially make some movement towards decolonization. While survivance is a conceptual way to break free of the constraints of continuity or change, it is also meant to redefine the Indigenous experience away from "victimry" (Silliman 2014; Vizenor 1994, 2008). However, it does not account for a scenario in which the Indigenous are outside of a settler-state context. Resilience is also a theme that implies the dominant culture is non-Indigenous. This is far from the case for the Great Lakes fur trade during the French period. It wasn't until after the French regime, when the British and then Americans took control that the seeds of colonialism sprouted (Thayer-Bacon 2017).

Power Dynamics - Adapted from Morrison et al. 2019 and Svarstad et al. 2018

Mode of Exercise	Ideological, coercive, incentivizing, and authority based
Types of Capacity	Power over, power to, power within, and power with
Power Actor Relationships	Dependence, competition, and antagonism

Table 2-1: Power capacity and mode.

[6] Survivance is a term coined by Anishinaabe scholar Gerald Vizenor as an alternative to "resistance." It is an intentionally vague term meant to redefine settler colonial relationships.

2.2 Political Economy

Political economy concerns the analysis of social relations as they shape, and are shaped by, access to and control of resources (Hendon 1996; Hirth 1996). Despite the ways the English language makes a discussion of power appear to be conceptualized as a commodity that can be had or lost, instead, political economy reminds the scholar that concepts like value and power are relational because of the ways production, distribution, and several other spheres of society interact (Hirth 1996; Labelle 2013; Morehart et al 2018).

Following the materialist approaches of the 1940s, political economy was adapted for anthropological purposes. Its usage, especially in the 1970s and 1980s, marked a shift towards large scale and regional system perspectives (Earle 1987; Roseberry 1988). Most often, a focus on resources has been employed to examine the power dynamics of societies with resource inequity and hierarchy (Patterson 1999). However, political economy has been applied to both state and non-state societies, albeit primarily within the former (Cobb 1993; Peebles and Kus 1977). In a non-state context, Indigenous political economies include mobility, subsistence strategies, food sharing, and land management strategies (Mayor 2012; Lightfoot et al. 2013).

Indigenous political economies also help structure the way European and Indigenous populations interact (Altman 2002). While a classic definition of political economy is, "an analysis of social relations based on unequal access to wealth and power" (Roseberry 1989), in the context of the fur trade, the perspective is on the unequal access of the French. For example, the lack of centralized power among Anishinaabek groups left the French with the challenge of actuating their goals when they could make no bargain with one so-called leader. McDonnell (2015) and other scholars have also made the case that the Odawa of Northern Michigan were able to utilize their kinship networks, positions on the landscape, and alliance building to their advantage. Thus, for Indigenous peoples it is clear that the mechanisms and the goals of political economy are different than those upon which states are based.

2.3 Political Ecology

It is not only that limiting access to resources provides leverage for political action, but also the natural landscape can be a source of power. Political ecology is a field defined as the study of the ways society and the environment interact to produce natural resource scarcity or abundance (Ingalls and Stedman 2016; Loftus 2019; Robbins 2011). Since a large portion of this dissertation involves the ecological world, political ecology is another useful anthropological field. Political ecology inevitably intersects with political economy as it examines resources and power influencing socio-ecological dynamics. While there have been approaches that call themselves “ecological political economy” (Quastel 2016), the development of political ecology as its own framework provided scholars with a honed toolset for researching the ways relationships between people and their environment provide the means for political action (Tetreault 2017).

Fairly early on in the 1970’s theorists turned their heads towards the intersection between local and extra-local politics, economics, and ecology (Roberts 2020). It is intrinsically an interdisciplinary approach since it must incorporate biology, geography, and anthropology. Roy Rappaport played an enormous role in the development of the field. While working among horticulturists living in Highland Papua New Guinea, Rappaport took an interdisciplinary path by utilizing ecology, biology, systems theory, and other fields to examine populations as parts of many interdependent systems rather than as an isolated unit (Rappaport 1968,1990). This was a departure from Stewardian anthropology that saw a “culture core” as the primary aspect of any population and any cultural behaviors beyond those derived from subsistence where largely symbolic “secondary features” (Robbins 2011; Steward 1937). To be fair to Steward, he did promote the idea that human and environment relationships are a two-way street where people shape and are shaped by the environment.

“Political ecology” entered our anthropological toolkit when Eric Wolf coined the term in the early 1970s (Wolf 1972). It was a turning point as it rejected the paradigm that culture was simply an adaptive response to the environment. As with political economy, the means for power can be created through human interventions. Similarly, it has tended to be myopic about its focus on extraction and inequality (Dunlap and Jakobsen 2020). Capitalism has played a leading role in the body of work. A key component of the field is the connection between social marginalization and environmental degradation. For those on the political periphery, environmental preservation is either a luxury since pressure to provide and survive can supersede sustainability or people do not have the means of protecting their environment (Bauer 2010). As Michael Dove (1993) would state, "Forests are not degraded because forest peoples are impoverished; rather, forest peoples are impoverished by the degradation of their forests and other resources by external forces."

Unfortunately, landscape and ecology have mostly been a backdrop for the study of inequality (Blaikie and Brookfield 1987; Rocheleau 2015). It may not be surprising then, that this framework has been critiqued for ignoring symbolic resources as well as forms of politics and power that fall outside of a state dominated society. It also tends to focus more on the impacts that politics have on environments and not necessarily the impact the environment can have on politics.

As mentioned, my study follows the well-trod path in Great Lakes Fur trade research by not framing indigenous groups as marginalized. Political ecology is traditionally framed between the human world and nature. However, the recent trends in conceptualizing a combined socioecological sphere have been useful as a way to heuristically blend the two concepts into a unified idea, rather than insisting that the two concepts are mutually exclusive (Ensor and Ensor 2003). I use political ecology with the expectation that the power relations are interpreted as discursive both between Anishinaabe and other Nations (i.e., Europeans or other Indigenous groups) and between the Anishinaabe and the ecology. This work shares more in common with what Kirksey and Helmreich (2010) call a "multispecies ethnography", defined as the study of species whose lifecycles are influenced by human societies. Importantly, Indigenous ontologies beat the social sciences to this reasoning long before "Ownership and Political Ecology" was a twinkle in Eric Wolf 's eye.

2.4 Environmental Ontology

Allard (2020) has argued that the shared relational worldview of Indigenous North Americans as proposed by La Donna Harris and Jaqueline Wasilewski, demonstrates that relationality is the appropriate lens through which Indigenous seventeenth and eighteenth centuries peoples can be understood. While I have stressed that aspect of power relations, I must situate these concepts in Indigenous philosophy as Allard suggests or risk mischaracterizing them.

A major drawback to the above frameworks is that ecology and culture are treated as segregated concepts. Although anthropology makes room for the combined concept of socio-ecology, it does not account for the indigenous concepts of kinship or monism (Scott 2013). As Tewa scholar Gregory Cajete (2000) says, "the lines separating humans, animals, and forces of nature are rather fluid, instead of rigid". Cordova's (2007) work points out that the foundations of Western philosophy are built from Platonic conceptions of "truth". These ideas include the assumptions of dualism and immutability of knowledge (Arola 2011). In comparison, core elements of American Indian epistemology and ontology are based on a model of integration, whereby knowledge is embedded in context, and personal experience (Kimmerer 2013). The outcome of this perspective is that plants and other beings that make up an environment represent nodes in a larger network of interconnected knowledge (Davidson-Hunt et al. 2005; Kenny and Parker 2004).

While this distinction reinforces the use of relational approaches, there is also an ontological issue with the Western concept of environment. Indigenous writer Jojo Guillet (2011) has noted:

> The term "Environment" does not exist in my Aboriginal worldview as it is not a place, but rather a concept of being. There is no word for environment in Ojibwe [Anishinaabe]. Environment is everything, so attempting to define a place it exists in, is not possible. We are creatures of the space and land we occupy, not caretakers of it, removed from the land. The land owns us, we do not own the land. [Hurlbert and Fletcher 2020; Korteweg et al 2010: 343].

The intimacy of what Guillet outlines should not be overlooked. Two important Indigenous theorists, Gerald Vizenor (1998) and Leanne Betasamosake Simpson (2011), have been instrumental in exploring the connection between the land and Anishinnabe people. Both would likely agree with Guillet since they have called this relationship "*sui generis*" or, in a word, unique. Albeit Simpson uses the term in reference to Vizenor, both outline the entwined nature of the land and culture. Vizenor considered the idea of transmotion. In a classic Vizenor fashion, he does not specifically define the term, but through the use of the term he does imply the meandering and periphrastic nature of interacting with the landscape. Another example comes from the work of Louise Erdrich. In her 2003 work, "Books and Islands in Ojibwe Country", she pours over the commingled spiritual and ecological meaning of plant communities. Erdrich paints a picture of encountering these beings as she progresses through her canoe trip. As each plant is encountered, she notes its Anishinaabemowin[7] (Anishinaabe language) name and the qualities of each being. Most importantly, the experience of visiting a plant-being along the journey means that she is encountering them in the context of their communities. Within Anishinaabe TEK, the term "plant community" takes on a more anthropomorphic meaning, in which the term "community" would indicate that these species are other-than-human beings that cohabitate and have shared interests (Gagnon et al. 2022; Knoeller 2012; Phillips 2016). Not only that, but the Anishinaabe experience of being with the landscape is the synthesis of material and spiritual.

It is Simpson who reestablishes a connection to territory and intentionality within the transmotional relationships with the land and plants. Simpson recognizes the holism of Anishinnabe "beingness" and imbues this set of relationships with placemaking or territoriality. She says, "Nishnaabeg people were not wandering around vast expanses of land. While boundaries around that land were much more fluid than that of modern states, there was a territory that was defined by Nishnaabeg language, philosophy, way of life, and political culture" (Simpson 2011: 182). This reminds us that while the Anishinaabe ontological view of the environment and other-than-human beings is vastly different than the Western conceptualizations used within political economy of ecology, elements of political action are still present. They simply manifest in their own unique forms.

2.4.1 The Covenant

The understanding that plants and the environment are sentient is another long-standing concept for indigenous peoples. Anishinaabe are a group that apply personhood to other-than-

[7] There are different dialectics of the language. Additionally, there are some who make a distinction between *Potawatomi* and Anishinaabemowin, choosing to define the latter as the Ojibwe language. See Kimmerer 2017a.

human-persons, like plants (Black 1977; Hallowell 1966). In Anishinaabemowin, many nouns are designated as "animate" meaning that they are suffused with "being" (Blackbird 2012 [1887]; Lockwood 2017; Noori 2013). Lest I forget their importance, beings included in the category are not only animals but, forces like fire and water (Kimmerer 2017a; Martinez 2018). They are all a part of a relationship with humans that is described by Anishinaabe as the "Original Compact" or "Creator's Garden" (Davidson-Hunt et al. 2005). The "Compact" or "Covenant" is the moral responsibility of humans in relation to plants and animals. Humans are not allowed to mistreat other-than-human persons, take more than they need, or disrespect them in another way. Otherwise, a person will be met with misfortune for violating the covenant. In return, plants and animals would provide for their human kin. This "Covenant" as described by Anishinaabe scholar Robin Wall Kimmerer (2017b) dictates that the concept of "person" is extended to other organisms. Plants are more than simply beings; they are kin, which is why contemporary sustainability movements like "kincentric ecology" as coined by Martinez (2018) represent that covenant (Diver et al. 2019; Thayer-Bacon 2017). Therefore, plants are a part of a philosophy of mutual respect and welfare.

Be it the concept of ecology, environment, or land, the meaning is integrated with personhood, responsibility, interdependence, and intimacy. By comparison, when political theorist Jane Bennett (2010) asked, "what is the difference between an ecosystem and a political system?", she explored the notion by supposing that the two are similar systems at different scales. Further, she pontificates on whether there are such things as non-human political actors. Within Anishinaabe ontology, the answer is they are a part of the same system and yes, there are non-human actors. This an example of what Zoe Todd (2016) has critiqued about the ontological turn and anthropologists in general. She is a part of a long line of Indigenous scholars to point out that Indigenous concepts on topics like relationality and object agency have predated the "development" of those same ideas within Western scholarship. She notes that there is an upsetting trend of anthropologists cherry-picking features of Indigenous ontology and not offering proper reference to the intellectual labor of those thinkers. Her prime example in her 2016 article is on the ways the "ontological turn" has co-opted Indigenous concepts or disproportionality applauded similar ideas from Western thinkers.

2.4.2 Reciprocity

The inclusion of Indigenous perspectives also affects perspectives on power. There is an overall recognition that reciprocity is a major guiding principle for many Indigenous groups across the world. There is also room to consider the known power of the Anishinaabe from this perspective. For the Anishinaabe, the power of the gift was both literal power and a representation of a bond between people (Wagner 2003). For Anishinaabe people of the Great Lakes, the processes behind production of goods, consumption, and the ritual that bind these two together is mediated through the concept of reciprocity.

It can easily be said that Anishinaabe wealth is stored in people. For mobile people, storage can be a limiting factor, which makes the storage of "debt' a useful method of handling resource insecurity (Halstead and O'Shea 1989). Classic economic models have emphasized the role of reciprocity as a mechanism for deriving debt and storing favors (Sahlins 1965). Within the French fur trade, we know that the trade of goods for pelts followed an Anishinaabe tradition of networking and reciprocity (Mann 2003; Parsons 2013; Pflüg 1992; Wagner 1998; Witgen 2012a). Gift-giving and ceremony were mandated for every trade, and it was the use of this gift-giving system that structured French trade with the Anishinaabek. In Maussan terms, when a gift was given or a trade occurred, the recipient was beholden to the giver (Mauss 2016 [1925]). So, when I made mention of La Potherie's description of Odawa and Ojibwe "excessive generosity," I wanted to highlight that from his perspective, the Odawa and Ojibwe were players in their own production of "The Town Mouse and the Country Mouse." While observing their seeming generosity, he misunderstood that this behavior was not an oversight that prevented Natives from being rich. Instead, if power is in the gift being given, then the person who gives is also gaining power by way of social status and prestige. In short, there is literal spiritual power within the practice of trade. So, while control over resource access will be a major consideration of this work, power as it was considered for Anishinaabek is a vital perspective that has the potential to reshape interpretations of trade (Pflüg 1992; Wagner 1998).

By comparison, the French operated within a market economy. A market economy is rooted in goods as commodities. Often the principles of supply and demand are central as well as capital. This notion of capital is the critical element of a market economy. The value of goods or services is not static and is dependent on the social value of labor. Once goods and services are symbolically valued in this way, they exist beyond a gift exchange system and can be "sold". A "sale" is a concept that is often judged to be fully incompatible with subsistence and reciprocity-based economies (Pflüg 1992; Shennan 1999). The impact of a market economy lifestyle is a focus on accumulation and wealth being pooled rather than shared. It is due to these differences that changes to the relationship with the landscape will be impacted by "buying in" to a market economy way of existence. The world may cease to be relatives and instead be transformed into resources.

Chapter 3 - Research Questions and Methods

While politics and intercultural contact are undoubtedly important features of this research, the core of this dissertation is the study of seventeenth and eighteenth century Anishinaabe power and its articulation with traditional ecological knowledge (TEK). As part of that focus, my research questions are aimed at uncovering the intricacies of those socio-ecological relationships within the context of the fur trade. Previous research in both archaeology and history has exposed the way the French fur trade was different from colonialism witnessed elsewhere on the continent. In particular, scholarship points to the economic and military power of the Anishinaabe, and Odawa trade savvy specifically (McDonnell 2015; Nichols 2018; Witgen 2007). Indeed, be it provisions, fish, or fur, French economic interests were undoubtedly rooted in access to environmental products accessible through Indigenous peoples. As will be discussed in further detail in “Chapter 3” and “Chapter 4”, there is a relationship between resource availability and power. Sharing, caching, and restricting plant and animal resources can be one route to social and political control (Cuéllar 2013; Fine 1994; Hastorf 1993; Killion 2013; Quintus et al 2016). Likewise, influence from technology, subsistence, and economics initiate changes in the patterns and intensity of land use (Knitter et al. 2019; Sörlin and Wormbs 2018; Winterhalder 1980). Despite this feedback loop between the social and ecological, the role of relationships with the natural world are not often put into conversation with theories of power and control. Meanwhile, Indigenous foodways and their continuity in the Great Lakes have received a great deal of attention (Davidson-Hunt et al. 2005; Dunham 2009; Kooiman 2018).

And yet, the role of ecological relationships remains an unexplored element of fur trade dynamics in the Mackinac region.

Through my research questions, I will be able to put political and economic systems into conversation with the socio-ecological systems to gain better insight into the articulation of Anishinaabewaki expressions of sovereignty and political influence. This focus has implications for the broader study of social and cultural phenomena. Below, I will provide my research questions related to the above relationships.

3.1 Primary Research Questions

For my overarching research questions, I ask:

1) *Did fur trade economics continue, reinforce, or alter Indigenous land use?*
2) *How did (or did) the political ecology/economy of the Anishinaabe emerge from their unique relationships with the landscape?*

Indigenous relationships with the land go far beyond the stereotype of the 'ecological Indian". There remains a strong link between Indigenous political independence and Indigenous ecological stewardship (Reed et al. 2020; Whyte 2018). Intimate knowledge of a landscape and TEK may provide resistance to economic coercion and alternatives to engaging in wage labor (Kuokkanen 2011; Lightfoot et al. 2013; Simmons 1995). The theory behind this process as well as the specifics of Anishinaabe plant-based spiritualism will be discussed in subsequent chapters.

3.2 Secondary Questions

My secondary questions are organized into three domains: 1) Landscape Access; 2) Socio-Ecological Relationships; and 3) Provisioning and Power. Although these domains are deeply related, separating them analytically will allow me to better examine the evidence from distinct and focused perspectives. A detailed discussion of the data used to answer my questions can be found in the data and analysis section of this chapter.

3.2.1 Domain 1: Landscape Access and Vegetation Types

1) *What types of ecosystems are represented in each period at the Cloudman site?*
2) *Are there multiple and/or distinct environments being exploited across the region?*
3) *Do the data from 2019 change what we know of the seasonality of the Cloudman site?*
    a. *And how does this information compare with other sites in the region?*

In general, landscape use is the product of two components: 1) The ecological properties of the area, wherein weather, plant competition, fauna, topography, and hydrogeology create resources for extraction and 2) The cultural priorities of the people who inhabit an area (Hughes et al. 2018). This domain focuses on the first component by identifying what resources were potentially available and what land cover types were accessed within the selected sites across the Mackinac region (e.g., closed forests, open forests, wetlands etc...). The questions provide the foundation for understanding changes to the use of catchments between the Late Woodland and French periods.

There does not appear to be any evidence for environmental devastation during the 17th and 18th centuries in the Mackinac region (Ferris 2009; Smith 1996). Therefore, changes to the plant communities identified through archaeological materials will represent collection practices and not adaptation to scarcity. Given that the Odawa were still primarily foragers, non-domesticated plants and animals can be assumed to come from the surrounding catchment. Except for cultivated resources, which could come from trade, plant collection is closely tied to the local landscape and thus reflects the patterns of interaction that collectors--often women--had with land-based resources (Herron 2002; Sleeper-Smith 2001). As a note, seasonal occupation will have to be taken into account since ethnographies and prior research indicate that most trapping took place during the winter seasons and that these coastal aggregation areas were primarily for communal activities (Warren 1885; Zedeño et al. 2001). Although evidence from macro and microbotanical data will be the primary focus, both faunal and archaeobotanical data will be used to answer these questions.

3.2.2 Domain 2: Socio-Ecological Relationships

1) *Is there evidence for ecological-engineering or niche construction?*
    a. *If so, which of the types outlined in this dissertation does it match?*
    b. *If so, is it detectable within each period?*
    c. *Does it change in scale or type across time?*
2) *Are there any detectable changes to the use or cultivation of domesticates?*
3) *Do communal harvesting practices decline or increase across periods?*

This domain addresses the ecological footprint of the Anishinaabe and the form those anthromes[8] took. The Anishinaabek peoples are known for resource management, particularly the management of forests through deliberate burning (See “Chapter 4”). Such practices promote sustainability and propagate the growth of underbrush for berries, mast producing trees, and habitats for prey animals (Geniusz 2006). However, within the historic period there was suddenly the issues of war and trade that may have disrupted the Late Woodland patterns. As such, these secondary questions evaluate the scale and intentionality of specific resource preferences of people across time. Activities focused on landscape modification, and resource extraction are my main concern. Using the six general categories of landscape modification

[8] Anthromes are anthropogenic biomes. The term highlights human influence.

outlined by Bruce Smith (2011), I will rely on the physical properties of each plant including the plant requirements for moisture, light, and other idiosyncratic adaptations to identify the varying socio-ecological relationships (Table 3-1).

To answer these questions, multiproxy data from phytoliths, starch, carbonized seeds, and other macrobotanical remains will be my primary sources of evidence. Since some of these data will not be available for sites other than the Cloudman site, many of the answers within this domain will be limited to Drummond Island. A detailed description of the ecological concepts at play within this domain will be outlined in "Chapter 4".

3.2.3 Domain 3: Provisioning and Power

1) *Are there measurable differences to management or overall subsistence strategies after the Huron diaspora?*
2) *Are there detectable changes in settlement and demographic patterns?*
3) *Did wood and food supply systems change to prioritize fur trade activities?*

While the other two domains deal with the two components of land use respectively, this domain will examine data that indicate the goals of landscape use by the Anishinaabe. The intensity and frequency of landscape use as well as land-use categories will be examined to answer the questions. As noted in "Chapter 1", after the destruction of Huronia in the 1650s, the Odawa took on the middleman role that was originally occupied by the Wendat (Anderson 1992; Ross 1938). Primary sources suggest that Anishinaabe participation in trade, the production of furs, and other economic activities outside of domestic production could have incentivized increased production of certain goods, like tools for hide preparation, fishing, or food storage technology. Likewise, there is the potential for a change to traditional Anishinaabe subsistence strategies, seasonal mobility, forest niche construction, communal labor, and the prioritizing of

Six General Categories of Human Landscape Management and Manipulation

1.	**General Modification of Vegetation Communities** *Creating mosaics and edge areas, and resetting successional sequences*
2.	**Broadcast Sowing of Wild Annuals** *Creating wild stands of seed-bearing plants in river and lake edge zones exposed by receding high water*
3.	**Transplantation of Perennial Fruit-bearing Species** *Creating "orchards" and berry patches in proximity to settlements*
4.	**In-place Encouragement of Economically Important Perennials** *Creating landscapes patterned with point resources*
5.	**Transplantation and In-place Encouragement of Perennial Root Crops** *Creating root gardens and expanding the habitat of wild stands*
6.	**Landscape Modification to Increase Prey Abundance in Specific Locations** *Enhancing salmon streams and creating clam gardens, fish ponds and weirs, and drive lines*

Table 3-1: Niche construction styles by small-scale human societies. Adapted from Smith 2011

high yielding foods (e.g., seasonal fish spawns or wild rice). Subsistence systems are tied to various forms of labor and social values (Burley 1981; Geniusz 2006; Scott 2008; Drewes and Silbernagel 2012). Each strategy relies on timing, organization of labor, and intentional management of plant resources (Nicholson and Hamilton 2001). However, there are always constraints on time and energy, and humans have inherent limitations on daily activities (Smith 2010). If the Anishinaabe prioritized trade with the French to a strong degree, I would expect there to be modifications to subsistence patterns and overall relationships to the landscape.

Categories of land use have been developed to assist this domain. These models are akin to "fuzzy logic" as discussed by Zadeh (1965) since the typology I outline has no definitive criteria for inclusion or exclusion. Rather, my categories operate primarily as a heuristic device to characterize the goals of landscape utilization, as with the landscape modification categories. My land-use categories include: 1) Extractive, 2) Sustainable, 3) Communal, 4) Individualistic, 5) Opportunistic, 6) Logistical, and 7) Residential (see Chapter 6).

Data for these questions also come from the previously mentioned archaeobotanical assemblages. Of particular note, evidence from the charcoal identification will aid interpretation of the coastal mixed economies, changing woodland composition, and water travel utilization. Data derived from faunal remains and both macro and micro botanical analysis enable a wider discussion of regional versus local fur trade dynamics associated with landscape use and subsistence changes (Fischer et al. 1997; García-Granero et al. 2015).

To answer my research questions, I use a multi-proxy approach to complement the recent work of Kooiman (2018). When possible, available data from the sites selected for this research will be compared with each other. However, the detailed anthracological analysis and microfossil data will only be relevant to the Cloudman site.

3.3 Fieldwork at the Cloudman Site

In the summer of 2019, I directed excavations at the Cloudman site, following the methods set out by Branstner during the 1990s. Excavations on a lower terrace north of the Potagannissing River focused on sampling features in the historic-period occupation. Using the existing grid, I added six new units to the original Branstner excavations and covered an area of 15 square meters, not including the test trench or shovel test units (Figure 3-1). I located the previous block using the permanent marker for Datum 3 that was cemented into the ground on the Cloudman family's land. The original excavation grid was oriented at 26.2 degrees east of magnetic north resulting in the east-west baseline running 116.2 degrees east of magnetic north. Given that magnetic declination shifts over time, the declination was corrected to accurately locate the previous grid and establish new units. The declination adjustment was calculated with the assistance of the World Magnetic Model magnetic field calculator tools provided by the Nation Centers for Environmental Information within the National Oceanic and Atmospheric Administration.

Excavations revealed shallow but dense cultural deposits primarily consisting of fire cracked rocks (FCR), ceramics, and faunal remains in a dark grayish brown silty sand (Munsell 10 YR 4/2) with some coarse gravels. These deposits began at the surface and were on average 10 cm thick. Given the thin deposits, levels were excavated in 5 cm arbitrary levels, as suggested by Branstner (1995). This work included an extensive collection of piece plotted ^{14}C samples, 53 of which were recovered over the duration of the field season. Fourteen of the charcoal samples were sent for ^{14}C measurements through the W. M. Keck Laboratory established at the University of California, Irvine.

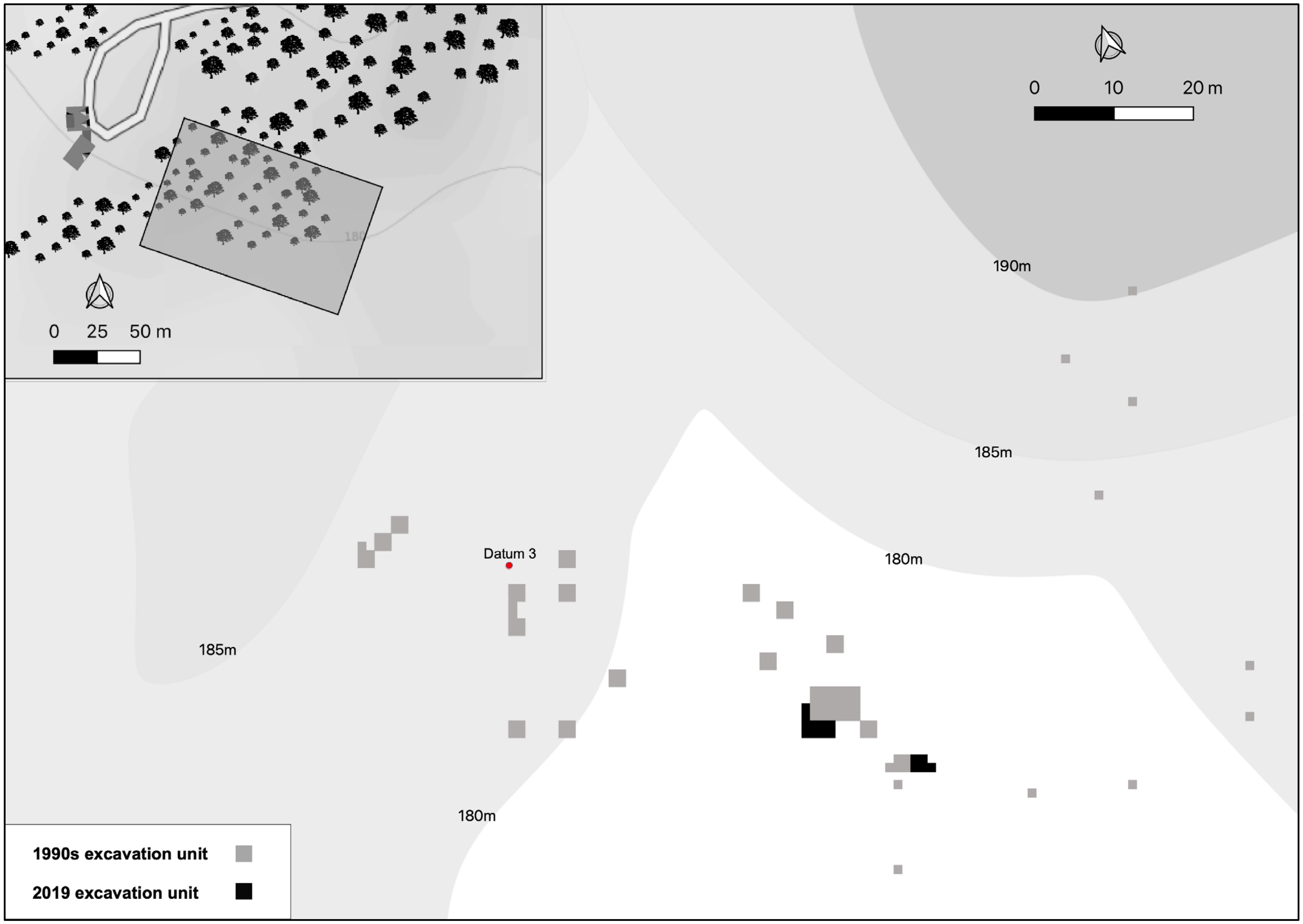

Figure 3-1: Cloudman (20CH6) excavation area.

Eighteen new features were excavated and both flotation and soil samples were collected. Ten-liter flotation samples were drawn from the northeast corner of each level, while the north half of each feature was sampled for flotation at 5 cm levels. In total, 57 flotation samples were collected during the 2019 field season. Flotation was accomplished using a triple barrel flotation system that utilized a water pump (Figure 3-2). This system was designed and built by the author and consisted of three 60-gallon plastic bins that were organized around each other to stagger their height. Mesh was attached to two of the bins with two spouts for water flow. The third barrel was meant as a clean water recycler, that pumped water back into the back barrel. This was the method used for all but one flotation sample. All non-flotation sediment was dry screened through 1/8-inch mesh to assist with the collection of small trade beads and small fish bones. When possible, diagnostic artifacts were piece-plotted in situ. In addition, 17 judgmental soil samples were collected during the 2019 season, 12 of which were selected for microfossil analysis. Those samples were first sterilized at the National Center for Electron Beam Research affiliated with Texas A&M University. The analysis of starch, spores, phytoliths, and pollen was performed by Mark Horrocks at Microfossil Research Inc. The microfossil analysis and faunal were the only outsourced analyses.

Of the newly excavated faunal remains 2001 fragments were sent for identification and 103.5g of the macrobotanical remains were analyzed. Excavations from the 2019 season also produced a mix of both local and non-local Iroquoian and Huron ceramics, including potential imitation Huron styles, and Late Woodland Juntunen wares that are local to the Straits of Mackinac. In addition, many early historic period European goods such as a tinkling cone, possible copper hair tube, and more than ten glass beads were recovered with the use of 1/8 inch screens.

Figure 3-2: Flotation machine used for the Cloudman 2019 samples.

As was the case in the 1990's, there were some issues with post depositional movement of artifacts within the general layers. For example, modern bullet casings and a saw butchered deer leg were recovered within the same level as Late Woodland ceramics in unit S24E110. However, the stratigraphy, dating, and associated artifacts within features indicated that features remained secure uncontaminated contexts.

3.4 Data and Analysis

A significant proportion of Anishinaabe tools, food, and technology is plant based. Fittingly, plants are deeply embedded in Anishinaabe knowledge structures and the practice of cultural lifeways (Densmore 1974; Herron 2002). While subsistence studies have been carried out on vessel residues from the Cloudman site, very few French period ceramics are represented within the assemblage (Kooiman 2018:2021). Thus, the new samples from my excavations provide an opportunity to address seasonality and environmental reconstruction of the French period at Cloudman where it could not be done before.

3.4.1 Carpological Data

These data are a mainstay of paleoethnobotany, also called archaeobotany (Ford 1979). I include charred seeds, nutshell, nut meat, and other non-wood carbonized materials in this category. The carpological data are drawn from both archaeobotany reports and the new analysis and identification of macrobotanical materials from Cloudman. The 2019 Cloudman materials come from hand-picked samples during excavation and 15 flotation samples associated with the Late Woodland period (AD 500/600 – AD 1600) and the early French period (AD 1650-1760) features.

Since the cultural deposits are shallow, non-carbonized seeds were noted but only charred materials were included in the analysis. Using strictly carbonized materials avoids the risk of including modern seeds within the assessment. Specimens with diagnostic features were identified to species or genus level using the embryo end of seeds, along with the dorsal, lateral and ventral view. The relative abundance of each genus or species was calculated for each taxon. To avoid overestimating the number of seeds, fragmented seeds larger than 50% of the preserved seed size will be counted as one. Identifications were completed with the assistance of reference material from the ethnobotany collections at the University of Michigan Museum of Anthropological Archaeology.

Since land use can occur on several scales and intensities it is difficult to quantify. This issue is complicated by the notoriously incomplete nature of archaeological evidence. However, the analysis of wild plant taxa permits a discussion of the surrounding landscape ecology at sites. Useful descriptive statistics can be limited since many taxa can occupy multiple landscape or habitat types. Therefore, the structural and compositional dominance of each taxon is accounted for since they help differentiate the forest type or coastal landscape being accessed. In line with the traditions of archaeobotanical analysis, macrobotanicals are analyzed through both autecological and synecological approaches. Species-specific adaptations, ecological communities, food sources, seasonality, and ethnographic uses are considered (Smith 2011). Specifically, plant species richness, relative frequencies, ubiquity values, and ecological associations were recorded. The indices used are described in section 3.5 at the end of this chapter.

3.4.2 Anthracological Data

As a discipline, anthracology focuses on the study of charred wood from archaeological contexts (Ascough et al. 2010; Asouti 2003; Asouti and Austin 2005; Scott and Damblon 2010). Colloquially, the term charcoal refers to charred wood despite there being a distinction between the type of pyrolysis (i.e., thermal decomposition) that occurs between the two types of botanical remains. However, for easier comprehension, carbonized wood within the analysis will be referred to as charcoal or charred wood interchangeably (Asouti 2003; Asouti and Austin 2005). A typical use of charred wood analysis is the reconstruction of past vegetation types. Since wood taxa represented within archaeological assemblages can be linked to specific landscape types it is a helpful marker of past forest communities (Gelabert et al. 2011; Marston 2009). However, wood is also a resource that is cross culturally linked to a variety of social and cultural practices (Costa Vaz et al. 2017). Wood is useful as both a product and energy source. Thus, anthracological analysis can also help us gain insights into firewood preferences, exploitation practices, and forest management (Braadbaart and Poole 2008; Gelabert 2011; Kabukcu 2018; Moskal-Del Hoyo 2018).

It is hard to imagine life either before or during the fur trade without fire. I have noted the waterpower of the Great Lakes, but its sister element has a role in daily life. Naturally fire is used for cooking, warmth, firing ceramics, and clearing plants. It is also a sacred element used in specific and targeted ways for ceremony. Economically, it plays a role in processing animal hides. Part of one method of hide tanning is smoking or soaking the skin. The tannins within hemlock for example are used for hide processing. Despite being necessary for almost all domestic, ritual, and economic tasks the fuel economy of the Great Lakes is an underutilized source of data.

Wood selection studies within anthracology have typically considered energy output, wood density, smoke output, burn speed, spark production, and processing ease. Each of these factors in addition to more idiosyncratic wood fuel qualities contribute to a complicated selection criteria within the overall labor process. There are a few main criteria that are used today for wood selection. The likelihood of producing dangerous sparks, general smoke output, and splitting ease are a few qualities considered in the selection of firewood. However, there are also more standardized measurements that can be compared. First, is the weight of wood per cord. A cord of wood is a measurement of the dry volume of fuel wood. Another is the heat potential of wood. British Thermal Units (BTUs) of wood are a standardized measurement of the heat potential. A BTU is defined as the amount of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit. It was a unit of measurement developed for the heating and cooling industry, but it is adapted for the purposes of this study.

To maximize materials for analysis, fragments from both flotation samples and specimens collected from field screens were included. While the ideal sample size for charcoal analysis is still a matter of debate, the ideal is to have 300 to 400 fragments identified per stratigraphic unit (Byrne et al. 2016; Théry-Parisot et al. 2010). However, this sample size has been criticized as the analyst risks over identifying from a few samples That sampling type will mask the variation between contexts. The most agreed upon method for determining the proper charcoal sample size is the use of a Gini-Lorenz curve or rarefaction curve to pinpoint when species richness has reached saturation (Asouti and Austin 2005). A rarefaction curve plots diversity against the number of charcoal samples following an exponential curve. This method is accomplished as identifications are occurring. As the number of identified fragments rises so does sample diversity. By the time a saturation curve flattens out, it is likely that the diversity of a sample has been properly represented within the fragments identified. The priority then is to analyze as many samples as possible, as opposed to individual fragments to avoid masking variation between contexts that might be obscured by too few samples (Chabal et al. 1999; van der Veen and Fieller 1982).

Ideally, to get a sense of long-term and broad patterns of firewood use, charred wood fragments should be selected from general contexts rather than features. However, the general fill at the Cloudman site was not only very shallow, but also highly mixed (Branstner 1995). So, only fragments from securely dated features were used for the analysis. The side effect is that these features are more likely to represent short term activities and perhaps lower wood diversity. However, this choice has the advantage of not only accurately matching identified charcoal to a specific time period but, it also facilitates a better examination of wood choices per activity at the site (Asouti and Austin 2005). Fragments of 2 mm or larger were prioritized for identification to aid accuracy. However, an exception was made for potential gymnosperms as they tend to fragment into thin segments. For charcoal with a long and thin morphology, 1mm was acceptable so that softwoods would not be excluded from the analysis. Samples with large proportions of charcoal were subsampled using a chute splitting technique.

During analysis, fragments were first sectioned on three anatomical planes (transverse, tangential and radial sections) for a clean view of the cellular anatomy (Figure 3-3). After the creation of clean breaks, the fragments were identified to the genus level. If identification to a specific genus could not be discerned, the fragment was categorized based on the taxonomic family or subfamily. The diagnostic sections were observed under reflected light microscopy (Fischer series). Identification was accomplished with the assistance of reference material from the ethnobotany collections at the University of Michigan Museum of Anthropological

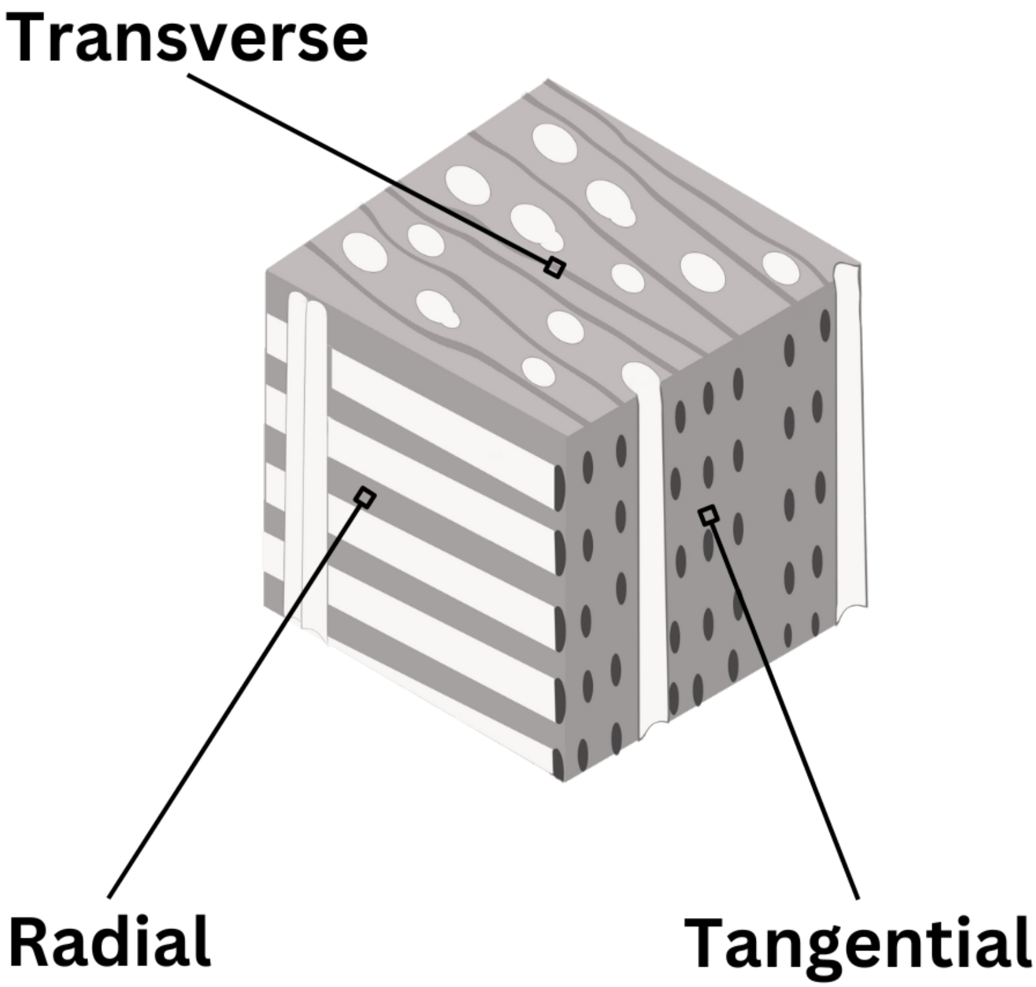

Figure 3-3: Wood sections used within the identification of charcoal.

Archaeology, experimentally charred wood from voucher specimens, and online sources such as InsideWood database (InsideWood. 2004-onwards; Wheeler 2011).

After identification to genus level, several characteristics were recorded for each fragment. For the purposes of this study, presence of vitrification, radial cracks, and alteration level (AL) based on cell deformation were recorded. Those three attributes provide evidence for the state of the wood before burning (i.e., green, seasoned, rotten). First, the presence or absence of vitrification and radial cracks were recorded as proxies for uncured wood or green wood. Recent studies indicate that the appearance of vitrification in carbonized wood relates in part to the burning of green wood and low-oxygen environments (Marguerie and Hunot, 2007; McParland et al. 2009). Radial cracks with a fragment are caused when moisture trapped within the wood vessels is rapidly heated. If the wood is cured properly to eliminate excess moisture, the cross section of the fragment will be less likely to crack. Second, the state of the wood pre-burning was also assessed using criteria developed by Henry and Théry-Parisot (2014). With this method four alteration categories were developed to measure cellular deformation. Each AL category represents increasing amounts of decomposition. The ALs were developed out of ethnographic work among the Evenk Siberian reindeer herders (Henry and Théry-Parisot 2014). The herders intentionally chose wood from the forest floor with high rates of decomposition and moisture. The goal is to create smokey fires to drive away insects and smoke hides. The AL categories were developed from charcoal analyzed from these activities. After each fragment is assigned to an AL. The ALs were then used to calculate a deformation index. In the case of this research, an index will be calculated for each separate time. The quantity in each category was put into the following formula, divided by the total number of fragments multiplied by three.

$$Ai\ is\ -((nA1x1\ +\ nA2x2\ +\ nA3x3)/nTOTx3)$$

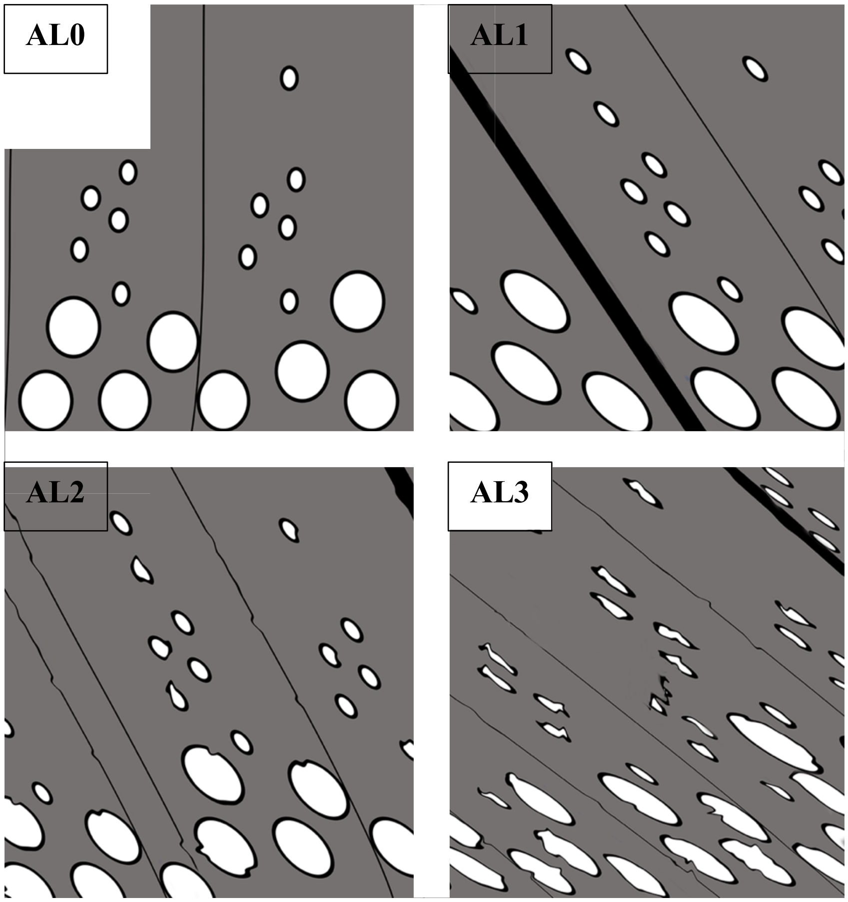

Figure 3-4: Alteration levels for charcoal analysis.

A higher deformation index indicates wood collection from the forest floor, whereas no deformation suggests the use of fresh wood (Figure 3-4). Henry and Théry-Parisot also provide thresholds for each alteration index for accurate interpretation.

After the presence or absence of radial cracks, AL, and vitrification was recorded, each fragment was sanded using a 12000-grit sanding stone to create a flat cross section for accurate measurements. All measurements were taken using the ToupLite imaging software and 18MP AmScope MU1803 18MP digital microscope. Additionally, whenever possible, the minimum diameter of each fragment was measured, and ring thicknesses were taken. These measurements were used to identify a preferred wood size (Jude et al. 2016). Fragments were sorted into five arbitrary size categories: 0–1.5 cm, 1.5–5 cm, 5–10 cm, 10–15 cm and >15 cm. A branch index was calculated to get a sense of potential silviculture activities like pollarding, coppicing, or preferential use of young trees. Nominal mean diameter was calculated using the following formula:

$$mD = (n1+n2\times2.5+n3\times 4+n4\times 7.5+n5\times 15)/N$$

3.4.3 Pollen, Diatoms, and Spores

Since this study differentiates the concepts of land use and land cover, evidence for both the land use (in the form of archaeological or historical data) and land cover (from paleoecological data, such as pollen analysis) are required. The inclusion of both micro and macro remains, results in a fuller picture of subsistence and land use across the Late Woodland and contact/French period contexts. Specifically, this analysis will address provisioning and interactions with the landscape. As with the carpological data, the results of the Microfossil Inc identifications were first analyzed by determining the light requirements, shade tolerance, fire tolerance, seasonality, and wetness coefficients for each taxon.

One of the most useful aspects of pollen data is its utility for determining seasonality. Given that pollen is produced during the flowering stage of a plants yearly cycle, it is a better gauge of seasonality than macrobotanical remains alone. Seeing as, seeds and nuts may be subject to storage and consumption at a later period, cultural practices introduce some uncertainty whether the depositional season is the same as the collecting season. The long history of cache pit creation in northern Michigan attests to this issue (Dunham 2000).

Along with seasonality, pollen can also be used as a method for reconstructing the composition of past vegetation communities. However, one of the difficulties with pollen data is that the ratios of pollen types are affected by high pollen producers. Pine for example produces substantially more pollen than most trees resulting in pine pollen being over-represented within samples. Often corrections or calibrations will need to be used to gain a more accurate view of pollen percentages. Additionally, differential dispersal of pollen creates added levels of uncertainty as unpredictable wind can thin pollen concentrations near their source (Jackson and Kearsley 1998). For example, trees in open canopies or forest edges may create a larger signature (Dawson et al. 2016). Mitigations for these issues come in the form of calibrations that correct for the production and transport differences. However, there are a few assumptions that I can make with some surety. First, while windborne pollen can travel hundreds of miles, it is likely that pollen represented within the Cloudman samples is from within the catchment area (Mazei et al. 2018; Pluess et al. 2019). This assumption is supported by pollen data from surface sediments sourced from Upper Michigan and north-western Wisconsin. Jackson and Kearsley (1998) demonstrated that pollen from forest hallow samples primarily stay within 50-120 m from its source area. Second, for this study, comparisons between time periods are prioritized over comparisons between taxa in a given sample. Thus, changes in pollen percentages across time will be examined for each taxon independently, avoiding this issue of assuming heavy pollen load indicates higher abundance of that species "on the ground."

Microfossil identifications included spores from fungi and bryophytes, pollen quantifications, diatoms, and sponge spicules. While taxonomic identification to species and genus level was possible for most pollen, fungi, and spores, diatoms and sponge spicules were only recorded based on their type. While the spicules and diatoms could not be analyzed in the same way as the other microfossils, they still offer indirect evidence of environmental conditions

(Denys 1992). They act as indicator taxa yielding evidence of water quality. For example, diatoms are unicellular algae that provide inferences into past ecology as they provide a sensitive gauge of the plant communities thriving within a given period (Battarbee et al. 2001; Stoermer and Smol.1999).

Here I provide the description of the identification methods as supplied to me. The methods used by Microfossil Research Ltd for the identification of these microfossils are as follows:

> *Pollen analysis includes pollen grains of seed plants and spores of ferns and other plants (Moore et al. 1991). The samples were prepared for pollen analysis by the standard acetolysis method (Moore et al. 1991, Horrocks 2020). Although pollen was generally sparse in the samples, counts of at least 100 pollen grains and spores were achieved for most samples…Slides were scanned for types not found during the counts.*

3.4.4 Phytoliths

Phytoliths are silica casts of plant cells. They are formed when mono-silicic acid [$Si(OH)_4$] from the soil is taken into a plant tissues during vascular action of a plant and the mineral solidifies between living tissues (Shillito 2013). After decomposition a hardened cast of the plant's anatomy is left behind. The advantage of phytolith analysis is that they are stable within heavily variable environments, surviving seasonal cycles of wet, cold, and heat. This process occurs across almost every plant clade (Rashid et al 2019). To extract the phytoliths from the soil samples Dr Horrocks used density separation (Piperno 2006). The process of identification included an initial identification up to 150 phytoliths and then the slides were scanned for additional types after the count that might have been missed in the sampling (Horrocks 2022 Personal Communication).

Within archaeological application, phytoliths are primarily used to assess agriculture, plant processing, domestication, and diet (Portillo et al. 2017; Weisskopf et al. 2014). In contrast with pollen, distinguishing plant selection from the atmospheric phytoliths is less of an issue for these microfossils since phytoliths will occur after decomposition.

Within this dissertation phytoliths from the Cloudman site are first used to identify the utilization of specific ecological plant communities. The analysis of utilized plants is often interpreted as diet. However, plant use overlaps technological, medical, sacred, and dietary categories. However, plant use overlaps technological, medical, sacred, and dietary categories. A single plant can occupy any of these categories simultaneously.

3.4.5 Starch

This category adds to the ongoing work of exploring prehistoric foodways in the Great Lakes. Starch is an energy storage method for plants. It acts as a reserve for critical carbohydrates, which are dense forms of potential energy (Tetlow 2011). Starch is also the main energy source for human diets. While both starch and phytoliths provide insight into plant processing at sites, starch granules indicate the direct use of food products at a site. Cooking starchy foods breaks down the complex polysaccharides into more easily digestible sugars (Crowther 2012). Since cooking affects the physical and compositional characteristics of starch granules, it can easily alter or destroy the morphological and optical properties relied upon by analysts for identification. However, ambient starch that is a byproduct of cooking is identifiable in soil samples when it may be destroyed by boiling in vessels.

As with the other microfossils, this work is isolated to the Cloudman samples. It does complement the residue analysis completed by Kooiman in her 2018 dissertation. Her work recorded the presence of maize and squash starches at the Cloudman site, but no wild rice starch. For this class of data, the preparation employed density separation, and the presence/absence of starches was recorded (Horrocks 2022 Personal Communication).

3.4.6 Faunal

The use of faunal data will include integrating previously completed analyses from sites included in this study with the new environmental data from Cloudman features. Preliminary results from the Cloudman faunal analysis will also be included. The faunal analysis was carried out in part by Emma Creamer but, is being completed by Craig Charier. Along with the identification of utilized taxa, butchering evidence, animal element, and charring were recorded. Both the presence and abundance of seasonally specific taxa will be noted. While my focus will be on coastal resources and byproducts, I will not ignore other potential industries such as opportunistic collection of fur-bearing animals or isinglass from sturgeon (Holzkamm et al. 1988).

These data provide evidence for seasonality, hunting, and fishing. As with plants, faunal remains represent a key component of the Anishinaabe diet. The remains of processed fauna can also reveal potential surplus creation or opportunistic provisioning occurring on the landscape (Crabtree 1990). The identification of fish and other fauna will be incorporated into this data pool. There is a deep history of seasonally based communal fishing in Northern Michigan that can reveal forms of communal labor or food processing (Cleland 1992, 1982). I would expect that shifts in the priorities of communities would result in changes to the labor invested in traditional subsistence as production for trade increased. I would also expect an increased focus on surplus creation or travel provisioning to have changed the types and abundance of fish that were collected, as well as the skeletal elements that were deposited. For example, Molnar (1997) has noted that within several sites on the Bruce Peninsula, Odawa fishing remnants changed within the historic period from discrete clusters of seasonally spawning suckerfish to ancillary catches of trout or whitefish.

3.4.7 Copper and European Goods

Analysis of European goods in my study area will focus on the spatial distribution, quantity, and most importantly the functional category of European goods across the region. The utilization and eventual discard of trade items are affected by the range of activities that took place at a site and the length of time it was occupied. Thus, trade goods will primarily play a role in interpreting continued access to quality goods and the length or intensity of occupation.

Besides previously excavated materials from across the region, newly excavated beads and copper require attention. Bead identifications were assisted through the use of the Kidd and Kidd bead guide. Meanwhile, previous work has differentiated local copper from European sources. The distinction between copper obtained through European trade and from local sources highlights the difference between resources accessed through European and Native networks. An analysis of many metal objects has already been carried out by Heather Walder (2015) for several copper artifacts across the study area. Three new copper objects from the Cloudman site were evaluated through the Michigan Center for Materials Characterization within the University of Michigan Department of Materials Science & Engineering. The goal of the copper analysis is to distinguish a European source from an Indigenous. Copper sourcing data to provide insights into access, use, and demand for European goods.

3.4.8 Primary Sources

The flow of goods coming into the region, and demand for the same, has previously been explored in detail by Dean Anderson (1992, 2009). Anderson notes the frequencies of clothing and other items carried into the Great Lakes area. He associates the influx of these goods with the desires of Native peoples. Such documents help to highlight the economic strategies of Great Lakes groups. For example, as noted, it is possible that the increased demand for clothing from

Europeans is evidence of increased trade activity, since furs were more valuable in such a situation (Winterhalder 1980). The purpose of these data is to form a basis of comparison between discarded European goods and the relative importance or abundance of such materials recorded in documentary sources. Trade manifests and other historical documents will provide descriptions of Anishinaabe contracts, food sources, and potential provisioning.

3.5 Analytical Methods

Measuring diversity is a major proxy for answering my research questions. There is no single index that perfectly summarizes diversity (Hurlbert 1971; Morris et al. 2014; Purvis and Hector 2000; Smith 2015). So, this study will utilize a few different methods. The indices and coefficient that I will describe will be used for the carpological results, charcoal, and pollen. Together they can provide more detailed evaluations of the taxon proportions per period.

Not all diversity measures work the same way but, Reciprocal Simpson Index and Simpson index of diversity help express the species evenness as well as diversity. The Simpson Index accounts for the number of species present, as well as their relative abundance. It measures the probability that two individuals randomly selected from a sample will belong to the same species. Comparatively, the Reciprocal Simpson Index provides an easy means of direct comparison. This index calculates a number between zero and one. The closer to zero the score gets, the lower the diversity. Furthermore, the transformation of the index into this format allows the analyst to interpret the data in terms of percentages. With an index of 0.15, it means that if I were to pick two random individuals from the samples, there is a 15% chance that they would be different.

Next, I calculated a Shannon Diversity Index (denoted as H) for relevant data.

$$H = -\sum p_{i*} \ln(\rho_i)$$

Shannon's diversity represents the evenness of a sample. It helps compare species abundance between populations (Morris et al. 2014; DeJong 1975). Furthermore, they provide a means of comparison between periods. The generated Shannon indices will be compared using the Hutcheson's t-test to evaluate significant changes to plant diversity. The Hutcheson's t-test is a modification of a standard t-test that accounts for the lack of replicated data. These tests were completed using a formula set up in Microsoft Excel. The Excel formula was developed by the ecologist Mark Gardener (2017).

Additionally, a Gini coefficient was calculated for each period and each separate class of data. This measure of diversity reveals the proportion of dominant taxa compared to the rest of the samples. The goal of this coefficient is to examine the dominance of specific taxa within each period. The fragmentation rate will be considered while using this coefficient since high fragmentation can skew the results implying higher dominance simply by virtue of there being more fragments. With that in mind, I can use the Gini Coefficient to identity favored or intensely utilized wood types.

Finally, the radiocarbon dates from the 2019 field season were calibrated through OxCal version 4.4.4 The curve used was the IntCal20 curve the represents the Northern Hemisphere (Reimer et al. 2020). The results of all the tests are provided in Chapter 7.

Chapter 4 - Environment and Ethnobiology

The Great Lakes region comprises the land and watersheds of Lakes Superior, Michigan, Huron, Erie, and Ontario. The state of Michigan specifically is split between two peninsulas surrounded by four of the five lakes. These inland seas were carved by glacial action and once filled with the glacial melt, altogether they hold 5439 cubic miles of water, which is roughly 20% of the world's fresh water. The drainage basin extends out 767,000 square km, and the lakes cover 244,753 square km (Egerton 2018; National Oceanic and Atmospheric Administration [NOAA] 2022). The land itself is also impacted by past glaciation. The basin in the southern peninsula was formed by the weight of a glacier compressing the land. As a result, the middle portion of the Lower Peninsula is currently rising each year due to isostatic rebound, also called post-glacial rebound (Clark et al. 1994). Differences between the peninsulas include bedrock and terrain. The Upper Peninsula (UP) is more elevated and rugged than the Lower Peninsula. However, within all of Michigan the highest elevation at Mt. Arvon only reaches 1,978 feet above sea level (United States Geological Survey [USDA] 1991). Though geologically, the tip of northern Michigan and the UP share similar geology, they have different bedrock. Broadly, northern Michigan and its surrounding Islands were formed from sedimentary rock with portions of exposed bedrock limestone and dolomite. Typically, the southern shores of the UP are Silurian bedrock with areas of limestone bedrock that are also common across the region. That bedrock is typically less than 50 feet below the surface and can be exposed in areas particularly along the coastline (Michigan Department of Natural Resources [DNR] 2022). Large pine forests helped form the primary soil sequences. The acidic needles acted as the main substrate. (Albert 1995).

Other prominent geologic features include the Niagara Escarpment that forms cliff features across the coasts.

Climatically, northern Michigan falls within the humid continental (Dfb) zone defined by the Köppen-Geiger system (Figure 4-1). This zone is distinguished by no dry season, an average summer temperature of 70 degrees Fahrenheit and four distinct seasons (Dastrup 2020; Geodiode 2022). The Mackinac region is also far enough north it is above the "floristic tension zone" that splits the upper part of the Lower Peninsula in half horizontally. The tension zone or "edge zone" is where the climatic conditions and plant community dynamics change from the temperate dominated Carolinian biotic province to the cold adapted Canadian biotic province (Dice 1938). Within this Latitudinal vegetation zone, the average number of frost-free days ranges from 152 days to 130 days (NOAA National Centers for Environmental Information 2022). Although climate change has caused these averages to change since the historic period (Brandt et al. 2013).

This Mackinac region specifically is internationally recognized for its ecological uniqueness as part of the UNESCO-designated Obtawaing Biosphere Region through the University of Michigan Biological Station (Figure 4-2). It's one of only 28 biosphere reserves in the United States and shares this distinction with its sister biosphere reserve on Isle Royale in Lake Superior (United Nations Educational Scientific and Cultural Organization [UNESCO] 2022). In total, the region stretches in fragmented zones from the southern edge of Michigan's Upper Peninsula, across the Straits of Mackinac to Sugar Island, near Sault Ste. Marie, and down to the Sleeping Bear National Lakeshore in Michigan's northern Lower Peninsula (LSA Biological Station 2022; Sherburne 2021). The region is known for its co-mingled natural and human history. Though a lot of the focus on the biosphere is the hardwood forest ecosystem.

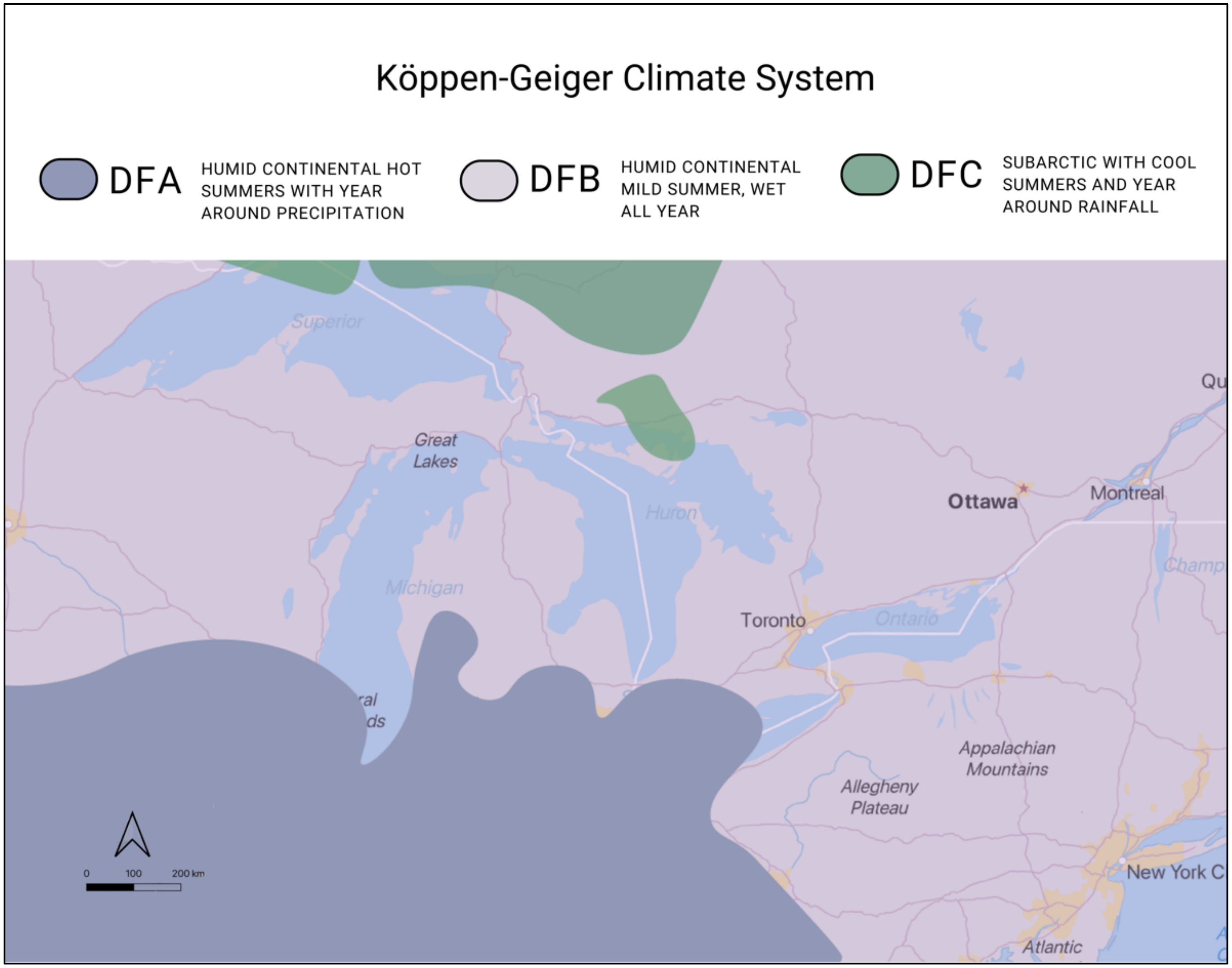

Figure 4-1: The three climatic zones that cover Michigan and the study area

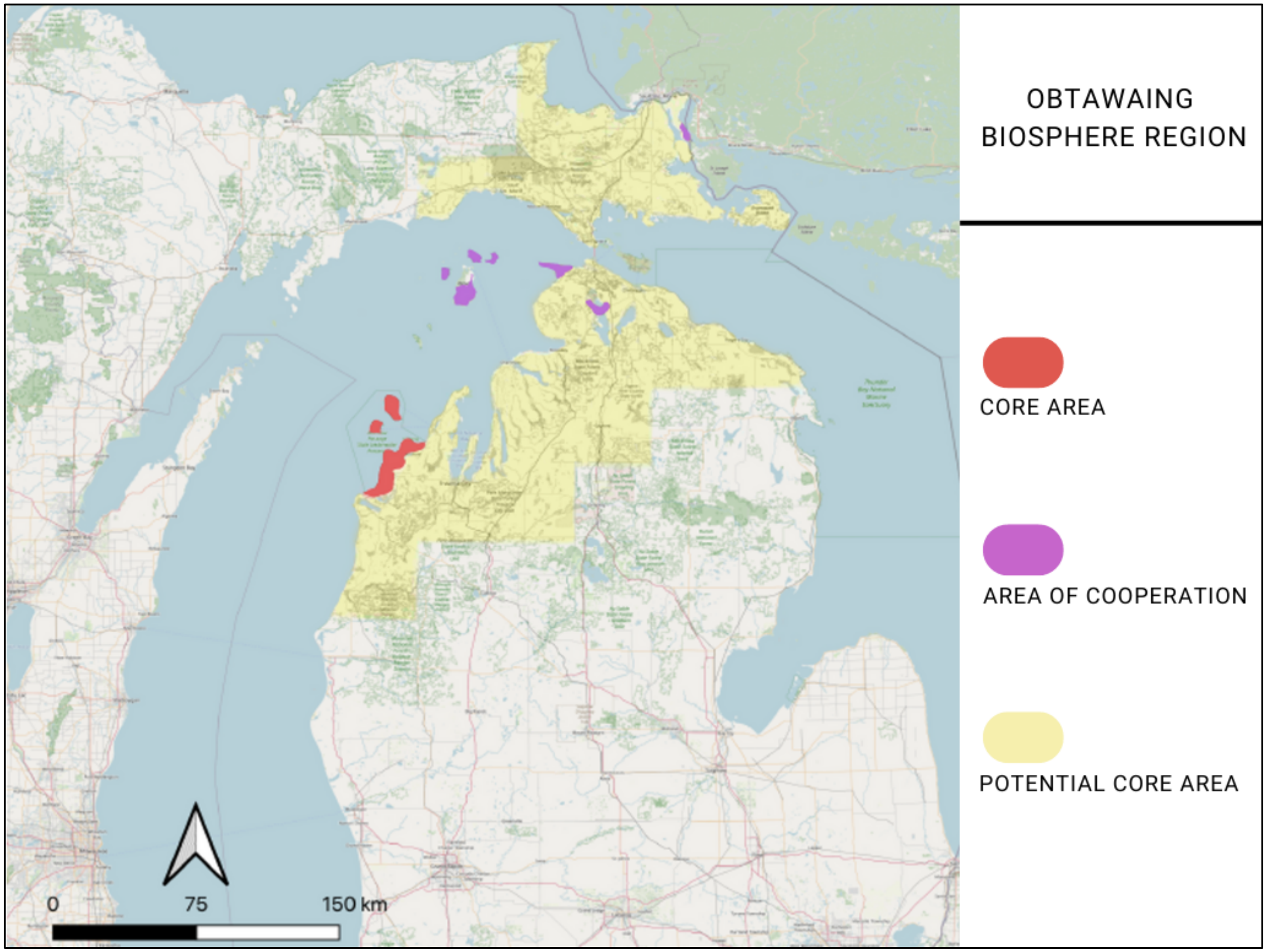

Figure 4-2: Obtawaing Biosphere Region and the areas considered for inclusion.

Within northern Michigan the northern hardwood forest is the most common type of woodland in Michigan spreading over most of the northern portion of the state (Figure 4-3). These are forests that do well on loamy sand and glacial landscapes. It is dominated by sugar maple (*Acer saccharum*) with red maple (*Acer rubrum*), hemlock (*Tsuga canadensis*), basswood (*Tilia americana*), and yellow birch (Betula alleghaniensis) associations. Secondary taxa of beech (*Fagus grandifolia*), black cherry (*Prunus* spp.), quaking aspen (*Populus tremuloides*), and white ash (*Fraxinus americana*) are commonly present among the dominating primary taxa (Kost et al. 2007). However, the cold temperature in northern Michigan limits the success of beech due to its intolerance to freezing temperatures.

Forests dominated by sugar maple and northern white-cedar are found in dunes or over calcareous bedrock. As forests progress inland, they transition to mesic northern forest, dry-mesic northern forest, or alvar. Primarily, mesic northern hardwood forests form a matrix of multigenerational climax woodlands mixed with new growth forests. The former can last centuries if left undisturbed. While hardwood forests are the climax form, there are several sub-climaxes of conifers that can occur. Upland coniferous forest includes white pine and hemlock, with red pine on dry sand ridges. Conifers such as hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*), yellow birch (*Betula alleghaniensis*), white ash (*Fraxinus americana*), basswood (*Tilia americana*), and red oak (*Quercus rubra*) are frequently important canopy associates (Cohen et al. 2015). The O'Neill site on the northern Lower Peninsula falls into the broadly northern hardwood territory. Detailed plant and animal associations are outlined in Appendix C.

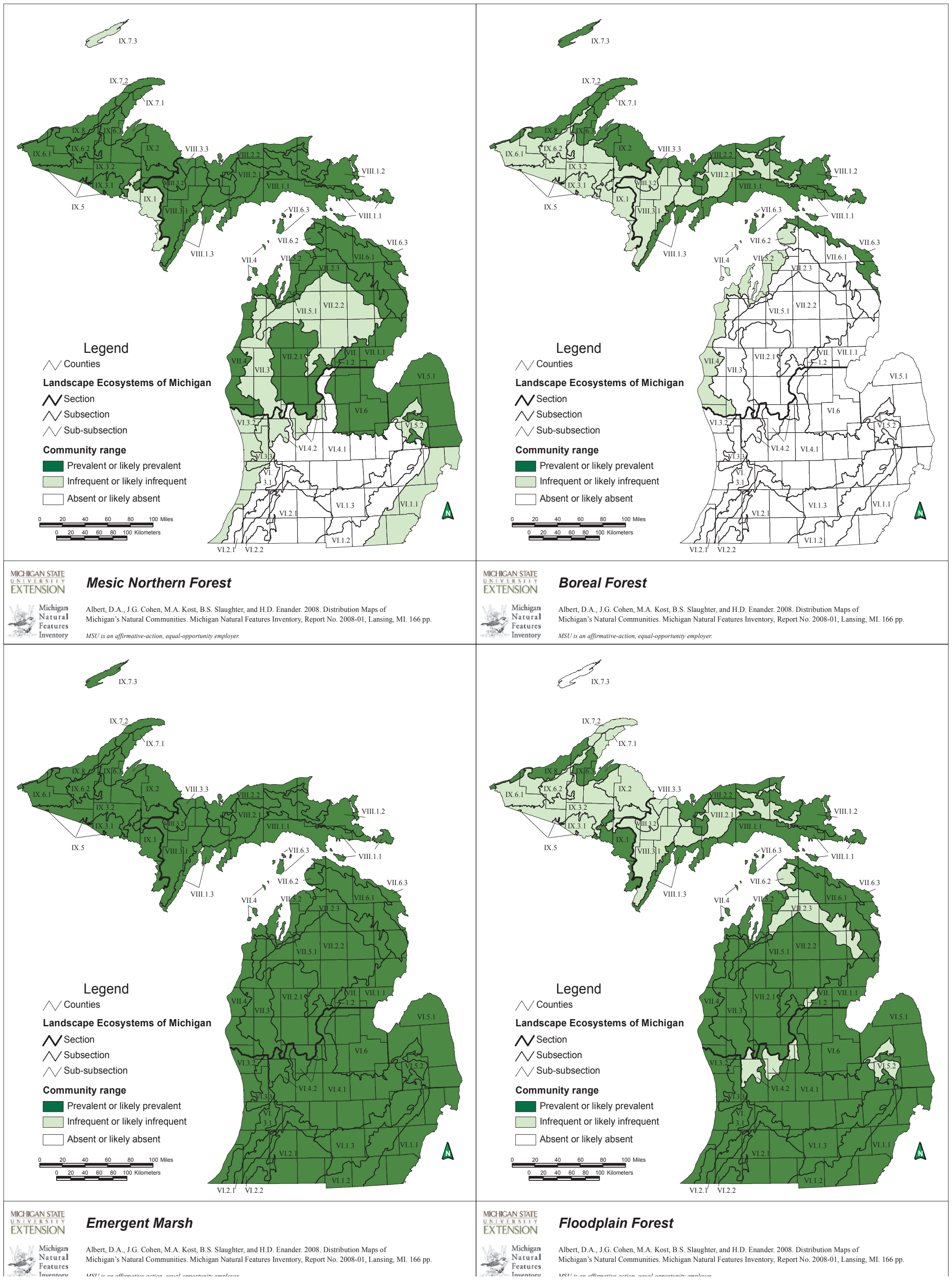

Figure 4-3: Common plant communities across Michigan.

4.1 Coastal Wetland Vegetation in Northern Michigan

As part of the largest freshwater ecosystem in the world, the biosphere region is home to a variety of biodiverse wetlands. The vast shorelines host palustrine habitats like submergent and emergent marshes, The high biodiversity of wetlands is a boon for collecting a variety of foods. These are also areas that would be environments for wild rice to grow. Emergent marshes are frequent across Michigan. They form in any shallow water and both mineral and organic soils. Common plants include cattails (*Typha* spp.), water plantains (*Alisma subcordatum* and *A. triviale*), sedges (*Carex* spp.), spike-rushes (*Eleocharis* spp.), pond-lilies (*Nuphar* spp.), pickerel weed (*Pontederia cordata*), arrowheads (*Sagittaria* spp.), and bulrushes (*Schoenoplectus* spp.)

4.2 Drummond Island

From its position on the Potagannissing River, the Cloudman site rests on a series of low terraces near the water. Predictably, almost every part of Drummond Island is close to some form of riverine resource (Figure 4-4). Residents would also have access to the St. Mary's River for fishing and travel, which has the advantage of much calmer water compared to Lake Huron to the south. From the point in which the Potagannissing River meets the St. Mary's River, Sault Ste. Marie is 50 miles by water.

Drummond Island in northern Michigan is a unique ecological region. For example, the Maxton Plains Alvar on Drummond Island is one of the largest examples of alvar grasslands in the United States **(**Prieskorn 2016**).** These landscapes are dry thin soiled areas that overlay limestones or bedrock. They are sedge rich plains with forb and shrub associations. Common plants found within these environments include little bluestem (*Schizachyrium scoparium*), prairie dropseed (*Sporobolus heterolepis)*, bulrush sedge (*Carex scirpoidea*), serviceberries (Amelanchier spp.), common juniper (*Juniperus communis*), sand cherry (*Prunus pumila*), chokecherry (*Prunus virginiana*), and fragrant sumac (*Rhus aromatica*). Additionally, the plant composition of inland alvars generally retain the same plant types as coastal alvars (Schaefer and Larson 1997).

Mesic northern forests are one of the common forest types on the island. Canopy trees are a mixture of ash, yellow birch, red oak, hemlock, and lime. Similarly, boreal forests contain maple, birch, and hemlock. Only, the presence of gymnosperms is more frequent within boreal type forests. Across to the south side of the Potagannissing River (opposite the Cloudman site), the vegetation transitions to aspen-birch forest, where hazelnuts would have been available. To a lesser extent, sugar maple-hemlock forests occupy portions of the island interior, where acorn-producing oaks would have been abundant (Cohen et al. 2015).

Great Lakes marshes of the St. Mary's River corridor are associated with less acidic soils, distinct water meadows, and submergent and emergent marsh (Albert 2013). The water of the St. Mary's River is deep and fast flowing. Whitefish will take advantage of the calmer bottom of the St. Mary's River, congregating there. When water levels are right, wet meadows, emergent wetland, and beds of submergent vegetation stretch across the coastline. When water levels are low, dense cattail beds become more widespread (all of which are edible). It is worth noting that cattails provide nesting material for birds, which provide hunting opportunities. Wave action in deep water is damaging to these beds but the disturbed areas are quickly colonized by other plants and small mammals like muskrats (*Ondatra zibethicus)* that take advantage of these openings by making themselves ponds (Kangas and Hannan 1985). These muskrat ponds create mini habitats for submerged bladderworts (*Utricularia gibba, U. intermedia, and U. vulgaris*) and pondweeds (*Potamogeton* spp.). It cannot be overlooked that these marshes also create habitats for insects which feed both fish and fowl during their fall migrations. Just in-land of the

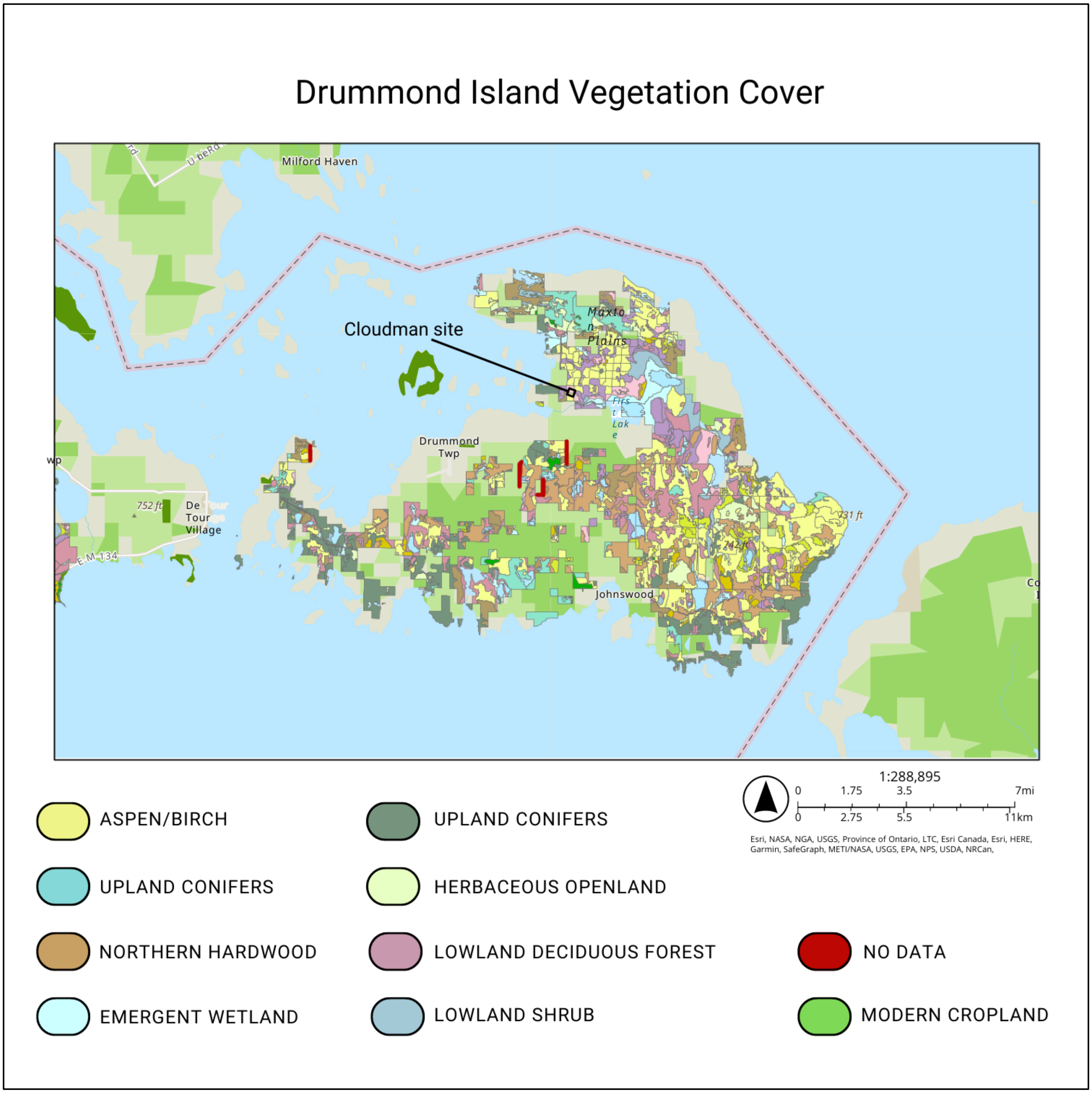

Figure 4-4: Vegetation cover areas. Data was sourced from the State of Michigan's GIS Open Data archive.

coasts, musk grass (*Chara* spp.) and quillwort (*Isoetes* spp.) occupy the areas with water depths at 10 -12 feet.

4.3 Summer Island

In Lake Michigan Summer Island is one of the southern islands of the Garden Peninsula archipelago. On the western edge of the Niagara Escarpment, Summer Island also falls into the Canadian biotic province (Department of Natural Resources inventory data 2012). It shares similar natural environments with Drummond Island including the wetland habitats (Figure 4-5). Currently, the forest cover of Summer Island is primarily northern hardwood, with cedar, and birch patches. Secondarily, lowland conifers associated with swamps provide another cover type (Eastern Upper Peninsula Regional State Forest Management Plan MA 14). Lowland conifer forests include balsam fir (*Abies balsamea*), tamarack (*Larix laricina*), balsam poplar (*Populus balsamifera*), and American elm (*Ulmus americana*).

The Summer Island site is located on the east portion of the island on the shores of Summer Harbor (Brose 1970). The shallow waters near the coastline provide habitat for birds and spawning fish in similar ways as Drummond Island. When water levels are low, the gravel bars become vital spots for migrating shorebirds. These habitats would be in close proximity to the site.

4.4 Manitoulin Island

Despite its proximity to Michigan, Manitoulin Island is located within Canadian waters. The unique geography of Manitoulin Island hosts other smaller islands within its borders. Treasure Island for example has the distinction of being the world's largest island in a lake that is also within an island on a lake (Guinness World Records Limited 2022). Never mind the fact that Manitoulin Island is the biggest freshwater lake-island in the world (Putnam 1947).

The Providence Bay site sits on the southern coastline of Manitoulin Island (Figure 4-6). Of the two plant hardiness zones that divide Manitoulin Island, Providence Bay is located within Zone 5b. This zoning indicates that plants in this area cannot survive temperatures lower than -26.1°C to -23.3°C, which makes those plants slightly less robust than those on the northern shores.

Overall, Manitoulin Island falls within the Manitoulin-Lake Simcoe ecoregion that stretches from northern Lake Huron to Lake Ontario. The groundcover on Manitoulin Island is an alvar-like species composition similar to what is found on Drummond Island (Catling et al. 1995; Reschke et al. 1999). In addition, similar northern hardwoods and wetlands shared across most of the Great Lakes occur here as well. One major difference is the presence of the bur oak savanna as a common landscape type on the island (Jones 2000; Nature Conservancy Canada 2022). These oak savannas are made up of a grass or shrub layer broken up by periodic scattered trees of bur oak (*Quercus macrocarpa*). Other than oaks, the shrub layer is commonly composed of downy arrowwood (*Viburnum rafinesquianum*), dwarf serviceberry (*Amelanchier spicata*), fragrant sumac (*Rhus aromatica*), and snowberry (*Symphoricarpos*). Underlying those plant communities Manitoulin Island shares Silurian and Ordovician-age sedimentary bedrocks with Drummond Island. There is also horizontal limestone or dolostone bedrock with extremely shallow soils (0-20 cm).

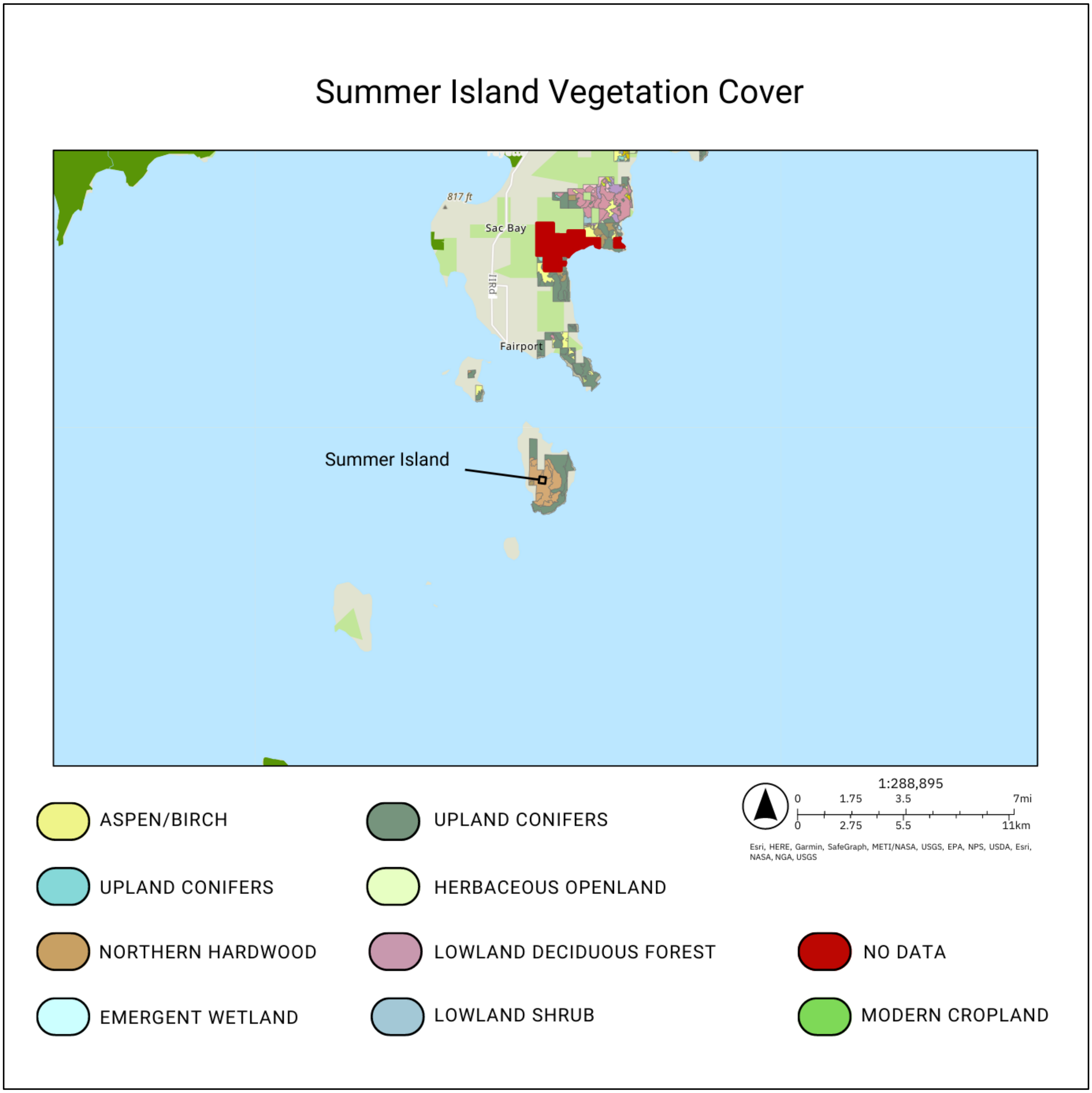

Figure 4-5: Vegetation cover on Summer Island. Data sourced from the State of Michigan's GIS Open Data archive.

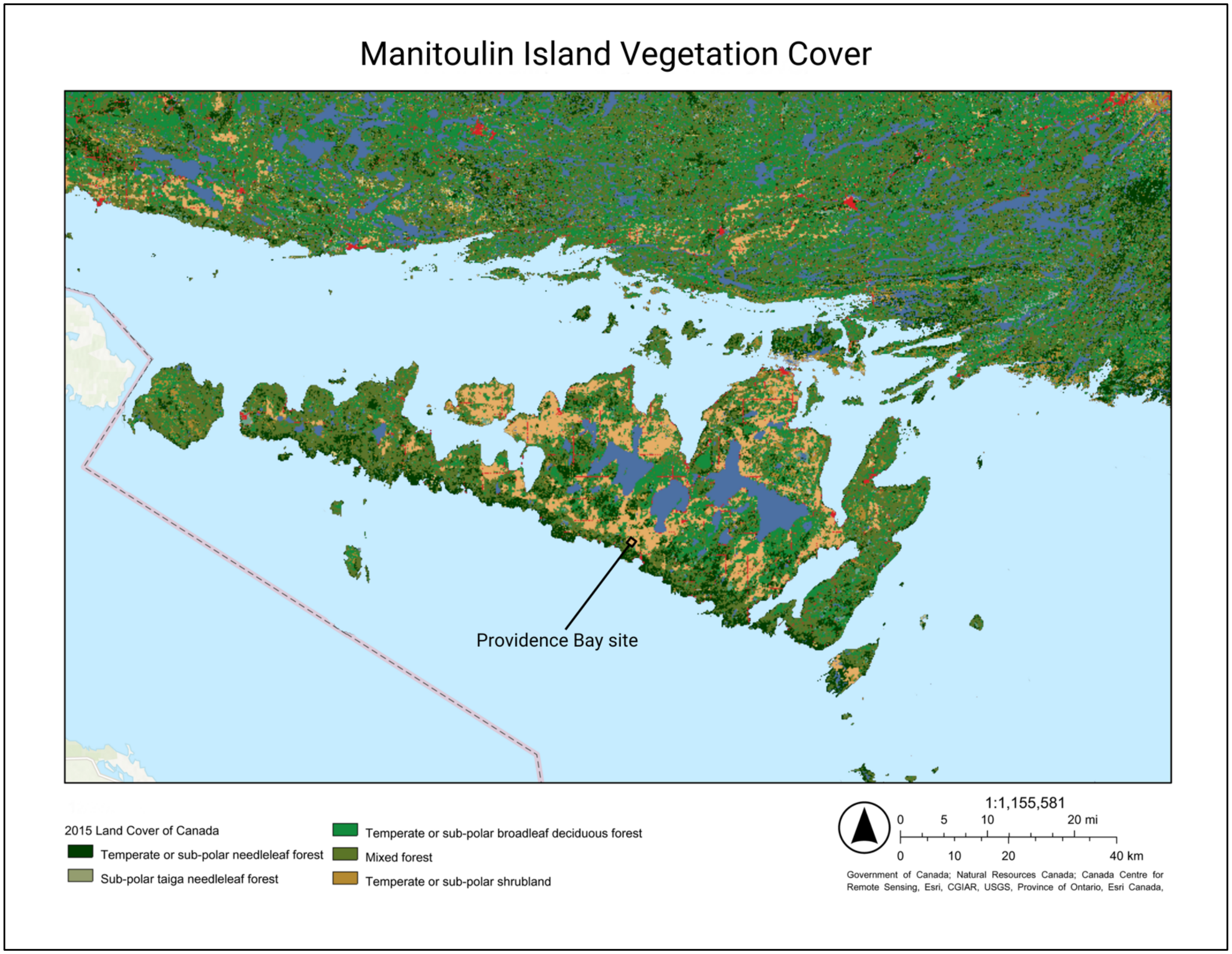

Figure 4-6: Major vegetation and forest types on Manitoulin Island as of 2015. These data come from the Canada Centre for Remote Sensing.

4.5 Forest Succession, Autecology, and Fire Ecology

A typical northern hardwood forest is characterized by a natural disturbance regime that facilitates a heterogeneous mixture of succession stages (West et al. 1981). This mixture of new and old growth provides higher biodiversity than a single age stand does. For this to occur, the biodiversity of the ecosystems relies on occasional renewal by clearing. A clearing event can be natural or anthropogenic. Examples include forest fires, ice storms, and windfall. The growth events that follow a clearing will progress through different stages of development as the area grows older (Hilmers et al. 2018). This process is called forest succession. The analysis of this ecological process relies on autecological knowledge. Autecology is innately tied to forest succession since it is the study of individual organisms and their idiosyncratic adaptations and interactions with respect to its environment (Walter and Hengeveld 2014). Information from autecology helps pin-point forest succession based on the reactions of different organisms to a clearing event.

On the old growth end of the age range, climax forests are defined as woodlands that have reached a long-term equilibrium. Once this stage has been reached, forest composition rarely changes unless a disturbance event occurs. Generally, there are long intervals between large-scale disturbance events that can last hundreds of years (Palik and Pregitzer 1993). However, the stability of old growth forests is a tradeoff for poor species diversity. Climax trees will be those capable of reproducing themselves within the same conditions for long periods of time. In the case of Northern Michigan, qualities for a climax forest would be a high tolerance of low light and colder weather (Dickmann and Leefers 2016). Trees that fit these criteria include hemlock (*Tsuga canadensis*), sugar maple (*Acer saccharum*), and balsam fir (*Abies balsamea*).

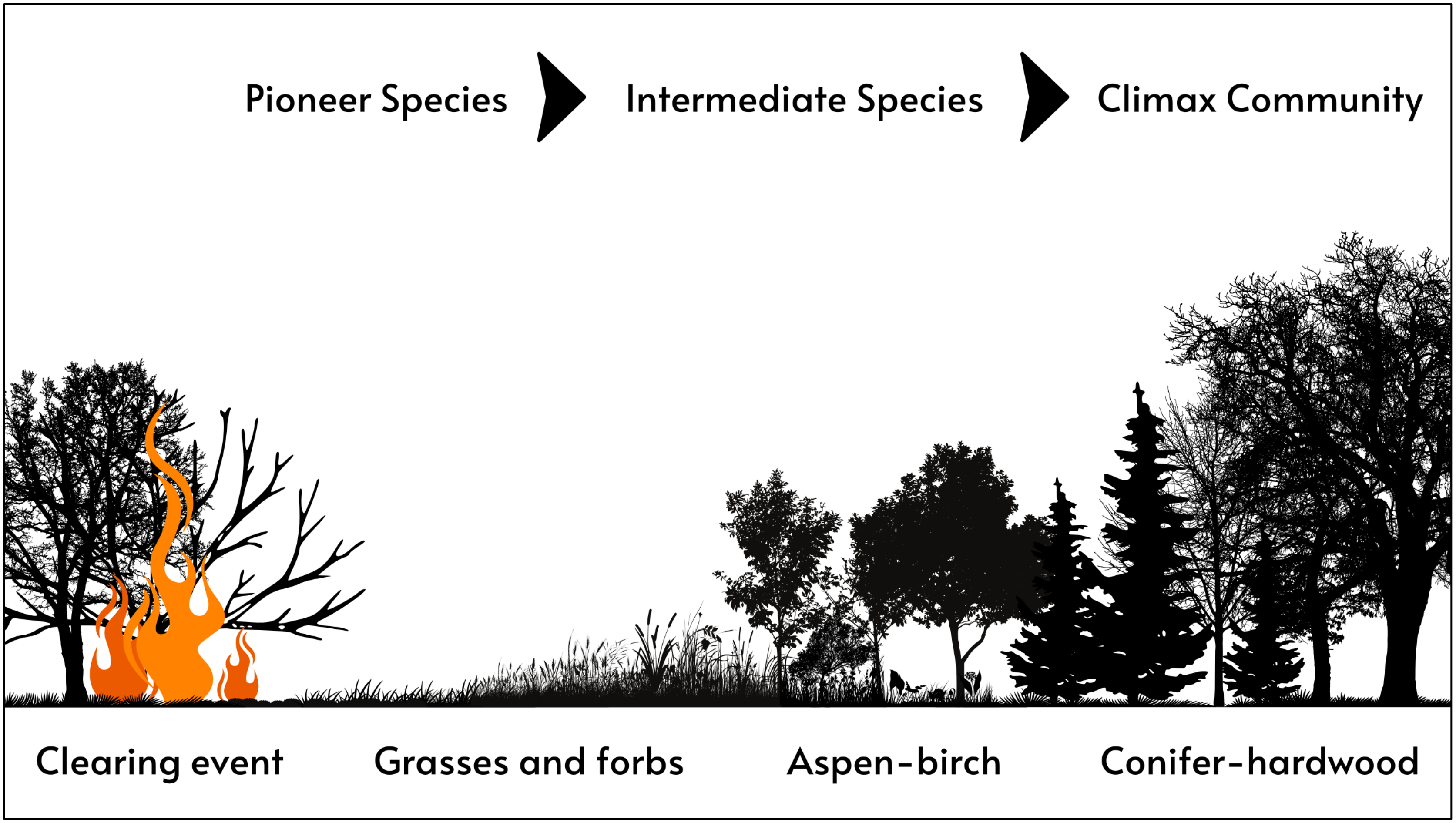

Figure 4-7: Major vegetation and forest types on Manitoulin Island as of 2015. These data come from the Canada Centre for Remote Sensing.

One of the adaptive “rules” of forest succession is that the more intolerant tree species will have a fast early growth rate. They must grow fast or risk other species taking over the canopy. These pioneer species will thrive until the more shade tolerant trees and plants fill in the area and block sunlight. The forest then enters a slow shift towards old growth as the canopy closes with continuous tree growth (Figure 4-7). A single tree fall may allow for a canopy gap that regenerates other species. However, a forest disturbance event large enough to change the stage in forest progression is infrequent. Even something as severe as a tornado cannot be counted on for regular forest “turnover”. The estimated return intervals for catastrophic windthrows are >1000 years (Canham and Loucks 1984). Fire is an exception to this pattern since it is historically correlated with catastrophic windthrow and not exclusively a natural phenomenon.

4.6 Intentional Fire Management

Within the Canadian boreal zone, fire is an essential element of vegetation renewal. It is an agent for clearing, increasing biodiversity, and controlling insect populations. Many plant communities like bur-oak savannas require fire clearing events to maintain the openness of those landscapes (Jones 2000). For generations, Anishinaabe people have been sophisticated managers of forests who have traditionally facilitated clearing events (Miller and Davidson-Hunt 2013, 2010). Doing so helps increase food sources like for increased mushrooms and berries (Claridge 2009) Though, based on the previously noted ontologies surrounding other-than-human beings, “management” may not be how they conceived of it.

Human mediated fire regimes are known to provide enriched soil, removal of pests, more productive flowering events increasing berry growth, and ideal environments for pioneer species like birch and ash that have important cultural uses (Smith 2011; Fidelis and Zirondi 2021; Payette et al 2021). Fire was also used on alvars to refresh them or to keep trails clear of large trees (Herron 2009; Reschke et al. 1999). Within northern forest and fire-dependent pine and oak-pine systems, low-intensity surface fires may have infrequently burned portions of the ground layer, exposed patches of mineral soil and thereby promoting regeneration of small-seeded conifers. As a side note, landscape type may also play a role in the selection of fire sites for domestic uses. For example, it is dangerous to set a fire for any activity near dry or overhanging trees (Miller and Davidson-hunt 2010). In either case, human environment interactions in the Great Lakes are closely tied to this relationship between humans promoting heterogeneous landscapes and intentional burning.

As mentioned, both lightning and humans are major sources of forest clearing. Since one of the goals of this dissertation is to identify and track human-environment relationships, distinguishing between "natural" and human fires is necessary. Luckily, fire caused by lightning vs. a human source creates different signatures. Lightning initiated fires will often take out large swaths of forest causing most of the forest in that area to be dominated by single age groups of trees (Knitter et al. 2019). Anthropogenic burning on the other hand creates small pockets of cleared forest where the broader forested area will maintain age groups that are heterogenous. Estimates for fire return interval for Canadian boreal forests range from 50 to 150 years.

However, if as we established the Anishinaabe respect the agency of other living things, how do we account for actions like burning within the philosophy since those are viewed as destructive? First, the burning of forests has a place within the oral traditions of Anishinaabe. Thunderbird for example is a *Manitou* that creates lightning (Densmore 1974). It is said that the Creator sends Thunderbird down to set fires when those forests become too old (Johnston 1995;

Warren 1885). As opposed to destruction, this activity is a part of a cycle of renewal. Respectful treatment of an other-than-human being is tied to renewal and not stasis. Additionally, the ethnographic work of Miller and Davidson-Hunt (2010) among the Pikangikum First Nation Elders, reveals that one nuance of the world view is that what we might define as agency, power, or creativity is akin to the ability to transform oneself and adapt. While beliefs do not need to be logical, it does follow that since fire has agency in the worldview, it is choosing what it burns.

4.7 Discontinuous Phenomena

Given the discussion of forest management and the creation of intermittent early succession patches, a discussion of the environment cannot be complete without addressing the discontinuous qualities of the landscape. Discontinuous phenomena within ecology include both anthropogenic, elemental, and other animal influences (Angeler et al. 2016; Fahrig 2020). Examples include beaver meadows, muskrat ponds, and the aforementioned forest clearing events by storm, fire, or people (Burchsted et al. 2010). Resource areas are comparable to the islands on which many of the ecosystems I have described occur. They can easily be characterized as nested nodes of discontinuous environments.

These habitat discontinuities combined with a seasonally mobile way of life have an impact on the cultural categories used to organize the world. While in the previous chapter I outlined the ontological relationships with the landscape in terms of kinship and agency, the perception of ecology is both spatial and temporal (Ingold 2000). This perception is influenced by the ways resources are distributed across the landscape, qualities of resources, and interrelationships (Davidson-Hunt et al. 2005).

In their ethnographic work among the Iskatewizaagegan No. 39 Independent First Nation, Davidson-Hunt and Berkes (2003) are taught that the Anishinaabe perception of the landscape and resources would be perceived in such a way that flexibility could be built into the cultural categories. Due in part to anthropogenic fires, the changing state of forest resources means that a cultural category is not tied to a specific Cartesian space. This is especially important since resources available in one location one year may not be in the same location the next. After all, forest succession is predicated on an ever-changing ecosystem.

Davidson-Hunt and Berkes (2010) note that linguistic terms in Anishinaabemowin emphasize discontinuity within biophysical categories. For example, the term *okwokizowaag* means forest patch. It is a specific term that is a separate concept from a "forest." It is not simply used as a descriptor; it represents a specific and separate landscape feature. In another instance, a blueberry patch is signified by the word *miiniikaa*, a compound word using the word for blueberry and the suffix denoting patches of vegetation. Meanwhile, the field of ecology recognizes forests as an overarching landscape category, it does not place individual elements of woodlands on the same hierarchical level as a "forest" (Figure 4-8; Figure 4-9). With exceptions, since Anishinaabemowin is a language that can create new words for new things, there is traditionally no word for "forest". Instead, the closest equivalent is *Mtigwaakii,* which translates to "being among the trees" (Wilhelm 2002). It is also important to note that the Anishinaabemowin categories are linked to processes, emphasizing the temporal aspects of the place instead of static descriptions. A place name could reference a specific geographic location like a lake, but they often describe a kind of place that could exist across space and time. For example, *ogishkibwaakaaning* is a place where wild potatoes grow, and *Gitigaani Minis* is an island where gardening occurred. In these specific cases, the names describe the growing conditions and resource events that are possible based on the category. To add to this pattern, a pathway, like a waterway or trail is also a distinct conceptual unit. Pathways represent a cultural

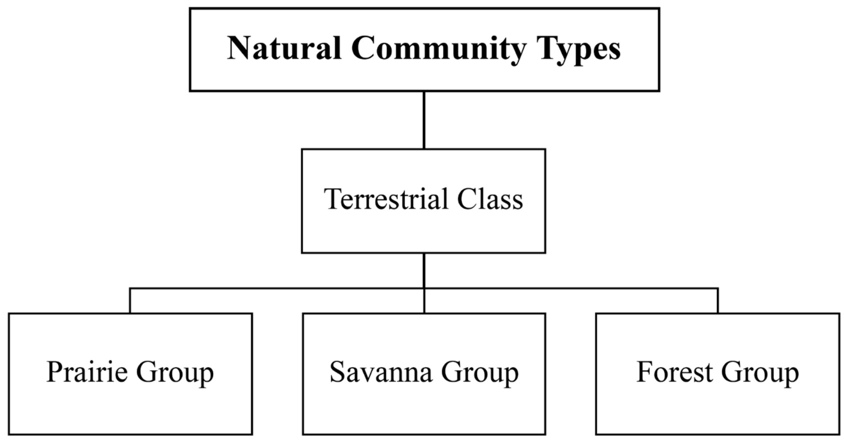

Figure 4-8: Michigan natural community types as organized by Cohen et al. 2015 as part of the Michigan Natural Features Inventory.

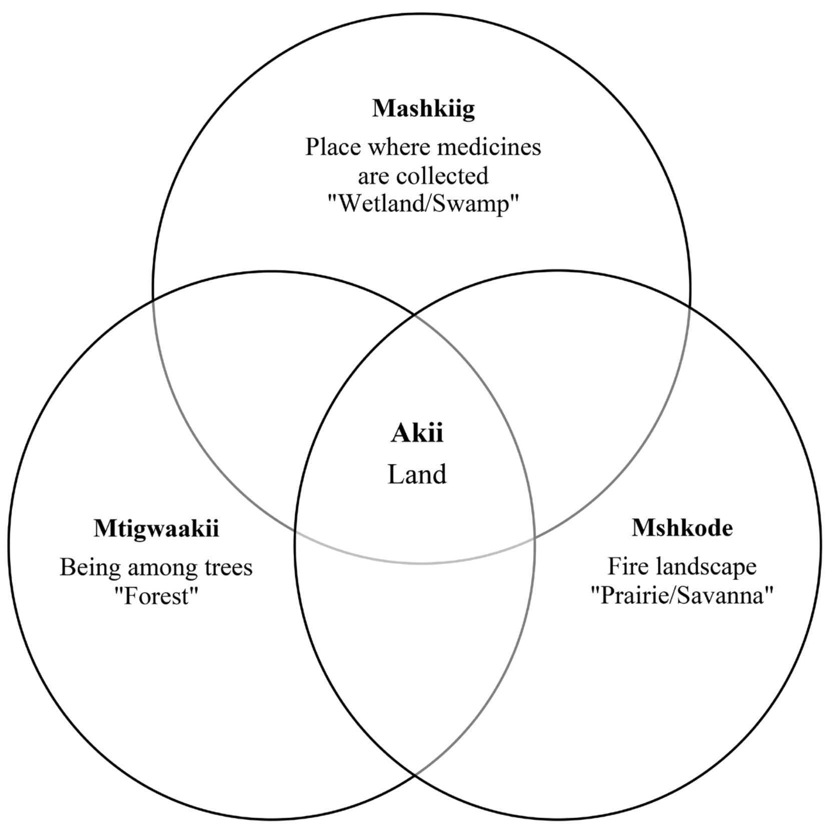

Figure 4-9: Conceptual connection between landscape types. Based off relationships with the land and process that take place there. Herron 2002, Davidson-Hunt et al. 2005, Wilhelm 2002, Johnston 2007, and The Ojibwe People's Dictionary.

space whose purpose is to link patches. For a culture so closely linked to mobility, the linguistic cultural categories describe the process of journeying. The point of these examples is not to provide an exhaustive exploration of the language. The language examples here help add to the overall pattern of paths and nodes making up a culturally and ecologically discontinuous landscape. Additionally, while these examples in no way express the complexity or intimacy of the subject, they do highlight the ecological world that would have been invisible to French visitors. Overall, the landscape is conceived as a network where the path traveled is one space and the resource area is another.

Another layer to the structure of the landscape is the islands themselves. If there were no other resources available to the Indigenous peoples of the northern Great Lakes, they would still have an abundance of water. The islands in this region add an additional layer to the node and path structure of the landscape. The conceptual pattern of paths and nodes is no doubt also influenced by the island and coastal landscape. Theirs was a water world, dotted with islands and archipelagos extending off both peninsulas of Michigan and Ontario. As a concept, an island is often associated with isolation or insularity (Fitzpatrick 2004; Fitzpatrick and Erlandson. 2018). Perhaps in part to the distinct boundaries of islands they can foster a sense of place. In studies of political development on archipelagos and islands are considered a part of a decentralized landscape in addition to discontinuous. Anckar (2007) notes that islands foster "predispositions to autonomy and power devolution" and "fragmented and distant geographies render difficult a manageable centralization of government and administrative power, practical, logistical and organizational considerations alone are likely to elicit the benefit of decentralization and devolution in archipelagos." As an added note, Anckar highlights that island cultures, especially archipelagos, may develop a political method to handle the mental and social distance of a population spread far apart. One potential method is nationalism combined with the desire to maintain individual identities and customs. The political consequences of circumscription and boundedness have been investigated archaeologically by both Pat Kirsch (1986) and Colin Renfrew (2004). Let us not forget that the waterways of Michigan are also dotted with archipelagos. Summer Island for example is a part of one off the Door peninsula. The pattern of nodes and paths throughout vegetation is writ large in the island and coastal landscape.

However, we cannot forget that technological innovations have also influenced the development of the political features commonly associated with islands. In particular, the canoe became a way for Anishinaabek to overcome spatial qualities of a discontinuous landscape. Though, the technology did not overcome the liminality of travel. In an interesting synchronicity Rob Mann (2017) points out that *voyageurs* of the later part of the seventeenth and eighteenth century were primarily liminal beings (Podruchny 1999). By this time *engagés*[9] were commonly hired to transport goods across Huronia and into the rest of the *pays d'en haut*. Ingold (2011) of course would frame this life as "wayfaring." A wayfarer's life is one of constantly being on the move and whose day is structured by the line of travel and eventual point of arrival. This is an interesting sentiment to make given that this is primarily how the Native people of the upper Great Lakes lived up to this point. If using the same criteria, the Anishinaabe would also t be considered liminal. After all, they traveled the dangerous waterways guarded by Mishipeshu. *Art mobiliere* or portable art is a rare but telling example of the liminality of Great Lakes travel. Across northern Michigan the use of these handheld effigies has been interpreted as talisman-like objects of spiritual and personal power. They are carried as a method of either protecting the traveler or of personal ritual. The *Naub-cow-zo-win* stone discs are an example of this type of

[9] *Voyageurs* hired by the *Congé* holder

artifact. They are small discs engraved with iconography of different powerful *mantiou* (Cleland et al. 1984; Cleland 1985). These objects are almost exclusively zoomorphic (Lovis 2001). One object from Summer Island has been interpreted as a snake effigy and may fit within these criteria. This behavior is a possible example of the perceived dangers of both the geographic and conceptual space.

4.8 Seasons and Plant Uses

Finally, since one aspect of this research is identifying seasonality or potential shifts in seasonal movement, a last, brief, aspect of this chapter is a description of Anishinaabe seasons. Since shifts in seasons will be dependent on latitude as well as other climatic and geographic factors, the categories I will outline will deviate depending on location. That said, I have chosen to use the categories outlined by Scott Herron (2002, 2009), Grover 2017, and Davidson-Hunt and Berkes (2010) as I believe they best represent the seasons in northern Michigan, specifically. It is generally agreed upon that there are five Anishinaabe seasons with the occasional inclusion of a sixth. These seasons are outlined in Table 4 along with the activities that are expected to occur during those times.

4.8.1 Anishinaabe Ethnobiology

In the following section I will discuss the ethnographic uses of the different plant types. There are potential plant uses that may influence the wood choice that go beyond burn potential. There are three main sources for the ethnographic information. First, I use the ethnobotanical investigations of Scott Herron (2002) from his dissertation research across Michigan, Wisconsin, and parts of Canada. Herron conducted observations and interviews among First Nation and

Season	Meaning	Activities
Ziigwan / Spring	Mild season. Sometimes called sugar season	Work within the sugarbush to collect sap, catch spring fish, and burn land
Miinokamin/Early summer	Berries have come	Berry, tree bark, and collection and processing
Niibin/Summer	Season of abundance	Travel and ceremony
Dagwaagin / Fall	Leaves turn color and fall	Collect wild rice and prepare food caches
Oshkibiboon/Early winter	Leaves have fallen and snow has come	Build wigwam
Biboon / Winter	Time for rest	Tell stories

Table 4-1: Anishinaabe seasons.

American Anishinaabe groups that he augmented with archaeological data. Second, there are the observations of Frances Densmore (1974). Finally, I use the research notes of Melvin Gilmore and Volney Jones. These notes are a part of the Archaeobiology Laboratories of the University of Michigan Museum of Anthropological Archaeology. Unless otherwise cited, any data discussed below are drawn from those three sources.

***Abies* –** Balsam fir, Zhingob

As resinous gymnosperms, fir trees are processed for pitch. The resin pulled from fir is boiled down to use as a glue or sealant. Traditionally, pitch has been an important component of canoe production and repair. Red cedar is also used in similar ways (Johnston 2012). To gather resin, the trees are cut and gravity drained. Abies are also good kindling. Small branches and twigs are very flammable. This quality makes for quick flames.

Acer – Maple, *Ininaatig*

If any tree is a "triple threat" it is maple. Famously, maple trees are tapped for mineral and sugar rich sap. Maple sap and its products can be used is a variety of dishes and drinks. Tapping is accomplished in the early spring (*ziigwan*) while atmospheric pressure from the near freezing temperatures allows positive pressure to spread the sap. In historic periods the sap would be boiled down into maple syrup or maple sugar. The likelihood and methods for producing maple syrup or sugar prior to copper bots it still a matter of debate. Through my own conversations with elders, it is possible that sap was concentrated down into syrup but, they may not have used fire. Instead, they could have allowed the sap to freeze and then partially thaw. The sugars will melt first allowing the remaining frozen water to be discarded, effectively concentrating the sap. All species in the *Acer* genus can be tapped for sap.

Hard maples like sugar maple also provide strong and flexible wood. Herron describes the construction of a structure using small maple trees, 2-3 inches in diameter. Interestingly, he observed that only the lower portions of those small trees were stripped. The top portions of the trees retained their leaves and smaller branches.

As for the third major use, in the Gilmore notes, informant Peter Chatfield discusses a maple decoction mixed with birch that is used for the lungs. Adam Hart also mentions a unique use for maple bark. Rusty steel traps were boiled with maple bark to clear away rust and to prevent rust in the future. Hemlock and swamp oak bark were used in the same way.

Alnus –Alder, *T'op*

Frank Cottrell mentions it is used to create a bright red dye. It can also be used to make a yellow dye in other sources. Outside of its use as a dye it is used as a medicine for anemia. A bark decoction is mixed with powdered bumblebees (Herron 2002). That drink would be administered during childbirth.

Betula **–** Birch, *Wiigwaasaatig*

The uses of birch bark are diverse and indispensable for Anishinaabe households. Birch bark is harvested from paper birch trees during the months of June and July. According to Frank Contrell and Mrs. William Jo Bell birch bark was stripped off at the time of ripening of raspberries was then laid away flat till the next spring, under pressure to hold it flat. In the spring this bark made into vessels. heated over a fire to make pliable to bend into any desired form. The bark has a lot of volatile oils that burn fast kindling. Split birch with bark intact was the selected for sacred fires that must burn continuously. It also should be noted that true tinder polypore is highly respected for its role as fire starter of sacred fires. It is a fungus that grown from wounds on the paper birch. paper birch trees. Though, cherry birch (*winsik*) has slightly different uses given the different bark properties. The inner bark used as medicine and A decoction to drink as a remedy for pulmonary.

Quercus - Red oak, *Mshkode-miizhmizh,* Bur oak*, Hgaakmizh*

In addition to being ubiquitous throughout most archaeological samples across Michigan it is an ethnographically important plant. Burning hardwoods was not simply a method of getting the most calories per unit of wood but also there is a long history if using hardwood ash during the process of making hominy or s*agamité*. The hard kernels of corn are made soft and palatable through continuous boiling with lye. The natural source of lie is hardwood ash so it is not simply that it is a wood fuel that is helpful for along burning. Based on its qualities as a very dense and evenly burning wood but the byproduct of burning oak or even sugar maple is that you have a product that then is also useful for processing your corn. The bark of red oak is used in making dye.

Tilia - Basswood, *Wiigbaatig*

The bark of basswood is peeled off the tree during the early summer when it will slip easily due to active sap flow.

Ulmus - Elm, *Aniib*

As with basswood, large sheets of bark are used for many things. The thick bark is prioritized for use in covering lodges, especially winter wigwams as it is thicker than birch bark. The bark is also used to make toboggans.

Tsuga – Hemlock, *Gaagaagimizh*

Hemlock bark used to have low burning-controlled fires to boil pitch. Conifers are broadly associated with ceremony. The high spark potential means they are better used for fires outdoors. Additionally, there are refenced to copper knives being used to cut cedar bark. The sacredness and utility of white cedar was evident during the Treaty period (1600-1900 A.D) when an Odawa chief gave away land title in Michigan but reserved the treaty right to protect and harvest white cedar, along with birch, wild rice, and maple syrup from sugar maples.

Rubus and Fragaria - Berries, *Miin, Adamin*

Naturally berries were an important food source for both vitamins and fiber. Berries offered to the fire during ceremony. If found in a fire feature rather than in general fill it may be that this is its means of entry into the archaeological record. Blackberries, blueberries, and maple syrup are often stored together for later. Strawberries (*Adamin*) are a good food but do not store well. Time spent in the berry patch would include temporary structures.

Typha - Cattail, *Apakweshkway*

All parts of the cattail are edible but also cattail or reed mats were labor-intensive, seasonally available resources. But they made precious mats. The Anishinaabemowin word is also synonymous with mats.

Chapter 5 - Previous Research and State of the Field

Since this work relies on a comparison between the Woodland and the French period, this chapter will begin by briefly describing the subsistence changes within the Late Woodland period followed by a discussion of previous research on the contact period in Michigan. The remainder of this chapter will discuss the previous research from the Cloudman site, details on the sites of comparison, and finally a summary of important references to Anishinaabek people within primary documents. As noted in Chapter 3, I treat the information from historical sources as contextual evidence that helps shape my later interpretations.

Within the archaeological history of northern Michigan, the time span known as the Late Woodland period has been the focus of robust modeling and investigation (Cleland 1982; Dunham 2014; Frederick 2019; Luedtke 1976). Several important subdivisions within the Late Woodland period have been identified by changes to the ceramic styles, subsistence, social organization, and settlement styles (Table 5-1). The overall changes across the Late Woodland period begin with more homogenous ceramic styles in the eastern Upper Peninsula during the early Late Woodland (AD 500/600 -1000) followed by distinct and heterogenous ceramic styles by the time of the late Late Woodland (AD 1200 – 1600). Such changes indicate a shift in settlement patterns, interaction spheres, and by extension, subsistence (Holman 1979; Dunham 2014).

What was residential mobility in the early Late Woodland (ELW) became more like logistical mobility during the latter part of the late Late Woodland (LLW). The subsistence techniques by this time relied on high yielding sources diffused across the landscape. Research has demonstrated that Late Woodland economic strategies centered on intensification of wild

Chronology of Northern Michigan		
Period	**Dates**	**Ceramic Associations**
early Late Woodland	AD 500 - 1000	Mackinac ware and Blackduck ware
middle Late Woodland	AD 1000 - 1200	Bois blanc ware
late Late Woodland	AD 1200 - 1600	Iroquoian styles, Juntunen ware, and Traverse ware
French Period	AD 1600 - 1750	Potential imitations Iroquoian styles

Table 5-1: Subdivisions of the Late Woodland period based on ceramic styles. Follows the organization of Kooiman 2018.

harvested foods, creation of surplus, and storage (Cleland 1992; Martin 1985). Subsistence strategies in northern Michigan have a deep history of a broad-based hunting-gathering-fishing pattern (Cleland 1982; Brose and Hambacher 1999). The linchpin of this focus was reliance on seasonal fish spawns as evidenced in part by increased gill net use (Smith 1996). Additionally, wild rice was also a major part of the coastal strategies (Surette 2008; Boyd et al. 2014). However, within more interior sites, the use of acorns and nuts should not be overlooked as a major food source (Dunham 2014).

Accompanying the practice of intensifying resource patches within the LLW subsistence Cleland (1966) noted that Odawa and Ojibwe territory in northern Michigan were positioned at the boundary between the Carolinian and Canadian biotic zones and as a result were able to develop adaptations for either floristic zone. This location on the transition zone in combination with the micro-environments present across the coasts and islands of the territory facilitated a diverse range of possible resources. Should one source fail, there could be other options. In this way, subsistence regimes were varied. For example, the corn-fish complex is one adaptation that includes minimal horticulture within a seasonal mobility and fishing focus. Of course, this behavior would be highly influenced by micro-environments capable of supporting enough frost-free days to grow corn (O'Shea 2003). No doubt the close associations of Odawa clans and the Huron-Wendat people also complicated subsistence patterns as these two groups often lived with one another.

By the time of Champlain's excursions into Michigan, the Anishinaabe across the Mackinac region possessed a highly flexible strategy that did not rely on a specific location. This fact is intriguing considering the linguistic evidence on landscape described in the previous chapter. The changes in subsistence may be attributed to the lake level changes associated with the Medieval Climatic Optimum post-AD 900 (Lovis et al. 2012). However, there is also evidence of a coastal horticulturalist-inland forager interaction sphere associated with Juntunen wares (Dunham 2014). It is within this context that the French period developed. The connection between horticulturalists and foragers is also a pattern seen in the historic period. Alliances between horticulturalists like the Petun (Tionontati) and mobile foragers like the Anishinaabe created a mutually beneficial relationship as each group could provide what the other lacked. Only, in the historic period the Odawa were interested in maintaining control over the flow of trade goods to their allies (Fox and Charles Garrad 2004; White 1991).

By 1615 the general pattern of seasonal movement mentioned in Chapter 4 became established. They would overwinter in one area and coalesce during the warmer seasons in a different location. Summer aggregation sites provided opportunities for ceremony as well as important logistical stops on coastal trade routes, where the gathering of resources would be focused on these coastal areas (Nelson 2018).

5.1 Fur Trade Research

Historical research has its own deep history, but here I will outline the basic trends and developments of fur trade research in the Great Lakes. The study of the fur trade in Michigan has developed out of acculturation-based work and into the study of nuanced interactions and social agents. Within his 1992 dissertation, Dean Anderson completed a detailed investigation of trade items, primary documents, and fur trade theory. Despite examining European sources, his focus was on Indigenous motives and desires. He was one of the first scholars to point out that the adoption of European goods in the French fur trade was not a proxy for acculturation. His work was built from the foundation set by George Quimby. Quimby was an important scholarly voice within the study of the pre-British fur trade (Quimby 1966a, 1966b). He was devoted to constructing chronologies and exhaustively investigated assemblages to outline trade patterns. He recognized that there was an initial period of European goods flowing into the west via "down the line trade." This was a period with no direct contact with Europeans and is often referred to as the proto-historic period (Mazrim and Esarey 2007; Wahla 1961). However, Quimby was a scholar who insisted on categorizing objects based on discrete cultural identities. Labeling artifacts as either "Native" or "European" has since been rejected in favor of hybridity (Walder 2015).

In a deviation from previous studies, Anderson wanted to know what European goods were sought out by Indigenous peoples, what the incorporation of European goods could indicate about the nature of the French fur trade and what patterns of trade could be identified. He addressed these questions by thinking about French-Indigenous interactions through an adaptive lens. For Anderson, he saw both the archaeological record and the historic records as offering different insights. Not only did he rightly claim that Native actors had agency, but he also made the case that the Indigenous peoples had “discerning tastes for trade goods.” Furthermore, based on their own specific desires Indigenous actors had the ability to influence the types of products brought into the region for trade (Anderson 2009). Other work on the period also reinforced the understanding that the adoption of European goods was selective (Branster 1992).

Of course, Richard White (1991) made the argument that the Great Lakes fur trade in Michigan was transformed into a new cultural landscape he dubbed “the middle ground.” The changes to the social world came from the local level, not from the imperial level. Village life, diplomacy, cycles of revenge, disease, and trade birthed the symbolic and functional aspects of the period. Only, to him the middle ground was both a place and a process. More importantly, the greater social space of the fur trade was created through individuals. Small-scale interactions influenced both the Indigenous and Europeans alike. This was a nuanced view of a power struggle that was up until this point, thought to be one-sided.

Later, Michael Witgen’s (2012) examination of Great Lakes encounters developed more than just the directionality and scale of power; it provided the idea that sovereignty could be something much different than the legal frameworks of Europeans. Witgen rightly emphasized that through an Anishinaabe lens political alliances were conceptualized as kinship (Witgen 2012). The French in turn had few avenues except to accept an Indigenous trade format. I cannot overstate the importance of deviating from an exclusively French perspective.

The works described so far do not make up the only important moments in the development of fur trade research. However, I selected those examples for their relevance to northern Michigan and their influence that created ripples in the field. For example, in an interesting departure from “traditional” acculturation theory, Rob Mann (2017) acknowledges that *voyageurs* were, often, living outside of the watchful eye of “civilization.” They adopted many features of Indigenous culture as part of their lifestyle. Examples include life on the water, the central importance of pipe smoking, importance of stories and ritual, and adoption of Native cloths and technology. As I see it, the "unique" elements of *voyageur* life are a hybrid of the Native cultures that came before them. Technology is often seen as a major “impetus” for social transformations but there is more than enough room to note the cultural transformations of Frenchmen once they adopted the canoe. That work is an example of how different fur trade research has become since the 1960s. As referenced in Chapter 1, where this leaves us is with a better understanding of the social processes and people in addition to the flow of goods.

5.2 State of the Field

As I move deeper into the particulars of fur trade research, archaeology has been a key but limited lens through which to reinterpret the written record of New France. Solidly dated fur trade sites beyond those associated with forts are less frequent than Late Woodland contexts. Still, archaeological work has pushed forward our understanding of diaspora, social networks, and identity.

One of the realizations of Andersons work (1992) is that many of the trade goods desired by Native Americans existed in a parallel format within their preexisting lifeways (Jordan 2014). Beads were simply a glass version of adornment and kettles a metal vessel. However, the extra element that follows the adoption of European goods is that some trade items were repurposed for Indigenous crafts. Based on the work of Heather Walder (2015) as well as Nassaney (2019), we know that while Natives of Michigan worked with copper, they would shape it by cold hammering. This is possible since the copper in northern Michigan is some of the purest in the world and soft enough for manual manipulation. As copper kettles made their way into the region, these became sources of copper for repurposing into tinkling cones or bracelets. This evidence is in keeping the trend of pushing back against the assumption that European goods were superior. One such cone from the Bell site is shown to have been made from a scrap of a kettle-body (Walder 2015).

Archaeological work has also explored the phenomenon of Iroquoian style ceramics made by Algonquin people. Analysis at the Cadotte site revealed that the Wendat style ceramics deviated from the styles found within Ontario from earlier periods. The “Huron incised” style Anishinaabe vessel utilized a combination of attributes from Wendat styles with differences in the execution of the style as well (Mazrim 2014). This work also complicates the timing of Western movement since the Cadotte materials indicate that the site was occupied by the Odawa before the 1650s diaspora, possibly as early as 1610s.

Due in part to Seneca warfare, the Odawa “heartland” shifted away from the Bruce Peninsula and Lake Huron to the Straits of Mackinac. Primary documents record the Odawa or Ojibwe living with the Huron in and around the Straits of Mackinac. Cadillac’s memoir makes a point of noting that the village near St. Ignace was in his estimate inhabited by 200 people (Quaife 1962). In 1665 Father Claude Jean Allouez also reported that Chequamegon Bay was becoming an Odawa trade hub (Thwaites 1610-1791: 50: 279). By 1668 the St. Mary's mission on Burt Lake was established under the direction of Father Jacques Marquette in part to service the populations there, though other groups remained on the eastern shore of Lake Michigan near the location of the O’Neill site (Fox 1990; Morrissey 2013; Nassaney and Martin 2017).

Other groups, like the Kiskakon and Sable groups moved further west with other Algonquians to Huron Island (now Rock Island) at the entrance to Green Bay (Blair 1911). At

Rock Island the French period populations were able to resume the fur trade activities. In 1654, people from Rock Island sent a fleet of canoes to the St. Lawrence River (Blair 1911).

While archaeological evidence does not support the population size suggested by Cadillac, there is a wealth of information reinforcing the idea that movement west had not only occurred, but there was also an overall shift towards the Straits area and beyond. The Rock Island II site located at the mouth of Green Bay provides evidence for multiple French period occupations (Mason 1986). Mason argues that the deposits at the site represent four components (Table 5-2). Mark Wagner (1998) continued investigations into the Rock Island II materials. He operated from the assumption that the fur trade was a conduit for culture. Through this perspective he also concluded that Algonquin groups like the Anishinaabe were politically independent from French control.

Rock Island (47 DR 128) Period II Occupations		
Cultural Affiliation	Approximate Date Range	Citations
Odawa	AD 1760-1770	Mason 1986 Mazrim 2014 Wagner 1998
Potawatomi	AD 1670-1730	
Huron-Petun-Odawa	AD 1650 -1653	
Potawatomi	AD 1641-1650	

Table 5-2: Chronology of Rock Island II and the cultural affiliations.

5.3 Cloudman Site (20CH6)

Drummond Island is the site of historic Fort Drummond, used by British Forces, circa 1812. Before the British there was a large Indigenous village on the island with 600 years of near continuous occupation (Branster 1995; Kooiman 2018; Kooiman and Walder 2019). The Cloudman site spans multiple time periods, beginning in the first millennium AD and ending in the twentieth century. The first major period includes a Middle Woodland component (200 B.C. – A.D. 500/600) with North Bay and Laurel traditions represented in the ceramic assemblage (Dunham 2013; Franzen 1975; Janzen 1968; Mason 1981). The Middle Woodland habitation is followed by several Late Woodland cultural divisions demarcated by their ceramic styles (Table 5-3).

	Early Late-Woodland	Middle Late Woodland	Late-Late Woodland
AD 1200-1600			Huron Incised Lawson Incised Juntunen Drag-n-Jab Juntunen Linear Punctate
AD 1000- 1200		Bois Blanc	
AD 500/600 -1000	Mackinac Punctate Mackinac Banded Blackduck Banded		

Table 5-3: Cloudman ceramic chronology.

The site has remained privately owned by the Cloudman family since the purchase of the land in the 1800s (Gary Cloudman, personal communication). Fieldwork at the site began with a survey by Wilbert Hinsdale in the 1930s (Hinsdale 1931). After amateur archaeological investigations in subsequent years, the next investigations occurred when John Franzen conducted the 1974 archaeological survey of Chippewa County (Franzen 1974). It was through the Franzen survey that the basic chronology of the site was first outlined. The survey revealed the Middle Woodland through the early historic occupations. Further investigations took place in 1990 as part of the St. Mary's River Archaeological Survey. Crews from Michigan State University shovel tested the area along six transects. This survey helped delineate the boundaries of the site and locate a 1920s component.

After the 1990 survey, the Cloudman family wanted the site placed on the National Register of Historic Places. This desire set in motion the intensive excavations in 1991, 1992, and 1994 led by Michigan State University graduate student Christine Branstner and Professor Charles Cleland (Branstner 1995). The total excavation area from 1992 to 1994 added up to 102 square meters. The 1990's excavations opened 36 units with 33 features excavated. While 40 features were initially identified, features 2-6 and 9 -10 were later removed from this category. During the 1994 season, a primary and secondary datum were cemented three feet into the ground. The seventeenth- and eighteenth-century components at the site were first excavated during the 1991 season.

The initial ceramic chronology was constructed by Branstner in the 1990's. The vessels from the 1900s total 136 vessels. More recently, Susan Kooiman refined the chronology through both retyping vessels as well as direct dating charred material on some of the sherds (Branstner 1995; Kooiman 2018). Of the five samples dated from ceramics the chronology and occupation periods were organized into early Late Woodland (ELW), middle Late Woodland (MLW), and late Late Woodland (LLW) divisions (Table 5-4). Kooiman's dates were processed through the W. M. Keck Carbon Cycle Mass Spectrometry Laboratory at the University of California, Irvine. This dating was particularly important as it was some of the first direct dates from Iroquoian ceramics in the St. Mary's River area. Overall, the temporal assignments from Branstner remained the same. However, the Iroquoian style ceramics, originally assumed to be historic period, were dated to the LLW. This timing combined with the assumption that Anishinaabe people began to replace Native made ceramics with copper kettles, or by using bark containers, introduces uncertainty into what we know of ceramics as part of a Fur trade system.

Vessel #	Ceramic Type	Calibrated Age
4	Laurel Dentate Stamped	AD 59 - 126
103	Mackinac Banded	AD 941 - 997
162	Cf. Sidey Notched/Lawson Incised	AD 1421 - 1445
1	Laurel Pseudo-Scallop Stamp	AD 80 - 180
193	Blackduck Banded	AD 938 - 987

Table 5-4: Cloudman vessel direct dates from Kooiman 2018

During the dissertation work of Susan Kooiman, the foodways of Drummond Island were examined. Using legacy collections from the Cloudman site, Kooiman performed a functional analysis of the ceramics including use-alteration and a variety of analyses on adhered food residue. Residue was also sampled for microbotanical evidence, stable isotope analysis, and analysis of lipids. Starch from squash and maize were identified, along with the phytoliths of wild rice, maize, and squash. There was no rice starch identified even though rice phytoliths and overall evidence for wild rice utilization increases over time. Replacing maize, wild rice becomes a much more important food source is the LLW than in earlier periods. However, wild rice and maize phytoliths were only associated with vessels that also contained evidence for other foods. Therefore, the vessels were multi-use pots that did not exclusively cook one type of food.

Additionally, acorn oil with some contribution of hazelnut oil was a staple which matches the macrobotanical assemblage (Table 5-5). Roughly 75% of the nut weight was acorn with the remaining nuts identified as hazelnut and butternut. Other finds include strawberry (*Frageria* sp.), possible cinquefoil (*Potentilla* sp.), wild plum (*Prunus Americana*), raspberry (*Rubus* sp.), elderberry (*Sambucus* sp.), wild grape (*Vitis* sp.), Bedstraw/cleavers (Galium sp.), Violet (*Viola* sp.), hazelnut (*Corylus* sp.), acorn (*Quercus* sp.) goosefoot (Chenopodium ap.), knotweed (*Polygonum* sp.), a single wild rice grain (*Zizania* sp.), maize (*Zea mays*), and a seed from the aster family (Asteraceae). The example of charred wild rice is a particularly rare find. However, the limited wild rice finds in Michigan are surprising given the availability of rice and its historic significance. Dunham in his unpublished work on wild rice also states that one of the 20th century locations of wild rice beds is on Drummond Island on the Potagannissing River (Dunham 2008).

Faunal evidence from the Cloudman site is limited as only two Late Woodland features were analyzed in the 1990s (Cooper 1996; Kooiman et al. 2019). Regardless, the results reveal the use of seasonal spawning fish as well as heavy representation of beaver during the Late

1990s Cloudman (20CH6) Botanical Remains	
Seeds	
Fragaria/Potentilla sp. Strawberry/Cinquefoil	15
Prunus americana Wild Plum	3
Rubus sp. Raspberry	6
Sambucus sp. Elderberry	28
Vitis sp. Blueberry	1
cf. Asteraceae Aster Family	1
Chenopodium sp. Goosefoot	3
Galium sp. Bedstraw/Cleavers	17
Polygonum sp. Knotweed	2
cf. *Viola* sp. Violet	2
Nutshell	
Corylus sp. Hazelnut	5
Juglandaceae Walnut Family	1
Quercus sp. Acorn	115
Zizania sp. Wild Rice	1
Nut Meat and Kernels	
Quercus sp. Acorn	2
Zea mays Maize	15

Table 5-5: Cloudman plants identifications from the 1990s.

Woodland (Figure 5-1). The Late Woodland fauna included ritual burials of a dog with a snapping turtle and nearby a beaver burial.

Additional dating was accomplished through the work of Heather Walder (2015) and her study of metal and glass objects from across the region. From the Cloudman site Walder initially analyzed 18 out of 21 beads and 11 copper objects with portable X-ray fluorescence (pXRF) and LA-ICP-MS at the Elemental Analysis Facility of the Field Museum, Chicago, Illinois. Through her work, she identified the glass formulas for trade beads found across the Great Lakes. The results indicate that the mass-produced white trade beads from Cloudman were produced after AD 1650 and often post AD 1670. Given that the white and blue beads were recovered together during water screening, it is likely that other bead types were deposited sometime after AD 1650 (Kooiman and Walder 2019). Walder also targeted trade items from 36 other fur trade sites across the region plus the Illinois region. Walder's analysis of O'Neill site metals and glass will be discussed later.

Other than trade beads, fur trade goods included one gunflint, a copper awl, a copper tube, a clasp knife, a Jesuit silver ring, and a variety of later historic and modern materials from the nineteenth and twentieth centuries. Her overall dissertation examined the manufacture techniques and chemical make-up of metal and glass artifacts with the goal of identifying ethnic divisions, cultural hybridization, and Native trade networks.

To summarize, previous work paints a picture of a Late Woodland aggregation site where acorn/nut processing was an important aspect of Cloudman activities. Occupation took place during warm weather where fish from both summer and fall spawns were present. The results reveal that they adapted their cooking styles and technology across time to incorporate new food opportunities and pulled resources from a broad range of habitats.

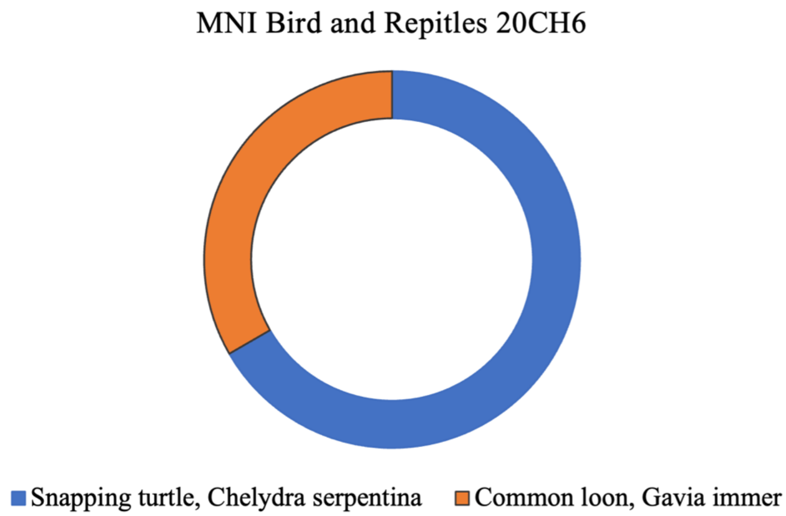

Figure 5-1: Cloudman birds and reptiles by percent

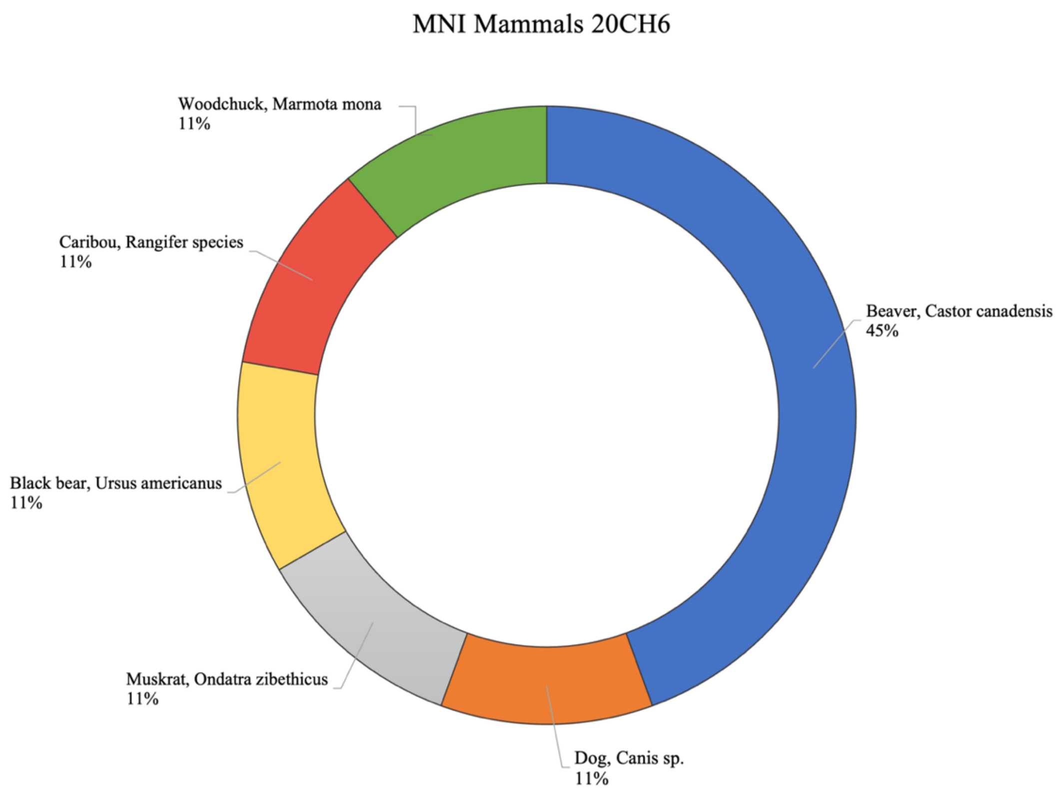

Figure 5-2: Cloudman mammals by percent.

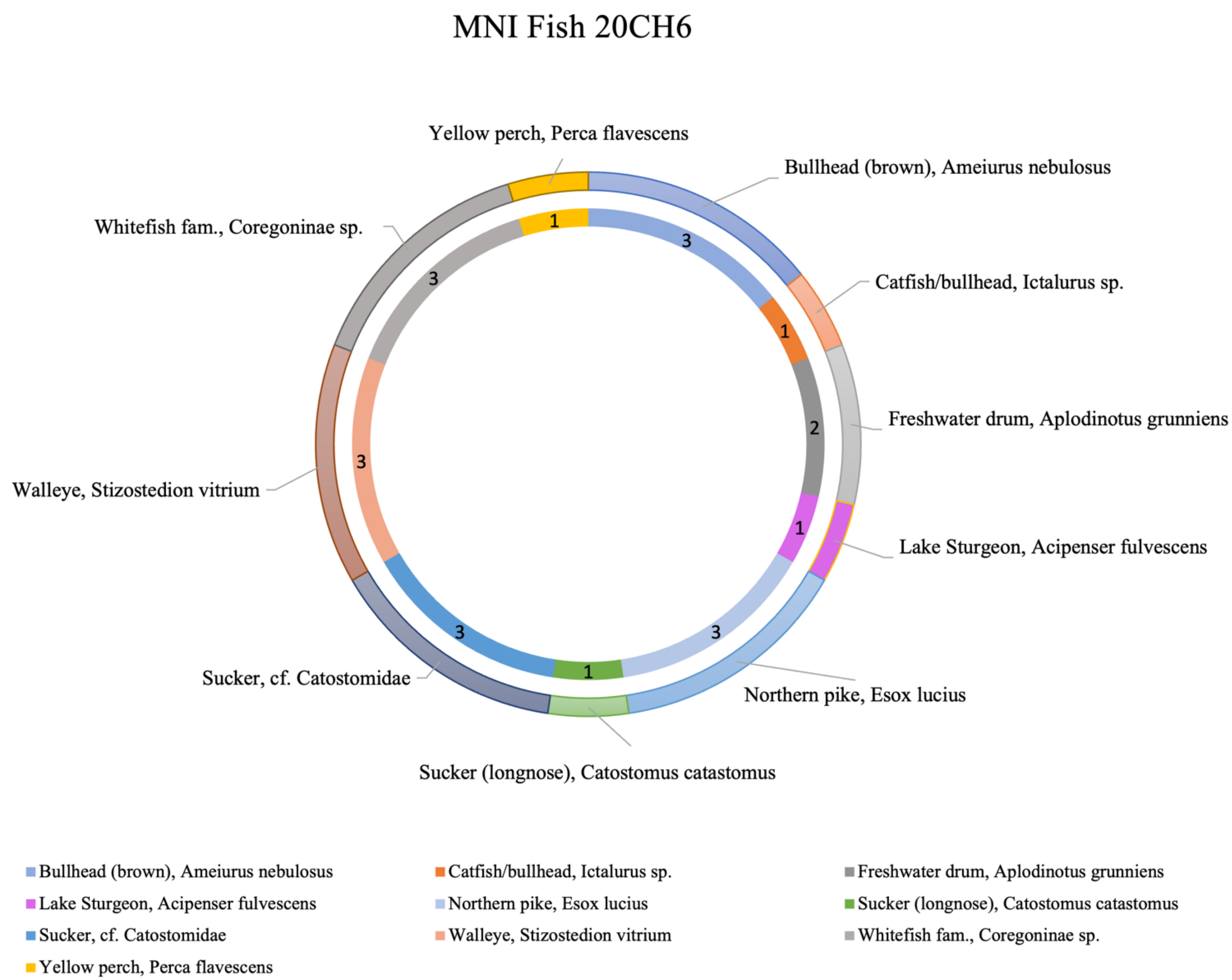

Figure 5-3: Cloudman fish by percentage.

5.4 O'Neill Site (20CX18)

The O'Neill Site in Charlevoix County, Michigan, was excavated by the Michigan State University Museum during 1969 and 1971 (Lovis 1973). It is located in modern day Charlevoix County, Michigan. The occupations range from AD 1000 to AD 1700. The historic assemblage comes from a thin scatter of trade materials, with a much more robust presence of Late Woodland cultures represented in the rest of the site. European trade items included knives, beads, tinkling cones, gunflints, and jewelry. The mammalian faunal analysis from the historic occupation zone offers evidence for butchering marks. Ceramics from this site include Late Woodland Juntunen and Traverse wares along with an early historic/transitional ceramic type with chevron motifs. This vessel type has been named O'Neill Curvilinear (Lovis 1973; Lovis et al. 2012).

The historic component of this site is very sparse but important artifacts associated with the fur trade include four copper-based metal artifacts, cut-brass bracelet/armband, iron knife blades, four glass beads, gunflint spalls, and an assumed Native-made gunflint (Lovis 1973; Walder 2015). The brass cuff is clearly made from European material though it is made in a style reminiscent of Wendat peoples.

As this site is at the edge of the plant transition zone animals represented in the assemblage include nine species of fish such as sturgeon (*Acipenser fulvescens*), trout (*Salvelinus* sp.), White sucker (*Catostomus commersomi*), redhorse sucker (*Moxostoma* sp.), walleye pike, (*Stizostedon vitreum),* bass (*Micropterus* sp.), catfish (*Ictalus*-sp.), channel catfish (*Ictalus punctatus*), and perch (*Percidae*). All are spring spawning fish except for trout. Mammals are identified as bear (*Ursus americanus*), whitetail deer (*Odocoilus virginianus*), elk (*Cervus* *canadensis*), and moose (*Alces alces*), possible coyote (*Canis latrans*), fox (*Urocyon,* sp.), gray fox (*Urocyon cineroargentens,* sp.), marten (*Martes americanus*), mink (*Mustelid.* sp.), cat (Felid. possibly bobcat, Lynx rufus), muskrat (*Ondatra zibethicus*), and racoon (*Procyon lotor*), and one domestic dog (*Canis familiarus*). The presence of so many large animals is indicative of its location on a larger landmass. Key birds identified include (*Gavia immer* sp.), gull (*Larus* sp.), duck (*Aythya* sp.), and Canada goose (*Branta canadensis*), turkey (*Meleagra gallopavo*), and the now extinct pigeon (*Ectopistes migratorious*). Given the heavy representation of fish in the assemblage, logistical use of the site was interpreted as heavily fishing based and occupied during the warm season (Holman 1984).

5.5 Summer Island (20DE4)

This site lies on the eastern shore of Summer Island, on the edge of Summer Harbor. While it is in Lake Michigan, it is close to an outlet of Green Bay, south of Point Detour in Delta County, Michigan. The first work at the Summer Island site was accomplished by Burton Barnard in 1968-70. The next major work to occur was by David Brose as part of his dissertation fieldwork. The site had spatially differentiated prehistoric and historic components.

As with the Cloudman site, occupations range from the Middle Woodland components into the French period (Brose 1970). Within the Late Woodland components, there is a significant presence of ceramics that are nearly identical to those found in Western Michigan. There are several Oneota ceramics as well (upper Mississippian 13th and 14th centuries AD). This near-continuous occupation is on the periphery of the Western Nations like the Fox and Mascoutin. This location sits at the territorial divide between Anishinaabe groups and their enemies during the Fox Wars.

The early historic period is centered in Area "B," a spatially distinct portion of the eastern shore. Brose excavated a sheet midden and another midden associated with post molds that indicate a round structure roughly 18 by 12 feet wide (Figure 5-4). Area "B" yielded ceramic types such as Bay de noc Notched, Huron Incised, Sidey Notched, Lake Winnebago Trailed, and local cord marked styles for a total of sixteen ceramic vessels. Dates for the Summer Island Cord Marked ceramics place this occupation at ca. AD1680-1730. However, it must be noted the ceramics were not directly dated. Furthermore, this site shares the issue of ceramics from earlier periods appearing within the same levels as European trade goods. However, Brose was nonetheless able to complete his analysis of the historic assemblage. Other early historic artifacts included brass kettle scrap, European trade beads, copper artifacts, and iron artifacts like clasp knife blades (Appendix D).

Potawatomi presence is represented on Summer Island through what Brose identified as Summer Island cord marked. These ceramics bore strong stylistic links to the proto-Potawatomi ceramic of the Dumaw Creek site in Western Michigan (Ehrhardt and Kelly 2018; Quimby 1966b). Nicolet references them in the Jesuit Relations as far west as Green Bay. Another ceramic style associated with the post 1600's Potawatomi is Algoma Modified Lip (formerly Bell Type II [Mason 1986; Naunapper 2007]). These are distinct for their grit-tempered ceramic types with the distinctive "pie crust" lip-notching. Instrumental neutron activation analysis by Naunapper (2007) has linked different ceramics styles with historical references to the Potawatomi across the Wisconsin and Western Michigan landscape. Unlike the Ojibway and Odawa, the Potawatomi moved into Southeastern Michigan and up into Green Bay. Before the Anishinaabe occupation, thirteenth and fourteenth century AD the Late Woodland component of the site was identified as Oneota

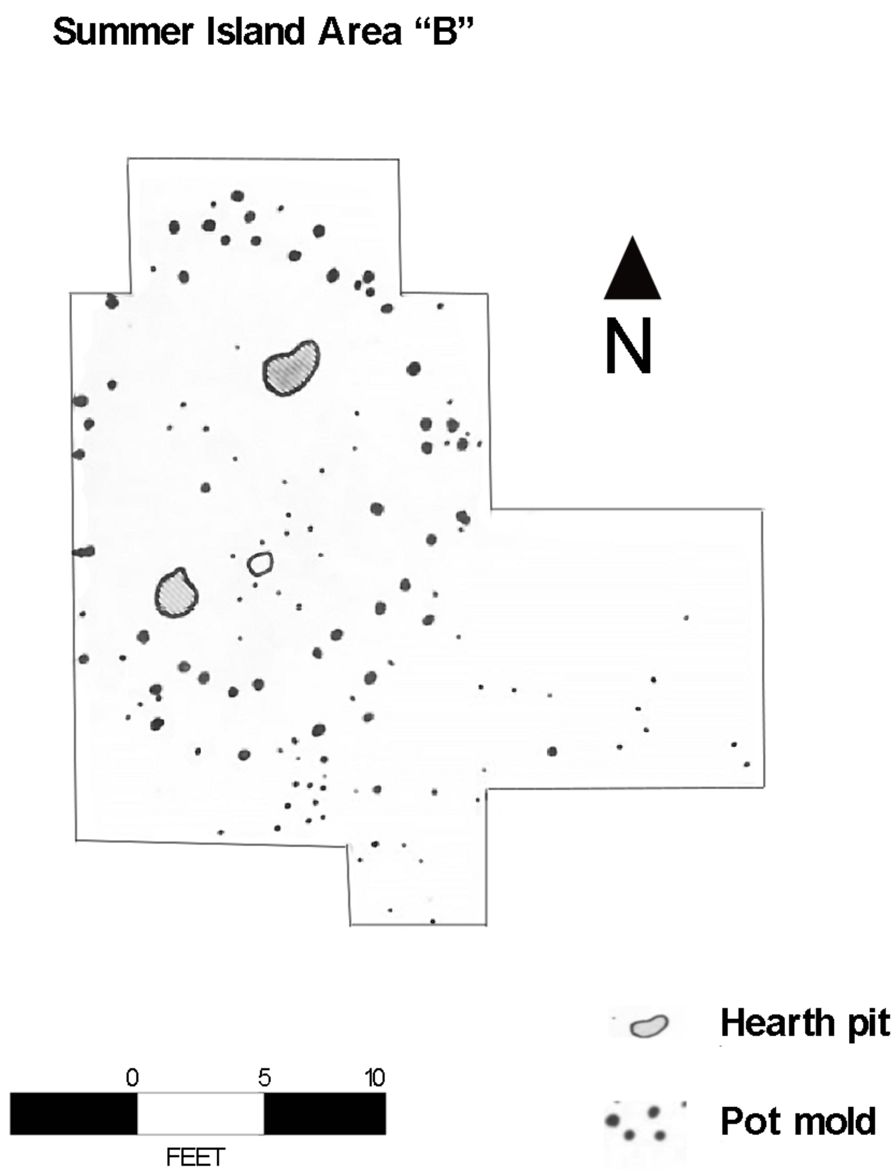

Figure 5-4: Summer Island early historic structure.

(Upper Mississippian). The shift from Oneota populations is linked with the diaspora previously noted.

Detailed faunal and botanical data were collected and analyzed. These data included 13,273 grams of faunal remains, as well as a macrobotanical assemblage (Brose 1968). Botanical remains recovered from the site were identified by Dr. Volney Jones of the Ethnobotanical Laboratory of the Museum of Anthropological Archaeology, then named the Museum of Anthropology. The botanical remains consisted of eight charred fragments of hazel nutshell (*Corylus* sp.), two chokecherry seeds (*Prunus virginiana*) and twenty-eight squash seeds (*Cucurbita pepo*).

Finally, Summer Island has been widely considered a seasonal fishing site through most of its occupational history. Fishing artifacts from the Late Woodland components include a toggling harpoon, gorge (for angling), and a sinker needle/shuttle (Martin 1985). Notable faunal remains include beaver (*Castor canadensis*) and black bear (*Ursus americanus* [Table 5-6]). The combination of both botanical remains and fauna from the historic period makes this one of the few sites to have both types of data in the region.

Mammals	**Beaver** *Castor canadensis*	**Black bear** *Ursus americanus*	**Elk** *Cervis canadensis*	**Rabbit** *Lepus* sp.	**White-tailed deer** *Odocoileus virginianus*
Late Woodland	✓			✓	✓
French Period	✓	✓	✓	✓	✓

Fish	**Bass (smallmouth)** *Micropterus dolomieui*	**Lake Sturgeon** *Acipenser fulvescens*	**Walleye** *Stizostedion vitrium*	**Northern pike** *Esox lucius*
Late Woodland	✓	✓	✓	
French Period	✓			✓

✓ = Present

Table 5-6: Summer Island fauna split by period.

5.6 Providence Bay (BkHn-3)

The Providence Bay site is located near the mouth of the Mindemoya River, on the south shore of Manitoulin Island, separating Lake Huron from the Georgian Bay. It is closest to the contemporary Wiikwemkoong Unceded Territory on the eastern peninsula of the island (Wiikwemkoong Unceded Territory Islands Claim 2022). The site was first referenced by Emerson Greenman in 1951 (Conway 1987). The site itself was officially recorded after the 1975 survey of Manitoulin Island conducted by Thor Conway and William Fox. Initial shovel testing was accomplished by Greenman, and further excavations were carried out from 1985 through 1988 under the direction of Thor Conway, who was with the Ontario Ministry of Culture and Communications at the time (Conway 1987). Excavations revealed thick cultural deposits associated with structures, middens, ritual activity, and isolated features. The site's occupation ranges from the Late Woodland all the way through the historic period. Other than the French period, Providence Bay's latest component is a ca. AD 1850-1870 patchy layer that was found across the surface of the site, only in sparse amounts and areas. Intermittent historic glass was identified to this period.

Unfortunately, development in the late 1980's destroyed the northeastern portion of the site, and another portion has eroded away into the Mindemoya River. While salvage excavations were undertaken, part of the ritual component was within the construction zone. As with the Cloudman site, the ritual components include dog burials with associated fish remains and a ritual beaver burial. The beaver was a young adult buried in a bundle within a shallowly dug basin (20 centimeters below surface and 15 centimeters deep). While there do not appear to be any ritual burials associated with the historic period, it is an activity that is witnessed and recorded as late as the nineteenth century (Conway 1987).

The historic period occupations of this site were designated Stratum II and date to the sixteenth and early part of the seventeenth centuries (Conway 1987). This stratum provides evidence of structures that are interpreted to be "longhouse-like". Trade goods at this site include glass beads, tube beads, a French iron trade ax, an iron knife, cut brass scraps, and cut pieces of copper (Smith and Prevec 2000). Scalloped ceramics from the Late Woodland component culturally align it with sites in the Sault Saint Marie area, which in turn connects Providence Bay with the Late Woodland people of Northern Michigan with the added presence of Juntunen ware. Other ceramics styles include Iroquoian ceramics. The historic component dates to the latter part of the sixteenth and early part of the seventeenth centuries. So, it is likely within what was ethnohistorical Odawa territory, most likely the Sable (Sand Beach) people.

The macrobotanical assemblage was reported by Crawford (1990 [Table 5-7]). Previous botany identification includes one bean (*Phaseolus vulgaris*), maize (*Zea mays*), vetchling (*Vicia* sp. or *Lathyrus* sp.), chenopodium (*Chenopodium* sp.), hazel (*Corylus* sp.), cherry or plum (*Prunus* sp.), bramble (*Rubus* sp.), elderberry (*Sambucus* sp.), cleaver (*Galium* sp.), and trout-lily (*Erythronium* sp.) (Conway 1989; Crawford 1989; Fecteau 1987).

Finally, as with many of the French period components selected for this study, a large faunal assemblage (NISP 34,758) was collected and analyzed (Smith 1996; Smith and Prevec 2000). Unsurprisingly, one of the most robust studies of Providence Bay was carried out on the faunal remains. Molnar (1997) and later Smith and Prevec (2000) expanded on the work of Conway (1986) by continuing to explore fish exploitation. They explored the depositional sequence to identify discrete fishing events that would otherwise be obscured. In Molnar's dissertation work (1997) he noted that there were two main fishing strategies occurring at the site (Figure 5-6). The first pattern included a focus on suckerfish spawns in the spring and the second on the combination of lake trout and whitefish in the fall. Based on his depositional analysis, fish remains during the Late Woodland period were deposited episodically. He concluded that these fishing strategies relied on communal labor. By contrast, lake trout is associated with shallow waters. Later Smith and Prevec (2000) undertook their own analysis of the materials and provided calorie estimates based on two sources, Cleland's (1970) methods designed for the analysis of fauna from Fort Michilimackinac and White's (1953) method which use the percentage of the average live weight for each species. Altogether Smith and Prevec examined a total of 37,803 specimens and 374 individual animals representing the faunal assemblage from Stratum II.

In her 1996 dissertation, Smith uses the faunal evidence from Providence Bay combined with other sites in the region to argue that the regional subsistence model for the Late Woodland to historic period Anishinaabe was predicated on meat consumption with foraged food supplementing the diet. Specifically, she compared sites located within known Ojibwe territory with Odawa territory. She contrasts the Ojibwe and Odawa within this broad pattern and argues that this meat collection with supplemental model is more closely associated with the northern Ojibwe sites in the region than with the Odawa sites. Based on the animal remains, Smith concluded that ethnographically associated Odawa sites would have required additional calories for complete nutrition. Trade for corn or fat would have been necessary on Manitoulin Island, which brings to the forefront the existence of a regional food trade network and a pre-existing role as "middle-men" pre-dating French contact. Since occupation dates at Cloudman reveal that the populations returned to the region by AD 1650, it suggests a massive disruption in Odawa sources of corn since their most likely trade partners, the Huron, were pushed into the west.

However, I believe there is room in this model to account for nut processing which has been shown to be a major part of Drummond Island foodways (Dunham 2009; Kooiman 2018

1990s Providence Bay (BkHn-3) Botanical Remains
Seeds
Vicia sp./*Lathyrus* sp. - Vetchling
Prunus sp. - Plum/Cherry
Rubus sp. - Raspberry
Sambucus sp. - Elderberry
Erythronium sp. - Trout-lily
Chenopodium sp. - Goosefoot
Galium sp. - Bedstraw/Cleavers
Domesticates
Zea mays - Maize
Phaseolus vulgari*s* - Common bean
Nut
Corylus sp. - Hazelnut

Figure 5-5: Seeds and nut finds at the Providence Bay site. This assemblage was identified by Crawford (1989) and Fecteau (1987).

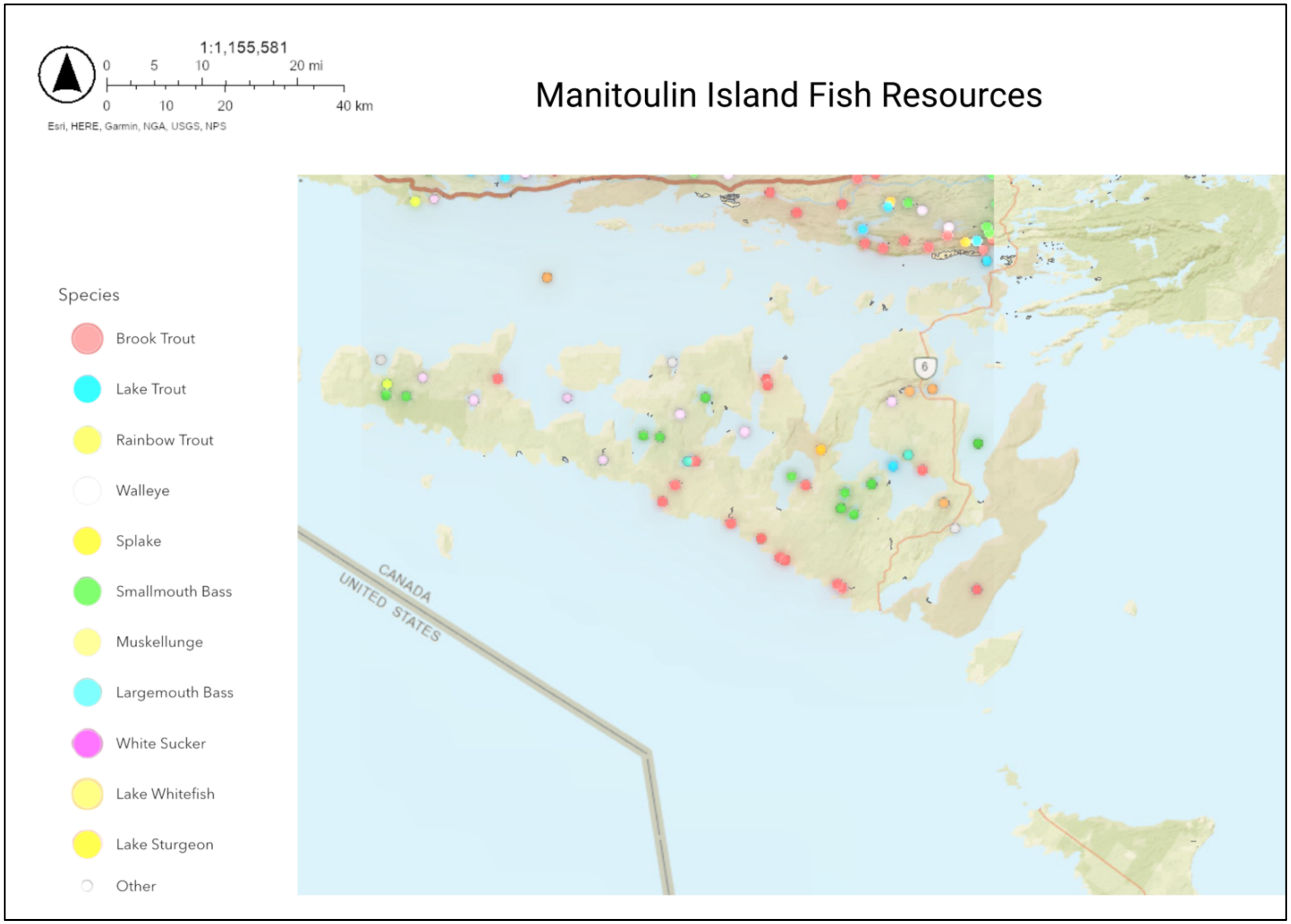

Figure 5-6: Fish resources and species counts. Based on historical stocking data ranging from 1900-1973.

Chapter 6 – Expectations

Having provided the context for my research questions and the complex entanglement of ecology and culture, I can now outline in greater detail the categories I will be using to help answer my research questions. These land use types are: 1) Individualistic, 2) Extractive, 3) Sustainable, 5) Opportunistic, 6) Communal, 7) Logistical, and 8) Residential. The categories I have constructed are meant as examples of the extreme end of a spectrum of behaviors. Not only that, but the categories also overlap, and a few land use styles can exist simultaneously. It is entirely possible that an extractive relationship with the land could be residential or even individual. Each category also has at least one other category that I have set up as conceptually opposed to another. For example, I have individualistic behavior as a category that conflicts with communal behavior. Whereas extractive behavior is compared with sustainable activities. Below, I will define and provide expectations for my interpretation using each category.

Within the second portion of this chapter, I will discuss the two models that are the best suited for comparing with my findings. Based on the background of the area I have already established, I also provide a list of the types of activities I would expect to see fit with those models.

6.1 Individualistic

Arguably, a switch to this type of landscape use would be the best example of the influence of the French market. I define a shift to individually focused labor as movement away from household or communal labor. Naturally there are a few daily or seasonal activities even within pooled labor systems that are individualistic. For example, children sent off to collect berries. However, fur trade research from elsewhere in the continental United States has highlighted individualism as a growing pattern within the changes to Indigenous economics. In an example of changing power relations in the American southeast, Beck (2013) demonstrates that a shift away from the creation of maize surplus to creating surplus of captives and deerskins afforded the young Native men taking part in the southern fur trade to consolidate prestige, and authority. By contrast, maize based resources relied on a different set of labor expectations, specifically pooled or place-based labor. The maize-based political economy that supported Chiefly power was de-fanged by individual oriented economies (Beck 2013). However, I would note that the nature of navigating the waters required a team effort. According to Timothy J. Kent's (1997) “Birchbark Canoes of the Fur Trade,” most canoes with *engagés* had a crew of three or four people but later grew as big as eight after AD 1730. It isn’t a stretch to say there would be at least that many Indigenous people per canoe among their own excursions. So, in a Lake Huron context a shift to individual work needs to account for small teams rather than individual actors. Evidence for this type of landscape relationship would include a shift away from communal fishing during seasonal spawns, no horticulture, and plant remains to reflect resources that require low labor output. Given the calorie demand of canoeing and portaging long distances, it could be a useful strategy.

6.2 Extractive

This category assumes not only intensification or at least maximizing behaviors, it assumes that the behavior would not take into account the longevity of the resource. It also assumes that accumulation (rather than reciprocity) will dominate daily activity. In studies of economic changes among the Mi'kmaq Culture in Northeastern New Brunswick, fur trade opportunities are associated with seasonal subsistence changes from a riverine- and coastal-oriented exploitation of fish and waterfowl from mid-March to mid-September to summer coastal uses with inland winter hunting. The underlying assumption was that either there was a disruption to food preservation and storage practices, copper kettle technology facilitated increased mobility for winters inland, or that the Mi'kmaq prioritized hunting fur bearing animals for use in the fur trade (Burley 1981). My expectations take on a similar assumption that one possibility is that either through disruption or incentive, Anishinaabe populations could return to Drummond Island after the Seneca wars and choose to intensify their land use on the island. On the extreme end, that change could coincide with a breakdown in traditional forest management practices. Evidence for this behavior would be the expansion of climax forests, grassland reduction, and heavy use of resources tied to market practices. This is where the historic references to blueberry trade become a point of interest.

6.3 Sustainable

While this is a loaded term, I use it here to imply that the longevity of the resources base (with a plant focus) on Drummond Island was accounted for. I extend this category to TEK and intentional forest management. Evidence for this use type would be continued presence of early forest succession and plants regeneration styles. However, the presence of all forest succession stages provide evidence for this pattern as well. A sustainable use type not only falls in line with the view of plant beings as kin, but it also suggests long term plans to return to the land and can even be interpreted as a form of place making. Place-making is defined as the practice of filling a physical space with social meaning and personalizing it by embedding oneself into a space (Badcock and Johnston 2009; Creese 2018). Place-making does not need to include physical changes to an environment but in the case of the Anishinaabe, it would. This type of land relationship can be tied to maximizing surplus for the fur trade. It is simply the way they would go about maximizing resources that is important for this category.

6.4 Opportunistic

Evidence for landscape systems that involve low demand on the landscape will include food resource collection taking place disconnected from the Late Woodland seasonal system. Within the Late Woodland period the timing of resources is an important element of life (like berry and sap collection). However, I would expect the evenness and diversity of resource collection to increase within this format. The organization and seasonality of labor may have changed to the point where foraging or hunting on the land was no longer a part of an organized and targeted strategy. Evidence of the "principle of least effort" plays a role in identifying this behavior. The principle of least effort (PLE) is a predictive model in anthracology. It assumes that firewood collection will follow a pattern rooted in the path of least resistance. Within this model, wood is likely to be collected closest to the habitation site and would more closely reflect the diversity of the local ecology than a planned wood fuel economy (Shackleton and Prins 1992; Tusenius 1986). So, PLE assumes that firewood represents the closest environmental range, and that people will move afield when this wood was depleted. While the use of this model has come under fire for ignoring cultural choices, that critique is an important feature that will guide my interpretation. In the absence of a specific fuel economy, I would expect this behavior. In scenarios where Drummond Island becomes a tool of market economy while potentially dropping sustainability practices, I would expect fuel collection to shift further towards a PLE model. Comparing the wood fuel used with the pollen evidence is an important aspect of identifying this behavior.

6.5 Communal

This type of landscape interaction could be either logistical or opportunistic. However, pooled labor is the main aspect of this landscape relationship. It is another method-based category. This model assumes traditional practices like communal fishing or farming that lend themselves to group organization (see Chapter 5). As opposed to individual forms of landscape use, I would look for evidence of subsistence that uses pooled labor and larger mass deposits of fauna. Ethnographic analogy plays a major role in identifying this behavior.

6.6 Logistical

Logistical use of the landscape is task specific. A classic example from northern Michigan is the collection of maple syrup, berry camps, and nut collection (Franzen et al. 2018; Quimby 1962). These are locations where a limited number of activities take place and are more temporary than residential use. It may be that logistical uses will co-occur with the existence of a residential area in another location and may only be used by a portion of the population. In the discussion of landscape patchiness and Anishinaabe seasons, the sugar bush and blueberry camp are prime examples of this use type (Holman 1984). When maple sugaring, a fraction of the winter camp will split off to collect the sap before the entire community moves on to the warm weather aggregation site. In his observations of a sugar camp in Wisconsin, Loftus (1977) noted that their food was primarily based on meat and the sap. While there were substantial hearth remains, few food remains were left behind. Additionally, he mentions temporary structures were erected at the camp.

Given the nature of logistical sites, evidence for this pattern would be low ecological diversity, discard that is episodic and sparse, and highly specific seasonality. Apart from fish remains, which could be evidence of its logistical activity, there may also be evidence of small temporary structures by way of post molds.

6.7 Residential

I use this category to examine long-term settling on a landscape. This landscape relationship employs a high demand land use system. A high-demand land use system includes intensive agriculture. Residents would spend more than one season at the site and the range of activities taking place would be more diverse than a logistical location given that a range of domestic activities would occur. Evidence for this category includes seasonal evidence of multi-season habitation, as well as an increase in weeds associated with ground disturbance (de Vareilles et al. 2021). I would also expect spatial differences that would distinguish a residential style from logistical. Short term camps would be isolated within smaller areas, whereas residential patterns would have a larger spread (Kooiman et al. 2019; Holman 1984).

6.8 Models of Political Economy

Many of the political economic models used in archaeology are built around the creation and redistribution of resources (Service 1962; Earle 1978). The potential for provisioning the French and possible redistribution of trade goods are the behaviors that would fit best with those forms of political economy. This tracks with the phenomenon that Hirth (1996) calls gate-way communities. These are polities that develop in relation to trade in a region. If there is a boundary area in between two nations or an ecological divide, gateway communities will take up residence as a way to become closer to the resources. Transportation costs are a driver. While transportation is not a limiting factor in the Great Lakes in the same way continental travel would be, the example reinforces the idea that the draw of trade goods will foster new priorities.

Therefore, there are two main models that I will use for comparison. I will compare data to a production model and a goods mobilization model.

6.8.1 Production

Primarily production models operate through the creation of surplus and control. A strategy that involves production can often be focused on domestic labor. This could be related to craft production or labor mobilization (Earle 1987). The land use types that I have described above can be used to help address some traditional models. Below I have laid out some of the possible ways the models could play out and my expectations.

The evidence I would expect would be evidence for provisioning and creating surplus. This would require there to be evidence of a residential and communal landscape use type and intensification. Some possible production activities for the Cloudman site include:

1) *Berry harvesting*
2) *Corn Agriculture*
3) *Canoe construction*
4) *Pitch production*

6.8.2 Goods Mobilization

A goods mobilization strategy falls within a service-oriented political economy (Hirth 1996). This form of control is geared toward redirecting the flow of goods. This could be in the form of the classic model of chiefly re-distribution, where tribute goes to the political top, and is mobilized from there. The other option for a service-oriented political economy is focused more on exchange. In contrast to a redistribution format, an exchange style would follow the principles of alliance making, aid, and creating access to goods.

Within the Mackinac context, evidence for accumulating European trade goods makes the best-case study. One possible case could be the use of this spot as a meeting place for trade and or a place using logistical land use to redistribute trade goods. This form of political economy may take the form of:

1) *Staking out a more substantial claim on the landscape*
2) *Potential defensive measure to safeguard goods prior to their redistribution among Anishinaabe allies*
3) *Evidence of trade specific encampments*

Chapter 7 - Results and Conclusions

The 2019 season at the Cloudman site yielded both contexts from each Late Woodland division and French period features. While there were Laurel style sherds excavated from the lowest levels in units S20E100 and S20E98, the Middle Woodland occupation was outside of the scope of this research. Only features from the Late Woodland to the French period were selected for this study. Furthermore, there were some features that were not selected for analysis, either because they were disturbed or for budgetary reasons.

The features selected for analysis include veneer middens, hearths, or generalized combustion features. Particularly exciting finds were the addition of white beads were previously matched to beads commonly manufactured after AD 1670 (Kooiman and Walder 2019). Other beads recovered during the 2019 season contributed 16 new examples of the type IIa55/56 blue circular beads, one type IIa50 large round blue bead, and two type IIa12 small circular opaque white beads (Figure 7-1). These types were identified using the Kidd and Kidd guide (1970, 2012).

Apart from feature 55, there were no new ritual components identified. Feature 55 was originally considered the first internal level of feature 47 as it was above a dense pocket of sherds and bone. After it was excavated separately, and that layer was dated, it is considered a part of its own French period feature. Feature 55 comprised a small pocket of disarticulated raptor claws associated with ten cobalt blue trade beads that matched the Kidd and Kidd (1970) type IIa55/56. No new animal burials were uncovered during this season.

Features 41, 51, and 53 represented the early Late Woodland components for this work. While feature 41 was dated with charcoal, features 51 and 53 were matched to the ELW through the presence of a Mackinac style sherd (Figure 7-2). Each feature within the ELW was a pit shaped deposit. Features 41 and 51 both had a thin (less than 1cm) lens of ash, whereas feature 41 suffered from tree root disturbance. These were located on the lower portion of the terrace. Features from this Late Woodland division did not contain many diagnostic sherds. However, Mackinac style ELW sherds were heavily represented within the general fill.

The middle Late Woodland features included numbers 46 and 49. Both features were located within the northeast corner of unit S20E100. Feature 46 was a multilevel combustion feature representing a single burning event. It contained intact layers of charcoal, rubified[10] sediment, and ash. The topmost layer was excavated separately as it is a potential ash dumping event. It contained mixed and fragmented fire cracked rock (FCR) and sherds. Feature 49 was an adjacent dark stain with FCR, sherds, and charcoal (Figure 7-4). Both features were dated within the range of cal AD 1165 to cal AD 1217. While each feature was analyzed separately. It is likely that features 46 and 49 represent a single depositional event and the overlaying midden and general fill obscured the portion of feature 49 that was above feature 46. However, feature 49 may also be an example of a rake-out deposit, creating a spread of hearth material outside the initial feature (Mentzer 2014).

The late Late Woodland features were the most abundant. Six of the features used in this study dated to this period. These included features 45, 47, 52, 56, 59, and 60. Features 52, 59, and 60 were identified as combustion features with intact ash layers. The diameter of each feature ranged from 15 cm to over 40 cm wide. Each hearth was shaped like a shallow basin and

[10] Rubification is a geologic process that occurs as a result of direct heating of sediment. It results in a distinct red color. See Mentzer 2017.

was often associated with sherds and abundant charcoal. The FCR in these combustion features displayed higher rates of reddening and curvilinear breakage. The smooth breakage style has been associated with dry cooling in experimental studies (Neubauer 2019). Most ceramic artifacts from features were non-diagnostic. Feature 45 only contained a single 2 cm thick ash layer. The remaining LLW features were feature 57, a shallow basin shaped bone cluster with associated Lawson opposed sherd and traverse ware and feature 56, a shallow deposit of FCR and bone.

Of the three features that dated to the French period, only features 48 and 50 were utilized for analysis. Both features were dark shallow lenses of clustered FCR, charcoal, and no larger than 60 cm wide. The date ranges for the ^{14}C dating were wide (Figure 7-3). However, the chemical matching accomplished by Heather Walder places the use of antimony in two of the white Cloudman beads circa AD 1670–1700. Those beads are the same type IIa12 beads recovered from feature 48. Feature 48 was primarily charcoal with three pieces of broken mammal long bone. Both feature 48 and feature 50 were associated with trade beads. The boundary between the bases of features 48 and 10 were spotted with sherds. These sherds most likely marked the beginning of the general fill. Flotation sampling avoided the bottom boundary of the features. Feature 54 was a small concentration of bone in unit S20E97. As was the issue during the 1990s excavations, some post depositional mixing occurred. Features that were either partially mixed or contaminated were excluded from this study. There was also a large concentration of coke[11] across the lowest terrace. It is most likely associated with the nineteenth or early twentieth century.

[11] Porous coal-based fuel. Commonly used in the 19th century.

Figure 7-1: Bead types IIa55/56 and two type IIa12 from Feature 48

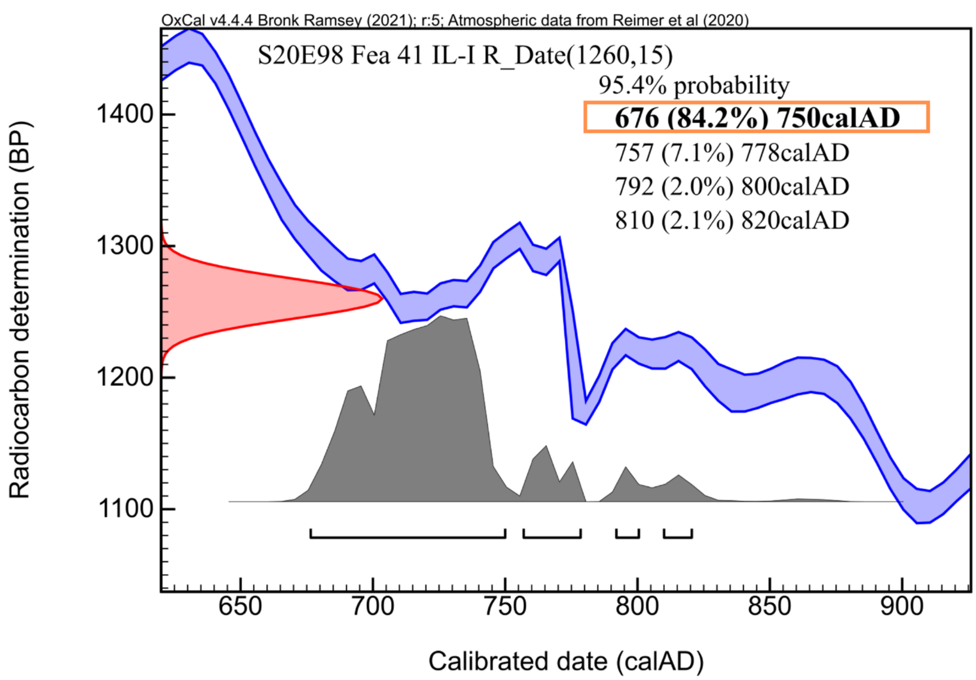

Figure 7-2: Cloudman site (20CH6) Feature 41 calibrated date.

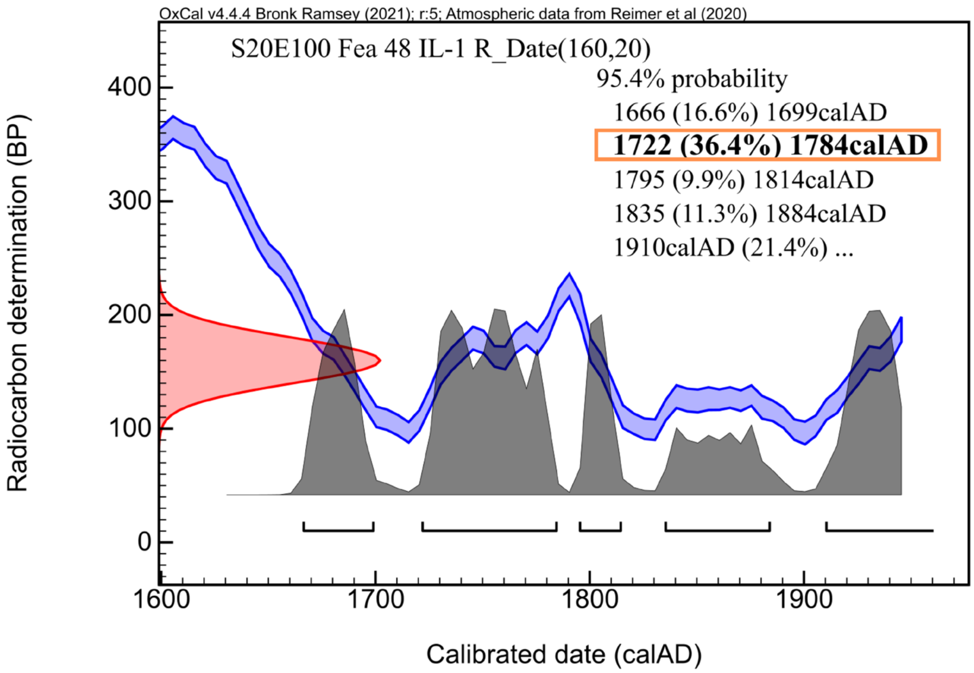

Figure 7-3: Cloudman site (20CH6) Feature 48 calibrated date.

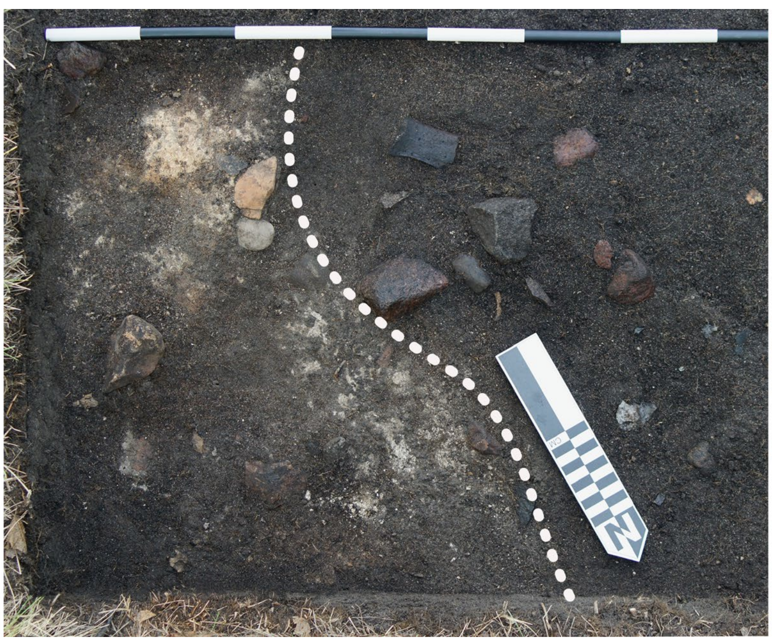

Figure 7-4: Middle Late Woodland Features 46 (left) and 49 (right).

7.1 Microfossil Evidence

Twelve soil samples from the 2019 season were selected for microfossil analysis. These samples were first sent to The National Center for Electron Beam Research affiliated with Texas A&M University. Samples were sterilized for export through electron beam sterilization and measurements were taken with a dosimeter on three of the samples to verify the dosage. The utility of this sterilization method is that is does not damage fragile pollen the way that a heat-based method can (Niu et al. 2021). Dr. Mark Horrocks of Microfossil Research Inc. completed three analyses on each sample: Starch, phytoliths, and pollen analysis.

The favored type of regeneration, successional stage, pollen and spore blooming range, fire tolerance, shade tolerance, and wetness coefficients were identified for as many taxa as possible. Taxa were only excluded from this process if the category was either not relevant, there were no data, or there was too much variation within the group. Data for this process were collected from the University of Michigan Herbarium Michigan Plant database, United States Department of Agriculture (USDA) Natural Resources Conservation Service, and the Lo et alia (2019), Chaput and Gajewski (2018), and the iNaturalist Canadian species tracking program, a joint initiative of the California Academy of Sciences and the National Geographic Society. Additional fire response data and overall plant propagation behaviors were drawn from the USDA Fire Effects Information System (FEIS). The FEIS synthesizes research from studies on the responses of individual species to fire. Finally, BTU data were pulled from the Utah State Forestry Extension (2022).

7.1.1 Pollen and Spores

Unsurprisingly, the pollen counts showed high numbers of pine (*Pinus* sp.) or members of the pine family (Pinaceae) within every sample. White pine is well known for its production of high volumes of pollen. Across periods there is a good representation of a few different types of plant communities (Figure 7-5). Both angiosperms and gymnosperms are represented among the tree class and both wetland and prairie plants also appear across samples. However, the types of plants within each category differ. Identification also counted spores and planktonic algae. Though the specific species of diatoms were not identified the overall count was tallied.

Isolated finds include the presence of maize (*Zea mays*) pollen in Feature 47. During the initial pollen count one grain was identified. The context of this find is a feature with bone, FCR, and ceramic sherds dating to the LLW. Similarly, planktonic algae are isolated to LLW feature 59. Elm (*Ulmus*) and basswood (*Tilia*) pollen are only found within the ELW feature 53.

During the calculation of diversity, indices of pollens or spores that were marked as either present or were found after the initial count were excluded from the process (Figure 7-2). However, their presence was accounted for while analyzing seasonality and ecological characteristics. Samples shared within a period were also compared using the Hutcheson t-test to determine the appropriateness of combining the samples together to represent a period. For example, feature 46 and 49 yielded a p-value equaling 0.72.

The t-tests comparing time periods revealed that the diversity between the LLW and French period was statistically significant. There was no statistical significance between the LLW to MLW and ELW or between the French period and both the ELW and MLW (Table 7-6; Table 7-7; Table 7-8). Considering the abundance of samples from the LLW compared to the other periods, it is not surprising that the LLW would be distinct. Until there are more samples representing the French, ELW, and MLW periods, it will remain unclear whether their diversity indices are indeed inconclusive.

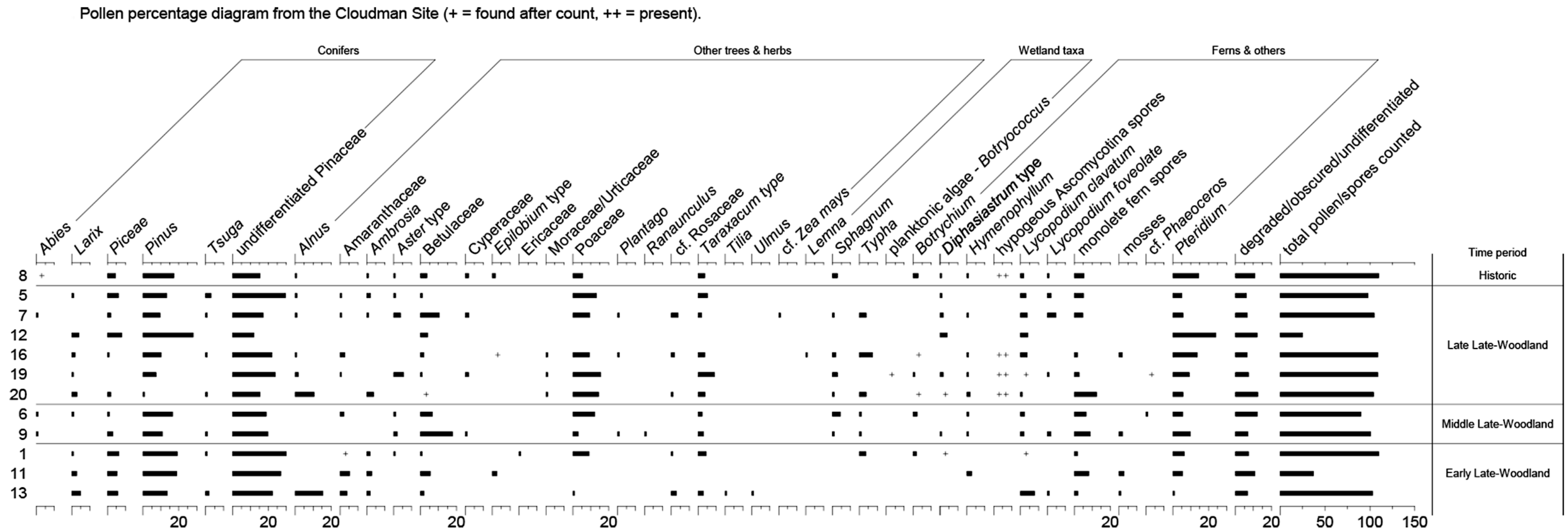

Figure 7-5: Cloudman pollen and spore results per sample. Samples are labeled with their 2019 in-field designations.

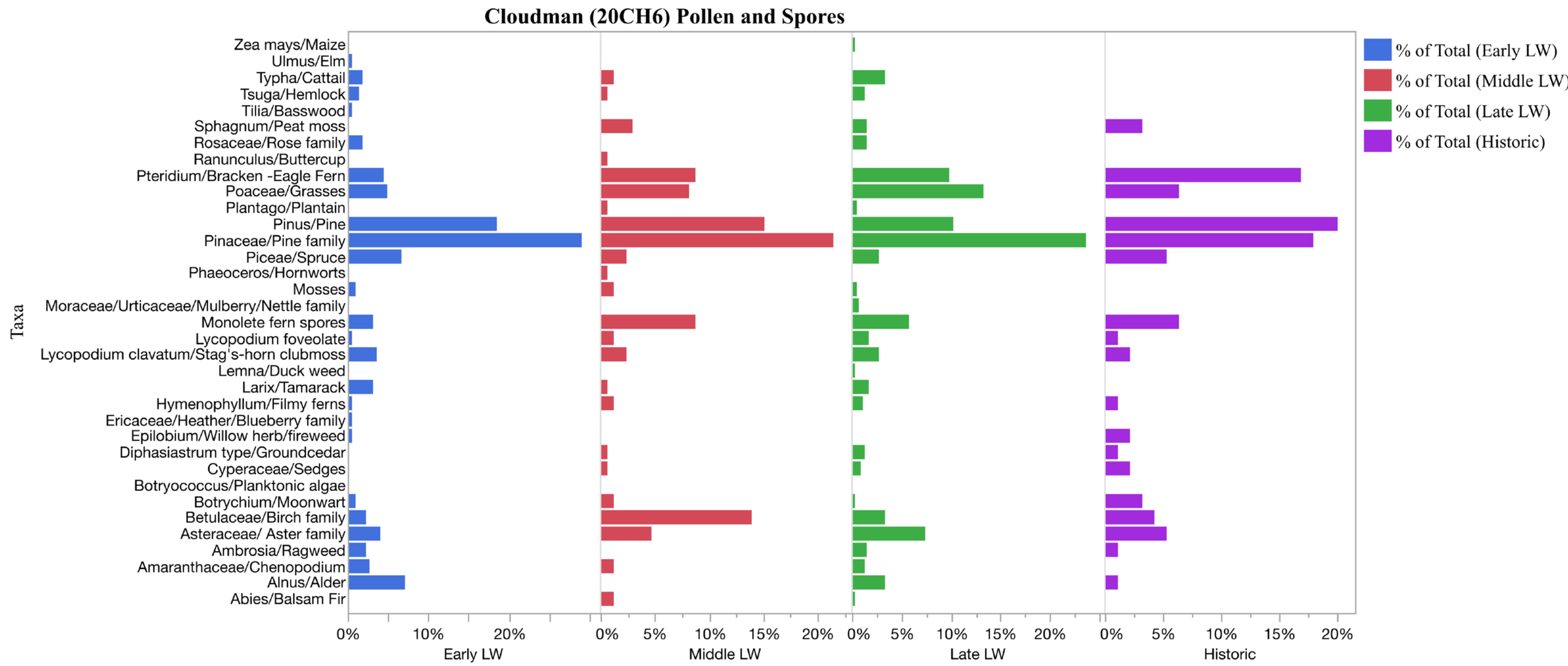

Figure 7-6: Cloudman pollen and spore percentages across periods.

When comparing the Simpson's indices between the French (Table 7-1; Table 7-2; Table 7-3; Table 7-4) periods, they have similar taxa evenness (0.1029 and 0.1038 respectively). There is a 10% chance that any two randomly selected pollen grains or spores will be from the same taxa. The ELW has a decreased evenness compared to the other periods, though it does not have the highest Gini coefficient. Based on the Gini coefficients, the French period has the most even spread of its represented taxa. In other words, it is less dominated by the most abundant taxa.

Pollen and Spore General Species Richness	
French Period	19
late Late Woodland	30
middle Late Woodland	25
Early Late Woodland	25

Table 7-1: Number of pollen and spore taxa identified per period

French Period Pollen and Spore Indices	
Simpson's Index (D)	0.1029
Gini Coefficient	0.5345
Shannon Index	2.45

Table 7-2: Pollen and spore diversity indices. French period.

Late Late Woodland Pollen and Spore Indices	
Simpson's Index (D)	0.1038
Gini Coefficient	0.6213
Shannon Index	2.68

Table 7-3: Pollen and spore diversity indices. Late Late Woodland.

Middle Late Woodland Pollen and Spore Indices	
Simpson's Index (D)	0.1082
Gini Coefficient	0.6109
Shannon Index	2.27

Table 7-4: Pollen and spore diversity indices. Middle Late Woodland

Early Late Woodland Pollen and Spore Indices	
Simpson's Index (D)	0.1345
Gini Coefficient	0.6172
Shannon Index	2.48

Table 7-5: Pollen and spore diversity indices. Early Late Woodland

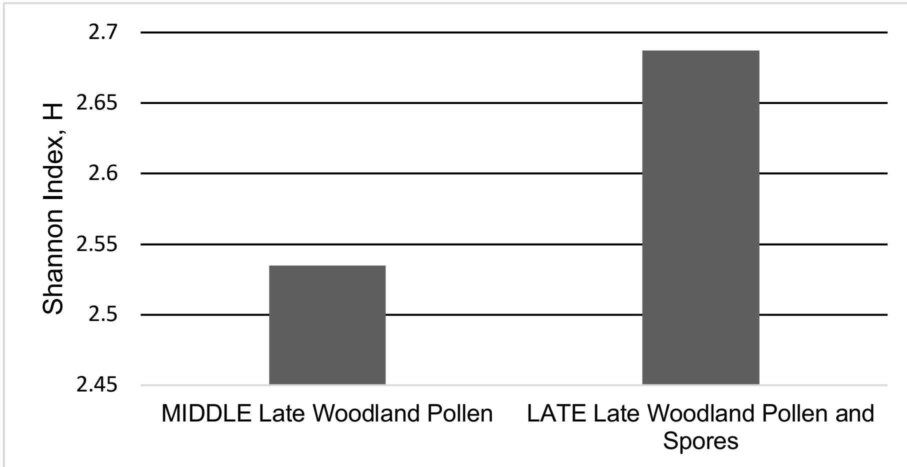

Figure 7-7: H values for 20CH6. Comparing late Late Woodland and middle Late Woodland.

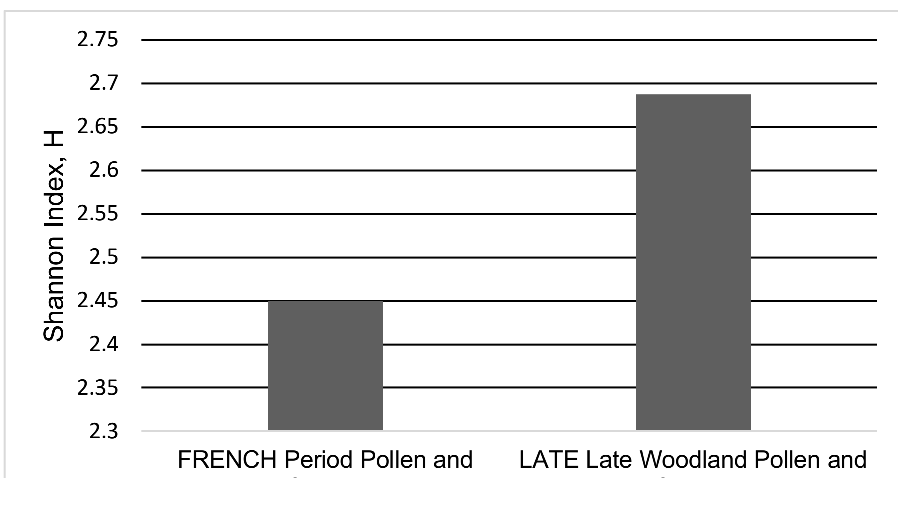

Figure 7-8: H values for 20CH6. Comparing French period and late Late Woodland.

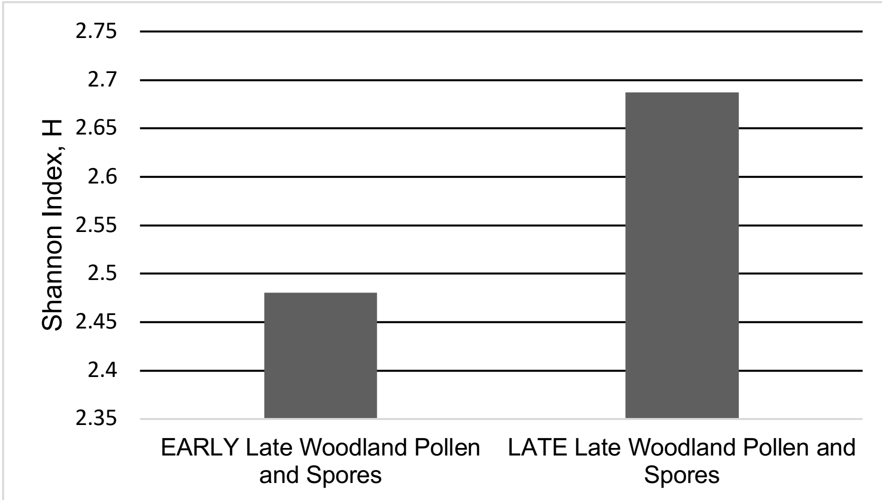

Figure 7-9: H values for 20CH6. Comparing the early Late Woodland late Late Woodland

20CH6	FRENCH Period Pollen and Spores	LATE Late Woodland Pollen and Spores
Total	95	492
Richness	19	30
H	2.450092	2.687426
S^2_H	0.009938	0.002426
t	2.134344	
df	145	
Crit	1.97646	
p	0.034496	

Table 7-6: Hutcheson t-test results comparing the French period and late Late Woodland.

20CH6	MIDDLE Late Woodland Pollen and Spores	LATE Late Woodland Pollen and Spores
Total	173	492
Richness	25	30
H	2.535022	2.687426
S^2_H	0.006549	0.002426
t	1.608719	
df	310	
Crit	1.967671	
p	0.108699	

Table 7-7: Hutcheson t-test results comparing the middle Late Woodland and late Late Woodland.

20CH6	EARLY Late Woodland Pollen and Spores	MIDDLE Late Woodland Pollen and Spores
Total	228	173
Richness	25	25
H	2.480215	2.535022
S^2_H	0.005998	0.006549
t	0.489292	
df	388	
Crit	1.966097	
p	0.624912	

Table 7-8: Hutcheson t-test results comparing the early Late Woodland and middle Late Woodland.

7.1.2 Phytoliths and Starch

Overall Poaceae was the dominant microfossil in this category (Figure 7-10). This result is unsurprising since members of the grass family are often over-represented due to high phytolith production. But the concentrations are also related to grass growth in dense stands (Surrette 2008). While there was plenty of grass pollen as well as these phytoliths, the only taxa to be fully identified is wild rice. There was one type of starch identified with the soil samples and that was ubiquitous throughout each sample. Starch from wild rice (cf. *Zizania palustris*) was present across all periods. The presence of wild rice phytoliths supports the accuracy of these results.

Evidence of cultivated plants is low within this category. Among the samples only one phytolith was identified relating to domesticated plants. From feature 40, a single phytolith from the exocarp of the cf. Cucurbitaceae was identified. The association of this find is with a hearth feature (Feature 20) dating to cal AD 1321-1410. Both the date and the sample were taken from the upper ash layer of the feature which was associated with FCR. The isolated find of a phytolith from a squash exocarp was identified within feature 40 (labeled as 20 in the figure).

This feature is a wide thin hearth dating to the LLW. This feature is also associated with the lowest numbers of pine pollen, higher numbers of monolete fern spores as well as high grass pollen counts.

The two types of *Helminth* eggs were also identified within the samples. The two parasites are Tapeworm (cf. *Taeniidae)* and Roundworm (*Ascaris lumbricoides).* However, only the LLW and French periods has any evidence of cf. *Taeniidae,* while *Ascaris lumbricoides* was present in all periods except the French period. It is unclear yet whether these eggs are from a modern or historic source. Given that the excavation area from 2019 only found cultural material within the first 50 cm below surface, the possibility that they are intrusive cannot be ruled out. Discussions are underway with a parasitologist to make this determination.

7.2 Macrobotanical Remains

Based on initial observations, seeds, charcoal, and nutshell were more abundant in the general fill samples than they were in the features. However, the issue with reliably matching botanical finds to a specific period limited the analytical potential of any seeds outside of the features. All identified botanical remains will be reported on in an official report. However, the priority of this study was the recovered elements from known contexts with dates.

7.2.1 Seeds and Nuts

This category is the least robust source of data. Due in part to the shallowness of the cultural deposits all non-carbonized seeds could not be ruled out as modern seed fall. This meant that many examples of uncharred *Chenopodium* and *Rubus* were not included in the analysis. Feature 51 contained two charred seeds and two fragments of nutshell. One seed was an example of *Polygonum* deformed by pyrolysis and the other was a charred *Rubus* sp. seed. Both nutshell examples were from *Corylus avellana* (hazelnut). Three uncharred *Chenopodium* seeds were also present. The ELW feature 41 contained the charred remains of minimum one *Prunus* sp. (likely wild plum) pit, while one fragment of Prunus and six *Galium* sp., were recovered from the LLW feature 52. Feature 52 also yielded 12 charred *Galium* sp., three fragments of hazelnut shell, one charred *Polygonum,* three *Rubus* sp. (one uncharred), and at least one fragmented *Vitis* sp. (grape seed). Features 45 and 47 from the LLW provided examples of two *Sambucus* sp. seeds. Feature #47 also contained unrecognizable charred organic material. While no stone fruit was recovered for the French period, one acorn kernel and the remains of an acorn style (distal end of an acorn cupule) were identified along with eight elderberry (*Sambucus* sp.) seeds, one cleaver (*Galium* sp.) seed, and two uncharred *Chenopodium* from feature 48. The presence of elderberry in the highest amounts is consistent with the consumption method. Elderberries cannot be eaten raw. The seeds contain glycoside that causes nausea. While a useful property if you need to induce vomiting, they need to be dried or cooked before consumption. Despite this factor, elderberries are a well-known Indigenous food. Ethnobotanist and herbalist Sage LaPena (Nomtipom and Tunai Wintu) describes elderberries as an important medicine. It is high in antioxidants, fiber, and used to reduce fevers. LaPena (2019) says that her people traditionally collected the berries in high numbers and dried them. After processing, they could be stored until they are needed for cooking. The need for processing explains the representation of charred *Sambucus* since it was a more likely fruit to be in proximity to fire. Alternatively, it is only the seeds, leaves, and stem that are poisonous. The fruit itself is edible. While it would be tedious, a person could in theory de-seed the berry prior to eating. However, that is very unlikely and much more labor intensive than drying or cooking.

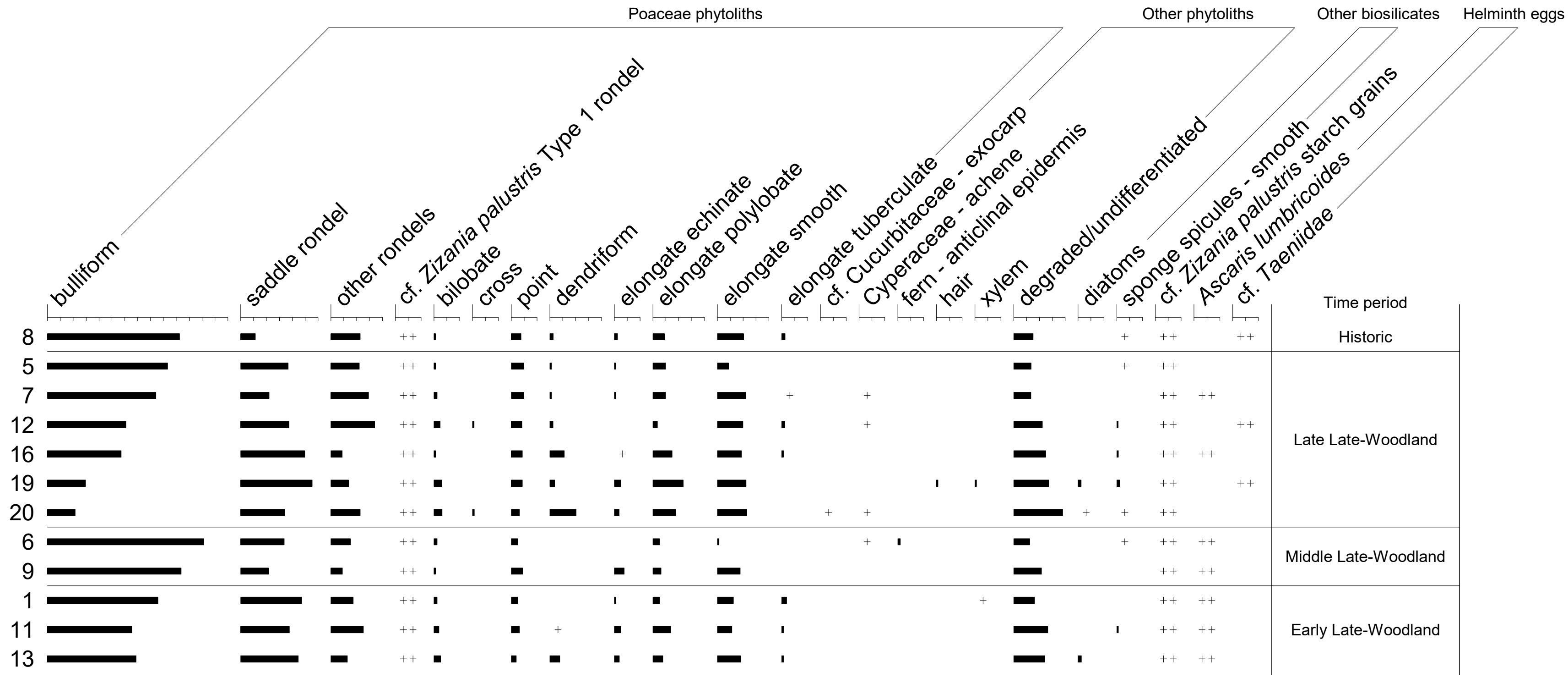

Figure 7-10: Phytolith percentage, starch, and helminth egg diagram from the Cloudman site. Other biosilicates excluded from the phytolith sum.
+ = found after count, ++ = present in samples.

2019 Macrobotanical Finds Cloudman (20CH6)				
Taxa	**French period**	**late Late Woodland**	**middle Late Woodland**	**early Late Woodland**
Seeds				
Galium sp. (Cleaver)	1	12	1	6
Polygonum (Knotweed/Smartweed)	-	1	-	1
Prunus sp. (Wild Plum)	-	1	-	1
Quercus (Acorn)	1	-	-	-
Rubus sp. (Raspberry)	-	2	-	1
Sambucus *sp.* (Elderberry)	8	2	-	-
Vitis sp. (Grape)	-	1	-	-
Nutshell				
Corylus avellana (hazelnut)	-	3	-	1
Quercus sp. (Acorn)	1	-	-	-

Table 7-9: Botanical finds from the 2019 season. Grey areas indicate no finds of that type.

One fragment of a long seed currently requires more investigation. One is from the LLW feature 47 and is the topmost segment of a long narrow ended seed. It is likely that this is another example of a charred wild rice seed. Comparisons with my own charred wild rice comparative collection leads me to believe this. However, I am cautious about making this important determination without further consultation.

7.2.2 Charcoal

Overall, the charcoal analysis revealed commonalities shared across time. Maple, oak, ash, and birch continued to be used throughout each period (7-14). Additionally, at least one other member of Betulaceae is present in all periods. This member of the birch family is very likely hazelnut (*Corylus* sp.) given the presence of hazelnut shell during the Late Woodland period. However, these fragments are also often twig-sized fragments (with bark present). At such a small scale, *Corylus* is difficult to differentiate from alder or hophornbeam. Further use of a scanning electron microscope will be needed to verify the perforation plate style and intervessel pitting with more certainty.

The state of cellular alteration was also shared across periods. Henry and Théry-Parisot (2014) set a range of expected alteration indices (Ai) that they categorized based on the overall health of the wood in a sample. Based on their experimentation, the healthy wood category resulted in an index of <0.15. They concluded that as long as the index fell within this acceptable range it qualified as primarily healthy wood used. When the AL levels were transformed into indices for each period, only the ELW had index that went beyond the <0.15 threshold set by Henry and Théry-Parisot (Table 7-11). If cellular degradation ranges from 20 – 40% overall, then deadwood was likely the fuel choice. The ELM charcoals Ai fell into the 21% range indicating light to medium deformation. This category was associated with burning deadwood with low or no numbers of greenwood. Deadwood is primarily collected from the forest floor. Fragments with a rating of AL1 or higher were spread across every angiosperm in the ELW samples. It should be noted that in the deadwood study there did not appear to be a preservation bias in favor of deadwood charcoal or healthy wood charcoal (Henry and Théry-Parisot 2014). The MLW was on the acceptable edge of the deadwood threshold, but fragments that were slightly altered or more occurred across the three main taxa (maple, oak, and ash). However, the interpretive potential of the MLW charcoal is limited. MLW fragments were either too deformed to properly identify or were too small and fragmented. These were the smallest samples with a large gap between charcoal sizes. Identifiable fragments were either very large (over 1 centimeter) or were pieces smaller than 2mm and most were very fragile or too fragmented to identify.

It may be an important detail that all fragments with an AL of 1 or higher in the French period were associated with elm, ash, or unidentifiable fragments. This same pattern is shared with the LLW except for five fragments from maple, two from oak, one from birch, and five from hemlock.

Early Late Woodland Charcoal	
Mean Branch Diameter *m*D	1.7143
Percent of Uncured or Greenwood	17.64%
Alteration Index	0.21

Table 7-10: 20CH6 Charcoal quality summary. ELW

Middle Late Woodland Charcoal	
Mean Branch Diameter *m*D	1.6429
Percent of Uncured or Greenwood	25%
Alteration Index	0.1

Table 7-11: 20CH6 Charcoal quality summary MLW

Late Late Woodland Charcoal	
Mean Branch Diameter *m*D	2.57639
Percent of Uncured or Greenwood	12%
Alteration Index	0.093

Table 7-12: 20CH6 Charcoal quality summary for the LLW period

French Period Charcoal	
Mean Branch Diameter *m*D	1.9324
Percent of Uncured or Greenwood	12.50%
Alteration Index	0.031

Table 7-13: 20CH6 Charcoal quality summary for the French period

Taxa	Early Late Woodland AD 500/600 -1000	Middle Late Woodland AD 1100–1200	Late Late Woodland AD 1200-1600	Early Historic Post AD 1650
Salix (Willow)	-	-	+	-
Ulmus (Elm)	-	-	+	+
Betula (Birch)	+	+	+	+
Betulaceae (Probable Corylus)	+	+	+	
Acer (Maple)	+	+	+	+
Alnus (Alder)	-	-	+	+
Fraxinus (Ash)	+	+	+	+
Pinus (Pine)	-	-	+	-
Quercus (Oak)	+	+	+	+
Tsuga (Hemlock)	+	-	+	+
Prunus (Stone fruit)	+	-	+	-

Chance of occuring in wetlands

>99% 99% - 66% 67% - 34% 33% - 1% < 1%

- =Absent

Table 7-14: Presence/Absence of tree types used as fuel.

The greenwood percentages for each period also shared a similar pattern with the Ai data. Both the LLW and French period contained the lowest percentages of greenwood (Table 7-12; Table 7-13). In this case the highest concentration of greenwood use was within the MLW (Table 7-11). The intense radial cracking or vitrification that accompanies greenwood pyrolysis contributed to the difficulty identifying fragments or taking accurate measurements.

Overall, the mean branch diameters (*m*D) across periods ranged from 2.57 cm to 1.6 cm. All the *m*Ds calculated fit within the second size category (1.5–5 cm). The MLW had the smallest *m*D despite the larger fragments than the ELW (Table 7-11; Table 7-10). Again, the smaller sample size and comparatively extreme radial cracking artificially impacted these measurements for the MLW. During the ELW the spread of the branch sizes is skewed towards the smallest category (0-1.5cm) and with the largest size category (in this case 5-10 cm) accounting for only 4% of the measured fragments. The pattern of large numbers of sub-2cm fragments was true for every period. The only period with all five size categories represented was the LLW. The LLW *m*D is 2.576 cm, while the French period's *m*D is 1.93 cm.

Comparison between Shannon indices occurred for only three of the four periods. Since the MLW charcoal numbers were lower than the suggested sample size (under 100) their interpretative potential is limited. The identified number is still enough for relative comparisons of wood types. The other three periods had statistically significant differences between their diversities. Based on the work of Crew and Mighall (2009), 30 fragments are enough to provide a representative number of taxa, even if the proportions of those taxa will not be accurate.

Early Late Woodland Charcoal Indices	
Simpson's Index (D)	0.207
Gini Coefficient	4.831
Shannon Index	1.76

Table 7-15: Charcoal diversity calculations ELW 20CH6

Middle Late Woodland Charcoal Indices	
Simpson's Index (D)	0.2381
Gini Coefficient	0.373
Shannon Index	1.542

Table 7-16: Charcoal diversity calculations MLW 20CH6.

Late Late Woodland Charcoal Indices	
Simpson's Index (D)	0.2381
Gini Coefficient	0.373
Shannon Index	1.851187

Table 7-17: Charcoal diversity calculations LLW 20CH6

French Period Charcoal Indices	
Simpson's Index (D)	0.4242
[redacted]	
Gini Coefficient	0.5865
[redacted]	
Shannon Index	1.291931

Table 7-18: Charcoal diversity calculations French period 20CH6

Wood choice, or at least wood use across periods was dominated by maple and ash. Maple is currently the most dominant tree on Drummond Island. Looking at the percentage of maple across period reveals that while each period had clear even representation of some genera over others, maple was dominant in the French period samples, while ash is more evenly matched with maple or outright dominates it in the LLW and MLW (Figure 7-13; Figure 7-12; Figure 7-14). The increase from a Gini coefficient of 0.373 in the LLW to 0.587 during the French period reveals that the abundant maple within fur trade samples occurred in higher frequencies than before contact.

The use of maple and ash may seem to be at odds the ethnographic importance of the trees (see Chapter 4). However, sugar maple is a dense wood that splits easily and produces limited sparks. Ash is also a good quality firewood. Considering the small *m*Ds, the appearance of ash could be a byproduct of basket making. Looking at the Simpson’s index for the French period, there is a 20% chance that any two randomly selected charcoal fragments will be the same, which I interpret as a 20% chance they would be maple (Table 7-17; Table 7-18). It may be that the use of maple was driven in part due to its qualities as a hardwood but also as a method of preventing “maple-ization”, where maple begins to increase and decrease the overall diversity of the forest.

Of the firewood choices available to the people at the Cloudman site, oak, in particular white oak, offers the highest number of BTUs per cord of wood. Depending on the species, maple and oak are equally high-quality sources of heat. Oak produces low smoke volume, is not prone to sparking, and produces plenty of easily spreadable coals. While maple may be equal in its heat potential, it has the edge over oak in that it is easier to split owing to its planar-like cellular structure. The drawback of both maple and oak is their relative weight for both green wood and dry wood compared to other taxa available.

It is important to remember that the charred wood within any given context is the accumulation of collecting behaviors over time, as is true for most archaeological assemblages. Overall, the firewood economy was very stable over the periods, and based on a wide range of genera. Of the potential tree-based fuel sources identified in both the macrobotanical and microbotanical assemblages, 78% of the total possible taxa appeared in the LLW charcoal assemblage, while on the higher end, the French period utilized 81% of available wood. The woods used were genera matched with a northern hardwood system and the local riverine tree types. However, the appearance of wetness intolerant trees like plum and shade tolerant trees indicates a conflicting forest types. There could be two wood supply systems occurring within both the LLW and French period.

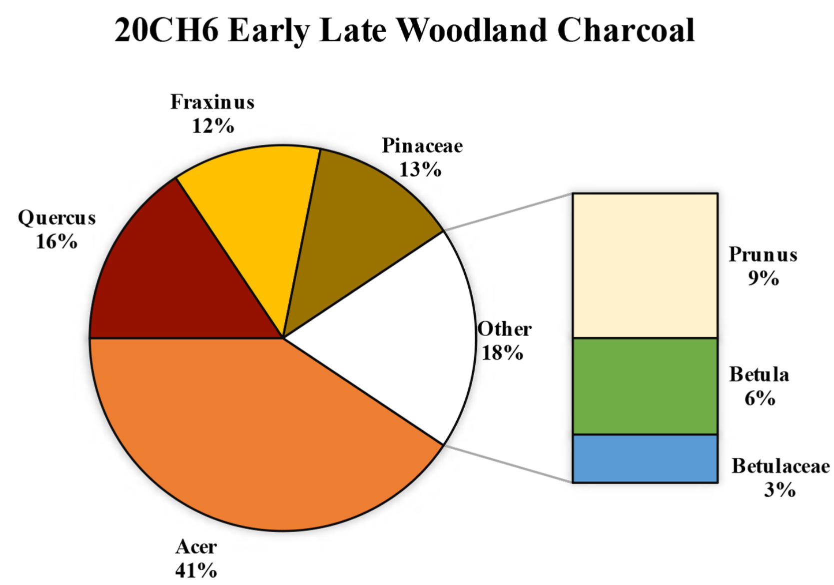

Figure 7-11: Early Late Woodland charcoal by percentage.

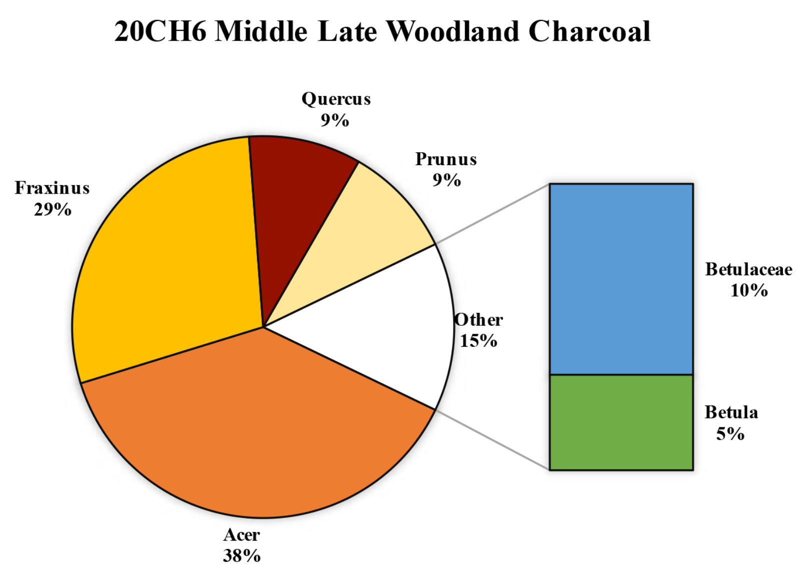

Figure 7-12: Middle Late Woodland richness

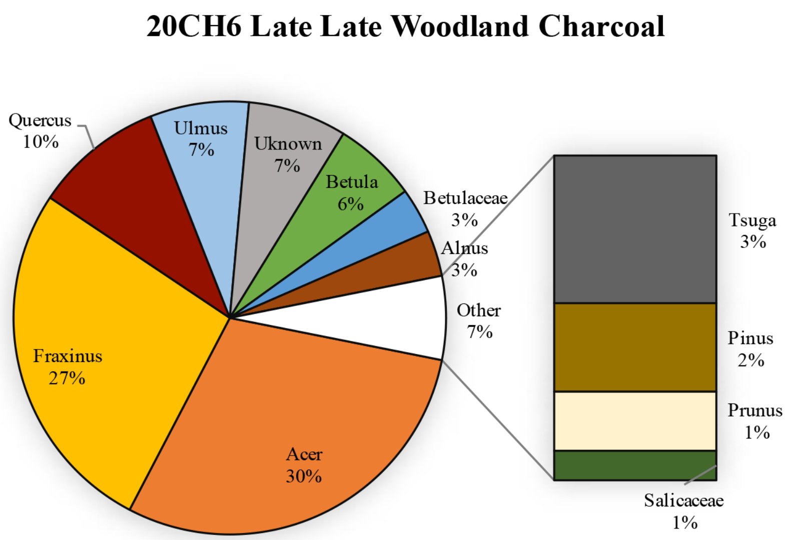

Figure 7-13: Late Late Woodland charcoal taxa percentages

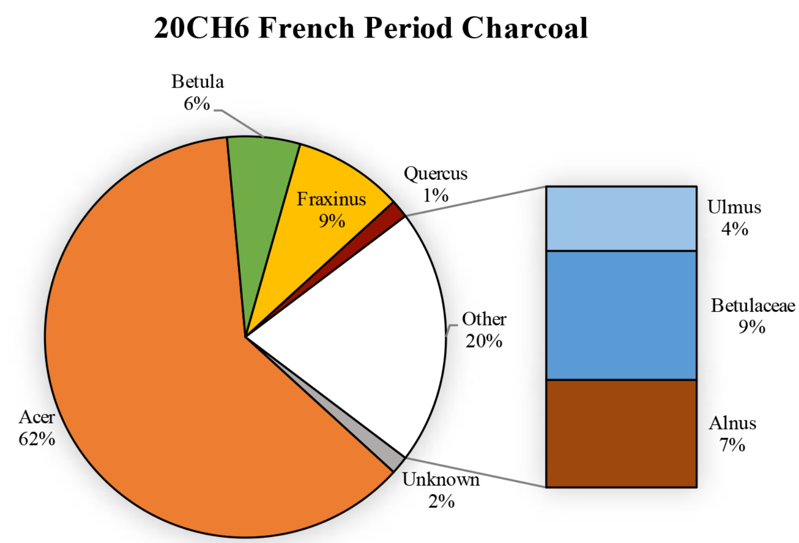

Figure 7-14: French Period charcoal taxa percentages.

20CH6	EARLY Late Woodland Charcoal	FRENCH Charcoal
Total	192	540
Richness	8	7
H	1.756088	1.291931
S^2_H	0.002991	0.00221
t	6.436104	
df	486	
Crit	1.964857	

Table 7-19: Charcoal Hutcheson t-test results. 20CH6 ELW to French period.

20CH6	LATE Late Woodland Charcoal	EARLY Late Woodland Charcoal
Total	192	1304
Richness	8	11
H	1.756088	1.851187
S^2_H	0.002991	0.000643
t	1.577512	
df	281	
Crit	1.968442	
p	0.115803	

Table 7-20: Charcoal Hutcheson t-test results. 20CH6 LLW to ELW

20CH6	FRENCH Charcoal	LATE Late Woodland Charcoal
Total	540	1304
Richness	7	11
H	1.291931	1.851187
S^2_H	0.00221	0.000643
t	10.47101	
df	869	
Crit	1.962698	
p	3.03E-24	

Table 7-21: Charcoal Hutcheson t-test results. 20CH6 French period to LLW.

Taxa	Common name	Plant type	Pollen Period Broad	Succession Stage	Fire Tolerance	Shade Tolerance	Maximum Age	Favored Regeneration Method
Abies	Balsam Fir	Tree	May to early July	Late succession	Very low	Tolerant	200+	Seed
Alnus	Alder	Tree	March-May	Initial community	High	Intermediate	100	Seed, Root crown
Ambrosia	Ragweed	Forb/herb	August - November	Initial community	Low	Tolerant		Rhizome
Betulaceae	Birch family	Tree	April - May	Initial community	Intermediate	Intolerant	150 years	Seed, stump base sprouting
Botrychium	Moonwart	Forb/herb	May - September	All successional stages	Intermediate	Intermediate		Rhizome
Cyperaceae	Sedges	Graminoid	March - November	Intermediate and late succession	Intermediate	Tolerant		Seed, rhizome
Diphasiastrum type	Groundcedar	Fern ally/Lycopod	March - December	Intermediate succession	Low	Tolerant		Rhizome
Epilobium type	Willow herb/fireweed	Forb/Shrub	May - September	Initial community	Tolerant	Intolerant		Airborne seeds, rhizome
Ericaceae	Heather/Blueberry family	Shrub	mid May-early June	Intermediate succession	Low	Intolerant	10+	Seed
Larix	Tamarack	Tree	April - May	Initial community	Low	Very intolerant	100+	Seed
Lycopodium clavatum	Stag's-horn clubmoss	Fern ally/Lycopod	N/A	Intermediate succession	Low	Tolerant		Rhizome
Piceae	Spruce	Tree	April -June	All successional stages	High	Intermediate	200 - 450	Seed, Crown residual colonizer
Pinus	Pine	Tree	April - June	Late succession	Very high	Tolerant	300	Seed banking
Pteridium	Bracken -Eagle Fern	Fern	N/A	Initial community	High	Intermediate		Windborne spores, rhizome
Ranunculus	Buttercup	Forb	March - April	Initial community	Intermediate	Intolerant - Intermediate		Seeds
Tilia	Basswood	Tree	May-June	Intermediate succession	Low	Tolerant	200	Seed
Tsuga	Hemlock	Tree	Late April -June	Late succession	Intermediate	Very Tolerant	800+	Bare Root, Seed
Typha	Cattail	Graminoid	May-July	Initial community	Intermediate	Intolerant		Rhizome
Ulmus	Elm	Tree	May-June	Intermediate succession	Low	Tolerant	200+	Stump sprouts

Table 7-22: Growth qualities, succession stages, and other autecological characteristics.

Wood Type	Green Weight (lbs./Cord)	Weight (lbs./Cord) Dry	Heat per Cord (BTUs)	Ease of Splitting	Smoke	Sparks	Coals	Overall Quality
Red Oak	4888	3528	24.6	Medium	Low	Few	Excellent	Excellent
White Oak	5573	4200	29.1	Medium	Low	Few	Excellent	Excellent
Maple	4685	3680	25.5	Easy	Low	Few	Excellent	Excellent
Silver Maple	3904	2752	19	Medium	Low	Few	Excellent	Fair
American Elm	4456	2872	20	Difficult	Medium	Few	Excellent	Fair
Birch	4312	2992	20.8	Medium	Medium	Few	Good	Fair
Green Ash	4184	2880	20	Easy	Low	Few	Good	Excellent
Willow	4320	2540	17.6	Easy	Low	Few	Poor	Poor

Table 7-23: Wood quality for identified taxa. Cloudman (20CH6)

7.3 Research Questions

Below I will answer each of my questions. To begin, I will discuss my domains and finish with the answers to my main research questions. Within this section I will also use the land management categories created by Bruce Smith (2012) and the general land use types I outlined in Chapter 6.

7.3.1 Domain 1: Landscape Access and Vegetation Types

1) *What types of ecosystems are represented in each period at the Cloudman site?*
2) *Are there multiple and/or distinct environments being exploited across the region?*

Questions 1) and 2) from this domain can be answered together. The people occupying the Cloudman site were drawing from multiple ecology types from a variety of plant communities. These ranged from old growth forest to wetlands. The co-occurrence of light requiring species like wild plum combined with pollen and wood from climax forest taxa like tamarack and hemlock suggest the use of at least two distinct terrestrial plant communities. Each period contained representative taxa from both boreal forests and northern hardwood forests (NHF). The abundance of maple and ash wood suggests more activity within a NHF population. Typical plant associations for a NHF are oak, cherry or plum, pine, fir, sedges, bracken ferns, mosses, shrubs with berries, and fern allies which are represented across the pollen and macrobotantical assemblages. Many of the samples also yielded evidence of maple, hemlock, alder, raspberry, *Gallium*, ferns, and club moss, which are associations within boreal forests. This evidence continues throughout the time periods. The data I am using to help classify environments was gathered from the Michigan State Forestry Extension and USDA Plants

Database. For a full list of the main landscape types and plant associations please see Appendix C.

The identification of activity within oak savannas or alvars is complicated by the limited species information from the grass and sedge plant categories. Pollen from the sedge family was identified within four samples and three of the four time periods. Sedges are grass-like plants whose species can occupy a variety of habitats. In Michigan, the Cyperaceae family includes sedges (*Carex* spp.), flatsedges (*Cyperus* spp.), spike-rush (*Eleocharis* spp.), and bulrushes (*Schoenoplectus* spp., *Scirpus* spp., and *Trichophorum* spp.). Members of the sedge family colonize both marshes, grass lands, and forest floors. While sedge species can be annuals or perennials, they all propagate primarily by rhizomes though their seeds are ubiquitous within seedbeds. Pollen rain from the sedge family indicates nearby colonized ground but is not specific enough to indicate alvars. The grass pollen and phytoliths do provide better evidence for grasses in and around the main habitation area. I attribute the higher rates of grass pollen from the LLW samples to the higher populations and residential occupation. More people moving about will cause increased ground disturbance which results in more weedy colonizers or grasses (Jenkins 2013).

Wetland taxa are present across the time periods but, the only evidence of plant-based wetland exploitation is wild rice (Meeker1993). However, preliminary results from the faunal analysis indicate that there were catfish and sturgeon in the samples. Therefore, the water was a procurement zone for collecting both animals and plants. For comparison I looked at the number of taxa and pollen counts for obligate wetland and facultative wetland taxa (Figure 7-15). The LLW had the highest diversity of wetland taxa accompanied by the highest percentage of cattail, and duckweed pollens. A closer examination of feature 56 (sample 16), reveals that the rise in cattail, duckweed, and mosses co-occur with a decrease in diatoms and algae. Though diatoms and algae are present with cattail in sample #20, it may be representative of change to the water levels or wetland competition. Emergent wetland plants like wild rice or cattails will absorb nutrients slowing algae blooms. Considering that planktonic algae was only recovered from one sample; all this knowledge can do is suggest a possible change in water quality over the short-term (Lund 1967).

As a final note, the absence of maple (*Acer*) and oak (*Quercus*) from the pollen samples is not indicative of those trees being absent. Due in part to the heavy load of *Pinus* pollen, it may drown out other pollen types. In addition to the evidence of oak and maple as charcoal and acorns, pollen sampling and dispersal studies reveal that the arboreal pollen taxa within a given soil sample will be typically from 20-120 m away (Davis et al. 1971; Li et al 2015). Therefore, it may be the maple and oak sources are simply far enough away that their signature is not present at the site level, were not actively producing pollen, or were overshadowed by pine.

3) *Do the data from 2019 change what we know of the seasonality of the Cloudman site?*
    a. *And how does this information compare with other sites in the region?*

The pollen within the French period samples indicates a potential occupation range from early spring until the fall. However, there are two concentrations of at least five taxa that suggest a likely occupation during mid-May and mid-July. The evidence of acorn, elderberry, and both rice phytoliths and starches inspires more confidence in late summer or early fall activities ().

The LLW period has four concentrations of co-occurring taxa. Ten taxa are flowering in mid-June, nine overlap in May, and eight in July and August. Additionally, the charred elderberry seeds also indicate activity on the Island during the summer months. Likewise, the rice phytoliths indicate the use of rice placing part of the land use in the fall. The MLW and

ELW both lack the late summer to fall flowering ragweed but maintain the rice connection to fall. A midsummer occupation is more heavily represented in these last two periods given the flowering bias. Three of the five Anishinaabe seasons are represented at the Cloudman site.

Two taxa in particular bracket the seasonality across periods. These are Alder, ragweed, and grasses (Figure 7-16). Alder pollen can begin to fall as early as January. Snow cover will slow or mitigate this process, but these trees are early pollen producers (Figure 7-16). Comparatively, ragweed tends to be a late blooming flower, providing pollinators an autumn source of food. Grasses also represent a wide seasonal range. While at present there is no good way to narrow down which taxa are specifically represented, they generally indicate late summer into early fall.

Sites as far away as Summer Island share similar macrobotanical assemblages with Cloudman. The combination of hazelnut and wild plum or cherry are paired across the Late Woodland components of the other sites in the region. Additionally, the smallmouth bass and northern pike fished during the French period component of Summer Island signals a likely spring fishing season. This was the same fishing season suggested by Smith for Providence Bay. If the movement west prior to AD1650 also focused on spring fish spawns as the data suggest, then at least one group of Anishinaabe adapted their spring subsistence regime to the western waters. Since the Late Woodland components at Summer Island are mostly associated with Oneota ceramics, spring fishing pre-historically should be considered separate from the later Anishinaabe activity.

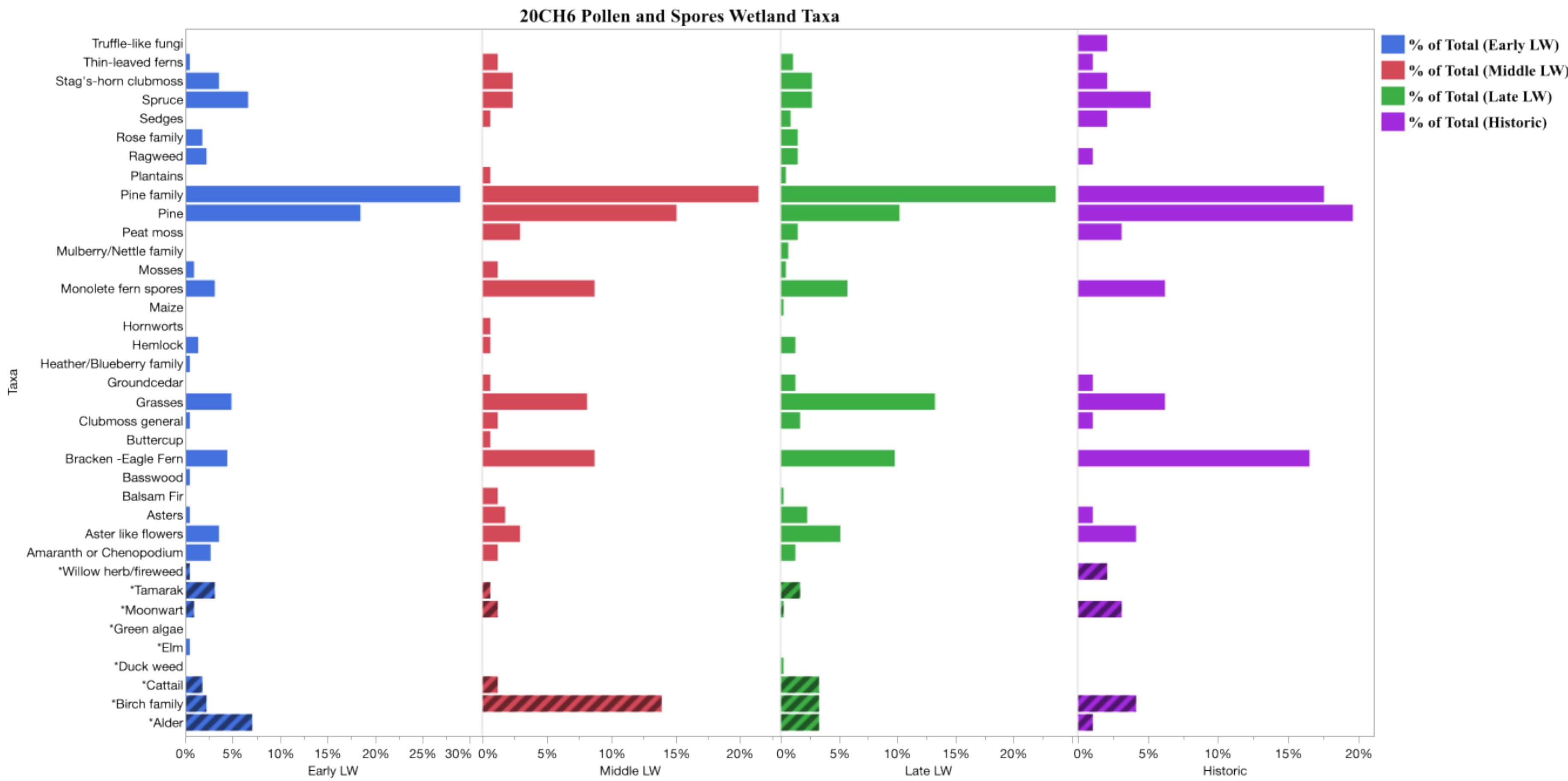

Figure 7-15: 20CH6 Pollen organized wetland taxa. Bottom striped bars indicate facultative wetland species to wetland obligate.

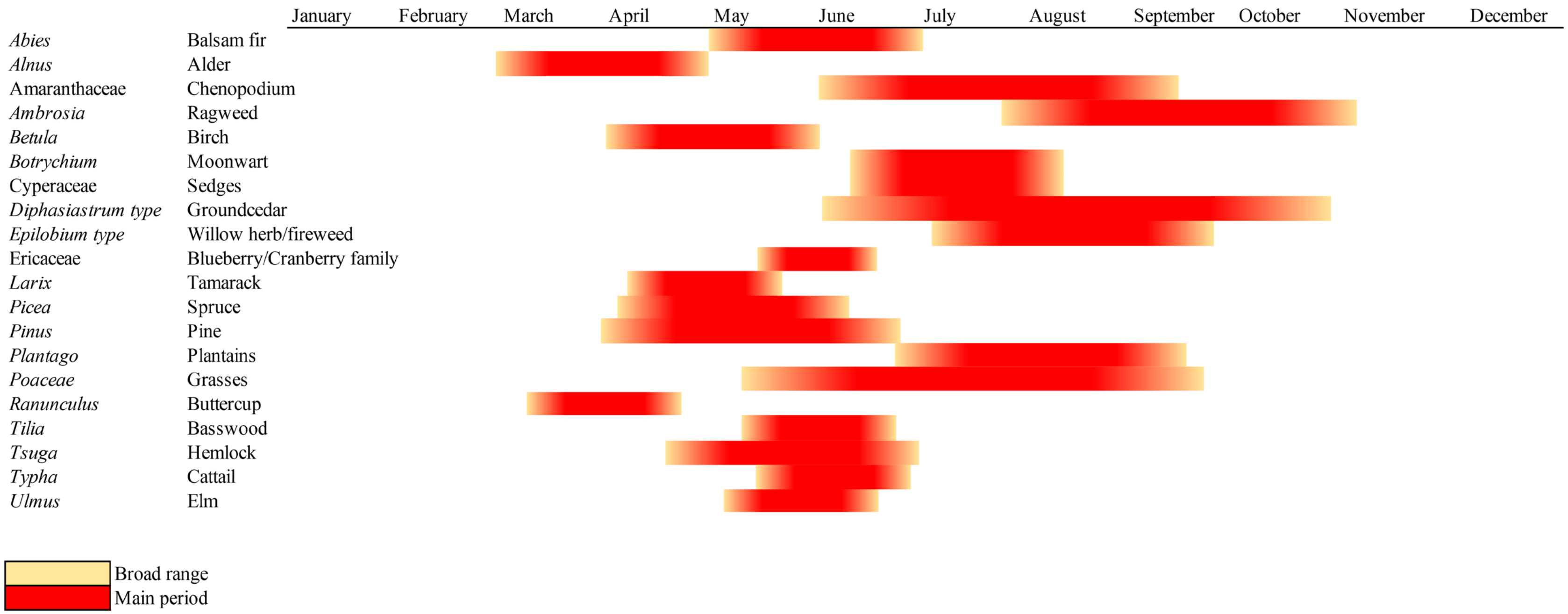

Figure 7-16: Pollen seasons in northern Michigan.

Early Late Woodland All taxa identified			
		Coefficient of Wetness:	**Wetness Index**
Acer	Maple	0 to -3	FAC- FACU
Alnus	Alder	0 to -3	FAC- FACU
Amaranthaceae	Chenopodium	3	FACU
Ascaris lumbricoides	Roundworm	N/A	N/A
Ambrosia	Ragweed	0-3	FAC- FACU
Aster type		5 to -3	UPL-FACW
Betula	Birch	3 to -5	FACU - OBL
Botrychium	Moonwart	5 to -3	UPL-FACW
Diphasiastrum type	Groundcedar	3	FACU
Ericaceae	Heather/Blueberry family	-3	FACW
Epilobium type	Willow herb	-3 to -5	FACW - OBL
Fraxinus	Ash	3 to -5	FACU - OBL
Hymenophyllum	Thin-leaved ferns	3	FACU
Larix	Tamarack	-3	FACW
Lycopodium clavatum	Stag's-horn clubmoss	0	FAC
Lycopodium foveolate	Clubmoss general	3	FACU
Monolete Fern spores		0-3	FAC- FACU
Mosses		5 to -3	UPL-FACW
Picea	Spruce	3 to -3	FACU -FACW
Pinus	Pine	3 to -3	FACW -FACU
Poaceae	Grasses	5 to -3	UPL-FACW
Prunus	Wild Plum	5	UPL
Pteridium	Bracken -Eagle Fern	3	FACU
Quercus	Oak	5 to 3	UPL - FACU
cf. *Rosaceae*	Rose family	5 to -3	UPL-FACW
Rubus	Raspberry	5 to -3	UPL-FACW
Sponge Spicules- smooth		N/A	N/A
Taraxacum type	Aster like flowers	0	FAC
Tilia	Basswood	3	FACU
Tsuga	Hemlock	3	FACU
Typha	Cattail	-5	OBL
cf. *Zizania palustris*	Wild rice	-5	OBL

OBL - Obligate wetland. Almost always occurs in wetlands under natural conditions (estimated probability > 99%)

FACW - Facultative wetland. Usually occurs in wetlands (estimated probability 67% – 99%), but occasionally found in non-wetlands (estimated probability 1% – 33%)

FAC - Facultative. Equally likely to occur in wetlands and non-wetlands (estimated probability 34% – 66%)

FACU - Facultative upland. Usually occurs in non-wetlands (estimated probability 67% – 99%), but occasionally found in wetlands (estimated probability 1% – 33%)

UPL - Obligate upland. Almost always occurs in non-wetlands under natural conditions (estimated probability > 99%)

(+) sign indicates a frequency towards the wetter end of the category
(−) sign indicates a frequency towards the drier end of the category

Table 7-24: Coefficients of wetness for every taxon associated with the early Late Woodland

Middle Late Woodland All taxa identified			
		Coefficient of Wetness:	**Wetness Index**
Abies	Balsam Fir	0	FAC
Acer	Maple	0 to -3	FAC- FACU
Amaranthaceae	Chenopodium	3	FACU
Ascaris lumbricoides	Roundworm	N/A	N/A
Aster type		5 to -3	UPL-FACW
Betula	Birch	3 to -5	FACU - OBL
Botrychium	Moonwart	5 to -3	UPL-FACW
Cyperaceae	Sedges	3 to -5	FACU - OBL
Diphasiastrum type	Groundcedar	3	FACU
Fraxinus	Ash	3 to -5	FACU - OBL
Hymenophyllum	Thin-leaved ferns	3	FACU
Larix	Tamarack	-3	FACW
Hypogeous Ascomycotina	Truffle-like fungi	N/A	N/A
Lycopodium clavatum	Stag's-horn clubmoss	0	FAC
Lycopodium foveolate	Clubmoss general	3	FACU
Monolete Fern spores		0-3	FAC- FACU
Mosses		5 to -3	UPL-FACW
Phaeoceros	Hornworts	3 to -5	FACU - OBL
Picea	Spruce	3 to -3	FACU -FACW
Pinus	Pine	3 to -3	FACW -FACU
Plantago	Plantains	0	FAC
Poaceae	Grasses	5 to -3	UPL-FACW
Prunus	Wild Plum	5	UPL
Pteridium	Bracken -Eagle Fern	3	FACU
Quercus	Oak	5 to 3	UPL - FACU
Ranaunculus	Buttercup	0	FAC
Sphagnum	Peat moss	0	FAC
Sponge Spicules- smooth		N/A	N/A
Taraxacum type	Aster like flowers	0	FAC
Tsuga	Hemlock	3	FACU
Typha	Cattail	-5	OBL
cf. *Zizania palustris*	Wild rice	-5	OBL

OBL - Obligate wetland. Almost always occurs in wetlands under natural conditions (estimated probability > 99%)

FACW - Facultative wetland. Usually occurs in wetlands (estimated probability 67% – 99%), but occasionally found in non-wetlands (estimated probability 1% – 33%)

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UPL - Obligate upland. Almost always occurs in non-wetlands under natural conditions (estimated probability > 99%)

(+) sign indicates a frequency towards the wetter end of the category
(−) sign indicates a frequency towards the drier end of the category

Table 7-25: Coefficients of wetness for every taxon associated with the middle Late Woodland.

Late Late Woodland Period All taxa identified			
		Coefficient of Wetness:	**Wetness Index**
Abies	Balsam Fir	0	FAC
Acer	Maple	0 to -3	FAC- FACU
Alnus	Alder	0 to -3	FAC- FACU
Ambrosia	Ragweed	0-3	FAC- FACU
Amaranthaceae	Chenopodium	3	FACU
Ascaris lumbricoides	Roundworm	N/A	N/A
Aster type		5 to -3	UPL-FACW
Betula	Birch	3 to -5	FACU - OBL
Botrychium	Moonwart	5 to -3	UPL-FACW
Cyperaceae	Sedges	3 to -5	FACU - OBL
Diphasiastrum type	Groundcedar	3	FACU
Epilobium type	Willow herb	-3 to -5	FACW - OBL
Fraxinus	Ash	3 to -5	FACU - OBL
Galium	Cleaver	3 to -5	FACU - OBL
Hymenophyllum	Thin-leaved ferns	3	FACU
Hypogeous Ascomycotina	Truffle-like fungi	N/A	N/A
Larix	Tamarack	-3	FACW
Lemna	Duck weed	-5	OBL
Lycopodium clavatum	Stag's-horn clubmoss	0	FAC
Lycopodium foveolate	Clubmoss general	3	FACU
Monolete Fern spores		0-3	FAC- FACU
Moraceae/Urticaceae	Mulberry family/Nettle family	3	FACU
Mosses		5 to -3	UPL-FACW
Phaeoceros	Hornworts	3 to -5	FACU - OBL
Plantago	Plantains	0	FAC
Planktonic algae			N/A
Pinus	Pine	3 to -3	FACW -FACU
Picea	Spruce	3 to -3	FACU -FACW
Poaceae	Grasses	5 to -3	UPL-FACW
Prunus	Wild Plum	5	UPL
Pteridium	Bracken -Eagle Fern	3	FACU
Quercus	Oak	5 to 3	UPL - FACU
Rosaceae	Rose family	5 to -3	UPL-FACW
Rubus	Raspberry	5 to -3	UPL-FACW
Salicaceae	Willow/Poplar/Aspen	0 to -5	FAC - OBL
Sambucus	Elderberry	-3	FACW
Sphagnum	Peat moss	0	FAC
Sponge Spicules- smooth		N/A	N/A
cf. *Taeniidae*	Tapeworm	N/A	N/A
Taraxacum type	Aster like flowers	0	FAC
Tsuga	Hemlock	3	FACU
Typha	Cattail	-5	OBL
Ulmus	Elm	0 to -3	FAC- FACU
cf. *Zizania palustris*	Wild rice	-5	OBL
cf. *Zea mays*	Corn	5	UPL

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FACW - Facultative wetland. Usually occurs in wetlands (estimated probability 67% – 99%), but occasionally found in non-wetlands (estimated probability 1% – 33%)

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UPL - Obligate upland. Almost always occurs in non-wetlands under natural conditions (estimated probability > 99%)

(+) sign indicates a frequency towards the wetter end of the category
(–) sign indicates a frequency towards the drier end of the category

Table 7-26: Coefficients of wetness for every taxon associated with the late Late Woodland

French Period Post AD 1650 All taxa identified			
		Coefficient of Wetness:	**Wetness Index**
Abies	Balsam Fir	0	FAC
Acer	Maple	0 to -3	FAC- FACU
Alnus	Alder	0 to -3	FAC- FACU
Ambrosia	Ragweed	0-3	FAC- FACU
Aster type		5 to -3	UPL-FACW
Botrychium	Moonwart	5 to -3	UPL-FACW
Betula	Birch	3 to -5	FACU - OBL
Cyperaceae	Sedges	3 to -5	FACU - OBL
Diphasiastrum type	Groundcedar	3	FACU
Epilobium type	Willow herb	-3 to -5	FACW - OBL
Fraxinus	Ash	3 to -5	FACU - OBL
Galium	Cleaver	3 to -5	FACU - OBL
Hymenophyllum	Thin-leaved ferns	3	FACU
Hypogeous Ascomycotina	Truffle-like fungi	N/A	N/A
Lycopodium clavatum	Stag's-horn clubmoss	0	FAC
Lycopodium foveolate	Clubmoss general	3	FACU
Monolete Fern spores		0-3	FAC- FACU
Picea	Spruce	3 to -3	FACU -FACW
Pinus	Pine	3 to -3	FACW -FACU
Poaceae	Grasses	5 to -3	UPL-FACW
Pteridium	Bracken -Eagle Fern	3	FACU
Quercus	Oak	5 to 3	UPL - FACU
Sambucus	Elderberry	-3	FACW
Sphagnum	Peat moss	0	FAC
Sponge Spicules- smooth		N/A	N/A
cf. *Taeniidae*	Tapeworm	N/A	N/A
Taraxacum type	Aster like flowers	0	FAC
Ulmus	Elm	0 to -3	FAC- FACU
cf. *Zizania palustris*	Wild rice	-5	OBL

OBL - Obligate wetland. Almost always occurs in wetlands under natural conditions (estimated probability > 99%)

FACW - Facultative wetland. Usually occurs in wetlands (estimated probability 67% – 99%), but occasionally found in non-wetlands (estimated probability 1% – 33%)

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UPL - Obligate upland. Almost always occurs in non-wetlands under natural conditions (estimated probability > 99%)

(+) sign indicates a frequency towards the wetter end of the category
(−) sign indicates a frequency towards the drier end of the category

Table 7-27: Coefficients of wetness for every taxon associated with the French period.

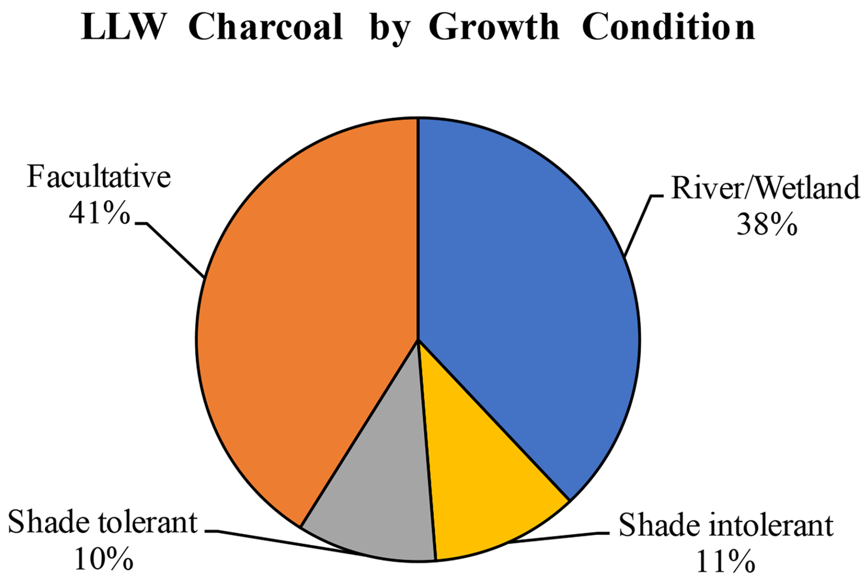

Figure 7-17: Late Late Woodland trees from 20CH6 organized by growing conditions.

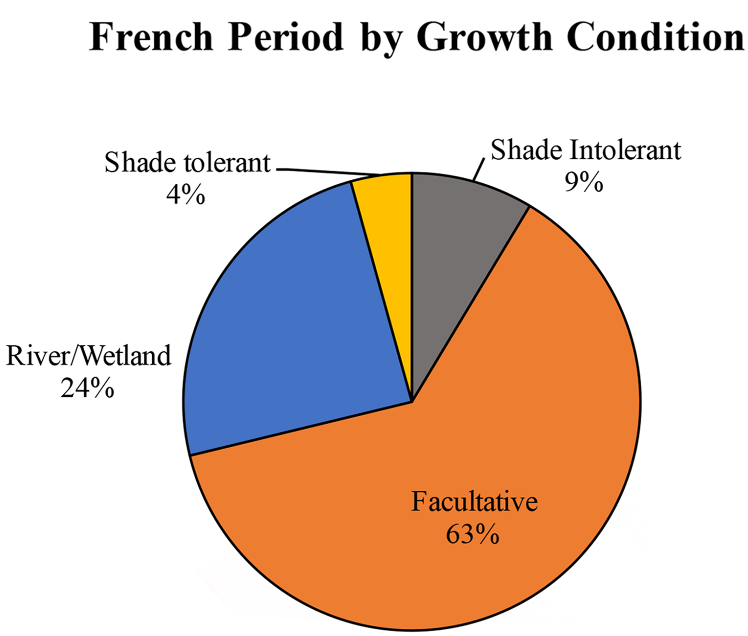

Figure 7-18: French period trees from 20CH6 organized by growing conditions.

7.3.2 Domain 2: Socio-Ecological Relationships

1) *Is there evidence for ecological-engineering or niche construction?*
    a. *If so, is it detectable within each period?*
    b. *Does it change in scale or type across time?*
    c. *If so, which of the types outlined in this dissertation does it match?*

Evidence for niche construction first comes from signs of soil disturbance as well as the abundance of initial succession communities. Roughly 40% of the taxa identified come from initial community plants. These are the plants that aggressively colonize cleared areas. There is also a mixture of intermediate and climax vegetation. Tamarack, hemlock, and balsam fir are major aspects of old growth forests. Low rates of elm also help establish the presence of mid-age succession stands. However, once elm becomes dominant in a mixed hardwood stand, due to its shade tolerance it is seldom overtaken by other species.

Other evidence for niche construction comes from shade tolerance information for each represented taxa and mean ring widths. Within Smith's (2011) categories of land management, in-place encouragement of economically important perennials creates landscapes patterned with point resources. This pattern involves preferential thinning to help promote fruit or nut trees (Smith 2011). This behavior is like the shelterwood systems used in silviculture (Matthews 1989). The shelterwood process involves removing trees to create increased light availability for understory plants (Hannah 1988). Evidence for in-place encouragement comes from an increase in the presence of hemlock and ash mean ring width data. Among the LLW and French period samples, the mean ring width of ash was chosen as a proxy for light availability. Fraxinus is a common pioneer plant that germinates in partially closed-canopy hardwoods. It was also abundant enough within each period to be appropriate for comparison. The mean ash ring width for the LLW was 0.81 mm, whereas the mean ring width for ash in the French period was 0.55 mm. This size difference is a good proxy for available light within the growing season for a tree. Ring widths increase with exposure to more light, especially in the early-wood portion of a tree ring (Crew and Mighall 2013). At least in the areas where ash grew, the LLW period canopy may have been thinner than those same areas in the French period. Hemlock also provides evidence for intentional shelterwood creation. The USDA Fire Effects Information System notes that hemlock reacts favorably to forest thinning. Hemlock is also extraordinarily fire intolerant, making the shelterwood system a better match for the tree's survival. The proportional increase in hemlock pollen in the LLW samples provides more support for minor shelterwood practices in the LLW. Soil sample 5 exemplifies a pattern of canopy thinning with relatively high hemlock pollen and low birch family pollen (Figure 7-15; Figure 7-20). However, the changing rates of birch are relevant since *Betula* germination is enhanced by fire management which would counter the success of hemlock (Uchytil 1991; Wisconsin Department of Natural Resources 2009).

While the conflicting evidence between birch and hemlock may simply represent two separate forest types being utilized, some other evidence makes the argument for a shelterwood method less compelling. First, it is unclear what impact the Medieval Climatic Optimum (ca. A.D. 800–1300) had on tree growing seasons. The warmer climate with the Late Woodland complicates the light availability data. Additionally, the continued presence of white pine adds another ambiguous element. White pine can become suppressed in environments with dense understory plants. Shelterwood cutting is one method shown to assist white pine (Kelty and Entcheva 1993). However, burning also is an effective means of white pine promotion. So, there are other explanations for the attributes that may represent shelterwood systems.

The best evidence for a specific plant management system comes from fire ecology. The use of fire management falls into Smith's (2011) category for general modification of vegetation communities. This category is associated with mosaic areas matched with a variety of successional sequences. Considering the rich ethnographic history of Anishinaabe fire management, unsurprisingly it is this pattern that best matches the evidence from the Cloudman site (Chapter 4; Warren 1885). While multi-age forests can exist in some form naturally, in the Cloudman samples there are some taxa that provide evidence for intentional fire management. Specifically, the pollen and spore data highlight the continued presence of pioneer plants and fire adapted rhizomes. *Pteridium* (Bracken ferns), *Poaceae* (Grasses), birch (*Betula* sp.), and *Cyperaceae* (Sedges) are characteristic of secondary succession forests in Michigan, but *Pteridium* and birch are specifically known to be a fire adapted (Houghton et al. 2022). White pine and alder ratios add to this interpretation. White pine benefits from the same burning strategy used to promote birch and bracken fern. A pattern of low intensity fires at 5- to 50-year intervals followed by eventual high intensity fires after 50 years are necessary for stand replacement. Frequent fire also favors alder over balsam fir. Based on the USDA fire tolerance studies, alder will replace balsam fir after a burning event, and it will become most abundant in areas that have been burned at a rate of three times per 30 years.

There is a pattern across the periods, where alder pollen and balsam fir pollen are negatively correlated. Balsam fir is only present in the MLW and the historic period samples. Even though the *Abies* pollen in the French period soil sample was noted after the initial pollen count, it is connected to a reduction in alder pollen in this period. The MLW balsam fir proportions are the highest of any period. Likewise, the increase in balsam fir in the MLW coincides with the absence of alder in both MLW soil samples. The relationship witnessed in contemporary studies between fir and alder is present in the samples.

Furthermore, post burn data from one to two years from the fire event show dominance by oak (*Quercus* sp.) and hickory (*Carya* spp.) within areas burned by medium- to high-intensity fire during the spring and summer. Comparatively, yellow-poplar (*Liriodendron tulipifera*) and red maple (*Acer rubrum*) become dominant areas with low-intensity burns regardless of season it was employed. Oak dominated areas are may only last a few decades with a fire-based clearing system (Brose 2010). The increase in maple charcoal and corresponding decrease in oak within the Fur trade samples may indicate the maintenance of a burn schedule, but a move away from a strictly spring burning implementation.

Comparatively, coppicing or pollarding systems are unlikely explanations for the alder/balsam fir pattern. Coppiced wood provides a characteristic size distribution that favors wood in the 5-10 cm category. Cutting back trees promotes multiple shoots with even growth. The *m*D values of known coppices range from 7 to 9 cm (Nelle 2003). Since the spread of the Cloudman *m*Ds were not concentrated in the 5-10 cm category and diameters were evenly spread, this rules out this wood management system. Furthermore, the typical tree genera present in the charcoal and pollen record do not respond well to coppicing (Table 7-22). Alder is known to become suppressed after being cut back. This implies the presence of fire management when alder is in higher concentrations and fir trees shrink.

However, the alder evidence does not eliminate fire management from the MLW. The expansion of birch family pollen in the MLW coincides with a decrease in tamarack. While birch and its kin require abundant light, tamarack is very shade tolerant with a low fire tolerance. This pattern could represent spatial changes in forest succession. In this case, the location of fire regenerated vegetation could be farther from the site in the MLW.

Given that the pollen Shannon indices were comparable between the ELW, MLW, and French period and the overall continued presence of fire adapted taxa remained stable, there were likely no large-scale changes to the fire management regimes between the Late Woodland and French period. However, small differences include the increase in the proportions of bracken fern over the course of the Woodland period, the French period containing the highest percentage of the fire-adapted *Pteridium*, and decreased evidence of local fire use in the MLW.

Overall, there was continuous access to and creation of mixed age forests on Drummond Island. Evidence for local fire management is present across all periods but is less prevalent in the MLW and more prevalent in the French period within the immediate site area. The continued evidence of multi-age forests and bracken fern continuity suggest that these practices were continually in use starting from the ELW up into contact with the French. However, only the LLW period shows signs of an additional plant management system. The shelterwood method may have been used as a secondary practice during the LLW. But the certainty of this is complicated by the high residential use of the site. The open canopy and clearing could be a symptom of the scale of firewood use. That said, the wood resources were clearly conserved.

1) *Are there any detectable changes to the use or cultivation of domesticates?*

There was an overall trend during the Late Woodland of cultigen use through small-scale horticulture at the site. Excavations from the 1990s uncovered charred maize and evidence of

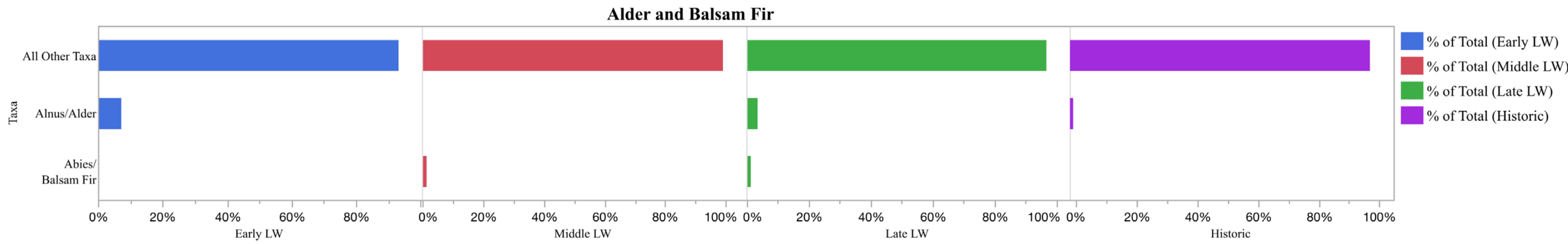

Figure 7-19: Changes to the percentage of alder and balsam fir between periods of 20CH6.

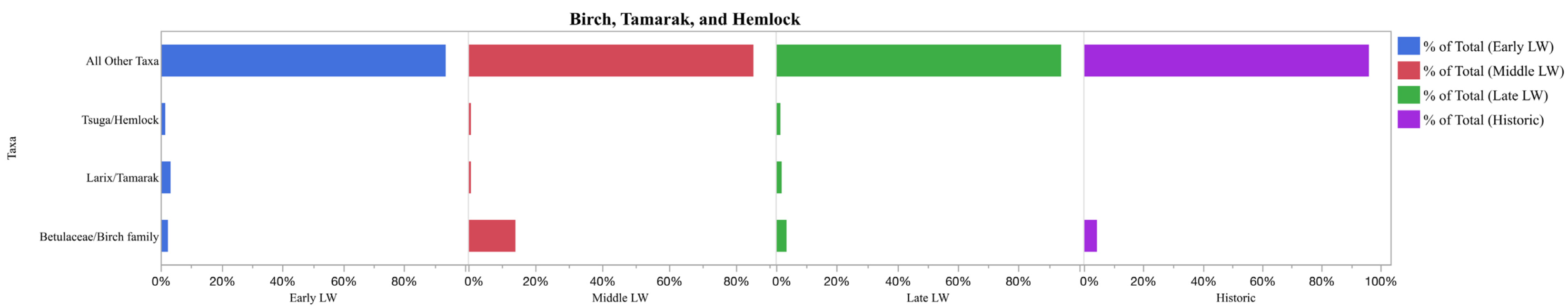

Figure 7-20: Differences between the birch family pollen, Tamarack, and Hemlock

corn and squash consumption in the form of both starch and phytoliths from the Kooiman (2018) residue analysis. Based on the presence of maize pollen we can more reliably interpret the LLW occupation as a period of small-scale horticulture. As established within the descriptions of Indigenous trade networks, it is likely that the maize could have been sourced from the Huron-Wendat trade network. However, either the communal aggregation in the LLW provided opportunities for Huron people to grow maize at this location or the Anishinaabe related groups were taking part in it themselves. Since there was no squash pollen, only one phytolith, evidence for squash gardening at the site is inconclusive.

However, there ceases to be any evidence of maize or squash in the historic period. Likewise, the proportion of grass pollen drops in the French period likely indicating a reduction in cleared areas. I interpret this pattern as a lack of domesticate cultivation on the Island during the fur trade.

2) *Do communal harvesting practices decline or increase across periods?*

While evidence for agriculture disappears in the French period, communal ricing could have occurred. The phytoliths and starch provide support for rice harvesting. However, a better understanding of wild rice processing in the past would help flesh out our understanding of site activities. For example, there are parching methods that would leave a limited archaeological signature. With the scaffold method, a wood rack would be placed over a low fire allowing the rice to dry and parch (Surette 2008). This rack method would be more difficult to detect than a parching pit. More experimental work needs to address the phytolith patterns associated with different ricing activities.

Another communal labor practice in the Late Woodland period was the harvest of spawning fish. Faunal evidence from the historic dated features is limited. Within feature 48, the French period deposit only contained 4 mammal bone fragments. The dense faunal assemblages found in the LLW are no longer visible. If large catches are occurring, they are not processing them at the site. However, the finalized faunal analysis will help solidify this interpretation.

Providence Bay provides some insight. On Manitoulin Island, larger numbers of walleye are available during their spring spawn. Walleye were found spread throughout the middens on Providence Bay, but small individual catches were present within the longhouses. The differences between the deposition events for walleye are explained by season and fishing method. While nets and groups of people could catch large masses of walleye, the single catch suggests hook and line fishing. This in turn implies that this method of individual catching was taking place during the warm seasons when the walleye populations were thinner (Molnar 1997; Smith and Prevec 2000). Comparisons with fishing practices at Hunter's Point confirm that there could be two separate fishing strategies, one based on spring spawns and the other opportunistic catches (Molnar 1997). Fishing may have become an individual task in the French period, while wild rice continued to be a communal activity. Berry collection can be either individual or communal. So, it is hard to distinguish which type of behavior was used in the collection of berries.

7.3.3 Domain 3: Provisioning and Power

1) *Are there measurable differences to management or overall subsistence strategies after the Huron diaspora?*

Berries like raspberry are a part of the rose family pollen signature. This pollen disappeared during the French period. At first glance this is evidence of a reduction of raspberry.

However, June or July are the likely ripening times of this fruit in northern Michigan. Use of the site during the time of berry fruiting and the other pollen evidence suggests a likely use of the site during those months since many pollen seasons overlap with that time. An issue is the lack of charred raspberry seeds within any of the French period samples. However, there continued to be acorn collection and summer berry collection in the form of elderberry seeds.

The microfossil analysis completed by Kooiman (2018) only produced phytoliths of wild rice within the ceramics and while starch from squash and maize were extracted from sherds, no rice starch was identified at this site until now. The differential presence of the wild rice starch may be explained by cooking strategies and overall processing parameters. Boiling and simmering residue was common on the Cloudman vessels. Long boiling times used to cook rice would be enough to weaken the binding force of the granule. Starch granules usually undergo gelatinization during boiling. While boiling is a method of breaking down the complex starch polysaccharides into digestible sugars, that same process will cause the semi-crystalline structure of the granule to absorb water and cause alterations of its morphological and optical properties (Johns and Kubo 1988; Crowther 2012). Maize may also undergo a similar process, but gelatinization can be lessened when large aggregates of seeds clump together. Another explanation for the lack of wild rice starch in ceramics is the presence of phytoliths extracted from vessel walls (Kooiman 2018). During wild rice processing, the seeds will need to be parched in some way to prevent germination during storage. The use of ceramics in parching is a possible explanation for the differences in starch presence. However, additional experimentation work needs to be done to increase the interpretive potential of wild rice phytoliths. Finally, wild rice pollen is known to be difficult to differentiate from other graminoids (Lee et al. 2004; Surette 2008). Thus, the intensity of wild rice harvesting cannot be addressed and so the measurable differences remain absent. Point being, that wild rice harvesting continued. Yet, as established earlier, maize production ended.

2) *Are there detectable changes in settlement and demographic patterns?*

The data from primary sources suggest a massive and somewhat permanent shift away from Lake Huron, towards the west. It is difficult to say how the O'Neill site fits into the shift towards the west. While the Jesuit Relations mention groups of Anishinaabe living on the west side of the Lower Peninsula, the thin and ephemeral French period component at O'Neill creates more questions than it answers. However, Rock Island, Summer Island, and historic references place many of the domestic spaces away from Drummond Island. An exception was the important Sault Ste. Marie settlement further North.

The size and density of features seems to have changed between periods at Cloudman. The burning events that created features 52 and 46 are not identified in the French period. In terms of demographics is it likely that the shift towards logistical use of Drummond Island would favor smaller adult groups. Fur trade canoe trips were commonly young men but if ethnographic information on wild ricing can be extended to the past, the continued use of wild rice may indicate the occasional small groups of women (Surette 2008). The representation of elderberry in the period as well as the potential water-cooled combustion feature suggest a scenario in which either a meal was prepared with elderberry added or a fire was used for drying rice or berries. The water-cooling method as evidenced by the crenulated FCR morphology. In comparison, between French period feature 50 and the FCR within level 2 of unit S18E97, the characteristics of the smooth curvilinear breakage observed with dry-cooling are present within level 2 and absent from feature 10 (Neubauer 2019). The next closest cultural feature to feature 50 is general fill. The FCR from feature 52, contained a combination of curvilinear breakage and crenulated, but higher rates of reddening due to high or long heat exposure. This is the style of cooling observed in the FCR experiments conducted on rocks on Grand Island in Michigan (Neubauer 2019). In Densmore's (1974) observations, fires within a habitation area or sugaring camp continued to burn almost day and night. It leads me to consider these FCR differences as a sign of lower intensity fires within the French period with the potential of shorter use time. There needs to be a more in-depth comparison between all FCR materials and some experimental burning using the geologically specific rocks from Drummond Island. However, the fires represent food preparation with a quickly extinguished fire.

3) *Did wood and food supply systems change to prioritize fur trade activities?*

If wood supply systems changed to accommodate trade with the French, the most likely influence would be canoe patching. Johnson et alia (2018) notes that during the fur trade frequent stops were required to collect and boil pitch. The rigors of water travel took its toll. As mentioned in the ethnobiology section of Chapter 4, the process of making pitch requires two separate boiling events that also require long periods over a fire. References to culturally modified trees in the nineteenth century attest to the possibility of landscape and in that case, single organism modification to handle the fur trade. Pitch is collected from gymnosperms. The charcoal and pollen data indicate that those were trees available for such work at Cloudman. However, the LLW sample provided better evidence of a shift to increased conifers than the French period did. Furthermore, the burning events associated with features 48 and 50 lack distinct ash layers or insitu rubified sediment. Whatever combustion event was associated with their creation it did not leave behind a strong signature. Only the FCR and charcoal offer clues. Large chunks (4-6 cm) of FCR from feature 50 display wavey jagged breakage. These angular cobbles are a distinct morphology associated with long-term firing followed by water-cooling

(Neubauer 2019; Graesch et al. 2014). Direct firing evidence comes from the FCR spawl-shaped fragments. Direct flame can cause this type of breakage. So, while there may be no ash layer, the intermixed charcoal and FCR suggest these French period deposits were dumps from long burning fires followed by water cooling (Mentzer 2014). It is likely that long-form boiling could have taken place with these features, but no other evidence suggests pitch production.

When examining the wood supply system from the French period samples, the individual rates of alteration provide insights. The charcoal is dominated by maple, elm, and ash trees. The elm and ash from this period are correlated with higher rates of alteration than the other genera in the French period. The size classes for each fall within the two smallest categories (0–1.5 cm and 1.5–5 cm). As they are also taxa likely to grow along the river, these features suggest that wood was collected from the closest trees. An added layer of context is that both elm and ash are known to be useful for their bark. Elm bark can be used to make structure covering and ash wood is prized in basket making. In an anthracological study of the Zongri foragers, nearby greenwood is a major part of the assemblage since this wood was a byproduct of another activity (Liu et al. 2021). One possibility is that the branches were left over from the process of basket making. However, greenwood rates of elm and ash fragments are almost nonexistent in the French period. This fact combined with the higher occurrence of cellular deformation of elm and ash make opportunistic forest floor collection more likely.

7.4 Primary Questions

1) *Did fur trade economics continue, reinforce, or alter Indigenous land use?*

First, it is impossible to discuss the use of Drummond Island without taking into account the population shift after the Seneca wars. Evidence from sites further to the west like Rock

Island not only show evidence of the multi-ethnic habitation. The multiple references to populations in these locations combined with evidence for defense (gun related artifacts) and evidence of new occupations at sites like Summer Island indicate residential living in the west. Unlike those sites, the post AD 1650 Cloudman historic period occupation lacks the traits I laid out for a residential land use style.

Returning to my land use categories, the LLW occupation fits well with a residential model. There is a larger *m*D in the LLW, the most even spread of diameter size categories, combustion features providing evidence for multiple types of activities, and expanded forest clearing (grass expansion) from larger occupations. The evidence of canopy thinning also provides another avenue to support the interpretation of a high-demand land-use style. One confounding find is the higher diversity in the samples. However, the unexpected wood diversity can be explained by an expanded daily range out from the site. The appearance of both hemlock and *Prunus* indicates a wider range of woodland types used and thus a larger wood collection footprint. Rather than the diversity representing the collection of more types of plants from the immediate site area, it represents a larger spatial collecting practice. This evidence along with ethnographic analogies about group fishing and maize suggests the LLW land management style is consistent with my communal category along with residential.

By the French period evidence of occupation is more ephemeral or at least seventeenth century activities created a smaller archaeological signature. In addition, entire sets of activities that are represented on Drummond Island and Providence Bay during the Woodland period disappear from the archaeological record. With the exception of the claw and bead feature, the ritual turtle and dog burials are no longer taking place at these sites.

While maple continues to be a wood prioritized for fires, the deadwood from specifically riverine trees indicates collecting nearby wood from the forest floor. The charcoal here also violates my expectation for PLE but given the proximity of the wood and its state, it is evidence for partial opportunism. I will emphasize that most of the charcoal show no sign of alteration and little evidence of greenwood usage. Since the use of the site matched a low demand system, it is likely trees or branches were cured using a girdling method. This method employs selective bark removal to kill the tree or branch and leave the wood in place. In the case of a tree branch, it would only need to be snapped off later for use as fuel. While some of the differences between the LLW and French period could be a result of sample size, multiple proxies support these overall interpretations.

Based on my categories from Chapter 6, I see two patterns in the French period that differ from the LLW. I expected a logistical land use style to be accompanied by task specific activities and individual land use to be isolated to limited numbers of people. First there was a shift towards individual labor, short term visits, and opportunistic collecting. This change from the LLW is evidenced by the end of horticulture, lack of large fish deposits, and presence of limited use combustion features. Second, there was likely a small-scale logistical land use pattern where rice was collected, and forests were managed. I believe the evidence for intentional forest management applies the sustainable style of land use to this period as well.

It seems that the metropolitan communities described by Cleland (1992) were disrupted by the Seneca war. Most scholars agree that the Wendat communities never fully recovered (McCullen 2015). While large aggregates ended, there remains the possibility of a new kind of gathering event on the Island meant for small-scale exchange or feasting. The area could have been a rendezvous location for *Voyageurs* and suppliers. We only know for sure that one half of the Anishinaabe-Huron trade system never returned.

2) *How did (or did) the political ecology/economy of the Anishinaabe emerge from their unique relationships with the landscape?*

In past literature there have been claims that the cultural groups of northern Michigan were not conditioned to the accumulation that was possible with access to European trade goods (Brose 1974). This perspective posits that accumulation would create drastic cultural changes. While is it true that there were major changes over the course of the fur trade, and that involvement in the trade created re-organization for many Indigenous groups, for the Anishinaabe, specifically the Odawa, trade with the French became an extension of a pre-existing cultural adaptation. Rather than observing a breakdown of a reciprocity-based culture, this research supports previous hypotheses about the Anishinaabe "pre-adaptation" leading to fur trade success. Cleland (1966) developed the idea that the Odawa clans took part in a "strategic ecology." He claimed that the resource base that existed before the fur trade only needed slight adjustments to be applied to trapping and trading. Examples include the winter hunting adaptation that could be adjusted for trapping and the warm weather mobility that would allow them to transport goods (Drake and Dunham 2004; Fitting 1969). Additionally, the canoe technologies and mobility that came before the French were both pre-adaptations that facilitated a "middleman" status. Available resources in the French period support this hypothesis. Since a main expectation of mine is that techno-socio-ecological spaces provide the means for political action, the sustainable relationship with the land contributes to access to seasonal fruit, rice, and fish. These food resources are transportable and storable if needed. The combined part logistical, part opportunistic land use pattern suggests that this landscape could be provisionally useful within fur trade travel.

Evidence of the opportunistic and short-term use of the Cloudman site helps support the interpretation that the land was not a source of products for trade but a support system for logistical success. Though the Cloudman site was not a location for fur procurement, or large-scale food provisioning, Drummond Island is set in the path of potential trade routes. With a landscape that was cared for, the foraging potential for the site was high. Continued forest management would have provided the abundant berries mentioned by Champlain and La Potherie (Biggar 1937; La Potherie 1753). Since frequent canoe repair stops were necessary, the forest management systems were akin to a fully stocked pantry.

Furthermore, the benefit of increased birch through fire use means that they could access more bark for canoes or patching. However, I am not suggesting that the Anishinaabe collected bark on a whim or even extensively. The removal of birch bark requires care and timing to not kill the tree (Frederick 2020; Herron 2002). The relative increase in birch pollen and birch charcoal post AD 1650 suggests that an unhealthy collection practice was not occurring. More evidence is required to consider the increase in birch as an intentional result of intensified fire use. One goal of fire renewal could have been expanding the availability of birch resources, but I would need the identification of the birch family pollen at higher resolution to differentiate birch from hazelnut.

The data certainly do not point to a degradation model of change. Instead, there is a pattern of renewal and multiple types of plant use systems. The renewal of discontinuous resource patches was a practice established in the Late Woodland period (Dunham 2014). This path and patch landscape that was built into the Anishinaabe concept of the world facilitated fur trade activity. I would add that the Anishinaabe approach to engaging with the world had an interrelated contribution to the success of the Odawa. While the intensive processing of nut oil appears to have ended by the French period, the smaller logistical groups of either traders or ricers would be able to provision themselves. So, this research reinforces the understanding that in the broader Mackinac region, instead of evidence for Anishinaabe adapting their ecological pattern to the fur trade, the pre-existing relationships with the landscape and TKE influenced the success of the Anishinaabe and French adaptations to the trade process (Biersack 2006). Looking at the power models, the potential use of the site for travel provisions is closest to a "power with" model. Through their provision options, they could alleviate the opportunity costs of taking part in the fur trade.

It is impossible to expect that no change would occur when new items, dynamics, plants, and other changes entered the Great Lakes (Parsons 2011). However, a subsistence and culture centered around adaptation to reducing risk provided flexibility that accommodated more changes than an agricultural system could. So, these same landscape practices facilitated continued sovereignty. Beaudry and Parno (2013) highlight that "mobility is implicated in the production and reproduction of power relations." It has been established that travel was a valuable skill set in the fur trade. This fact is true in more ways than one. Travel and the spatial elements of the landscape were one way that Anishinaabe people avoided coercion from Montreal (Jung 1997). Should one location on the landscape be inaccessible due to warfare or another political obstacle, they could manage to move to another area that was previously managed through traditional fire use and find foraging opportunities.

Descriptions of chiefdom fissioning in the southeastern United States provide an example of the way landscapes and resources can make coercive power difficult to maintain. Fissioning is a model used to explain the process of large complex forms of leadership breaking apart into factional leadership (Anderson 1996; Blitz 1999). However, one of many factors in fissioning is that resources or kin are available elsewhere, people did not have to endure unwelcome political scenarios. They would in essence "vote with their feet" (Ames 1995; Stearns 1984; Zechman 2019). The situation in the southeast is obviously more complicated than I am letting on, but it provides an example of the ways distributed resources, or in this case discontinuous resources can be used to navigate power relations. Mobility as resistance may be a previously developed hypothesis, but it is through the evidence from Cloudman that it is further supported.

Scott (2017) points out that some plants have ecological qualities that make them more or less of a useful tool for political economy. Any plant resource with a limited range, high potential for calorie density, storage potential, and high labor requirements are better suited to a political economic strategy that uses restricted access. As Dunham (2014) points out, the availability of different starchy foods is geographically restricted in the way that animal resources or perennial foods are not. Foraged resources are therefore harder to restrict or monopolize. Though, this same quality of dispersed food and fur resources also means it would be difficult for the Anishinaabe to monopolize them. As romantic as the idea of a berry-based trade economy may be, even though they were storable, the patchy qualities of berry resources do not suggest the berry forager exchange system would make for a good fur trade enterprise.

As an added factor, if wild rice was harvested, ethnographic sources claim that this was usually done by groups of women. Over the course of ten weeks wild rice ripens and women will canoe out and tie up the rice into bundles so that when they canoe by, they can knock the rice into their vessel. Much of the fur trade focuses on the role of men, especially the young warriors going to war or rendezvousing for trade. While scholars like Sleeper-Smith (2014) have highlighted the role of marriage and women's social connections, there may be some invisible women's labor that supported the continuation of the Anishinaabe success. A separate land use system that involved the collection of wild rice could provide a support role for sovereignty via a "power with" model. In this case, the technique is also power through food (Wickman 2021). It was not only that they had the advantage of "voting with their canoes," but they had also already structured a series of resource areas across the landscape that were in the unique position, both literally and figuratively to create the means for trade transport.

If the continued sustainable land use style is considered, another possibility appears. Sustainability, despite the drawback to that word, creates a form of political ecology. The responsibility towards other-than-human-beings that I outlined in Chapter 2 indicates that the relationship with the land is a form of belonging. If the people are a part of the land and vice versa the relationship of continued ecological renewal creates both a physical and spiritual claim on the land. It is a form of placemaking that not only establishes a connection to place but *attaches meaning to the space* through enhancing a Anishinaabe-specific desirability (Gandy 2022; Sen and Nagendra 2019). Whether or not the placemaking was an intentional signal it is still evidence of a conceptual "claim" over the territory. The claim on the land and return to it is also present in the account of a Jesuit, who in the 1670s wrote "a part of the Outaouacs, who last summer separated from the rest, betook themselves to the Island called Ekaentouton, lying in the middle of the Lake of the Hurons, as to their former country." The description places this homeland in the St. Mary's River area (Thwaites 1610-1791:55:133). Despite the description of it as a "former" country, the same Jesuit goes on to describe a large spiritual rite occurring on a neighboring island (Thwaites 1610-1791:55:137). This continuity in use as a gathering place combined with the occupation of nearby Sault Ste. Marie provides additional support for the argument that the Drummond Island area retained a place within Anishinaabe existence. This interpretation is further evidenced by the continued practice of intentional forest management.

I mentioned in Chapter 1 that the Anishinaabe were the figurative key to the Mackinac region. Historians also note the strategic geography of the Anishinaabe (McDonnel 2015). Important communities like the one at Sault Ste. Marie could use their relative place in between the French and rival nations to maintain a better hold on their direct access to trade goods. In his memoirs, the intendant of New France, Du Chesneau claimed that the Odawa tried to intimidate other nations to prevent them from taking part in the fur trade (Cupid 2018; Brodhead 1853). Other sources like Father Allouez clearly Clearly there was incentive to maintain a connection to this area despite their temporary absence and the desire to restrict other nations from direct trade. Claiming responsibility for the land supports that goal.

In the models of political economy outlined in Chapter 6, I outline a few ways the Anishinaabe could have a landscape specific political economy/ecology. Holding this territory is one way to use a restrictive method of power creation. In mobilization models, redistributing goods generates what I am going to call political power. We have evidence from primary sources that this was an Anishinaabe motive. However, the question then becomes *whether the* Anishinaabe were able to continue their values related to reciprocity while taking part in the fur trade? The economic strategies of the Odawa clans in Lake Huron and the Straits primarily included non-ecological factors like their skills as warriors and expansive reciprocity networks. Their power through defensive systems was only strengthened by their gift giving to other Anishinaabe kin and creating prestige and storage of power in people. Giving of trade goods created a larger network with more incentive to follow the giver’s lead. The access to trade goods was not motivated by accumulation. It was Anishinnabe kinship politics and the power through gift giving and debt creation that provided a great source of self-determination. The continuity of the reciprocity system does not follow expected patterns of switching to capitalist style practices and moving towards exploitation. The use of their ecological resources and expanded potential travel range (via many opportunistic food procurement sites) only strengthened their ability to maintain sovereignty and avoid the shift towards capitalistic behavior.

One other element of the gift-giving and alliance making system of Michigan Natives, is their status as hosts. La Potherie may have been wrong about the Anishinaabe “frivolity about the future,” but his description of excessive food giving is an element that requires further thought. This description opens up the possibility of selective sharing. Giving (and receiving) is an essential aspect of alliance making and maintaining relationships. Their excessive sharing may not just be showing off in a display of “conspicuous consumption.” It could be a strategy to maximize giving potential in an encounter while restricting access to their most valuable goods. In an example of gift exchange in Japan, socially mandated gift -giving drove the obligation to give even with those who you were more socially distant. They developed a gift giving strategy based on consumable products (Daniels 2009). Gifts in this category could be fruit or washing detergent. The main point was that these items would disappear with use. Now, part of the incentive in the Japanese case study was to avoid clutter, but it recognized and theorized a form of relationship creation and renewal that avoided the mandate to provide economic gain to your recipient. Excessive food sharing could be a use of resource rich areas (not unlike the ritual feasting events hypothesized to occur in the Late Woodland) to maximize giving and the prestige that comes with it, while selectively passing on the more valuable beads or knives to their kin.

7.5 Discussion

The study of political units has highlighted that interdependence within a political system is interrelated with their environment (Hempel 1996). The most exciting aspect of this work is that the existence of a socio-ecological world as well as a socio-political world complicates the concept of "agency" or "power." Yes, political action creates change within an environment. One of the founding narratives of political ecology is environmental devastation after all (Svarstad 2018). It cannot be overlooked that environmental activity creates consequences within a political system. One of the challenges of this dissertation is navigating or avoiding the nature/culture duality. Returning to the word *Mtigwaakii,* "being among the trees," there exists the proper framing for this work and the nature of "power" (Wilhelm 2002). "Being" embodies the back-and-forth feedback loop of environment and agent. Using this mindset requires that we center all the factors of the fur trade world not just the trade goods. If we begin to unravel the environmental information, a different story emerges. The carefully crafted landscapes of the Odawa were a useful tool for:

1) *Facilitating the logistics of travel*
2) *Avoiding coercion through the spatial elements of the resource base*
3) *To claim the gateway to the west as a way to monopolize the flow of goods into the region.*

Returning to Champlain's berry references, it may remain a mystery whether a berry trade existed. There may be no evidence for using the Cloudman site as a grand berry trade hub, but if they did collect berries en masse, it could be for excessive sharing, not trade. Regardless, evidence is clear that some clans maintained a claim to this strategic island.

Finally, as an interesting answer to Jane Bennett ‘s (2010) query about the agency of non-human actors, the great plant covenant referenced in Chapter 2 implies that the land and other-than-human beings became players in an international system. The Cloudman site may have served the people’s socio-economic needs, but meanwhile the people continued to be good relatives to their plant kin. I cannot speak to whether they were good relatives to their human kin, but the plant beings kept their end of the covenant. They continued to support the human beings.

7.6 Future directions

First, the charcoals that could not be identified to genus level will need to be examined under higher resolution. Ideally a scanning electron microscope would be used to get a clean image of the intervessel pitting and other vessel elements that are under 50µm. These identifications will help differentiate some of the family level charcoal divisions. There also needs to be better species-specific identifications of diatoms from soil samples. The habit and tolerance of individual species provide proxies for past water quality (Charles 1985; Stone and Yost 2020). This in turn will allow a better understanding of plant competition in emergent marsh environments (Bansal et al. 2019). The goal would be determining the likelihood of intentional rice seeding in the past.

Additionally, a major drawback to this study is the inability to compare it with other sites in the region. Expanding the microfossil data sets from northern Michigan fur trade components will clarify if the observations at the Cloudman site are more widespread. While archaeologists always want more data, in this case the lack of detailed microfossil evidence and anthracological research prevents any meaningful regional comparison.

Finally, the question of wild rice use requires more investigation. First, the identification of that potential rice fragment needs to occur. Second, the continued evidence of wild rice use is intriguing, but the scale and intensity is not identifiable as of yet. In the future I hope to complete experimental wild rice research to differentiate between drying, parching or scorching, hulling, and winnowing (Yost et al. 2011, 2013). This work can complement the extensive morphological comparisons of wild rice phytoliths conducted by Clarence Surette (2009).

Chapter 8 – Epilogue

As Kuokkanen (2011) has suggested, research often fixates on the effects of capitalism on the environment. Koukkanen is critical of market system violence against Indigenous economies and claims that the relationship between indigenous economies and the environment needs exploration. This call to action is targeted at contemporary economics but touches on the potential utility of this study. The argument is that policy aimed at reducing poverty among Indigenous peoples has focused almost exclusively on wage labor and a market economy. However, scholars like Colleen O'Neill or Robin Wall Kimmerer highlight how Indigenous peoples are better served by alternatives that incorporate food production, environmental justice, and legal protections (Coté 2015; Kimmerer 2013; Normyle et al. 2022; O'Neill 2004).

Simultaneously, movement towards that possibility is growing in Michigan. Within the same territory as the Cloudman site, contemporary Anishinaabe people continue to fight for treaty rights and develop food sovereignty programs. The goal of food sovereignty is not just food security but a road to better health, and reconnecting with TEK (Indigenous Food Systems Network 2022). Examples of well-known food sovereignty projects include the 2013 Debweyendan Indigenous Gardens as part of the *Bemadizijig ogitiganiwaa* (People's Garden) a hub for community gardening of agricultural products like the three sisters complex, Ziibimijwang Farm for revitalizing indigenous food systems, and the Decolonizing Diet Project created by Dr. Martin Reinhardt. This latest project challenged people to adopt an Indigenous diet (Geist 2017).

Despite movement forward, the complicated legacy of American colonialism reared its ugly head when in 2022, an environmentalist group called the Coalition to Protect Michigan Resources (CPMR) decided to try to block the renegotiations of the 2000 Great Lakes Consent Decree (United States District Court Western District of Michigan Southern Division 2022). This decree is a part of two important legal structures that protect tribal harvesting and fishing rights in northern Michigan. The 2000 Great Lakes Consent Decree upholds the agreements outlined in the 1836 Treaty of Washington (Michigan Department of Natural Resources Fisheries Division and Law Enforcement Division [MDNR] 2021). This treaty was instrumental in the formation of Michigan as a state. Rights to continue to hunt, fish and collect were written into the legal document. However, generations of extractive colonialism all but erased the protections of the treaty. After years of legal battles, in 1985 the 2000 Great Lakes Consent Decree was developed as a co-management framework that includes five of the 12[12] federally recognized tribes in Michigan and Michigan's government.

Yet, the CPMR sued the state in an attempt to block renegotiations of the decree (Green 2022). Tony Radenjovich, the president of the CPMR claimed, "The State is not protecting the interests of our members who are conservationists, charter boat captains, boaters, paddlers and users of our Great Lakes." Furthermore, court documents expressed concern that the tribes and the state were moving forward in a way that "would harm their interests." To add insult to injury, the language from the court fillings in a Western Michigan federal court state that the "Intervenors believe that the Great Lakes fishery resources are threatened through abandonment of sound biological principles that we believe should guide decisions related to the fishery." What the misguided lawsuit failed to account for was that those practicing their treaty rights are

[12] At the time of this dissertation there are only 12 federally recognized tribes but there are a number of state-recognized communities that are in the process of seeking federal recognition.

still subject to regulation. Only, it is different regulations (MDNR 2021). Individual fishing permits and numbers are tracked by tribal bodies and these reports are overseen by the Chippewa Ottawa Resource Authority (CORA), the Intertribal management for the 1836 treaty. In an ironic twist, tribes are also the main instigators of ecological restoration and fishery health. The Sault Ste. Marie Tribe of Chippewa Indians has a walleye stocking program that to date has released 19 million walleye fingerlings throughout the Great Lakes and 2.1 million in 2022 alone (The Sault News, 13 July 2022). The Sault Tribe also has both an Inland Fish and Wildlife Department and a separate fisheries management program. Other tribes across the north provide their own fish hatcheries and research programs. Tribes are also working with state and federal services to manage resources. In the face of this evidence, it is hard to imagine how the CPMR came to their conclusion that Native anglers would threaten Great lakes fisheries.

The CPMR court case is only one example in an ongoing tension between two damaging stereotypes. One is the ecological Indian stereotype that sets up Indigenous people as “original environmentalists” while insisting on a definition of conservation that is entirely Western or the “Greedy" Indian stereotype which projects a capitalist mindset onto Indigenous people (McLaurin 2014). In the case of the lawsuit, the CPMR clearly operated under the assumption that the tribes would have no oversight and in the absence of oversight, would immediately consume all the resources. This accumulation mindset is still clearly an issue for public understanding of Indigenous food sovereignty.

The reason I am highlighting this modern case is that it ties back to the role of indigenous economies and access to the land. In a modern-day political ecology, it is clear that the environment is a theatre in the war for indigenous self-determination through their relationship with the land and the forces that attempt to control Indigenous peoples by limiting their access to not just resources, but also an aspect of their sense of self and "beingness" in the world.

At present, the evidence of wild rice and forest management may be able to play a role in food sovereignty movements. Drummond Island falls under the jurisdiction of The Sault Ste. Marie Tribe of Chippewa Indians. The Sault tribe's Natural Resources Department is currently undertaking a variety of research and restoration projects. Their work to better understand ecological responses to fire is currently focused on the reactions of ash trees to burning events. They also have a 2006 Memorandum of Understanding (MOU) with the United States Forest Service to undertake forest management together (Ishkode Project 2019). My data are also relevant to their coastal marsh restoration project in the St. Mary's River. Part of the project is focused on re-seeding wild rice beds that have since disappeared. In 2019, the project re-seeded areas of Munuscong Bay with plans to expand the work. Finally, the Sault tribe's Center for Cooperative Ecological Resilience (CCER) is a collaboration between the Sault Tribe Wildlife Program and the Applied Forest and Wildlife Ecology Laboratory at Michigan State University (MSU) This center is held together with an MOU. The goal of the center is to incorporate academic research and provide students with research opportunities (Sault Ste. Marie Tribe of Chippewa Indians Inland Fish and Wildlife Department 2020).

The results of my research reveal that environmental specific information from archaeological deposits can complement existing movements by tribal bodies. *Zizania* can be vulnerable to minor changes within their watershed. This sensitivity includes the natural progression of plant communities in the absence of disturbance. It can be seen from these data that increases in cattail or other emergent plants create different ecological conditions that may influence ecological competition with wild rice for the same environments. Contemporary studies are already recognizing the impact of invasive narrow leaf cattails on the range of wild rice stands. If further diatom and algae data can be made more robust through archaeological sampling, this may provide another avenue of research that can complement the work of ecologists (Bansal et al. 2019; Biesboer 2019; Pillsbury 2009). Understanding land-use patterns is vital to developing Future management strategies (Pillsbury and McGuire 2009) Thus, there is already a landscape of active research and engagement that this study is likely to support.

It may also be the case the prestige of archaeology can be an additional voice in the work to better educate the public. If the CPMR case provides nothing else, it is an example of the ongoing need for public outreach. But this hopeful message comes with a danger. Academia trying to insert itself rather than play a supportive role can inadvertently reinforce colonial power structures. Anthropology, but Western science in general, has had a habit of extracting Native knowledge to bolster their own pursuits and projects (Deloria 1969). Western scientists may even have good intentions, but choosing to take ownership over Indigenous knowledge can be harmful as well (Hurley et al 2017). So, what is the difference between this dissertation using indigenous knowledge to improve my work and exploitation? The answer to that question must ultimately fall to the reader of this research for there is no clear solution. I only hope the impact is a net positive for the continuity of traditional ecological relationships.

Appendices

Appendix A: Select Artifacts from Previous Excavations

State Number	Ceramic Pipe	Bone Artifact	Bone Bead
20CH6	1	2	
20DE4			
20CX18	2		
BkHn-3			1

	Copper Awl	Copper/Tube Bead	Copper Scrap	Copper Jewlery	Copper Point/Cone	Copper Effigy	Copper Knife
20CH6	5	1	6				1
20DE4	3	3	3		4	1	
20CX18		2	3	2	2		1
BkHn-3			3				

	Jesuit Item	Glass Beads	European Knife	Gun flint	Lead ball
20CH6	1 (Ring)	21	1	1	1
20DE4					
20CX18		4	2	4	
BkHn-3		3	1		

Appendix B: Timeline of Political Events

- **1600**
  - Overlapping Odawa and Huron territory
- **1603**
  - Champlain learns of the existence of Lake Superior
- **1608**
  - Champlain creates first post on St. Lawrence River
- **1621**
  - Champlain sends Etienne Brule to explore the north shore of Lake Huron
- **1650s**
  - Some Odawa doodem abandon their villages and move west
- **1670s**
  - Odawa and some Huron move back to the Straits of Mackinac, St. Mary's River area, and Manitoulin Island
- **1680**
  - Some Odawa moved their villages to St. Ignace and tensions between the Huron and Odawa grow
- **1681**
  - *Congé* system inaugurated
- **1695**
  - Alliance of the Huron-Petuns, Ottawas, and French. Odawa and Huron-Petun secret negotiations with the Five Nations
- **1698**
  - Temporary ban on trading
- **1701**
  - Great Peace of Montréal. During the conference Native Americans invited to settle in Detroit
- **1701**
  - Fort Pontchartrain du Détroit (Fort Detroit) is established and active
- **1708**
  - The Odawa were said to be on the north side of the straits, occupying an area with "poor soil."
- **1715**
  - Fort Michilimackinac established and active on the northern tip of the Lower Peninsula.
- **1760**
  - Britain wins over the territory

Appendix C: Vegetation Communities of Northern Michigan and Manitoulin Island

<u>Northern Hardwood Forest</u>

Graminoids

wavy hair grass (*Avenella flexuosa*)
long-awned wood grass (*Brachyelytrum aristosum*)
sedges (*Carex foenea*, *C. pensylvanica*, *C. siccata*, and others)
poverty grass (*Danthonia spicata*)
rough-leaved rice grass (*Oryzopsis asperifolia*)
rice grass (*Piptatherum pungens*)

Forbs

spreading dogbane (*Apocynum androsaemifolium*)
wild sarsaparilla (*Aralia nudicaulis*)
bluebell (*Campanula rotundifolia*)
fireweed (*Chamerion angustifolium*)
pink lady-slipper (*Cypripedium acaule*)
large-leaved aster (*Eurybia macrophylla*)
rattlesnake weed (*Hieracium venosum*)
twinflower (*Linnaea borealis*)
Canada mayflower (*Maianthemum canadense*)
cow-wheat (*Melampyrum lineare*)
partridge berry (*Mitchella repens*)
hairy goldenrod (*Solidago hispida*)
starflower (*Trientalis borealis*)

Ferns

bracken fern (*Pteridium aquilinum*)

Lichens

reindeer lichens (*Cladina mitis* and *C. rangiferina*)

Mosses

fork mosses (*Dicranum* spp.)
Hypnum mosses (*Hypnum* spp.)
big red stem moss (*Pleurozium schreberi*)

Shrubs

running serviceberry (*Amelanchier spicata*)
bearberry (*Arctostaphylos uva-ursi*)
pipsissewa (*Chimaphila umbellata*)
sweetfern (*Comptonia peregrina*)
bunchberry (*Cornus canadensis*)
bush honeysuckle (*Diervilla lonicera*)
trailing arbutus (*Epigaea repens*)
wintergreen (*Gaultheria procumbens*)
huckleberry (*Gaylussacia baccata*)
sand cherry (*Prunus pumila*)
northern dewberry (*Rubus flagellaris*)
prairie willow (*Salix humilis*)
low sweet blueberry (*Vaccinium angustifolium*)
Canada blueberry (*Vaccinium myrtilloides*)

Trees

balsam fir (*Abies balsamea*)
red maple (*Acer rubrum*)
paper birch (*Betula papyrifera*)
white spruce (*Picea glauca*)
black spruce (*Picea mariana*)
jack pine (*Pinus banksiana*)
red pine (*Pinus resinosa*)
white pine (*Pinus strobus*)
big-toothed aspen (*Populus grandidentata*)
trembling aspen (*Populus tremuloides*)
black cherry (*Prunus serotina*)
northern pin oak (*Quercus ellipsoidalis*)

<u>Boreal</u>

Graminoids

sedges (*Carex deweyana* and *C. eburnea*)
blue wild-rye (*Elymus glaucus*)
false melic (*Schizachne purpurascens*)

Forbs

red baneberry (*Actaea rubra*)
trail-plant (*Adenocaulon bicolor*)
wild sarsaparilla (*Aralia nudicaulis*)
calypso (*Calypso bulbosa*)
bluebead lily (*Clintonia borealis*)
goldthread (*Coptis trifolia*)
ram's head lady-slipper (*Cypripedium arietinum*)
large-leaved aster (*Eurybia macrophylla*)
fragrant bedstraw (*Galium triflorum*)
Menzie's rattlesnake plantain (*Goodyera oblongifolia*)
creeping rattlesnake plantain (*Goodyera repens*)
twinflower (*Linnaea borealis*)
Canada mayflower (*Maianthemum canadense*)
starry false Solomon-seal (*Maianthemum stellatum*)
false mayflower (*Maianthemum trifolium*)
partridge berry (*Mitchella repens*)
naked miterwort (*Mitella nuda*)
one-flowered pyrola (*Moneses uniflora*)
broad-leaved twayblade (*Neottia convallarioides*)
one-sided pyrola (*Orthilia secunda*)
northern wood-sorrel (*Oxalis acetosella*)
sweet-coltsfoot (*Petasites frigidus*)
gay-wings (*Polygala paucifolia*)
green shinleaf (*Pyrola chlorantha*)
lesser pyrola (*Pyrola minor*)
twisted-stalks (*Streptopus* spp.)
starflower (*Trientalis borealis*)

Ferns

wood ferns (*Dryopteris* spp.)
oak fern (*Gymnocarpium dryopteris*)
bracken fern (*Pteridium aquilinum*)

Fern Allies

ground-pines (*Dendrolycopodium dendroideum* and *D. obscurum*)
shining clubmoss (*Huperzia lucidula*)
running ground-pine (*Lycopodium clavatum*)
stiff clubmoss (*Spinulum annotinum*)

Lichens

usnea lichens (*Usnea* spp.)

Mosses

dicranum moss (*Dicranum montanum*)
stair step moss (*Hylocomium splendens*)
largetooth calcareous moss (*Mnium spinulosum*)
big red stem moss (*Pleurozium schreberi*)
oncophorus moss (*Oncophorus wahlenbergii*)
ostrich-plume moss (*Ptilium crista-castrensis*)
shaggy moss (*Rhytidiadelphus triquetrus*)

Shrubs

tag alder (*Alnus incana*)
mountain alder (*Alnus viridis*)
bearberry (*Arctostaphylos uva-ursi*)
bunchberry (*Cornus canadensis*)
round-leaved dogwood (*Cornus rugosa*)
bush honeysuckle (*Diervilla lonicera*)
wintergreen (*Gaultheria procumbens*)
common juniper (*Juniperus communis*)
Canadian fly honeysuckle (*Lonicera canadensis*)
prickly gooseberry (*Ribes cynosbati*)
skunk currant (*Ribes glandulosum*)
thimbleberry (*Rubus parviflorus*)

dwarf raspberry (*Rubus pubescens*)
soapberry (*Shepherdia canadensis*)
snowberry (*Symphoricarpos albus*)
Canada yew (*Taxus canadensis*)
tall bilberry (*Vaccinium membranaceum*)
Canada blueberry (*Vaccinium myrtilloides*)
oval-leaved bilberry (*Vaccinium ovalifolium*)

Trees

balsam fir (*Abies balsamea*)
striped maple (*Acer pensylvanicum*)
red maple (*Acer rubrum*)
mountain maple (*Acer spicatum*)
paper birch (*Betula papyrifera*)
white spruce (*Picea glauca*)
black spruce (*Picea mariana*)
jack pine (*Pinus banksiana*)
red pine (*Pinus resinosa*)
white pine (*Pinus strobus*)
balsam poplar (*Populus balsamifera*)
quaking aspen (*Populus tremuloides*)
American mountain-ash (*Sorbus americana*)
mountain-ash (*Sorbus decora*)
northern white-cedar (*Thuja occidentalis*)
hemlock (*Tsuga canadensis*)

Emergent and Submergent Wetland

Submergent Plants

coontail (*Ceratophyllum demersum*)
muskgrasses (*Chara* spp.)
common waterweed (*Elodea canadensis*)
water star-grass (*Heteranthera dubia*)
milfoils (*Myriophyllum* spp.)
naiads (*Najas flexilis*, and others)
stoneworts (*Nitella* spp.)
pondweeds (*Potamogeton* spp.)
submergent bulrush (*Schoenoplectus subterminalis*)

bladderworts (*Utricularia gibba*, *U. intermedia*, and *U. vulgaris*)
water-celery (*Vallisneria americana*)

Rooted Floating-leaved Plants

water-shield (*Brasenia schreberi*)
yellow pond-lilies (*Nuphar advena* and *N. variegata*)
sweet-scented waterlily (*Nymphaea odorata*)
large-leaved pondweed (*Potamogeton amplifolius*)
Illinois pondweed (*Potamogeton illinoensis*)

Non-rooted Floating Plants

small duckweed (*Lemna minor*)
star duckweed (*Lemna trisulca*)
red duckweed (*Lemna turionifera*)
great duckweed (*Spirodela polyrhiza*)
water meals (*Wolffia* spp.)

Emergent Plants

Graminoids

sedges (*Carex aquatilis*, *C. comosa*, *C. lacustris*, *C. lasiocarpa*, *C. oligosperma*, *C. stricta*, and others)
three-way sedge (*Dulichium arundinaceum*)
spike-rushes (*Eleocharis acicularis*, *E. elliptica*, *E. equisetoides*, *E. obtusa*, *E. palustris*, *E. quinqueflora*, and others)
manna grasses (*Glyceria borealis*, *G. canadensis*, and *G. striata*)
cut grass (*Leersia oryzoides*)
common reed (*Phragmites australis* subsp. *americanus*)
hardstem bulrush (*Schoenoplectus acutus*)
threesquare (*Schoenoplectus pungens*)
softstem bulrush (*Schoenoplectus tabernaemontani*)
wild rice (*Zizania aquatica*)
northern wild rice (*Zizania palustris*)

Forbs

water-plantain (*Alisma subcordatum* and *A. triviale*)

pipewort (*Eriocaulon aquaticum*)
smartweeds (*Persicaria amphibia*, *P. hydropiper*, *P. lapathifolia*, and others)
pickerel-weed (*Pontederia cordata*)
arrowheads (*Sagittaria graminea*, *S. latifolia*, and *S. rigida*)
bur-reeds (*Sparganium americanum*, *S. angustifolium*, *S. emersum*, *S. eurycarpum*, *S. fluctuans*, and *S. natans*)
broad-leaved cat-tail (*Typha latifolia*)

Ferns

marsh fern (*Thelypteris palustris*)

Bur Oak Plains

Graminoids

big bluestem (*Andropogon gerardii*)
blue-joint (*Calamagrostis canadensis*)
Bicknell's sedge (*Carex bicknellii*)
Leiberg's panic grass (*Dichanthelium leibergii*)
panic grass (*Dichanthelium oligosanthes*)
porcupine grass (*Hesperostipa spartea*)
switch grass (*Panicum virgatum*)
little bluestem (*Schizachyrium scoparium*)
Indian grass (*Sorghastrum nutans*)
cordgrass (*Spartina pectinata*)
prairie dropseed (*Sporobolus heterolepis*)

Forbs

hog-peanut (*Amphicarpaea bracteata*)
milkweeds (*Asclepias purpurascens*, *A. syriaca*, *A. tuberosa*, and *A. verticillata*)
white false indigo (*Baptisia lactea*)
false boneset (*Brickellia eupatorioides*)
prairie coreopsis (*Coreopsis palmata*)
tall coreopsis (*Coreopsis tripteris*)
showy tick-trefoil (*Desmodium canadense*)
prairie tick-trefoil (*Desmodium illinoense*)

rattlesnake-master (*Eryngium yuccifolium*)
flowering spurge (*Euphorbia corollata*)
wild strawberry (*Fragaria virginiana*)
American columbo (*Frasera caroliniensis*)
northern bedstraw (*Galium boreale*)
wild geranium (*Geranium maculatum*)
white gentian (*Gentiana alba*)
woodland sunflower (*Helianthus divaricatus*)
western sunflower (*Helianthus occidentalis*)
pale-leaved sunflower (*Helianthus strumosus*)
alum root (*Heuchera americana*)
tall lettuce (*Lactuca canadensis*)
veiny pea (*Lathyrus venosus*)
round-headed bush-clover (*Lespedeza capitata*)
hairy bush-clover (*Lespedeza hirta*)
hoary puccoon (*Lithospermum canescens*)
false spikenard (*Maianthemum racemosum*)
wild-bergamot (*Monarda fistulosa*)
prairie phlox (*Phlox pilosa*)
common mountain mint (*Pycnanthemum virginianum*)
early buttercup (*Ranunculus fascicularis*)
yellow coneflower (*Ratibida pinnata*)
black-eyed Susan (*Rudbeckia hirta*)
starry campion (*Silene stellata*)
rosin weed (*Silphium integrifolium*)
prairie dock (*Silphium terebinthinaceum*)
goldenrods (*Solidago caesia*, *S. juncea*, *S. nemoralis*, *S. rigida*, and *S. speciosa*)
asters (*Symphyotrichum laeve*, *S. oolentangiense*, and *S. pilosum*)
yellow pimpernel (*Taenidia integerrima*)
purple meadow-rue (*Thalictrum dasycarpum*)
common spiderwort (*Tradescantia ohiensis*)
horse-gentian (*Triosteum aurantiacum*)
feverwort (*Triosteum perfoliatum*)
Culver's root (*Veronicastrum virginicum*)
American vetch (*Vicia americana*)
pale vetch (*Vicia caroliniana*)
golden alexanders (*Zizia aurea*)
prairie violet (*Viola pedatifida*)

Woody Vines

Virginia creeper (*Parthenocissus quinquefolia*)
bristly greenbrier (*Smilax hispida*)
poison-ivy (*Toxicodendron radicans*)
summer grape (*Vitis aestivalis*)
riverbank grape (*Vitis riparia*)

Shrubs

leadplant (*Amorpha canescens*)
New Jersey tea (*Ceanothus americanus*)
gray dogwood (*Cornus foemina*)
American hazelnut (*Corylus americana*)
American plum (*Prunus americana*)
sumacs (*Rhus copallina*, *R. glabra*, and *R. typhina*)
pasture rose (*Rosa carolina*)
prairie willow (*Salix humilis*)

Trees

pignut hickory (*Carya glabra*)
shagbark hickory (*Carya ovata*)
white oak (*Quercus alba*)
bur oak (*Quercus macrocarpa*)
black oak (*Quercus velutina*)

Alvar

Graminoids

ticklegrass (*Agrostis scabra*)
big bluestem (*Andropogon gerardii*)
prairie brome (*Bromus kalmii*)
blue-joint (*Calamagrostis canadensis*)
Crawe's sedge (*Carex crawei*)
Richardson's sedge (*Carex richardsonii*)
bulrush sedge (*Carex scirpoidea*)
poverty grass (*Danthonia spicata*)

tufted hair grass (*Deschampsia cespitosa*)
flattened spike-rush (*Eleocharis compressa*)
golden-seeded spike-rush (*Eleocharis elliptica*)
mat muhly (*Muhlenbergia richardsonis*)
little bluestem (*Schizachyrium scoparium*)
cordgrass (*Spartina pectinata*)
prairie dropseed (*Sporobolus heterolepis*)

Forbs

small pussytoes (*Antennaria howellii*)
wild columbine (*Aquilegia canadensis*)
hairy rock cress (*Arabis pycnocarpa*)
harebell (*Campanula rotundifolia*)
Indian paintbrush (*Castilleja coccinea*)
field chickweed (*Cerastium arvense*)
Hill's thistle (*Cirsium hillii*)
limestone calamint (*Clinopodium arkansanum*)
bastard-toadflax (*Comandra umbellata*)
prairie cinquefoil (*Drymocallis arguta*)
wild strawberry (*Fragaria virginiana*)
Carolina crane's-bill (*Geranium carolinianum*)
prairie-smoke (*Geum triflorum*)
early saxifrage (*Micranthes virginiensis*)
rock sandwort (*Minuartia michauxii*)
wild bergamot (*Monarda fistulosa*)
balsam ragwort (*Packera paupercula*)
early buttercup (*Ranunculus fascicularis*)
small skullcap (*Scutellaria parvula*)
old-field goldenrod (*Solidago nemoralis*)
upland white goldenrod (*Solidago ptarmicoides*)

Lichens

reindeer lichens (*Cladina mitis* and *C. rangiferina*)
felt lichen (*Peltigera canina*)

Mosses

schistidium mosses (*Schistidium* spp.)
tortella moss (*Tortella* spp.)

Shrubs

serviceberries (*Amelanchier* spp.)
shrubby cinquefoil (*Dasiphora fruticosa*)
common juniper (*Juniperus communis*)
creeping juniper (*Juniperus horizontalis*)
sand cherry (*Prunus pumila*)
choke cherry (*Prunus virginiana*)
fragrant sumac (*Rhus aromatica*)
soapberry (*Shepherdia canadensis*)
snowberry (*Symphoricarpos albus*)

Trees

paper birch (*Betula papyrifera*)
white spruce (*Picea glauca*)
white pine (*Pinus strobus*)
quaking aspen (*Populus tremuloides*)
northern white-cedar (*Thuja occidentalis*)

Bibliography

Albert, Dennis A. 1995. “Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin: A Working Map and Classification.” U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station.

Allard, Amélie. 2016. “Communities on the Move: Practice and Mobility in the Late Eighteenth-Century Western Great Lakes Fur Trade.” Dissertation Department of Anthropology, Minneapolis: University of Minnesota.

———. 2018. “Communities, Survivance, and Acts of ‘Residence’ in the Late Eighteenth-Century Fur Trade in Minnesota.” *Midwest Archaeological Conference Inc. Occasional Papers*, no. 2: 67–86.

———. 2020. “Relationships and the Creation of Colonial Landscapes in the Eighteenth-Century Fur Trade.” *The American Indian Quarterly* 44 (2): 149–70.

Allard, Amélie, and Craig N. Cipolla. 2021. “Failure and Colonialism in the North American Fur Trade: The View from Riverine Assemblages.” *Historical Archaeology* 55 (1): 110–26.

Altman, Jon. 2002. “The Political Economy of a Treaty: Opportunities and Challenges for Enhancing Economic Development for Indigenous Australians.” *The Drawing Board: An Australian Review of Public Affairs* 3 (2): 17.

Ames, Kenneth M. 1995. “Chiefly Power and Household Production on the Northwest Coast.” In *Foundations of Social Inequality*, edited by T. Douglas Price and Gary M. Feinman, 155–87. Fundamental Issues in Archaeology. Boston, MA: Springer US.

Anderson, David. 1996. Fluctuations between Simple and Complex Chiefdoms. In *Political Structure and Change in the Prehistoric Southeastern United States*. edited by J. F. Scarry, 231-252. The Ripley P. Bullen Series, Florida Museum of Natural History, Gainesville: The University Press of Florida.

Anderson, Dean. 1992. “Documentary and Archaeological Perspectives on European Trade Goods in the Western Great Lakes Region.” Dissertation Department of Anthropology, Lansing: Michigan State University.

———. 2009. “The Flow of European Trade Goods into the Western Great Lakes Region, 1715-1760.” In *Rethinking the Fur Trade: Cultures of Exchange in an Atlantic World*, edited by Susan Sleeper-Smith, 385–410. Lincoln & London: University of Nebraska Press.

Angeler, David G., Craig R. Allen, Chris Barichievy, Tarsha Eason, Ahjond S. Garmestani, Nicholas A. J. Graham, Dean Granholm, et al. 2016. “Management Applications of Discontinuity Theory.” Edited by Joseph Bennett. *Journal of Applied Ecology* 53 (3): 688–98.

Anckar, Dag. 2007. "Archipelagos and Political Engineering: The Impact of Non-Contiguity on Devolution in Small States." *Island Studies Journal* 2(2): 193-208.

Arola, Adam. 2011. “Native American Philosophy.” In *The Oxford Handbook of World Philosophy*, edited by William Edelglass and Jay L. Garfield, 562–73. New York: Oxford University Press.

Ascough, Philippa L., Michael I. Bird, Andrew C. Scott, Margaret E. Collinson, Illit Cohen-Ofri, Colin E. Snape, and Katherine Le Manquais. 2010. “Charcoal Reflectance Measurements: Implications for Structural Characterization and Assessment of Diagenetic Alteration.” *Journal of Archaeological Science* 37 (7): 1590–99.

Asouti, E. 2003. “Wood Charcoal from Santorini (Thera): New Evidence for Climate, Vegetation and Timber Imports in the Aegean Bronze Age.” *Antiquity* 77 (297): 471–84.

Asouti, Eleni, and Phil Austin, 2005 “Reconstructing Woodland Vegetation and its Exploitation by Past Societies, based on the Analysis and Interpretation of Archaeological Wood Charcoal Macro-Remains.: *Environmental Archaeology* 10(1):1–18.

Badcock, Anna, and Robert Johnston. 2009. "Placemaking Through Protest: An Archaeology of the Lees Cross and Endcliffe Protest Camp, Derbyshire, England." *Archaeologies* 5(2): 306-322.

Bansal, Sheel, Shane C. Lishawa, Sue Newman, Brian A. Tangen, Douglas Wilcox, Dennis Albert, Michael J. Anteau, et al. 2019. “Typha (Cattail) Invasion in North American Wetlands: Biology, Regional Problems, Impacts, Ecosystem Services, and Management.” *Wetlands* 39 (4): 645–84.

Barnd, Natchee Blu. 2017 *Native Space: Geographic Strategies to Unsettle Settler Colonialism*. Oregon State University Press, Corvallis.

Battarbee, Richard W., Vivienne J. Jones, Roger J. Flower, Nigel G. Cameron, Helen Bennion, Laurence Carvalho, and Stephen Juggins. 2001. *Diatoms*. Netherlands: Springer.

Bauer, Andrew M. 2010. "Socializing Environments and Ecologizing Politics: Social Differentiation and the Production of Nature in Iron Age Northern Karnataka." PhD Dissertation, Department of Anthropology. Chicago: The University of Chicago.

Beaudry, Mary, and Travis G. Parno. 2013. “Introduction: Mobilities in Contemporary and Historical Archaeology.” In *Archaeologies of Mobility and Movement*, edited by Mary Beaudry and Travis G. Parno. New York: Springer.

Beck, Robin, 2013. Chiefdoms, Collapse, and Coalescence in the Early American South. New York: Cambridge University Press.

Beck, Robin A., Gayle J. Fritz, Heather A. Lapham, David G. Moore, and Christopher B. Rodning. 2016. “The Politics of Provisioning: Food and Gender at Fort San Juan De Joara, 1566–1568.” *American Antiquity* 81 (1): 3–26.

Bellfy, Phil. 2011. *Three Fires Unity: The Anishnaabeg of the Lake Huron Borderlands*. Lincoln: University of Nebraska Press.

Bennett, Jane. 2010. "Political Ecologies." In *Vibrant Matter: A Political Ecology of Things*. Durham and London: Duke University Press.

Berndtson, Arthur. 1970. "The Meaning of Power." *Philosophy and Phenomenological Research* 31 (1): 73–84.

Berthelette, Scott. 2016. "'Frères et Enfants Du Même Père': The French Illusion of Empire West of the Great Lakes, 1731–1743." *Early American Studies: An Interdisciplinary Journal* 14 (1): 174–98.

Biersack, Aletta. 2006 "3 Reimagining Political Ecology: Culture/Power/History/Nature". *Reimagining Political Ecology*, edited by Aletta Biersack, James B. Greenberg, Arturo Escobar and Dianne Rocheleau, New York, USA: Duke University Press.

Biesboer, David Dean. 2019. "The Ecology and Conservation of Wild Rice, Zizania Palustris L., in North America." Acta Limnologica Brasiliensia 31: e102

Biggar, Henry Percival, trans. 1937. *The Works of Samuel de Champlain*, 6 Vols. Toronto: Champlain Society.

Black, Mary B. 1977. "Ojibwa Taxonomy and Percept Ambiguity." *Ethos* 5(1): 90-118.

Blackbird, Andrew J. 2012 [1887]. *History of the Ottawa and Chippewa Indians of Michigan.* Petoskey: Little Traverse Regional Historical Society.

Blaikie, Piers, and Harold Brookfield. 1987. "Foreward/Preface/Introduction To." In *Land Degradation and Society*, 222. London: Routledge.

Blair, E. 1911 eds. *Indian Tribes of the Upper Mississippi Valley and the Region of the Great Lakes*. Cleveland: Clark.

Bohaker, Heidi. 2020. *Doodem and Council Fire: Anishinaabe Governance through Alliance*. Toronto: University of Toronto Press.

Boyd, M., Surette, C., Lints, A, and Hamilton, S. 2014. "Wild Rice (Zizania spp.) the Three Sisters, and the Woodland Tradition in Western and Central Canada." *Midwest Archaeological Conference Inc. Occasional Papers* 1: 7-32.

Braadbaart, F., and I. Poole. 2008. "Morphological, Chemical and Physical Changes during Charcoalification of Wood and Its Relevance to Archaeological Contexts." *Journal of Archaeological Science* 35 (9): 2434–45.

Brandão, José António, ed. 2019. *Mémoires of Michilimackinac and the Pays d'en Haut: Indians and French in the Upper Great Lakes at the Turn of the Eighteenth Century*. East Lansing: Mackinac Island: Michigan State University Press; Mackinac Island State Park Commission.

Brandt, J.P., M.D. Flannigan, D.G. Maynard, I.D. Thompson, and W.J.A. Volney. 2013. "An Introduction to Canada's Boreal Zone: Ecosystem Processes, Health, Sustainability, and Environmental Issues." *Environmental Reviews* 21 (4): 207–26.

Branstner, Susan M. 1991 "Decision-making Processes in a Culture Contact Context: The Case of the Tionontate Huron of the Upper Great Lakes". PhD dissertation, Department of Anthropology, Michigan State University, Lansing.

Branstner, Christine. 1995. "Archaeological Investigations at the Cloudman Site (20CH6): A Multicomponent Native American Occupation on Drummond Island, Michigan 1992 and 1994 Excavations." Consortium of Archaeological Research. Copies available from Michigan State University.

Brose, Patrick H. 2010. "Long-term Effects of Single Prescribed Fires on Hardwood Regeneration in Oak Shelterwood Stands." *Forest Ecology and Management* 260(9): 1516-1524.

Brose, David S. 1968 "The Archaeology of Summer Island: Changing Settlement Systems in Northern Lake Michigan". PhD dissertation, Department of Anthropology, University of Michigan, Ann Arbor. ProQuest (ATT 6902293).

———. 1970. Summer Island III: An Early Historic Site in the Upper Great Lakes. *Historical Archaeology* 4(1):3–33.

Brose, David and M. J. Hambacher. 1999. "The Middle Woodland in Northern Michigan." In Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State, edited by J. R. Halsey. Cranbrook Institute of Science, Bloomfield Hills: Bulletin 64: 173-192.

Brodhead, John. 1853. "M. Du Chesneau's Memoir on the Western Indians, &c." In *New-York Colonial Manuscripts, Paris Documents: II*, 9:160–66. Albany, N.Y: Weed, Parsons and Co. https://archive.org/details/documentsrelativ09brod/page/160/mode/2up.

Brown, James A. 2004. "Michilimackinac Archaeology and the Organization of Trade at a Distance." In *An Upper Great Lakes Archaeological Odyssey: Essays in Honor of Charles E. Cleland*, edited by William A. Lovis, 150–82. Detroit: Wayne State University Press.

Burchsted, Denise, Melinda Daniels, Robert Thorson, and Jason Vokoun. 2010. "The River Discontinuum: Applying Beaver Modifications to Baseline Conditions for Restoration of Forested Headwaters." *BioScience* 60 (11): 908–22.

Burley, David V. 1981. "Proto-Historic Ecological Effects of the Fur Trade on Micmac Culture in Northeastern New Brunswick." *Ethnohistory* 28 (3): 203.

Byrne, Chae, Emilie Dotte-Sarout, and Vicky Winton. 2013. “Charcoals as Indicators of Ancient Tree and Fuel Strategies: An Application of Anthracology in the Australian Midwest.” *Australian Archaeology* 77 (1): 14.

Cajete, Gregory. 2000. *Native Science: Natural Laws of Interdependence*. Santa Fe: Clear Light Publishers.

Campanella, Richard. 2013. “Geography of a Food, or Georgraphy of a Word? The Curious Cultural Diffusion of ‘Sagamité.’” *Louisiana History: The Journal of the Louisiana Historical Association* 54 (4): 465–76.

Canham, Charles D., and Orie L. Loucks. 1984. “Catastrophic Windthrow in the Presettlement Forests of Wisconsin.” *Ecology* 65 (3): 803–9.

Catling, Paul M., and Vivian R. Brownell. 1995. "A Review of the Alvars of the Great Lakes Region: Distribution, Floristic Composition, Biogeography and Protection." *Canadian Field-Naturalist* 109(2): 143-171.

“Center for Cooperative Ecological Resilience.” 2020. Sault Ste. Marie Tribe of Chippewa Indians Inland Fish and Wildlife Department. (Accessed Feb 2, 2020). https://www.saulttribe.com/membership-services/natural-resources/inland-fish-wildlife-department.

Chaput, Michelle A., and Konrad Gajewski. 2018. “Relative Pollen Productivity Estimates and Changes in Holocene Vegetation Cover in the Deciduous Forest of Southeastern Quebec, Canada.” *Botany* 96 (5): 299–317.

Charles, Donald F. 1985. “Relationships between Surface Sediment Diatom Assemblages and Lakewater Characteristics in Adirondack Lakes: Ecological Archives E066-004.” *Ecology* 66 (3): 994–1011.

Chief Fred Ettawageshik oral history of the “Creation of Mackinac Island by Nanabojo,” Recorded by Jane Willets 1947. *American Philosophical Society*. Recording. https://diglib.amphilsoc.org/islandora/object/audio:9070

Claridge, Andrew, James Trappe, and Debbie Claridge. 2009. “Diversity and Habitat Relationships of Hypogeous Fungi. III. Factors Influencing the Occurrence of Fire-Adapted Species.” *Mycological Research* 113 (Pt 6-7): 792–801.

Clark, James A., Mark Hendriks, Thomas J. Timmermans, Clavin Struck, and Kenneth J. Hilverda. 1994. “Glacial Isostatic Deformation of the Great Lakes Region.” *GSA Bulletin* 106 (1): 19–31.

Cleland, Charles E. 1966. *Prehistoric Animal Ecology and Ethnozoology of the Upper Great Lakes Region*. Ann Arbor: University of Michigan, Mus. of Anthro. No. 29.

———. 1970. “Comparison of the Faunal Remains from French and British Refuse Pits at Fort Michilimackinac: A Study in Changing Subsistence Patterns.” In *Canadian Historic Sites*. Occasional Papers in Archaeology and History 3:7-23. National Historic Sites Service, Department of Indian Affairs and Northern Development, Ottawa.

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

———. 1985. “Naub-Cow-Zo-Win Discs and Some Observations on the Origin and Development of Ojibwa Iconography.” *Arctic Anthropology* 22: 131–40.

———. 1992. *Rites of Conquest*. Ann Arbor: University of Michigan Press.

Cleland, Charles E, Richard D Clute, and Robert E Haitiner. 1984. “Naub-Cow-Zo-Win Discs From Northern Michigan.” *Midcontinental Journal of Archaeology* 9: 235–49.

Clifton, James A. 1977. *The Prairie People: Continuity and Change in Potawatomi Indian Culture, 1665-1965*. Iowa City: University of Iowa Press.

Cobb, Charles R. 1993a. “Archaeological Approaches to the Political Economy of Nonstratified Societies.” *Archaeological Method and Theory* 5: 43–100.

Cohen, Joshua G., Bradford S. Slaughter, Michael A. Kost, and Dennis A. Albert. 2015. *A Field Guide to the Natural Communities of Michigan*. East Lansing, Michigan: Michigan State Univiversity Press.

Cohen, Kenneth. 2002. “A Mutually Comprehensible World? Native Americans, Europeans, and Play in Eighteenth-Century America.” *American Indian Quarterly* 26 (1): 67–93.

Comaroff, John, and Jean Comaroff. 1992. *Ethnography and the Historical Imagination*. Boulder: Westview Press.

Conway, Thor. 1975. “Manitoulin Survey.” Ontario: Ministry of Culture and Recreation. On file at Ministry of Citizenship and Culture.

———. 1987. “The Providence Bay Site - An Ottawa Village on Manitoulin Island.” Ontario: On file at Ministry of Citizenship and Culture.

Cooper, Janet.1996. “Cloudman Site (20CH6), Drummond Island, Michigan, Features 26 and 27, 1992 Excavations.” On file at the Consortium for Archaeological Research, Department of Anthropology, Lansing: Michigan State University.

Cooper, Frederick. 2005. *Colonialism in Question: Theory, Knowledge, History*. Berkeley: University of California Press.

Cordova, V. F. 2007. *How It Is : The Native American Philosophy of V.F. Cordova*. Edited by Kathleen Dean Moore, Kurt Peters, Ted Jojola, and Amber Lacy. Tucson: University of Arizona Press.

Coté, Charlotte. 2016. "'Indigenizing' Food Sovereignty. Revitalizing Indigenous Food Practices and Ecological Knowledges in Canada and the United States." *Humanities* 5 (3): 57.

Crabtree, Pam J. 1990. "Zooarchaeology and Complex Societies: Some Uses of Faunal Analysis for the Study of Trade, Social Status, and Ethnicity." *Archaeological Method and Theory* 2:155–205.

Creese, John L. 2018. "Place-Making in Canadian Archaeology." *Canadian Journal of Archaeology / Journal Canadien d'Archéologie* 42(1): 46–56.

Crew, Peter, and Tim Mighall. 2013. "The Fuel Supply and Woodland Management at a 14th Century Bloomery in Snowdonia: A Multi-disciplinary Approach." Edited by J Humphris and T Rehren. *The world of iron,* Proceedings of a Conference at the Natural History Museum 2009. London: Archetype: 473-482.

Crowther, Alison. 2012. "The differential survival of native starch during cooking and implications for archaeological analyses: a review." *Archaeological and Anthropological Sciences* 4(3):221-235.

Cuéllar, Andrea M. 2013. "The Archaeology of Food and Social Inequality in the Andes." *Journal of Archaeological Research* 21 (2): 123–74.

Cupid, Nathan A. 2018. "New France and the Illicit Fur Trade, 1663-1740." Master of Arts, Department of History, Saskatoon: University of Saskatchewan.

D'Aigremont, François Clairambault, *1708 Report*. Michigan Pioneer and Historical Collections, Lansing 40:424–52.

Dastrup, R. Adam. 2020. "Köppen Classification System." In *Physical Geography and Natural Disasters*, 875–85.

Davidson-Hunt, Iain, and Fikret Berkes. 2003. "Learning as You Journey: Anishinaabe Perception of Social-Ecological Environments and Adaptive Learning." *Conservation and Ecology* 8 (1).

Davidson-Hunt, Iain J., Phyllis Jack, Edward Mandamin, and Brennan Wapioke. 2005. "Iskatewizaagegan (Shoal Lake) Plant Knowledge: An Anishinaabe (Ojibway) Ethnobotany of Northwestern Ontario." *Journal of Ethnobiology* 25 (2): 189–227.

Davis, Margaret Bryan, Linda B. Brubaker, and Jane M. Beiswenger. 1971. "Pollen Grains in Lake Sediments: Pollen Percentages in Surface Sediments from Southern Michigan1." *Quaternary Research* 1(4): 450-467.

Dawson, Andria, Christopher J Paciorek, Jason S McLachlan, John W Williams, and Stephen T Jackson. 2016.“Quantifying Pollen-Vegetation Relationships to Reconstruct Ancient Forests Using 19th-Century Forest Composition and Pollen Data.”

DeJong, Theodore M. 1975. "A Comparison of Three Diversity Indices Based on Their Components of Richness and Evenness." *Oikos 26(2)*: 222-227.

Deloria, Vine J. 1969. *Custer died for your sins*. New York, Norman: University of Oklahoma Press.

Densmore, Frances. 1974. *How Indians Use Wild Plants for Food, Medicine and Crafts*. Dover Publications, Incorporated, New York. Originally published 1926/1927 (Uses of Plants by the Chippewa Indians), Bureau of American Ethnology, Smithsonian Institution, Washington, D.C

Denys, Luc. 1992. “On the Significance of Marine Diatoms in Freshwater Deposits at Archaeological Sites.” *Diatom Research* 7 (1): 195–97.

Department of Agriculture Natural Resources Conservation Service. *U.S. Department of Agriculture*. Accessed September 21, 2021. https://www.nrcs.usda.gov/

De Vareilles, Anne, Ruth Pelling, Jessie Woodbridge, and Ralph Fyfe. 2021. "Archaeology and Agriculture: Plants, People, and Past Land-use." *Trends in Ecology & Evolution* 36(10): 943-954.

Dice, Lee R. 1938. “The Canadian Biotic Province with Special Reference to the Mammals.” *Ecology* 19 (4): 503–14.

Dickmann, Donald I., and Larry A. Leefers. 2016. *The Forests of Michigan*. AnnArbor: University of Michigan Press.

Diver, Sibyl, Mehana Vaughan, Merrill Baker-Médard, and Heather Lukacs. 2019. “Recognizing ‘Reciprocal Relations’ to Restore Community Access to Land and Water.” *International Journal of the Commons* 13 (1): 400.

Dove, M. 1993. “A Revisionist View of Tropical Deforestation and Development. *Environmental Conservation* 20(1), 17-24.

Drake, M. and S. Dunham. 2007. *2005 Cultural Resource Surveys: Hiawatha National Forest.* Commonwealth Cultural Resources Group, Inc., Jackson, Michigan.

Du Chesneau M. to M. de Seignelay, *November 14, 1679. Letter*. From New York Colonial Manuscripts, Paris Documents II:138. https://play.google.com/books/reader (Accessed December 14, 2022).

Dunham, Sean B. 2000. “Cache Pits: Ethnohistory, Archaeology, and The Continuity of Tradition.” In *Interpretations of Native North American Life: Material Contributions to Ethnohistory*, edited by Michael Nassaney and Eric Johnson, 225–60. Gainesville: University of Florida Press.

———. 2008. “Wild Rice in the Eastern Upper Peninsula: A Review of the Evidence.” *Annual Meetings of the Michigan Academy of Science, Arts & Letters*, 28.

———. 2009. “Nuts about Acorns: A Pilot Study on Acorn Use in Woodland Period Subsistence in the Eastern Upper Peninsula of Michigan.” *The Wisconsin Archeologist* 90 (1): 17.

———. 2014. “Late Woodland Settlement and Subsistence in the Eastern Upper Peninsula of Michigan.” PhD Dissertation Department of Anthropology, Lansing: Michigan State University.

Dunlap, Alexander, and Jostein Jakobsen. 2020. *The Violent Technologies of Extraction: Political Ecology, Critical Agrarian Studies and the Capitalist Worldeater*. Cham: Palgrave Macmillan.

Dunnigan, James Cain. 2020. “Those Beyond the Walls: An Archaeological Examination of Michilimackinac’s Extramural Domestic Settlement, 1760-1781.” Master of Arts, Kalamazoo: Western Michigan University.

Earle, Timothy K. 1987. “Chiefdoms in Archaeological and Ethnohistorical Perspective.” *Annual Review of Anthropology* 16 (1): 279–308.

“Eastern Upper Peninsula Regional State Forest Management Plan MA 10 Drummond Island.” n.d. Michigan Department of Natural Resources.

Eccles, W. J. 1983. “The Fur Trade and Eighteenth-Century Imperialism.” *The William and Mary Quarterly* 40 (3): 341–62.

Egerton, Frank N. 2018. “History of Ecological Sciences, Part 60: American Great Lakes before 2000.” *The Bulletin of the Ecological Society of America* 99 (1): 77–136.

Ehrhardt, Kathleen L., and Kelly. 2018. “Revisiting Dumaw Creek.” *Midwest Archaeological Conference Inc. Occasional Papers*, no. 2: 19–32.

Engels, Friedrich, 1940 [1883]. *Dialectics of Nature*. Translated by C.P. Dutt, J. B. S. Haldane. 1st ed. New York: International Publishers.

Ensor, Bradley E., Marisa O. Ensor, and Gregory W. De Vries. 2003. “Hohokam Political Ecology and Vulnerability: Comments on Waters and Ravesloot.” *American Antiquity* 68 (1): 169–81.

Erdrich, Louise. 2003. *Books and Islands in Ojibwe Country: Traveling Through the Land of My Ancestors*. National Geographic Society.

Fahrig, Lenore. 2020. “Why Do Several Small Patches Hold More Species than Few Large Patches?” Edited by David Storch. *Global Ecology and Biogeography* 29 (4): 615–28.

Feiss, Thomas, Hélène Horen, Boris Brasseur, Jonathan Lenoir, Jérôme Buridant, and Guillaume Decocq. 2017. “Optimal Sampling Design and Minimal Effort for Soil Charcoal Analyses Considering the Soil Type and Forest History.” *Vegetation History and Archaeobotany* 26 (6): 627–37.

Ferris, Neal. 2009 *The Archaeology of Native-Lived Colonialism: Challenging History in the Great Lakes.* The University of Arizona Press, Tucson.

———. 2014 *Being Iroquoian, Being Iroquois: A Thousand-year Heritage of Becoming*. In Rethinking Colonial Pasts Through Archaeology, edited by Neal Ferris, Rodney Harrison, and Michael Vincent Wilcox, pp. 371–396. Oxford University Press.

Fidelis, Alessandra, and Heloiza L. Zirondi. 2021. “And After Fire, the Cerrado Flowers: A Review of Post-Fire Flowering in a Tropical Savanna.” *Flora* 280: 151849.

Fine, Ben. 1994. “Towards a Political Economy of Food.” *Review of International Political Economy* 1 (3): 519–45.

Fischer, Julian B., Laura H. McArthur, and James B. Petersen. 1997 “Continuity and change in the food habits of the seventeenth-century English colonists in Plymouth and Massachusetts Bay.” *Ecology of Food and Nutrition* 36(1):65–93.

Fitting, James. 1969. “Great Lakes Region Settlement Analysis.” *Southwestern Journal of Anthropology* 25 (4): 360–77.

Fitzpatrick, Scott M. 2004. *Voyages of Discovery: The Archaeology of Islands*. Westport: Greenwood Publishing Group.

Fitzpatrick, Scott M., and Jon M. Erlandson. 2018. “Island Archaeology, Model Systems, the Anthropocene, and How the Past Informs the Future.” *The Journal of Island and Coastal Archaeology* 13 (2): 283–99.

Ford, Richard. 1979. “Paleoethnobotany in American Archaeology.” In *Advances in Archaeological Method and Theory*, 2:285–336. Academic Press, Inc.

Foucault, Michel. 1980. *Power/Knowledge: Selected Interviews and Other Writings, 1972-1977*. Edited by Colin Gordon. Brighton, Sussex: Harvester Press.

Fox, William A. 1990. “The Odawa.” In *The Archaeology of Southern Ontario to A.D. 1650*, edited by Chris Ellis and Neal Ferris. Occasional Publication of the London Chapter 5. London: Ontario Archaeological Society Inc.

Fox, William A, and Charles Garrad. 2004. “Hurons in an Algonquian Land.” *Ontario Archaeology* 77 (78): 121–34.

Franzen, John. 1974 *An Archaeological Survey of Chippewa County, Michigan*. Michigan History Division, Michigan Department of State.
———. 1975 "An Archaeological Survey of Chippewa County, Michigan." Lansing. Michigan Department of State, Archaeological Survey Reports, Number 5. Lansing: Michigan History Division.

Franzen, John G., Terrance J. Martin, and Eric C. Drake. 2018. "Sucreries and Ziizbaakdokaanan: Racialization, Indigenous Creolization, and the Archaeology of Maple-Sugar Camps in Northern Michigan." *Historical Archaeology* 52 (1): 164–96.

Frederick, Kathryn. 2019. "Storage, Decision-Making, and Risk Management in Non-Sedentary Societies." PhD dissertation, Department of Anthropology, Lansing: Michigan State University.

Gagnon, Valoree S., Chelsea Schelly, William Lytle, Andrew Kliskey, Virginia H. Dale, Anna-Maria Marshall, Luis F. Rodriguez, et al. 2022. "Enacting Boundaries or Building Bridges? Language and Engagement in Food-Energy-Water Systems Science." *Socio-Ecological Practice Research* 4 (2): 131–48.

Gandy, Matthew. 2022. "Urban Political Ecology: A Critical Reconfiguration." *Progress in Human Geography* 46 (1): 21–43.

Gardener, Mark. n.d. "Shannon diversity t-test calculator.xlsx." Accessed September 4, 2022. https://www.dataanalytics.org.uk/comparing-diversity/

García-Granero, Juan José, Carla Lancelotti, and Marco Madella. 2015. "A Tale of Multi-Proxies: Integrating Macro- and Microbotanical Remains to Understand Subsistence Strategies." *Vegetation History and Archaeobotany* 24 (1): 121–33.

Geist, Mary Ellen. 2017. "Eating the Great Lakes: The Decolonizing Diet Project." *Great Lakes Now*, November 14, 2017. https://www.greatlakesnow.org/2017/11/eating-great-lakes-decolonizing-diet/.

Gelabert, Llorenç Picornell, 2011. "People, Trees and Charcoal: Some Reflections about the Use of Ethnoarchaeology in Archaeological Charcoal Analysis." 5th International Meeting of Charcoal Analysis; The Charcoal as Cultural and Biological Heritage, 185–86.

Geniusz, Wendy Djinn. 2006. "Decolonizing Botanical Anishinaabe Knowledge: A Biskaabiiyang Approach." PhD Dissertation, Minneapolis: University of Minnesota.

GEODIODE. "Koppen Climate Classification: Dsa Dsb Dfa Dfb Dwa Dwb." Accessed August 3, 2022. https://geodiode.com/climate/continental

Gilmore, Janet C. 2004. "Sagamité and Booya: French Influence in Defining Great Lakes Culinary Heritage," 12.

Gosden, Chris. 2004. *Archaeology and Colonialism: Cultural Contact from 5000 B.C. to the Present*. Cambridge: Cambridge University Press.

Graesch, Anthony P., Tianna DiMare, Gregson Schachner, David M. Schaepe, and John Dallen. 2014. “"Thermally modified rock: The experimental study of “fire-cracked” byproducts of hot rock cooking." *North American Archaeologist* 35(2): 167-200.

Green, Nick. 2022. “Angling, Conservation Organizations File Motion to Intervene in Ongoing Consent Decree.” *Michigan United Conservation Clubs* (blog). July 13, 2022.

Gross, Konrad. 1990. “Coureur-De-Bois, Voyageurs, & Trappers:The Fur Trade and the Emergence of an Ignored Canadian Literary Tradition.” *Canadian Literature*, no. 127: 76–91.

Grover, Linda LeGarde. 2017. *Onigamiising: Seasons of an Ojibwe Year*. Minneapolis: University of Minnesota Press.

Gueno, Michael Paul. 2004. “Baptism and Humanity: Native American-Jesuit Relationships in New France.” Master of Arts, Department of Religion, Tallahassee: Florida State University.

Guinness World Records Limited. 2022. Accessed September 12, 2022. Https://Www.Guinnessworldrecords.Com/World-Records/497930-Largest-Island-in-a-Lake-on-an-Island-in-a-Lake.

Hallowell, A. Irving. 1966. "The Role of Dreams in Ojibwa Culture." In *The Dream and Human Societies*. Edited by G. E. Von Grunebaum, Roger Caillois. University of Los Angeles, Near Eastern Center: 267- 292.

Halstead, Paul, and John O’Shea. 1989. "Introduction: Cultural Responses to Risk and Uncertainty." In *Bad Year Economics: Cultural Responses to Risk and Uncertainty*: Edited by Paul Halstead and John O’Shea: 1-7.

Hambacher, Michael J., and Randall J. Schaetzl. 2021. “A Case Study of Cache Pit Construction, Use, and Abandonment from the Upper Great Lakes, USA.” *Journal of Field Archaeology* 46 (4): 223–38.

Hannah, Peter R. 1988."The Shelterwood Method in Northeastern Forest Types: A Literature Review." *Northern Journal of applied forestry* 5(1): 70-77.

Hartigan, John. 2020. “Power.” In *Anthropocene Unseen: A Lexicon*, edited by Cymene Howe and Anand Pandian. Santa Barbara: Punctum Books.

Hastorf, Christine A., and Sissel Johannessen. 1993. “Pre-Hispanic Political Change and the Role of Maize in the Central Andes of Peru.” *American Anthropologist* 95 (1): 115–38.

Heidenreich, Conrad, and Arthur Ray. 1976. *The Early Fur Trades: A Study in Cultural Interaction*. Toronto: McClelland and Stewart Limited.

Hempel, L.C. 1996. *Environmental Governance: The Global Challenge*. Washington, DC: Island Press.

Hendon, Julia A. 1996. "Archaeological Approaches to the Organization of Domestic Labor: Household Practice and Domestic Relations." *Annual Review of Anthropology* 25 (1): 45–61.

Henry, Auréade, and Isabelle Théry-Parisot. 2014. "From Evenk Campfires to Prehistoric Hearths: Charcoal Analysis as a Tool for Identifying the Use of Rotten Wood as Fuel." *Journal of Archaeological Science* 52: 321-336.

Herron, Scott. 2002 "Ethnobotany of the Anishinaabek Northern Great Lakes Indians." PhD dissertation, Department of Plant Biology, Southern Illinois University, Carbondale.
———. 2009. "Human History." Nadelhoffer, Knute J., Alan J. Hogg, and Brian A. Hazlett, eds. In *The Changing Environment of Northern Michigan: A Century of Science and Nature at the University of Michigan Biological Station*. Ann Abor: University of Michigan Press, 2010.

Hilmers, Torben, Nicolas Friess, Claus Bässler, Marco Heurich, Roland Brandl, Hans Pretzsch, Rupert Seidl, and Jörg Müller. 2018. "Biodiversity along Temperate Forest Succession." Edited by Nathalie Butt. *Journal of Applied Ecology* 55 (6): 2756–66.

Hinsdale, Wilbert B. 1931. *Archaeological Atlas of Michigan.* Ann Arbor: University of Michigan Press.

Hirth, Kenneth G. 1996. "Political Economy and Archaeology: Perspectives on Exchange and Production." *Journal of Archaeological Research* 4 (3): 203–39.

Holman, Margaret. 1978. "The Settlement System of the Mackinac Phase." Dissertation Department of Anthropology, Lansing: Michigan State University.
———. 1984. "The Identification of Late Woodland Maple Sugaring Sites in the Upper Great Lakes." *Midcontinental Journal of Archaeology* 9 (1): 63–89.

Holzkamm, Tim E., Victor P. Lytwyn, and Leo G. Waisberg. 1988 "Rainy River Sturgeon: An Ojibway Resource in the Fur Trade Economy." *The Canadian Geographer/Le Géographe canadien* 32(3):194–205.

Houghton, David C., Lily G. Erickson, Robert C. Kintz, Kaitlyn L. Rowland, Nathaniel C. Gipe, and Charles Adams. 2022. "The Distinctive Plant and Insect Assemblages of An Experimental Forest in Northern Lower Michigan (United States)." *Environmental Entomology* 51(4): 716–727.

Howard, James H. 1960. “When They Worship the Underwater Panther: A Prairie Potawatomi Bundle Ceremony.” *Southwestern Journal of Anthropology* 16 (2): 217–24.

Howey, Meghan C.L., Michael Palace, Crystal H. McMichael, and Bobby Braswell. 2014. “Moderate-Resolution Remote Sensing and Geospatial Analyses of Microclimates, Mounds, and Maize in the Northern Great Lakes.” *Advances in Archaeological Practice* 2 (3): 195–207.

Hughes, Ryan, Erika Weiberg, Anton Bonnier, Martin Finné, and Jed Kaplan. 2018. “Quantifying Land Use in Past Societies from Cultural Practice and Archaeological Data.” *Land* 7 (1): 9.

Hurlbert, Margot, and Amber J. Fletcher. 2020. “Indigenous Rights in the Context of Oil and Gas Pipelines in Canada: Exposing Naturalised Power Structures through a Lens of Intersectionality.” *International Journal of Law in Context* 16 (1): 57–76.

Hurley, David A., Sarah R. Kostelecky, and Paulita Aguilar. 2017. “Whose Knowledge? Representing Indigenous Realities in Library and Archival Collections.” *Collection Management* 42 (3–4): 124–29.

Ingalls, Micah L., and Richard C. Stedman. 2016. “The Power Problematic: Exploring the Uncertain Terrains of Political Ecology and the Resilience Framework.” *Ecology and Society* 21 (1): art6.

iNaturalist. Available from https://www.inaturalist.org. Accessed November 3, 2021.

Ingold, Timothy. 2000. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. London: Routledge.

Inter-Tribal Council of Michigan, Inc. 2019. “Ishkode Project Report.” Hiawatha National Forest: Sault Ste. Marie Tribe of Chippewa Indians Wildlife Program.

InsideWood. 2004-onwards. Published on the Internet. http://insidewood.lib.ncsu.edu/search Accessed on January 2020.

Jackson, Stephen T., and Jennifer B. Kearsley. 1998. “Quantitative Representation of Local Forest Composition in Forest-floor Pollen Assemblages.” *Journal of Ecology* 86 (3): 474–90.

Johnson, Lane B., Lee R. Johnson, Evan R. Larson, and Kurt F. Kipfmueller. 2018. “Culturally Modified Red Pine, Birch-Bark Canoes, and the Strategic Geography of the Fur Trade on Lake Saganaga, Minnesota, U.S.A.” *Historical Archaeology* 52 (2): 281–300.

Johns, Timothy, and Isao Kubo. 1988. "A Survey of Traditional Methods Employed for the Detoxification of Plant Foods." *Journal of Ethnobiology* 8(1): 81-129.

Johnston, Basil. 1995. *The Manitous: Supernatural World of the Ojibway*. New York: HarperCollins Publishers.

Jones, Judith. 2000. "Fire History of the Bur Oak Savannas of Sheguiandah Township, Manitoulin Island, Ontario" 39 (1): 3–15.

Jordan, Kurt. 2008. *The Seneca Restoration 1715-1754: An Iroquois Local Political Economy*. Gainesville: University Press of Florida.

———. 2014. "Pruning Colonialism: Vantage Point, Local Poltical Economy, and Cultural Entanglement in the Archaeology of Post-1415 Indigenous Peoples." In *Rethinking Colonial Pasts Through Archaeology*, edited by Neal Ferris, Rodney Harrison, and Michael V. Wilcox, 101–20. New York: Oxford University Press.

Jung, Patrick. 1997. "Forge, Destroy, and Preserve the Bonds of Empire: Euro-Americans, Native Americans, and Metis on the Wisconsin Frontier, 1634-1856." Dissertation, Department of History, Milwaukee: Marquette University.

Kabukcu, Ceren. 2018. "Wood Charcoal Analysis in Archaeology." In *Environmental Archaeology*, edited by Evangelia Pişkin, Arkadiusz Marciniak, and Marta Bartkowiak, 133–54. Interdisciplinary Contributions to Archaeology. Cham: Springer International Publishing.

Kane, Stephanie. 2012. *Where Rivers Meet the Sea: The Political Ecology of Water*. Philadelphia: Temple University Press.

Kangas, Patrick C., and Gary L. Hannan. 1985. "Vegetation on Muskrat Mounds in a Michigan Marsh." *American Midland Naturalist* 113 (2): 392.

Kelty, Matthew J., and Petya K. Entcheva. 1993. "Response of Suppressed White Pine Saplings to Release During Shelterwood Cutting." *Northern Journal of Applied Forestry* 10(4): 166-169.

Kenny, Mary B, and William H. Parker. 2004. "Ojibway Plant Taxonomy at Lac Seul First Nation, Ontario, Canada." *Journal of Ethnobiology* 24 (1): 75–91.

Kent, Timothy. 2002. *Birchbark Canoes of the Fur Trade*. Sturgis: Silver Fox Enterprises (2).

Kirksey, S. Eben, and Stefan Helmreich. 2010. "The Emergence of Multispecies Ethnography." *Cultural Anthropology* 25 (4): 545–76.

Kirsch, Patrick V. 1986. "Rethinking East Polynesian Prehistory." *The Journal of the Polynesian Society* 95(1): 9-40.

Kidd, Kenneth E, and Martha Ann Kidd. 1970. "A Classification System for Glass Beads for the Use of Field Archaeologists." 1. Canadian Historic Sites: Occasional Papers in

Archaeology and History. Ottawa: Department of Indian Affairs and Northern Development.
———. 2012. “A Classification System for Glass Beads for the Use of Field Archaeologists.” *Beads* 24: 39–61.

Killion, Thomas W. 2013. “Nonagricultural Cultivation and Social Complexity: The Olmec, Their Ancestors, and Mexico’s Southern Gulf Coast Lowlands.” *Current Anthropology* 54 (5): 569–606.

Kimmerer, Robin Wall. 2013. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. 1st ed. Minneapolis: Milkweed Editions.
———. 2017a. “Learning the Grammar of Animacy.” *Anthropology of Consciousness* 28 (2): 128–34.
———. 2017b. *The Covenant of Reciprocity*. *The Wiley Blackwell Companion to Religion and Ecology*. Chichester, UK: John Wiley & Sons, Ltd.

Kinietz, W. Vernon. 1940. “The Indians of the Western Great Lakes, 1615-1760.” *Occasional Contributions, Museum of Anthropology* 10.

Knitter, Daniel, Jan Piet Brozio, Walter Dörfler, Rainer Duttmann, Ingo Feeser, Wolfgang Hamer, Wiebke Kirleis, Johannes Müller, and Oliver Nakoinz. 2019. “Transforming Landscapes: Modeling Land-Use Patterns of Environmental Borderlands.” *The Holocene* 29 (10): 1572–86.
Knoeller, Christian. 2012. "Landscape and Language in Erdrich's Books and Islands in Ojibwe Country." *Interdisciplinary Studies in Literature and Environment* 19(4):645-60.

Kooiman, Susan. 2018. “A Multiproxy Analysis of Culinary, Technological, and Environmental Interactions in the Northern Great Lakes Region.” PhD dissertation, Department of Anthropology, Lansing: Michigan State University.
———. 2021. *Ancient Pottery, Cuisine, and Society at the Northern Great Lakes*. Notre Dame: University of Notre Dame Press.

Kooiman, Susan M., and Heather Walder. 2019. “Reconsidering the Chronology: Carbonized Food Residue, Accelerator Mass Spectrometry Dates, and Compositional Analysis of a Curated Collection from the Upper Great Lakes”. *American Antiquity* 84(3): 495–515.

Korteweg, Lisa, Ismel Gonzalez, and Jojo Guillet. 2010. “The Stories Are the People and the Land: Three Educators Respond to Environmental Teachings in Indigenous Children’s Literature.” *Environmental Education Research* 16 (3–4): 331–50.

Kuokkanen, Rauna. 2011. “Indigenous Economies, Theories of Subsistence, and Women: Exploring the Social Economy Model for Indigenous Governance.” *American Indian Quarterly* 35 (2): 215–40.

LaPena, Sage. 2019. *Indigenous Perspectives on Elderberry Uses*. University of California, Department of Agriculture and Natural Resources. Accessed October 21, 2022. https://ucanr.edu/sites/Elderberry/Indigenous/Indigenous_perspectives/

La Potherie. 1753. "Claude Charles Le Roy, Bacqueville de La Potherie [from His Histoire de l'Amérique Septentrionale (Paris, 1753), Tome Ii and Iv]. English Translation." Translated by Claude Charles Le Roy.

Labelle, Kathryn M. 2013. *Dispersed but Not Destroyed: A History of the Seventeenth-Century Wendat People*. 13th ed. Vancouver: University of British Columbia Press.

Lee, Gyoung-Ah, Anthony M. Davis, David G. Smith, and John H. McAndrews. 2004. "Identifying Fossil Wild Rice (Zizania) Pollen from Cootes Paradise, Ontario: A New Approach Using Scanning Electron Microscopy." *Journal of Archaeological Science* 31:411-421.

Leitner, Jonathan. 2005. "Commodity Frontier as Contested Periphery: The Fur Trade in Iroquoia, New York and Canada, 1664–1754." *Research in Rural Sociology and Development* 10: 231–52.

Lenik, Edward. 2010. "Mythic Creatures: Serpents, Dragons, and Sea Monster in Northeastern Rock Art." *Archaeology of Eastern North America* 38: 17–37.

La Verendrye, Pierre Gaultier De Varennes. *1968 Journals and Letters of Pierre Gaultier de Varennes de la Verendrye and His Sons*, The Champlain Society, Toronto.

Li, Yiyin, Anne Birgitte Nielsen, Xueqin Zhao, Lingjun Shan, Shengzhong Wang, Jing Wu, and Liping Zhou. 2015. "Pollen production estimates (PPEs) and fall speeds for major tree taxa and relevant source areas of pollen (RSAP) in Changbai Mountain, northeastern China." *Review of Palaeobotany and Palynology* 216: 92-100.

Lightfoot, Kent G. 1995 "Culture Contact Studies: Redefining the Relationship Between Prehistoric and Historical Archaeology." *American Antiquity* 60(2):199–217.

Lightfoot, Kent G., and Antoinette Martinez. 1995 "Frontiers and Boundaries in Archaeological Perspective". *Annual Review of Anthropology* 24:471-192.

Lightfoot, Kent G., Lee M. Panich, Tsim D. Schneider, Sara L. Gonzalez, Matthew A. Russell, Darren Modzelewski, Theresa Molino, and Elliot H. Blair. 2013. "The Study of Indigenous Political Economies and Colonialism in Native California: Implications for Contemporary Tribal Groups and Federal Recognition." *American Antiquity* 78 (1): 89–104.

Liu, Fengwen, Minmin Ma, Gang Li, Lele Ren, Jiyuan Li, Wei Peng, Yishi Yang, and Hucai Zhang. 2021. "Prehistoric Firewood Gathering on the Northeast Tibetan Plateau: Environmental and Cultural Determinism." *Vegetation History and Archaeobotany*, October.

Lo, Fiona, Cecilia M. Bitz, David S. Battisti, and Jeremy J. Hess. 2019. “Pollen Calendars and Maps of Allergenic Pollen in North America.” *Aerobiologia* 35 (4): 613–33.

Lockwood, Hunter Thompson. 2017. “How the Potawatomi Language Lives: A Grammar of Potawatomi.” PhD Dissertation, Department of Linguistics. Madison: University of Wisconsin.

Loftus, Alex. 2019. “Political Ecology I: Where Is Political Ecology?” *Progress in Human Geography* 43 (1): 172–82.

Loftus, M. K. 1977. “A Late Historic Period Chippewa Sugar Maple Camp.” *The Wisconsin Archaeologist* 58(l):71-76.

Lovis, William A., G. William Monaghan, Alan F. Arbogast, and Steven L. Forman. 2012. “Differential Temporal and Spatial Preservation of Archaeological Sites in a Great Lakes Coastal Zone.” *American Antiquity* 77 (3): 591–608.

Lovis, William A. 1973. “Late Woodland Cultural Dynamics in the Northern Lower Peninsula of Michigan.” Ph.D. Dissertation, Department of Anthropology, Lansing: Michigan State University.

———. 2001. "Clay Effigy Representations of the Bear and Mishipishu: Algonquian Iconography from the Late Woodland Johnson site, Northern Lower Michigan." *Midcontinental Journal of Archaeology* 26 (1):105-119.

Luedtke, Barbara Ellen. 1976. “Lithic Material Distributions and Interaction Patterns During the Late Woodland Period in Michigan (Volumes I and II).” PhD Dissertation, Department of Anthropology. Ann Arbor: University of Michigan.

Mann, Rob. 2003. “Colonizing the Colonizers: Canadien Fur Traders and Furs Trade Society in the Great Lakes Region, 1763-1850.” PhD Dissertation, Department of Anthropology, Binghamton: State University of New York.

———. 2017. ““They Are Fit to Eat the Divel and Smoak His Mother” Labor, Leisure, Tobacco Pipes, and Smoking Customs among French Canadian Voyageurs during the Fur Trade Era.” In *Archaeological Perspectives on the French in the New World*, edited by Elizabeth M. Scott, 58–82. Gainesville: University Press of Florida.

Marguerie, Dominique, and Jean-Yves Hunot. 2007. “Charcoal Analysis and Dendrology: Data from Archaeological Sites in North-Western France.” *Journal of Archaeological Science* 34 (9): 1417–33.

Martin, Roderick. 1971. “The Concept of Power: A Critical Defence.” *The British Journal of Sociology* 22 (3): 240–56.

Marston, John M. 2009. “Modeling Wood Acquisition Strategies from Archaeological Charcoal Remains.” *Journal of Archaeological Science* 36 (10): 2192–2200.

Martinez, Dennis. 2018. “Redefining Sustainability through Kincentric Ecology: Reclaiming Indigenous Lands, Lnoweldge, and Ethics.” In *Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability*, edited by Melissa K. Nelson and Daniel Shilling, 292. London: Cambridge University Press.

Mason, Ronald J. 1981. *Great Lakes Archaeology*. New York: Academic Press.
———. 1986. “Rock Island: Historical Indian Archaeology in the Northern Lake Michigan Basin.” Kent: Kent State University Press.

Matthews, John D. 1989. *Silvicultural Systems*. Oxford: Clarendon Press.

Mauss, Marcel. 2016. *The Gift*. Translated by Jane I. Guyer. Chicago: HAU Books.

Mayor, Thomas. 2012. “Hunter-Gatherers: The Original Libertarians.” *The Independent Review* 16 (4): 485–500.

Mazei, N. G., M. V. Kusilman, and E. Yu. Novenko. 2018. “The Occurrence of Carpinus, Fagus, Tilia, and Quercus Pollen in Subrecent Spore–Pollen Spectra from the East European Plain: On the Possibility of Long-Distance Pollen Transfer.” *Russian Journal of Ecology* 49 (6): 484–91.

Mazrim, Robert F., and Duane Esarey. 2007. “Rethinking the Dawn of History: The Schedule, Signature, and Agency of European Goods in Protohistoric Illinois.” *Midcontinental Journal of Archaeology* 32 (2): 145–200.

McCullen Megan M. 2015. “The Impact of Migration on Community Identity in the Seventeenth Century in the Great Lakes.” PhD Dissertation, Department of Anthropology, Lansing: Michigan State University.

McDonnell, Michael A. 2015a. “Maintaining a Balance of Power: Michilimackinac, the Anishinaabe Odawas, and the Anglo-Indian War of 1763.” *Early American Studies: An Interdisciplinary Journal* 13 (1): 38–79.
———. 2015b. *Masters of Empire: Great Lakes and the Making of America*. New York: Hill and Wang.

McLaughlin, Paul and Dietz, Thomas. 2008 “Structure, Agency and Environment: Toward an Integrated Perspective on Vulnerability.” *Global Environmental Change*. 39. 99-111.

McLaurin, Virginia A. 2014. “Stereotypes of Contemporary Native American Indian Characters in Recent Popular Media.” Master of Arts, Department of Anthropology, Amherst: University of Massachusetts.

McMurtry, Deirdre C. 2009 “Discerning Dreams in New France: Jesuit Responses to Native American Dreams in the Early Seventeenth Century.” Master's thesis, Ohio State University, Columbus.

McParland, Laura C., Margaret E. Collinson, Andrew C. Scott, and Gill Campbell. 2009. "The Use of Reflectance Values for the Interpretation of Natural and Anthropogenic Charcoal Assemblages." *Archaeological and Anthropological Sciences* 1 (4): 249–61

Meeker, James Edwin. 1993. "The Ecology of 'Wild' Wild-Rice (Zizania Palustris Var. Palustris) in the Kakagon Sloughs, a Riverine Wetland on Lake Superior." Dissertation, Madison: University of Wisconsin.

Mentzer, Susan M. 2014. "Microarchaeological Approaches to the Identification and Interpretation of Combustion Features in Prehistoric Archaeological Sites." *Journal of Archaeological Method and Theory* 21 (3): 616–68.

———. 2017. "Hearths and Combustion Features." In *Encyclopedia of Geoarchaeology*, edited by Allan S. Gilbert, 411–24. Dordrecht: Springer Netherlands.

Michigan Department of Natural Resources Fisheries Division and Law Enforcement Division. 2021."2020 Annual Report on Implementation of the 2000 Consent Decree for 1836 Treaty-Ceded Waters of the Great Lakes." Prepared for the Michigan United Conservation Clubs, Inc. Michigan Fisheries Resource Conservation Coalition Bay de Noc, and Great Lakes Sportfishermen, Inc.

Michigan Flora Online. University of Michigan Herbarium. Accessed January 20, 2021. https://michiganflora.net/

"Miigwech, Inc." 2022, 2022. https://www.miigwechinc.org/about. (Accessed Dec 2, 2022).

Miller, A.M., and Iain Davidson-Hunt. 2010. "Fire, Agency, and Scale in the Creation of Aboriginal Cultural Landscapes." *Human Ecology* 38: 401–14.

Miquelon, Dale. 1993. "Jean-Baptiste Colbert's 'Compact Colony Policy' Revisited: The Tenacity of an Idea." *Proceedings of the Meeting of the French Colonial Historical Society* 17: 12–23.

Molnar, James S. 1997. "Interpreting Fishing Strategies of the Odawa." Dissertation Department of Anthropology, Albany: State University of New York.

Morehart, Christopher T., John K. Millhauser, and Santiago Juarez. 2018. "Archaeologies of Political Ecology - Genealogies, Problems, and Orientations: Archaeologies of Political Ecology - Genealogies, Problems, and Orientations." In *Special Issue: Uneven Terrain: Archaeologies of Political Ecology*, 29:5–29. Archeological Papers of the American Anthropological Association.

Morris, E. Kathryn, Tancredi Caruso, François Buscot, Markus Fischer, Christine Hancock, Tanja S. Maier, Torsten Meiners, et al. 2014. "Choosing and Using Diversity Indices: Insights for Ecological Applications from the German Biodiversity Exploratories." *Ecology and Evolution* 4 (18): 3514–24.

Morrison, Kathleen D. 2018. “Empires as Ecosystem Engineers: Toward a Nonbinary Political Ecology.” *Journal of Anthropological Archaeology* 52: 196–203.

Morrison, T.H., W.N. Adger, K. Brown, M.C. Lemos, D. Huitema, J. Phelps, L. Evans, et al. 2019. “The Black Box of Power in Polycentric Environmental Governance.” *Global Environmental Change* 57: 101934.

Morrissey, Robert Michael. 2013 *The Terms of Encounter: Language and Contested Visions of French Colonization in the Illinois Country, 1673-1702*. In French and Indians in the Heart of North America, 1630-1815, edited by Robert Englebert and Guillaume Teasdale, pp. 43–76. Michigan State University, East Lansing.

Moskal-del Hoyo, Magdalena, Maria Lityńska-Zając, Pál Raczky, Alexandra Anders, and Enikő K. Magyari. 2018. “The Character of the Atlantic Oak Woods of the Great Hungarian Plain.” *Quaternary International* 463 (January): 337–51.

Nassaney, Michael S. 2019. “Cultural Identity and Materiality at French Fort St. Joseph (20BE23), Niles, Michigan.” *Historical Archaeology* 53 (1): 56–72.

Nassaney, Michael S., William M. Cremin, and Daniel P. Lynch. 2002. “The Identification of Colonial Fort St. Joseph, Michigan.” *Journal of Field Archaeology* 29 (3/4): 309.

Nassaney, Michael S, and Terrance J Martin. 2017. “Food and Furs at French Fort St. Joseph.” In *Archaeological Perspectives on the French in the New World*, edited by Elisabeth M. Scott, 83–111. Gainesville: University Press of Florida.

Nelle, Oliver. 2003. "Woodland history of the last 500 years revealed by anthracological studies of charcoal kiln sites in the Bavarian Forest, Germany." *Phytocoenologia* 33(4): 667-682.

Nelson, John William. 2019. “The Ecology of Travel on the Great Lakes Frontier: Native Knowledge, European Dependence, and the Environmental Specifics of Contact.” *Michigan Historical Review* 45 (1): 1–26.

Neubauer, Fernanda. 2019. “Fire-Cracked Rock Experiments: A Comparison of Use-Alteration and Fracture Patterns between Stone Boiling/Wet Cooling and Hearth/Dry Cooling.” *The Wisconsin Archeologist* 100 (1 & 2): 35–47.

Nichols, David Andrew. 2018. Peoples of the Inland Sea: Native Americans and Newcomers in the Great Lakes Region, 1600-1870. Athens: Ohio University Press.

Nicholson, B.A., and Scott Hamilton. 2001. “Cultural Continuity and Changing Subsistence Strategies During the Late Precontact Period in Southwestern Manitoba.” Canadian Journal of Archaeology / Journal Canadien d’Archéologie 25 (1/2): 53–73.

Niu, Shiduo, Xiong Du, Dejie Wei, Shanshan Liu, Qian Tang, Dahong Bian, Yarong Zhang, Yanhong Cui, and Zhen Gao. 2021. “Heat Stress After Pollination Reduces Kernel Number in Maize by Insufficient Assimilates.” *Frontiers in Genetics* 12 (October): 728166.

Noori, Margaret. 2013. “Beshaabiiag G’gikenmaaigowag: Comets or Knowledge.” In *Centering Anishinaabeg Studies: Understanding the World Through Stories*. Edited by Jill Doerfler, et al., Lansing: Michigan State University Press.

Normyle, Anna, Michael Vardon, and Bruce Doran. 2022. “Ecosystem Accounting and the Need to Recognise Indigenous Perspectives.” *Humanities and Social Sciences Communications* 9 (1): 133.

Nute, Grace Lee. 1955. *The Voyageur*. Minneapolis: Minnesota Historical Society.

O’Neill, Colleen. 2004. “Rethinking Modernity and the Discourse of Development in American Indian History, an Introduction.” In *Native Pathways: American Indian Culture and Economic Development in the Twentieth Century*, edited by Brian Hosmer and Colleen O’Neill, 1–26. Boulder: University of Colorado Press.

Palik, Brian J., and Kurt S. Pregitzer. 1993. “The Vertical Development of Early Successional Forests in Northern Michigan, USA.” *The Journal of Ecology* 81 (2): 271–85.

Parsons, Christopher Michael. 2011. “Plants and Peoples: French and Indigenous Botanical Knowledges in Colonial North America, 1600 – 1760.” PhD Dissertation, Department of History, Toronto: University of Toronto.
———. 2013. “Natives, Newcomers, and Nicotiana.” In *French and Indians in the Heart of North America, 1630-1815*, edited by Robert Englebert and Guillaume Teasdale, 21–41. Lansing: Michigan State University Press.

Patterson, Thomas C. 1999. “The Political Economy of Archaeology in the United States.” *Annual Review of Anthropology* 28 (1): 155–74.

Payette, Serge, Vanessa Pilon, Mathieu Frégeau, Pierre-Luc Couillard, and Jason Laflamme. 2021. "Post-Glacial Climate–Fire Interactions Control Tree Composition of Mesic Temperate Forests in Eastern North America." *Ecosystems* 24(8): 1906-1927.

Peebles, Christopher S., and Susan M. Kus. 1977. “Some Archaeological Correlates of Ranked Societies.” *American Antiquity*, Essays on Archaeological Problems, 42 (3): 421–48.

Peyser, Joseph L., and José António Brandão. 2008. *Edge of Empire, 1671-1716: Documents of Michilimackinac*. Lansing: Michigan State University Press.

Pflüg, Melissa A. 1992. “`Breaking Bread’: Metaphor and Ritual in Odawa Religous Practice.” *Religion* 22 (3): 247–58.

———. 1990. "Contemporary Revitalization Movements Among the Northern Great Lakes Ottawa (Odawa) Indians: Motives and Accomplishments." Dissertation Department of Anthropology, Detroit: Wayne State University.
———. 1996. "'Pimadaziwin': Contemporary Rituals in Odawa Community." *American Indian Quarterly* 20 (3/4): 489.

Phillips, Ruth. 2016. "Between Rocks and Hard Places - Entre l'arbre et l'écorce / Au Pied Du Mur." *Journal of Canadian Art History / Annales d'histoire de l'art Canadien* 37 (1).

Pillsbury, Robert W., and Melissa A. McGuire. 2009. "Factors Affecting the Distribution of Wild Rice (Zizania Palustris) and the Associated Macrophyte Community." *Wetlands* 29 (2): 724–34.

Piperno, Dolores R. 2006. *Phytoliths: A Comprehensive Guide for Archaeologists and Paleoecologists*. Rowman: Altamira.

Pluess, Andrea R., Victoria L. Sork, Brian Dolan, Frank W. Davis, Delphine Grivet, Kurt Merg, Jeanette Papp, and Peter E. Smouse. 2009. "Short Distance Pollen Movement in a Wind-Pollinated Tree, Quercus Lobata (Fagaceae)." *Forest Ecology and Management* 258 (5): 735–44.

Podruchny, Carolyn. 1999. "Unfair Masters and Rascally Servants? Labour Relations among Bourgeois, Clerks and Voyageurs in the Montreal Fur Trade, 1780–1821." Labour/Le Travail: *Journal of Canadian Labour Studies* 43:43–70.

Prieskorn, Emily. 2016. "*Assessing the Visual Quality of the Maxton Plains Alvars*." Master of Arts, Department of Environmental Design. Lansing: Michigan State University.

Putnam, D. F. 1947. "Manitoulin Island." *Geographical Review* 37 (4): 649–62.

Quaife, Milo M. 1962. *The Western Country in the Seventeenth Century: The Memoirs of Lamothe Cadillac and Pierre Liette*. New York: Citadel Press.

Quastel, Noah. 2016. "Ecological Political Economy: Towards a Strategic-Relational Approach." *Review of Political Economy* 28 (3): 336–53.

Quimby, George Irving. 1962. "A Year with a Chippewa Family." *Ethnohistory* 9 (3): 217–39.
———. 1966a. *Indian Culture and European Trade Goods: The Archaeology of the Historic Period in the Western Great Lakes Region*. Madison: University of Wisconsin Press.
———. 1966b. "The Dumaw Creek Site: A Seventeenth Century Prehistoric Indian Village and Cemetery in Oceana County, Michigan." *Fieldiana, Anthropology* 56 (1).

Quintus, Seth, Melinda s. Allen, and Thegn N. Ladefoged. 2016. "In Surplus and in Scarcity: Agricultural Development, Risk Management, and Political Economy on Ofu Island, American Samoa." *American Antiquity* 81 (2): 273–93.

Rappaport, R. 1968. *Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People*. New Haven: Yale University Press.
———. 1990. "Ecosystems, Populations, and People." In *The Ecosystem Approach in Anthropology: From Concept to Practice*, edited by E. Moran, 41–72. Ann Arbor: University of Michigan Press.

Reed, Graeme, Nicolas D. Brunet, and David C. Natcher. 2020. "Can Indigenous Community-Based Monitoring Act as a Tool for Sustainable Self-Determination?" *The Extractive Industries and Society* 7 (4): 1283–91.

Reimer, Paula J., William EN Austin, Edouard Bard, Alex Bayliss, Paul G. Blackwell, Christopher Bronk Ramsey, Martin Butzin et al. 2020. "The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 cal kBP)." *Radiocarbon* 62(4): 725-757.

Renfrew, Colin. 2004. "Islands Out of Time." In *Voyages of Discovery: The Archaeology of Islands Edited by Scott M. Fitzpatrick.* Westpoint: Praeger Publishers.

Reschke, Carol, Ron Reid, Judith Jones, Tom Feeney, and Heather Potter. 1999. "Conserving Great Lakes Alvars Final Technical Report of the International Alvar Conservation Initiative." The Nature Conservancy: Alvar Working Group.

Rice, Prudence M. 1998 *Contexts of Contact and Change: Peripheries, Frontiers, and Boundaries. In Studies in Culture Contact: Interaction, Culture Change*, and Archaeology, edited by James G. Cusick, pp. 44–66. Southern Illinois University Press, Carbondale.

Richter, Daniel K. 2013 *Trade, Land, Power: The Struggle for Eastern North America*. 1st ed. University of Pennsylvania Press, Philadelphia

Robbins, Paul. 2011. "A Tree with Deep Roots." In *Political Ecology: A Critical Introduction*, 2nd ed. West Sussex: John Wiley & Sons Ltd.

Roberts, Jason. 2020. "Political Ecology." Edited by Felix Stein, Hildegard Diemberger, Matei Candea, Sian Lazar, Joel Robbins, Andrew Sanchez, and Rupert Stasch. *Cambridge Encyclopedia of Anthropology*.

Rocheleau, Dianne. 2015. "Roots, Rhizomes, Networks and Territories: Reimagining Pattern and Power in Political Ecologies." In *The International Handbook of Political Ecology*, edited by Raymond L. Bryant, 70–88. Northampton: Edward Elgar Publishing Limited.

Roseberry, William. 1988. "Political Economy." *Annual Review of Anthropology* 17: 161–85.

Ross, Frank E. 1938. "The Fur Trade of the Western Great Lakes Region." *Minnesota History* 19 (3): 271–307.

Rushforth, Brett. 2006. "Slavery, the Fox Wars, and the Limits of Alliance." *William and Mary Quarterly* 63 (1): 53.

Sagard, Gabriel. The Long Journey to the Country of the Hurons. Edited by George M. Wrong and translated by H.H. Langton. Champlain Society, Toronto.

Sahlins, Marshall. 1965. "On the Sociology of Primitive Exchange." In *The Relevance of Models for Social Anthropology* edited by Michael Banton 139: 236.

Saunders, Richard M. 1939. "The Emergence of the Coureur de Bois as a Social Type." *Report of the Annual Meeting* 18 (1): 22.

Scaramelli, Franz, and Kay Tarble de Scaramelli. 2005. "The Roles of Material Culture in the Colonization of the Orinoco, Venezuela." *Journal of Social Archaeology* 5 (1): 135–68.

Scarry, John F. 2010. "Agency and Practice in Apalachee Province." In *Across a Great Divide: Continuity and Change in Native North American Socieities, 1400-1900*, edited by Scheiber, Laura L and Mitchell, Mark D., 23–41. Amerind Studies in Anthropology. Tucson: The University of Arizona Press.

Shackleton, C.M., and F. Prins. 1992. "Charcoal Analysis and the 'Principle of Least Effort'—A Conceptual Model." *Journal of Archaeological Science* 19 (6): 631–37.

Schaefer, Claudia A., and Douglas W. Larson. 1997. "Vegetation, Environmental Characteristics and Ideas on the Maintenance of Alvars on the Bruce Peninsula, Canada." *Journal of Vegetation Science* 8 (6): 797–810.

Schaumberg, Ned. 2019. "Living, Land-Broken Waters: Epistemological Resistance in Solar Storms." *Mosaic: An Interdisciplinary Critical Journal* 52 (2).

Scott, Andrew C., and Freddy Damblon. 2010. "Charcoal: Taphonomy and Significance in Geology, Botany and Archaeology." *Palaeogeography, Palaeoclimatology, Palaeoecology* 291 (1–2): 1–10.

Scott, Elizabeth M. 2008. "Who Ate What? Archaeological Food Remains and Cultural Diversity." In *Case Studies in Environmental Archaeology*, 357–74. Springer.

Scott, Michael W. 2013. "The Anthropology of Ontology (Religious Science?): The Anthropology of Ontology." *Journal of the Royal Anthropological Institute* 19 (4): 859–72.

Sen, Amrita, and Harini Nagendra. 2019. "The Role of Environmental Placemaking in Shaping Contemporary Environmentalism and Understanding Land Change." *Journal of Land Use Science* 14 (4–6): 410–24.

Service, Elman R. 1962. *Primitive Social Organization: An Evolutionary Perspective.* New York: Random House.

Shennan, Stephen. 1999. "Cost, Benefit and Value in the Organization of Early European Copper Production." *Antiquity* 73(280): 352-363.

Sherburne, Morgan. 2021. "Designation Puts U-M Biological Station 'At the Halfway Place.'" The University Record. October 14, 2021. https://record.umich.edu/articles/biological-station-at-center-of-new-unesco-biosphere-region/.

Sherman, Howard J. 1993. "The Relational Approach to Political Economy." *Rethinking Marxism* 6 (4): 104–16.

Shillito, Lisa-Marie. 2013. "Grains of Truth or Transparent Blindfolds? A Review of Current Debates in Archaeological Phytolith Analysis." *Vegetation History and Archaeobotany* 22(1): 71-82.

Silliman, Stephen W. 2001 "Theoretical Perspectives on Labor and Colonialism: Reconsidering the California Missions." *Journal of Anthropological Archaeology* 20:379-407.
———. 2005 "Culture Contact or Colonialism? Challenges in the Archaeology of Native North America." *American Antiquity* 70(1):55.
———. 2014. "Archaeologies of Indigenous Survivance and Residence: Navigating Colonial and Scholarly Dualities." In *Rethinking Colonial Pasts through Archaeology*, edited by Neal Ferris, Rodney Harrison, and Michael Wilcox, 57–75. Oxford: Oxford University Press.

Simmons, Deborah. 1995. "Against Capital: The Political Economy of Aboriginal Resistance in Canada." Dissertation Faculty of Graduate Studies, York University.

Simpson, Leanne Betasamosake. 2011. *Dancing on Our Turtle's Back: Stories of Nishnaabeg Re-Creation, Resurgence, and a New Emergence*. Winnipeg: Arbeiter Ring Publishing.

Sleeper-Smith, Susan. 2001. *Indian Women and French Men: Rethinking Cultural Encounter in the Western Great Lakes*. Native Americans of the Northeast. Amherst: University of Massachusetts Press.
———. 2018. *Indigenous Prosperity and American Conquest: Indian Women of the Ohio River Valley, 1690-1792*. Williamsburg: Omohundro Institute and University of North Carolina Press

Smith, Alexia. 2015. "The Use of Multivariate Statistics within Archaeobotany." In Method and Theory in Paleoethnobotany, edited by John M. Marston, Jade d'Alpoim Guedes, and Christina Warinner, 181–204. University Press of Colorado.

Smith, Bruce D. 2011. "General Patterns of Niche Construction and the Management of 'Wild' Plant and Animal Resources by Small-Scale Pre-Industrial Societies." *Philos Trans R Soc Lond B Biol Sci* 366 (1566): 836–48.

Smith, Matthew Noah. 2010. "Reliance." *Noûs* 44 (1): 135–57.

Smith, Beverley A., and Rosemary Prevec. 2000. “Economic Strategies and Community Patterning at the Providence Bay Site, Manitoulin Island.” *Ontario Archaeology* 69: 76–91.

Smith, Beverley A.1996. “Systems of Subsistence and Networks of Exchange in the Terminal Woodland and Early Historic Periods in the Upper Great Lakes.” PhD Dissertation, Department of Anthropology, East Lansing: Michigan State University.

Sommerville, Suzanne Boivin. 2005. “The Fur Trade in Nouvelle France: Coureurs de Bois and Voyageurs and Engagés.” *Michigan’s Habitant Heritage, the Journal of the French-Canadian Heritage Society of Michigan* 26 (4): 156–61.

Sörlin, Sverker, and Nina Wormbs. 2018. “Environing Technologies: A Theory of Making Environment.” *History and Technology* 34 (2): 101–25.

Stearns, M.L. 1984. “Succession to Chiefship in Haida Society.” In *The Tsimshian and Their Neighbors of the North Pacific Coast*, edited by J. Miller and C.M. Eastman. Seattle: Univ of Washington Press.

Stephen W. Silliman. 2014. “Archaeologies of Indigenous Survivance and Residence: Navigating Colonial and Scholarly Duties.” In *Rethinking Colonial Pasts Through Archaeology*, edited by Neal Ferris, Rodney Harrison, and Michael V. Wilcox, 57–75. New York: Oxford University Press.

Steward, Julian H. 1937. "Ecological Aspects of Southwestern Society." *Anthropos* H.(1./2): 87-104.

Stone, Jeffery, and Chad Yost. 2020. “Diatom Microfossils in Archaeological Settings.” In *Handbook for the Analysis of Micro-Particles in Archaeological Samples*, 23–64. Interdisciplinary Contributions to Archaeology.

Stoermer E. F. and John P. Smol. 1999. “Applications and Uses of Diatoms: Prologue.” In *The Diatoms : Applications for the Environmental and Earth Sciences*, 3–10. Cambridge: Cambridge University Press.

Surette, Clarence Leopold Joseph. 2008. "The potential of microfossil use in paleodiet and paleoenvironmental analysis in Northwestern Ontario." PhD dissertation, Department of Geology. Thunder Bay: Lakehead University.

———. 2009. *The Potential of Microfossil Use in Paleodiet and Paleoenvironmental Analysis in Northwestern Ontario*. Ottawa: Library and Archives Canada = Bibliothèque et Archives Canada.

Svarstad, Hanne, Ragnhild Overå, and Tor Benjaminsen. 2018. “Power Theories in Political Ecology.” *Journal of Political Ecology* 25 (1): 350–63.

Tartaron, T. 2013 The Problem of Mycenaean Coastal Worlds. In *Maritime Networks in the Mycenaean World*: 1-11. Cambridge: Cambridge University Press.

Tesdahl, Eugene R. H. 2017. “Exchange, Empire, and Indigeneity in French America.” *The William and Mary Quarterly* 74 (3): 548.

Tetlow, Ian J. 2011."Starch biosynthesis in developing seeds." *Seed Science Research* 21(1): 5-32.

Tetreault, Darcy. 2017. “Three Forms of Political Ecology.” *Ethics and the Environment* 22 (2): 1–23.

Thayer-Bacon, Barbara J. 2017. “Land: First Nations’ Examples.” *Counterpoints* 505: 33–61.

Théry-Parisot, Isabelle, Lucie Chabal, and Julia Chrzavzez. 2010. "Anthracology and Taphonomy, from Wood Gathering to Charcoal Analysis. A Review of the Taphonomic Processes Modifying Charcoal Assemblages, in Archaeological Contexts." *Palaeogeography, Palaeoclimatology, Palaeoecology* 291(1-2):142-153.

Thompson, Victor D., and John A. Turck. 2010. “Island Archaeology and the Native American Economies (2500 B.C.–A.D. 1700) of the Georgia Coast.” *Journal of Field Archaeology* 35 (3): 283–97.

Thwaites, Reuben Gold. 1899. *The Jesuit Relations and Allied Documents: Travels and Explorations of the Jesuit Missionaries in New France, 1610-1791*. 73 vols. Cleveland: Burrows Brothers.

Todd, Zoe. 2016. “An Indigenous Feminist’s Take on The Ontological Turn: ‘Ontology’ Is Just Another Word For Colonialism: An Indigenous Feminist’s Take on the Ontological Turn.” *Journal of Historical Sociology* 29 (1): 4–22.

Trigger, Bruce G. 1965. “The Jesuits and the Fur Trade.” *Ethnohistory* 12 (1): 30–53.

———. 1969. *Huron: Farmers of the North*. Case Studies in Cultural Anthropology. New York, Holt: Rinehart and Winston.

———. 1991. “Early Native North American Responses to European Contact: Romantic versus Rationalistic Interpretations.” *The Journal of American History* 77(4):1195.

Tusenius, M. L. 1986. “The Study of Charcoal from Some Southern African Archaeological Contexts.” Master of Arts Thesis, University of Stellenbosch, Stellenbosch: South Africa.

Uchytil, R.J. 1991. “Abies lasiocarpa.” In: *Fire Effects Information System*, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://www.fs.usda.gov/database/feis/plants/tree/abilas/all.html

United States District Court Western District of Michigan Southern Division. 2022. “Response of the United States, Bay Mills Indian Community, Little Traverse Bay Bands of Odawa Indians, and Little River Band of Ottawa Indians in Opposition to The Coalition to Protect

Michigan Resources' and Bay De Noc Great Lakes Sport Fishermen's Motion to Intervene." Case number 2:73-CV-26.

USDA, NRCS. 2023. The PLANTS Database (http://plants.usda.gov, 10/25/2022). National Plant Data Team, Greensboro, NC USA.

Vaz, Filipe Costa, João Pedro Tereso, and Teresa Pires de Carvalho. 2017. "Selection of firewood in Monte Mozinho (NW Iberia) in the Late Antiquity: A question of function and availability." *Quaternary International* 431(Part A):103-115.

Vizenor, Gerald. 1984. *People Named the Chippewa: Narrative Histories*. Minneapolis: University of Minnesota Press.

———. 1994. *Manifest Manners: Postindian Warriors of Survivance*. Hanover: Wesleyan University Press.

———. 1998. *Fugitive Poses: Native American Indian Scenes of Absence and Presence*. Lincoln: University of Nebraska Press.

———. 2008. *Survivance: Narratives of Native Presence*. Lincoln: Univerity of Nebraska Press.

Wagner, Mark J. 1998. "Some Think it Impossible to Civilize Them at All: Cultural Change and Continuity Among the Early Nineteenth-Century Potawatomi." *In Studies in Culture Contact, Interaction, Culture Change, and Archaeology*, edited by J. G. Cusick, Center for Archaeological Investigations Occasional Paper No. 25, Carbondale: Southern Illinois University: 430-456.

———. 2003. "Tobacco Smoking and Pipe Manufacture and Use among the Potawatomi of Illinois." *Stone Tool Traditions in the Contact Era*: 109.

Wahla, Edward. 1961. *Everyday Life of the Protohistoric Michigan Indians*. Vol. 1. Detroit: Aboriginal Research Club.

Walder, Heather. 2015 "…A thousand beads to each nation": Exchange, interactions, and technological practices in the upper great lakes c. 1630-1730". PhD Dissertation, Department of Anthropology, The University of Wisconsin, Madison.

Walder, Heather, and Jessica Yann. 2018. "Resilience and Survivance: Frameworks for Discussing Intercultural Interactions." *Midwest Archaeological Conference Inc. Occasional Papers*, no. 2: 1–18.

Wallerstein, Immanuel. 1974. *The Modern World System I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York: Academic Press.

Walter, Gimme H, and Rob Hengeveld. 2014. *Autecology: Organisms, Interactions and Environmental Dynamics*. Baton Rouge: Taylor & Francis Group.

Warren, William W. 1885. *History of the Ojibway People*. Minnesota Historical Society Press.

Weber, Richard W. 2015. “Allergen of the Month—Narrowleaf Goosefoot.” Annals of Allergy, Asthma & Immunology 114 (3).

Wheeler, Elisabeth. 2011. “Inside Wood – A Web Resource for Hardwood Anatomy.” IAWA Journal. 32. 199-211.

West, Darrell C., Herman H. Shugart, and Daniel B. Botkin, eds. 1981. *Forest Succession: Concepts and Application*. Springer Advanced Texts in Life Sciences. New York, NY: Springer New York.

Wesson, Cameron B. 2008 *Households and Hegemony: Early Creek Prestige Goods, Symbolic Capital, and Social Power*. University of Nebraska Press, Lincoln.

White, Bruce M. 1999. “The Woman Who Married a Beaver: Trade Patterns and Gender Roles in the Ojibwa Fur Trade,” 40.

White, Richard. 1991. *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650–1815*. New York: Cambridge University Press.

White, T.E. 1953. “A Method of Calculating the Dietary Percentage of Various Food Animals Utilized by Aboriginal Peoples.” *American Antiquity* 18:396-398.

Whyte, Kyle. 2018. "Settler colonialism, ecology, and environmental injustice." *Environment and Society* 9(1):125-144.

Wickman, Thomas. 2021. “Our Best Places: Gender, Food Sovereignty, and Miantonomi’s Kin on the Connecticut River.” *Early American Studies: An Interdisciplinary Journal* 19 (2): 215–63.

Widder, Keith. 2013. *Beyond Pontiac’s Shadow: Michilimackinac and the Anglo-Indian War of 1763*. Lansing: Michigan State University Press.

Wiesner, Brendan. 2022. “Tribe Walleye Stocking Program Introduces 2 Million Fish into Michigan Waterways This Year.” *The Sault News*, July 13, 2022. https://www.sooeveningnews.com/story/sports/outdoors/fishing/2022/07/13/more-than-2-million-walleye-were-released-into-michigan-year/10036435002/.

Wiikwemkoong Unceded Territory. 2002. Accessed November 13 2022. https://wiikwemkoong.ca/

Wilcox, Michael V. 2010 “Marketing Conquest and the Vanishing Indian: An Indigenous Response to Jared Diamond's Guns, Germs and Steel and Collapse.” *Journal of Social Archaeology* 10:92-117.

Wilhelm, Gerould. February 13-19, 2002. “What Is a Savanna?” Kansas City: Society for Range Management Conference Savanna/Woodland Symposium.

Winterhalder, Bruce P. 1980. “Canadian Fur Bearer Cycles and Cree-Ojibwa Hunting and Trapping Practices.” *The American Naturalist* 115 (6): 870–79.

Wisconsin Department of Natural Resources. 2009. “Paper Birch Cover Type.” *Silviculture Handbook* 1-9-2015 44-2 HB24315.44.

Witgen, Michael. 2007. “The Rituals of Possession: Native Identity and the Invention of Empire in Seventeenth-Century Western North America.” *Ethnohistory* 54 (4): 639–68.

———. 2012. *An Infinity of Nations: How the Native New World Shaped Early North America*. Kindle Edition. Philadelphia: University of Pennsylvania Press.

Wolf, Eric. 1972. “Ownership and Political Ecology.” *Anthropologial Quarterly* 45 (3): 201–5.

Wolford Sheppard, Diana. 2015. “Fur Trade Contracts during the French Regime.” French-Canadian Heritage Society of Michigan.

Yost, C. L., M. S. Blinnikov, and M. L. Julius. 2013. “Detecting Ancient Wild Rice (Zizania Spp. L.) Using Phytoliths: A Taphonomic Study of Modern Wild Rice in Minnesota (USA) Lake Sediments.” *Journal of Paleolimnology* 49 (2): 221–36.

Yost, Chad L., and Mikhail S. Blinnikov. 2011. “Locally Diagnostic Phytoliths of Wild Rice (Zizania Palustris L.) from Minnesota, USA: Comparison to Other Wetland Grasses and Usefulness for Archaeobotany and Paleoecological Reconstructions.” *Journal of Archaeological Science* 38 (8): 1977–91.

Zadeh, L.A. 1965. “Fuzzy Sets. *Information Control* 8(3): 338-353.

Zechman, Hannah Danielle. 2019. “Archaeological Investigations at a Mississippian Platform Mound Site in Lowndes County, Mississippi.” Master of Arts, Department of Sociology and Anthropology, Oxford: The University of Mississippi.

Zedeño, M. Nieves, Richard Stoffle W., Fabio Pittaluga, Genevieve Dewey -Hefley, R. Christopher Basaldú, and Maria Porter. 2001. “Traditional Ojibway Resources in the Western Great Lakes.”