Macrobotanical and Zooarchaeological Examination

of the Macgillivray Site (DbJm-3):

A Woodland Period Habitation in Northwestern Ontario

Jake Cousineau

Master of Environmental Studies

Lakehead University

Thunder Bay, Ontario, Canada

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Abstract

The Macgillivray site (DbJm-3) is located on an island in Whitefish Lake, approximately 50 km southwest of Thunder Bay, Ontario in the central Canadian Boreal Forest ecozone. Indigenous people have lived in this area for a long time with the earliest sites occupied during the First Ancestor period, but occupation intensified during the Woodland period. Kenneth Dawson first excavated at this site in 1966, and Lakehead University has more recently investigated other parts of the site in 2016 and 2017. Although Dawson highlighted the Laurel composite cultural affiliation, recent analysis has also identified Brainerd ware, Blackduck complex, Psinomani culture/Sandy Lake ware, and Selkirk composite affiliations.

This thesis examines the macrobotanical and zooarchaeological evidence from the Macgillivray site to assist with reconstructing the diets of its precontact Indigenous Woodland period occupants. There is a lack of direct evidence for the consumption of wild resources on sites in Northwestern Ontario. Due to this, organic resources consumed and exploited by the Woodland period people have been inferred through other means such as modern environmental data, archaeological settlement patterns, ethnographic analogies, tool kits and other circumstantial evidence. More recently, carbonized food residue has provided evidence for the consumption of cultivated plant remains and wild rice. This suggested that the diets of the Woodland period people in Northwestern Ontario are more complex than previously assumed. Further information gathered from fauna and macrobotanical remains during this study aided in contextualizing the cultivated plant component of the diet inferred from microfossils.

Soil samples excavated from the Macgillivray site in 2016 and 2017 were subject to flotation and fine-sieving to recover smaller fragmented fauna and floral materials. Nested-sieves of 4 mm, 2 mm, 1 mm and 500 µm (light fraction only) were used to capture all the materials. This resulted in the recovery of charred wild rice grains (*Zizania* sp.), goosefoot (*Chenopodium* sp.), cherries (*Prunus* sp.), hawthorns (*Crataegus* sp.) and amaranth (*Amaranthus* sp.) seeds. The wild rice was found in association with Laurel wares and produced a radiocarbon age of 1680 ± 30 BP (Beta-567300; *Zizania* sp. seed; $\delta^{13}C$: -24.3‰). This is the first macrobotanical evidence for the consumption of wild rice during the Middle Woodland period in Northwestern Ontario.

Although the faunal assemblage from the Macgillivray site was heavily fragmented, the results of the study aided in new interpretations and provided a rare example of the use of these methods on Boreal Forest samples. The data suggests that a 2 mm sieve is optimal for the recovery of fauna material from Subarctic sites; however, that does affect the rate of work needed for sorting through the soil. Using finer screens for excavating decreases recovery biases in favour of large and medium mammals. The 4 mm sieve resulted in the identification of six new taxa absent from the excavation assemblage: mussels (Bivalvia), turtles (Testudines), pheasants (Phasianidae), sandhill cranes (*Antigone canadensis*), minks (*Neovision vision*) and muskrats (*Odantra zibethicus*). The 2 mm sieve added ducks (Anatidae) and squirrels (Sciuridae), while the 1 mm sieve introduced grebes (Podicepidae). Over 90% of fish remains recovered from the site would have been lost using only the 6 mm sieve. Although the use of 4 mm screen increases species richness counts, the 2 mm screen increases species diversity count. The latter sieve increased the recovery of fish remains, making them on par with the number of mammal remains. In short, through the application of this method, archaeologists may better understand the fishing economy from Northwestern Ontario sites.

Indicator species recovered from the Macgillivray site support its interpretation as a warm-season habitation site. Perhaps one of the reasons for occupying this locale was for the gathering and processing of wild rice. However, the presence of small quantities of charred *Chenopodium* sp. and *Amaranthus* sp. seeds may hint at a wider use of starchy plant foods including cultivated plant remains. Due to the small quantity of macrobotanical and faunal recoveries from the site, this interpretation should be considered preliminary. In general, this study emphasizes the value of intensive faunal and botanical investigation of Boreal Forest sites in order to develop a more complete picture of Woodland period diet and subsistence.

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Chapter 1 – Introduction

1.1 Overview and Objectives

The Macgillivray site (DbJm-3) is located on Bishop Island in Whitefish Lake approximately 50 km southwest from Thunder Bay, Ontario (**Fig 1.1**). The site is located on the traditional territory of the Fort William First Nation, Signatory of the Robinson-Superior Treaty of 1850. It is a multi-component precontact Indigenous habitation site associated with a burial mound within the central Canadian Boreal Forest ecozone. The site was first excavated by Ken Dawson in 1966 (Dawson 1980), and then work was completed there again by Lakehead University in the 2016-2017 excavation seasons (Boyd and Hamilton 2018). Through excavation of the habitation area a large amount of fire-cracked rock was exposed. Soil samples collected from this feature provides an excellent opportunity to examine the diet of the Woodland period (500BCE – Post-contact) people of Northwestern Ontario.

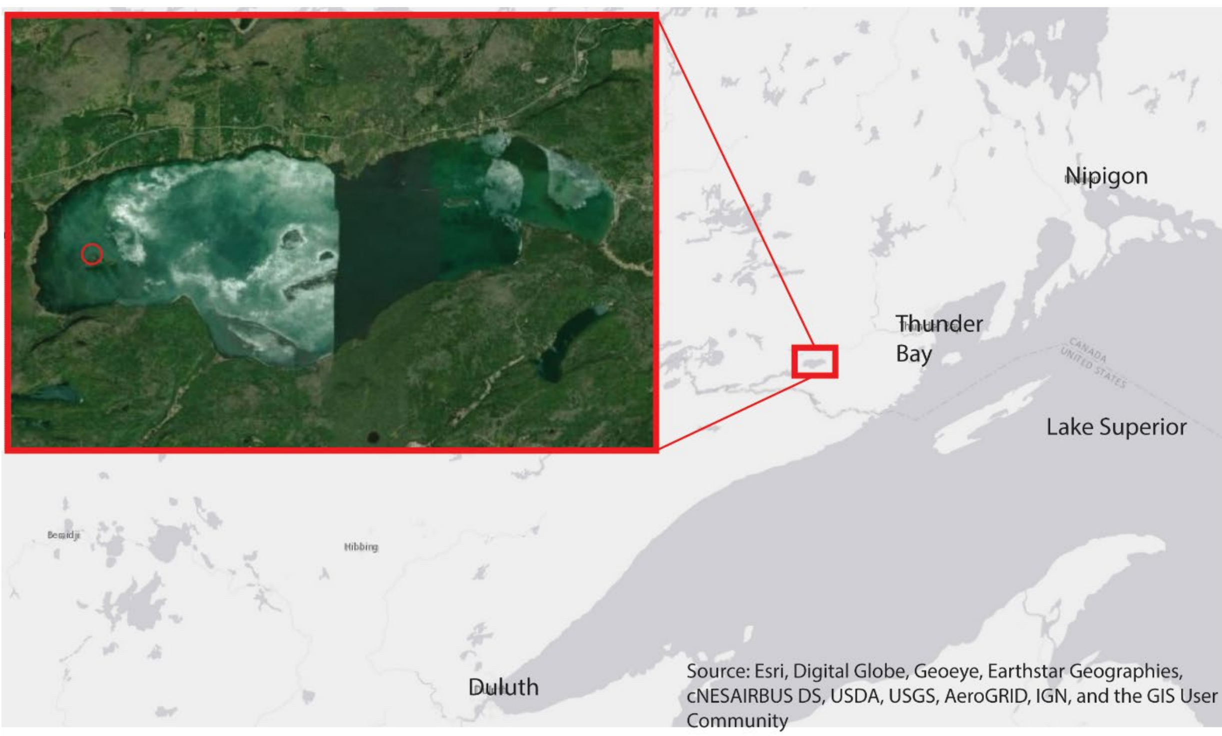

Fig 1.1: Map of the Whitefish Lake area, Macgillivray site located in the red circle.

The Macgillivray site is primarily a Laurel composite (150 BCE and– 1250 CE; Arzigian 2008) habitation with sparser occupation in the Late Woodland period and post-contact period. A few sherds of a Brainerd wares (1000 BCE – 400 CE; Arzigian 2008) were found associated with Laurel wares. Late Woodland wares include Blackduck ware (800 CE – 1400 CE; Nicholson et al. 2006), Psinomani/Sandy Lake ware (1000 CE - 1700 CE; Birk 1979; Taylor-Hollings 1999) and Selkirk composites ware (1100 CE – post-contact; Meyer-Russel 1987). Post-contact material recovered was more likely deposited by disturbances in the late 1800's by looters, material left by Dawson and his crew as well as the landowners.

There is currently few zooarchaeological and archaeobotanical studies from sites in Northwestern Ontario. The reports and descriptions of organic material which do exist prior to the last decade were mostly limited in scope and interpretation. This may also be due to the acidity of the soil in the Boreal Forest which makes recovery of well-preserved organic material rare. The paucity of recoveries likely also is a function of excavating and sampling methods used at these sites which are inefficient to optimize their recovery. Recent identification of food residues has provided evidence for the consumption of cultivated plant remains and wild rice (Boyd and Hamilton 2018; Boyd and Surette 2010). This suggested that the diet of northern groups during the Woodland period is more complex than previously assumed in the early days of archaeological research. Additional information from fauna and macrobotanical remains could aid in contextualizing the cultivated plants components of their diet.

The goal of this study is to examine the diet of Woodland period groups that inhabited the Macgillivary site and investigate the impact that recovery method has on the nature and frequency of organic material in Boreal Forest archaeological sites. This will be achieved through the analysis of zooarchaeological and macrobotanical material from the Macgillivray site (DbJm-3). Macrobotanical remains consist of large carbonized plant material such as seeds, fruits, and stems. This term is used to differentiate the material from microbotanical remains, that usually consist of microfossils such as starch grains and phytoliths. Microfossil analyses have been successfully used to identify cultivated food remains in Boreal Archaeological sites (Boyd and Hamilton 2018; Boyd and Surette 2010). Such foods were previously not considered to have been a component of the diet in the region. Zooarchaeological analysis has not been routinely undertaken in the Boreal Forest mainly due to poor preservation and recovery.

This study had several objectives with the overarching goal of examining the diet of the Woodland period people in Northern Ontario: (1) investigate the impact that recovery method has on the recovery of organic material in the Boreal Forest; (2) examine the function of the Macgillivray site through the interpretation of organic material; (3) discuss the role of plants including goosefoot (*Chenopodium* spp.) and wild rice (*Zizania* spp.) in northern Woodland period diets; (4) discuss the taphonomy of organic material in the central Canadian Boreal Forest and emphasize the importance of macrobotanical and zooarchaeological analysis within the region.

1.2 Theory and Methodology

This thesis uses environmental archaeology as a theoretical and methodological approach. Environmental archaeology is both the study of the interactions between past humans and the environment (landscape archaeology, paleoecology) and the study of ecological elements as they relate to human behaviour (archaeobotany, geoarchaeology, and zooarchaeology) (Driver 2001). Dincauze (2000) defined three main goals to environmental archaeology: (1) historical goals focused on describing and understanding the environments that past cultures inhabited; (2) theoretical and philosophical goals, which include the study of the behaviours of humans within the environment; (3) policy goals, which use the knowledge gained from the first two goals to plan for the future.

Environmental archaeology is not a coherent body of theory, but a collection of methodologies useful for thematically investigating the environment (Albarella 2001). Environmental archaeologists may concern themselves with a different set of data than other specialists who study traditional artifacts, their goals are the same: the study of human behaviours (O’Connor 2001).

Although environmental archaeology is a productive mode of inquiry, it has its limitations. First of which is the employment of methods and concepts developed from other disciplines. Although this is not necessarily a limitation, the concepts, and theories in which these methods were developed need to be considered. Misused techniques and misapplication of theory can lead to oversimplification of interpretation and general errors. Environmental archaeology is often synonymous with scientific archaeology (Albarella 2001), but unlike the natural sciences, archaeology cannot be as empirical in its analysis. Interpretations obtained from analogue arguments need to be more tentative due to the nature of the data sets available to archaeologists. For example, the data obtained from ecologists by observing the ecosystem and the subjects in real time can be much more precise than the indirect inference of past events imperfectly represented in recovered material culture. Ecologists are able to quantify the populations and communities present and describe the resource patches in much finer detail. Archaeologists using similar ecological models would need to use the samples which they have available. Datasets available to archaeologists are incomplete and discontinuous, yielding few representative samples. Furthermore, human behaviour is complex and may lead to decisions that would be considered counterintuitive based on certain foraging models. Analogues from the ethnographic record may be inappropriate or inaccurate, as well. Hamilton (2000) proposed that the uncritical use of ethnographic analogy to model ancient Boreal Forest land use would introduce new biases. It would be inappropriate to project unprecedented behavioral responses to the fur trade upon thousands of years of pre-contact Indigenous settlement patterns (Hamilton 2000).

The archaeological record will never be complete enough to effectively validate behavioural models pertaining to food procurement and human ecology. This is especially the case for sites in the Boreal Forest. The nature of multi-component sites characterized by compressed-stratigraphy can results in limited hypothesis arriving from organic material. Within 5 cm of soil, material culture constructed one-thousand years apart can be found mixed together. Smaller organic material could easily move through the stratigraphic sequence, and some faunal material could be larger than the stratum containing the temporal period or occupation event it represents. This can make associating organic material with a specific time period difficult. This also leads to difficulties in interpretating changes in diet and foraging behaviours when relying on relative association.

The analysis within this thesis treats the organic material recovered from the Macgillivray site (likely deriving from multiple occupation over many decades) into a single analytic unit that generalizes about Woodland period land use strategies. This less than ideal circumstance seeks to offer insight while acknowledging the complex preservation, taphonomic and depositional challenges presented by this site. The interpretation of the organic material from the site will use abductive reasoning rather than using a theoretical model to generate a hypothesis. The interpretation of seasonality on the site will draw from the observable behaviour of animals within the region as well as the subsistence pattern of the Anishinaabe people documented within the ethnographic literature of the region. This is partly due to the lack of other sites reporting organic material in the Boreal Forest. It will critically examine the use of models based around expected values (e.g., Balmer 1983) for hypothesis generation.

1.3 Taphonomy in Northwestern Ontario

An important issue in the interpretation of the Boreal Forest archaeological record is the characteristics of its soils which profoundly affects the survivability of organic materials and the depositional interpretability of archaeological deposits (Cronyn 1990). Much of the Boreal Forest soil is podzolic. Podzolic soil develops from coarse to medium textured, acidic parent material commonly found under forest or heath vegetation in cool humid climates (Haynes 1998). General characteristics of podzol soil are an organic surface horizon, a light-colored eluvial horizon (which may be absent) (Haynes 1998). A reddish brown to black B horizon with an abrupt upper boundary and a lower B or BC horizon with colors that become more yellow in hue with depth, except in parental material with reddish-colours (Haynes 1998). The B horizons of podzolic soil have higher water-holding capacity than other soil orders of similar texture (Haynes 1998). Podzolic soils are quite acidic with a base saturation, as determined by unbuffered salt, nearly always below 80% and commonly less than 50%. This is significant as acidity in the soil results in quicker degradation of organic structures (Kibblewhite et al. 2015).

Furthermore, Boreal Forest soil can obscure readily identifiable features such as post-moulds and storage pits. Although processing pits have been identified by archaeologists in Northern Ontario (e. g. Dawson 1974; Rajnovich and Reid 1987), they have never been associated with wild rice or any other botanical material. This may be due to three issues. The slow accumulation and severe pedoturbation may result in regular mixing and disturbance of the sediment. Secondly, most sites were seasonal, and the human occupation density may have been low (Hamilton 2000). The repeated occupation on the surface may damage evidence of previous occupations. As well, widely dispersed test pits and 1 m^2 unit excavation may be suboptimal for the discovery of these features (Hamilton 2000). Lastly, the interpretation of shallow stains makes it difficult for archaeologists to properly identify and interpret these features.

1.4 Organization of this Thesis

This thesis is composed of five parts. Chapter 2 will discuss the current knowledge of the archaeological history of Northwestern Ontario. Chapter 3 focuses on archaeological sites within the study area, the Whitefish Lake basin. Next, Chapter 4 describes previous archaeological excavation conducted at the Macgillivray site and contains a review of the 2016 and 2017 excavations. Then, Chapter 5 discusses the methods used for the recovery and identification of organic material from the Macgillivray site. The results from the fine-sieving and flotation of soil samples collected from the site and the results of the examination of the macrobotanical and zooarchaeological recoveries from the site are summarized in Chapter 6. Finally, Chapter 7 will discuss the interpretation of the results of this study and their implication.

Chapter 2 – Archaeology of the Northwestern Ontario

2.1 Introduction

This chapter reviews the archaeology of Northwestern Ontario, where the Macgillivray site is located. This region does not exist in a cultural vacuum, so attention will also be given to archaeological finds in adjacent regions such as Manitoba and Minnesota.

The study area is located within an area identified as the central Canadian Boreal Forest, which lies south of the Hudson Plains, north of the Mixedwood Plains, and west of the Eastern Boreal province (**Fig 2.1**). Compared to Southern Ontario, the archaeological study of the area began relatively late, beginning in the mid 1950's (Dawson 1999). Recent interest in the study area has demonstrated that the way of life in the central Canadian Boreal Forest was much more complex than earlier researchers assumed (Boyd et al. 2013; Boyd and Hamilton 2018; Boyd and Surette 2010; Hamilton 2000; Wright 1987).

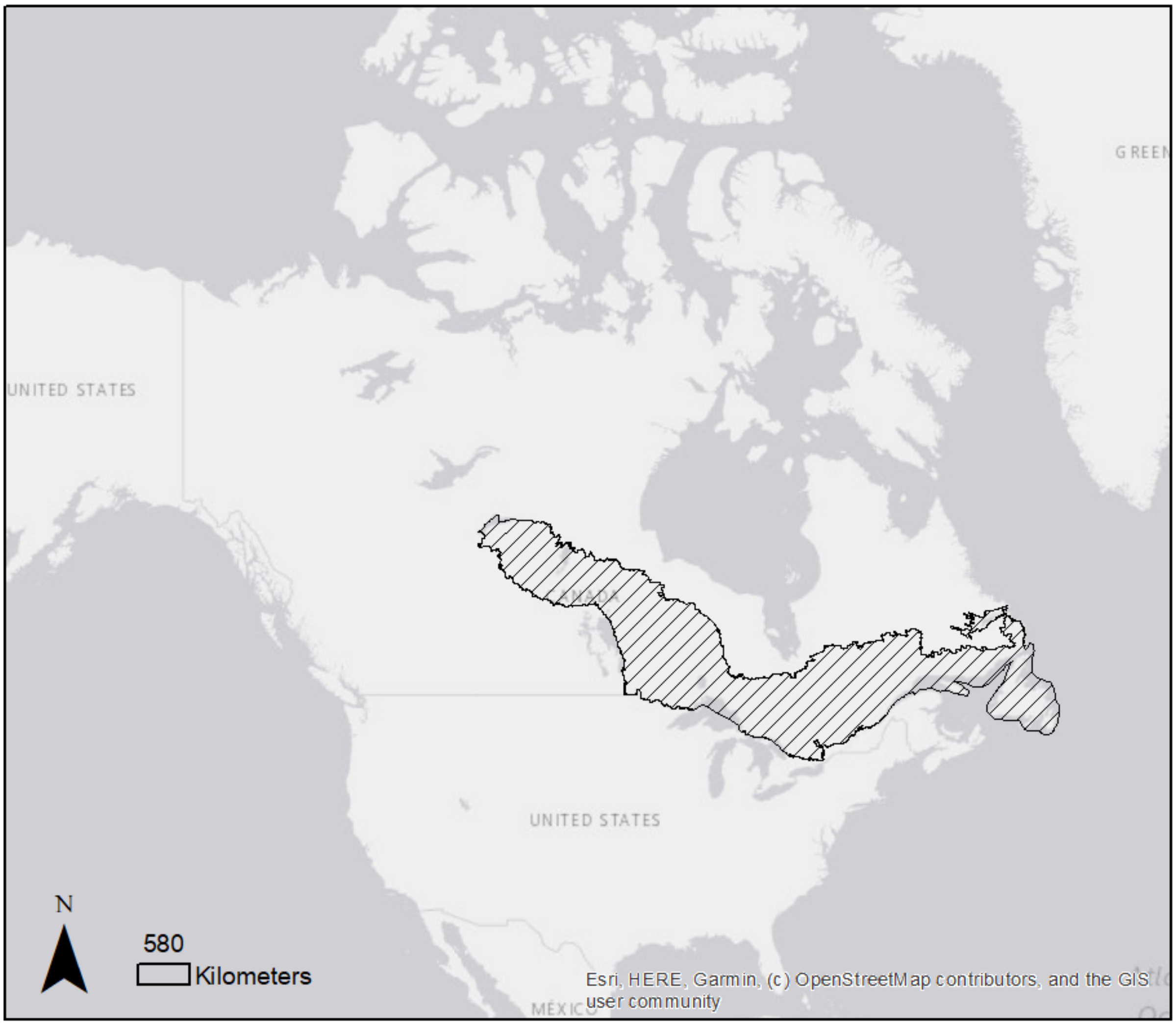

Fig 2.1: Map of the central Canadian Boreal Forest (Data obtained from Government of Canada 2017).

2.2 First Ancestors (~7000BCE- 4500BCE)

The earliest inhabitation of Northwestern Ontario occurred between 7000 – 4500 BCE, which is known as the Paleoindian period by earlier archaeologists (e.g., Dawson 1983; Julig 1984). Recent articles in Archnotes have brought into discussion the troublesome nature of the term Paleoindian since it is outdated and inappropriate for modern usage in Canada (Hazell 2019; Hinshelwood 2019; Sherratt 2019; Taylor-Hollings 2019). Hazell (2019) suggested the use of the term “First Ancestors” to acknowledge both the distinct relationship that Indigenous people have with their past and their traditional territory, while also mirroring terminology already used by First Nations. This term will be used in this thesis as a placeholder in hopes that an appropriate name for this period can be chosen in consultation with descendant communities.

The first peopling of Northwestern Ontario occurred following the last glacial retreat. The Thunder Bay region would have likely been unavailable for people to enter until the Laurentide Ice sheet retreated. However, even after the glacial ice had melted the environment would have been physically challenging due to the local climatic characteristics (Lowell et al. 2009). Research suggests that the first people to settle in the region would have originated from North Dakota, Minnesota and Wisconsin (Ross 1995). Comparison of tools recovered from the Boundary Waters and Quetico areas of Northwestern Ontario, as well from the Arrow Lake site (DaJn-7), demonstrates similarities with the technology used by people occupying locations to the south (Fox 1975). These similarities include the presence of what authors describes as Agate Basin, or a lanceolate, oblique flaked point style (Fox 1975). A more recent analysis of the projectile points from the Mackenzie I site demonstrates that several specimens share similarities with traits diagnostic of several complexes such as Goshen, Cumberland, Scottsbluff and Eden (Markham 2013). The similarities of the traits were considered superficial, and their characteristics indicate cultural influence from both the east and the west, suggesting that lithic traditions were being transferred throughout the area rather than being diffused from one geographic space (Markham 2013).

The Cummins site (DcJi-1) is one of the best researched First Ancestors’ sites in Northwestern Ontario and is located in Thunder Bay only 50 km from the Macgillivray site. The site was located on what would have been the beach edge of Glacial Lake Minong (Julig 1984). The tool kit associated with the site is a typical Plains Plano tool kit; with other tools such as trihedral adzes, heavy choppers and other steep-edged cutting tools which would imply some form of woodworking activity (Julig 1984). The environment of the Cummins site during the early Holocene would have been more of an open Boreal Forest environment, composed of spruce, tamarack and balsam firs with open areas dominated by grasses and forbs (Boyd et al. 2012). Some researchers suggest that the First Ancestors likely came to the Thunder Bay area during seasonal rounds to hunt large game (Julig 1984). Similarities with Plains toolkits (which was also found in Northern Wisconsin) and exotic lithic material found at Cummins site may also be due to widespread interaction between groups, similar to what is shown in First Ancestors groups in the South (Julig 1984).

Two possible First Ancestor sites the Old Tower Road (DbJm-6) and Billing Bridge (DbJm-32) are located near the Macgillivray site. There were no diagnostic tools associated with these sites and they were affiliated as with the period based on geoarchaeological interpretation (Schweitzer 2014).

2.3 Middle Period (Archaic) (4500 BCE - 500 BCE)

The transition between First Ancestors into the Middle period is poorly understood in most areas of Canada but particularly so in Northwestern Ontario. Even though the Canadian Shield occupies a very large area, there has only been a small number of sites dating to this period with a meaningful context reported or researched (Langford 2018). Due to this problem, early studies were very limited. Wright's (1972) initial study on the Middle period (name by him as the Shield Archaic), focused on just 11 sites from Nunavut, Ontario, Manitoba and Quebec. From this dataset, he concluded that the Shield Archaic developed from the early Northern Plano population in Nunavut and spread south and east throughout the shield (Wright 1972). Buchner (1980) questioned the validity of the Shield Archaic as a distinct cultural group, proposing instead that influences were present along the margin of the Canadian shield in the area that overlapped with other populations arguing that what Wright (1972) identified as Shield Archaic may just be seasonal camps of adjacent population travelling north. Langford (2018) argues that due to the early Holocene environmental transitions, a southern diffusion would be more likely. The diffusion is supported by trade networks already present within the First Ancestors period, which would likely still be used during the Middle period, especially as Glacial Lake Agassiz would have made the trade with First Ancestor populations in Nunavut difficult (Langford 2018).

Middle period sites are identified by a shift from lanceolate lithic tools to side and corner notch varieties (Wright 1972). In the southern Canadian Shield people began to use copper during this period, which they used to manufacture points, adzes, fishhooks and chisels (Wright 1981). Copper material from two Middle period sites Renshaw and Anderson Point dated to 5000 and 5300 cal yrs BP (Renshaw) and ca. 6800 Cal yrs BP (Anderson point) (Beukens et al. 1992). This demonstrates that the people of the Minnesota-Ontario border were utilizing copper by at least 5000 BCE (Beukens et al. 1992).

Compared to other regions, Middle Period sites in Northwestern Ontario have a toolkit that did not include the production of ground-stone tools, and when found in sites in this region, groundstone was often attributed to trade or contact with more southern populations (Langford 2018). Trade during this period is regarded as being brief and limited to the cultural boundaries (Langford 2018). Some recoveries from the period suggest otherwise, a burial at the Wapekeka site in Northwestern Ontario recovered a single ground and polished stone gouge (Hamilton 2004). Although the gouge could not be directly associated with the burial, Hamilton (2004) suggest that it may be the result of trade between middle groups in the Laurentian or Maritime regions. Trade with groups from the Plains is also present through the recovery of Knife River Chalcedony from North Dakota (Langford 2018). This material was also present on First Ancestors sites in Northwestern Ontario, however, was extremely rare (Langford 2018).

During the Middle period, people within Northwestern Ontario were probably following a seasonal round similar to their descendants in the later periods (Kuehn 1998). Abrupt changes to the climate cycle during the early Holocene may have affected the diversity of fauna/flora resources opening new microhabitats where new species may be found (Yu and Eicher 1998). This would broaden the diet of the people, as new food resources can become dietary staples within short periods of time (Krist and Brown 1994; Yu and Eicher 1998).

2.4 Middle Woodland Period (500 BCE- 1000 CE)

Early Woodland wares have not been identified in Northwestern Ontario, but they have been found in adjacent regions such as Northern Minnesota and Southern Ontario (Taylor-Hollings 2017). The Middle Woodland period saw the introduction of pottery and the use of small projectile points in Northwestern Ontario, and such places as at the Macgillivray site, the construction of small burial mounds. The Laurel composite was more than likely the first to produce pottery in the region (Mason

2001). Pottery is the most culturally diagnostic artifact class for this time period. It is defined by its conical and conoidal vessels with a smoothed surface finish, generally more coarse paste, and often with a variety of bosses, punctates, pseudo-scallop shell, dentate and dragged stamped decorative techniques (Dawson 1983).

2.4.1 Laurel Composite

There has been very little research on Laurel site density and population estimates. Often historic Anishinaabe groups are used as an ethnographic analogue (Mather et al. 1996). Laurel composite carriers would be composed of extended families that would gather during the warm months, and then split into smaller groups in the winter (Arzigian 2008; Mather et al. 1996). Laurel sites range from small campgrounds to a few larger communities based around a mound structure (Dawson 1983). Sites are occupied seasonally for long periods of time rather than continuous occupation (Dawson 1983). Features found on Laurel sites include hearths, post-moulds, and a variety of pits.

The chronology of the Laurel composite is controversial. Much of the early work on Laurel consisted of mound excavation with the chronology being derived from their fill (Arzigian 2008). Later work on habitational areas did demonstrate a bit of stratification, but most of the sites are multi-component and deposits co-occur with later complexes such as Blackduck. Coupled with slow soil accumulation in the Boreal Forest, stratigraphic interpretation is often difficult. Within Minnesota, there seems to be agreement that the Laurel composite existed between 200 BCE and– 800 CE, with calibrated dates concentrated between 150 BCE and– 650 CE (Arzigian 2008). However, dates in Ontario and Manitoba might be as late as 1100 to 1250 CE (Rapp et al. 1995).

Pottery from Laurel sites have been studied more thoroughly compared to other artifacts, and they are the primary diagnostic factor for Laurel components and phases. Reid and Rajnovich (1991) provided a Laurel ware chart describing different pottery styles and decoration found within Ontario. Mather et al. (1996) provided an updated description, which integrates types described by Stoltman (1974) and Lugenbeal (1976). These typologies are summarized in **Table 2.1.**

Lithics associated with Laurel assemblages include end scrapers, large side-notched points, large corner-notched points, small side-notched points and small-eared points along with a variety of scrapers, knives and other flint-knapped tools (Arzigian 2008). There were some changes in lithic technology from the Laurel component to Late Woodland period, such as the use of hard-hammer percussion being more common in Laurel and decreasing over time (Mather et al. 1996). There were also changes between platform preparation, the use of blades, the incidence of heat treatment, the use of certain raw materials, and the occurrence of different debitage types (Arzigian 2008; Mather et al. 1996). The preservation of faunal material is poor in Laurel component sites; however, there is evidence of worked bone including cut beaver incisors and antler harpoons, awls, and ornaments of animal teeth and bones (Arzigian 2008; Morey et al. 1996; Webster 1973).

Table 2.1 Laurel Pottery Decoration Typology

Type	Description	Source
Pseudo-Scallop Shell	Pseudo-scallop shell stamps are a form of linear stamping. The impressions appear as wavy lines either in vertical, oblique and/or horizontal patterns. These impressions can either be dragged and impressed rather than impressed and lifted, resulting in a stamp-and drag or push-and-pull motif. A secondary decorative pattern such as punctate or bosses occurs but is rare. This type of pottery decoration is most common in early Laurel sequencing, especially in the McKinstry phase; however, Bayesian modelling suggest that in the region Pseudo-Scallop Shell continues into the Late Woodland period.	(Dawson 1980; Mather et al. 1996; Mehault 2017 Stoltman 1974)
Dentate	Dentate decoration motifs are formed through the impressing of a notched or toothed stamp in the clay in vertical, oblique or horizontal rows. Sometimes these types will have secondary elements such as punctate or bosses. This type of pottery is most common in late Laurel sequences.	(Mather et al. 1996; Reid and Rajnovitch 1991; Stoltman 1974)
Incised	Incised decorative motifs are short or long incised lines in a vertical, oblique or horizontal pattern. These lines are widely spaced and straight, instead of curvilinear. This type is fairly rare and appears in very low frequencies on most sites.	(Mather et al. 1996; Stoltman 1974)
Bossed	The use of bosses by Laurel potters is often associated with the use of punctate. These types only have exterior bosses, with the interior punctate that formed them, usually in single evenly spaced row around the exterior of the rim. This technique is most common in the middle of the Laurel sequence, although it is found in some later transitional vessels.	(Mather et al. 1996; Reid and Rajnovitch 1991; Stoltman 1974)
Punctate	This type of decoration only has exterior punctate with corresponding interior bosses. Theses pots occur at very low frequency.	(Dawson 1980; Mather et al. 1996; Stoltman 1974)
Boss and Punctate	Within this category, bossing and punctate occur in an alternating pattern on the ware. This type of ware is more common in the middle of the Laurel sequence.	(Mather et al. 1996; Reid and Rajnovitch 1991; Stoltman 1974)

Oblique	This pattern consists of one or more rows of oblique or vertical stamping or incising around the rim without a horizontal motif. This motif is most common in the earlier phases of Laurel sequencing.	(Brandzin-low 1997; Mather et al. 1996, Stoltman 1974)
Plain	Laurel plain pottery lacks any exterior decoration. This type of ware is found in almost all Laurel assemblages, however, there is some debate as to whether it appears in greater frequencies in early, middle or late phases.	(Brandzin-low 1997; Mather et al. 1996, Stoltman 1974)
Cord-wrapped Stick	This motif has a rough exterior that was formed by pressing a fibre-wrapped paddle against its wall. Prior to Lugenbeal (1976) interpretation of this decoration being late Laurel, this motif was considered to be a Blackduck variant. These types appear very late in Laurel sequencing such as the Hungry Hall phase and they are sometime describe as Laurel-Blackduck transitional vessels.	(Lugenbeal1976; Mathers et al. 1996; Reid and Rajnovich 1991)

Other artifacts found on Laurel sites include copper and ochre. Copper tools from Laurel sites tend to be small and consist of awls, pressure flakers and beads (Arzigian 2008). Trace-element analysis of copper sources suggests that Laurel copper artifacts from the River Point site south of Ely, Minnesota has a source area in Minong, Wisconsin (Rapp et al. 1990). Both yellow and red ochre can be found on Laurel sites. They are mostly associated with burials, although both can also be found in smaller frequencies in habitation areas (Arzigian 2008).

2.4.2 Brainerd Complex

Until recently, the most common Middle Woodland sites in Northwestern Ontario were Laurel composite. However, a few examples of Brainerd wares have recently been identified at the Martin-Bird site (Boyd et al. 2014) and now at the Macgillivray site (Jill Taylor-Hollings, personal communication 2020). Brainerd ware has two distinct types of surface treatment – net impressions and horizontal cord marking (Arzigian 2008). Brainerd wares may represent some of the earliest pottery in Minnesota (1000 BCE – 400 CE) (Arzigan 2008).

Few single-component or spatially separable Brainerd components exist within Northwestern Ontario and Minnesota, resulting in a poor understanding of this complex beyond pottery analysis (Arzigian 2008). Some suggest that the Brainerd people were too highly adapted to the prairie-forest ecotone and as the ecotone collapsed with the late Holocene environmental changes, and as the forest began to take over the area, the complex declined (Hohman-Caine and Goltz 1995). This argument is flawed as Hunter-gatherers could easily adapt to a long and slow period of environmental change, and as seen in the Late Woodland period, the Blackduck complex and other hunter-gatherers' groups would cross the prairie-forest boundaries easily. The Brainerd complex relationship with the Laurel composite is unclear. The two can be found together on archaeological sites, however, it is uncertain whether one precedes the other or if they overlap significantly, as the dates suggest. The relationship between Brainerd and Avonlea, a northern Plains archaeological affiliation (points and pots), also needs to be examined, as Early Avonlea begins at about 450 CE which overlaps with the ending of the Brainerd complex (Meyer and Hamilton 1994).

2.4.3 Middle Woodland Period Diet

There is very little evidence available for reconstructing the diets of Indigenous people for the Woodland period in Northwestern Ontario; however, there is more information than in earlier times. A small number of faunal reports and subsistence research have been produced in Northwestern Ontario, and more advanced biomolecular analyses have been conducted (e.g., Boyd and Hamilton 2018; Boyd and Surette 2010). This section will focus on evidence of dietary reconstruction for Laurel composite sites as it relates to the Macgillivray site.

Pottery was developed for several reasons, but it may have allowed for new ways to prepare or process food resources. Although there are other methods for heating water, pottery became a more effective tool for preparing meals (Skibo et al. 2016; Speth 2015). Within the Great Lakes region, there is some debate on why pottery was adopted. Using bulk nitrogen and carbon isotope analysis, and Gas-Chromatography coupled Mass-spectrometry (GC-MS) of 143 Vinette 1 potsherds, an Early Woodland period complex, Taché and Craig (2015) conclude that the invention and widespread uptake of pottery throughout northeastern North America was associated with the preparation of aquatic resources. Skibo et al. (2016) assumed that this model could not be applied to the Great Lakes region, as ethnographic sources during the contact period and in modernity demonstrated that the Anishinaabe people would rarely boil fish, and it was far more likely for them to cook fish by spit-roast or smoking. Skibo et al. (2016) conducted GC-MS focusing on fatty acid distribution on pottery sherds from three different sites in the Lower Great Lakes region, including Laurel sherds from Noamikong point, Minnesota. Their results suggest that early pottery within the Great Lakes region was primarily used for stewing vegetables and meats, the processing of acorns, and the rendering of nut oils (Skibo et al. 2016). Taché et al. (2019) replied to the Skibo et al. (2016) article suggesting that their method of relying on fatty acid distribution was not robust enough to detect the fatty acid of fish as this method failed to identify fish lipids from Thule site with an obvious fishing economy (Taché et al. 2019). This is partially due to the higher susceptibility that fish fatty acid has to post-depositional oxidation (Taché et al. 2019).

However, within Northwestern Ontario, Laurel pottery is found outside the northern range of oak (*Quercus* spp.) and pottery vessels tested within the region do not contain an abundance of oak starches (Boyd et al. 2018). Boyd et al. (2018) argues rather that pottery may have been adopted for ceremonial reasons rather than solely for utilitarian purposes. They argued that the labour needed to construct pottery and their weight may not have been worth the effort for mobile groups especially when organic containers such as those made out of birch bark were available (Boyd et al. 2018). As food residues on Woodland vessels in the southern Boreal Forest demonstrated high frequency of domesticated plants, such as maize, pottery vessels may have a stronger connection to special meals that accompanied important ceremonial events (Boyd et al. 2018). Cultivated plants may have been highly valued both for their nutritional value and rarity within the Subarctic (Boyd et al. 2019). As the Woodland period in many places is associated with an increase in intense intergroup interaction and communal feasting, pottery may have been used to signal social identity and convey information about social boundaries during communal feasts (Boyd et al. 2018).

Due to preservation issues within the Boreal Forest, the amount of direct data on Laurel subsistence is limited. Laurel composite groups are described as having a mixed hunter-fisher-gatherer economy with seasonal rounds that exploited seasonally and locally abundant fish, large and small game, and plant foods. Where these resources aggregate in large enough quantities, large groups of people would gather and then disperse when food sources were scarcer such as during winter (Arzigan 2008).

Major faunal resources on Laurel sites often include sturgeon, pike, suckers and other fish as well as moose, beavers, other small mammals in the southern Boreal Forest ecotone, and bison in the Prairies (Arzigan 2008). There are few detailed reports of substantial, well-collected and thoroughly analyzed assemblages of faunal remains from Laurel composite sites, but those that do exist present contradictory trends, which is most likely due to recovery method (Arzigian 2008; Morey et al. 1996). Morey et al. (1996) reported a decrease in the representation of sturgeon bones, which were considered to be common on Laurel sites. The authors also reported that samples coming from the larger sieves overrepresented sturgeon and moose, while smaller species such as suckers were more dominants in the smaller screens (Morey et al. 1996).

As for floral remains, very little evidence of macrobotanical remains has been recovered from Laurel composite sites (Arizigan 2008). There is evidence for the consumption of North American cultigens with maize starch and phytoliths recovered from Laurel pottery sherds, and some resources such as goosefoot (*Chenopodium* spp.) could be a possibility (Arizigan 2008; Boyd and Hamilton 2019; Boyd and Surette 2010). It can be assumed that even at the most northern Laurel sites, they would have had access to edible plants; however, due to the preservation and recovery methods little is known about the consumption of plants by the Laurel composite people.

Wild rice (*Zizania* sp.) grains were found in some Middle Woodland sites. Small quantities were recovered at the McKinstry site, and a possible processing feature might be present at the Big Rice site (21SL163) north of Virginia, Minnesota. Wild rice grain from three pits associated with Laurel wares from the Big Rice Site AMS dated to the Middle Woodland period (35 BCE – 229 CE) (Rapp et al. 1990; Valppu 1996; Valppu and Rapp 2000). Wild rice was also identified as a phytoliths from pottery at the Big Rice site (Burchill 2014). If wild rice was gathered as a part of their seasonal rounds the transition to a complex focusing on the harvesting of wild rice would have social, cultural and settlement implications. Due to the multiyear variability in harvest yield, it would require bands to rely on multiple rice beds in multiple areas to ensure at least one good crop in any given year (Arzigian 2008).

2.5 Late Woodland Period (500 CE-1650 CE)

The Late Woodland period is marked by a new trend in manufacturing pottery wares in a globular form, often with fabric or textile impressed exteriors. Lithics are characterized by the appearance of smaller projectile points that would have been used in bow and arrow technologies. Identified Late Woodland pottery wares within Northwestern Ontario including Blackduck, Duck Bay, Bird River, several new wares from the Lac Seul area, Sandy Lake, and Winnipeg Fabric-impressed (of the Selkirk composite) wares (Taylor-Hollings 2017). Those Identified at the Macgillivray site will be discussed.

2.5.1 Blackduck Complex

The Blackduck Complex is the earliest Late Woodland culture in Northwestern Ontario, the Blackduck complex, centred on the Subarctic and northern section of the Eastern Woodland between 800 CE – 1400 CE (Nicholson et al. 2006). Blackduck wares have been identified from excavations at the Macgillivray site and the Martin-Bird site (Hamilton 2009). They also occupied the Plains of

Southwestern Manitoba until completely retiring to the Boreal Forest by 1300 CE (Nicholson et al. 2006). After this complex was replaced by the Vickers Focus and other complexes such as Mortlach in southwestern Manitoba (Nicholson et al. 2006). Prior to this, seasonal round models suggest that they would occupy forest biomes during the spring where they would rely on fish. In the summer, they would move into the parklands to hunt bison and harvest other resources (Nicholson et al. 2006). In the fall, the Blackduck people aggregated at sites suitable for bison mass kills– these groups would then split, with some returning to the Boreal Forest for the winter to hunt game, while others may stay in the Parklands (Nicholson et al. 2006). However, this scenario ought to be treated as speculative as only a few aspects of the Blackduck's seasonal round appear within the archaeological record (Arzigian 2008).

People of the Blackduck complex would follow rivers and lakes from region to region, marked in some areas by burial mounds constructed in the Middle Woodland period which formed a part of their ceremonial practices (Nicholson et al. 2006). In Northwestern Ontario and Minnesota, this movement may be responsible for why there are so few single-component Blackduck sites as they would occupy the same location that were successful in the previous Middle Woodland period (Arzigian 2008). Many Blackduck sites also have earlier Laurel components to them, demonstrating repeated use over time.

The cultural origin of Blackduck is debatable since they are located in all areas that the Laurel composite previously occupied, which either suggests an in-situ development out of Laurel or a population replacement (Arzigian 2008). Some researchers have argued that Laurel and Blackduck were partially contemporaneous and that the Blackduck complex moved into the Boreal Forest from the south (Dawson 1983; Graham 2005). Another hypothesises proposes that Blackduck ware originated from west of Lake Ontario via the Princess Point culture (Buchner et al. 1983), while some argue that Blackduck and Laurel coexisted for several hundred years until they merged to produce transitional wares (Hamilton 1981). Lenius and Olinyk (1990) went so far as to propose the Rainy River Composite, a group of sites and complexes supposedly formed during the Minnesota Early Blackduck period (Arzigian 2008).

As for linking the Blackduck complex with a successor, some argue for historic groups of Siouan-speaking Nakota (Macneish 1958; Vickers 1948; Wilford 1945, 1955), while others have tried to link them with Algonquian-speaking Anishinaabe people (Dawson 1976; Johnson 1969; Steinbring 1980). This argument may, however, be pointless, as indeed directly prior to European contact Northwestern Ontario was inhabited by Algonquian-speaking peoples. The ethnic division between groups known as the Ojibwe and Cree in Northwestern Ontario are a colonial-construct and held little importance before the arrival of Europeans (Arzigian 2008; Mather et al. 1996). As an example, Greenberg and Morrison (1982) argue that the emergence of the Ojibwe people North of Lake Superior was not a result of population explosion and migration into areas abandoned by the Cree people, but that the term Ojibwe spread into the region. In other words, the residents of Northern Lake Superior did not move, Europeans just began referring to them as Ojibwe (Greenberg and Morrison 1982).

There are no generally accepted typological schemes for Blackduck wares, although several have been proposed (Arzigian 2008; Dawson 1974; Lenius and Olinyk 1990; Lugenbeal 1976; Macneish 1958; Meyer and Russel 1987). In Minnesota, Blackduck wares are divided into two periods, Early and Late Blackduck. This is based on the geographic and temporal variation evident in the assemblages (Arzigian 2008). Blackduck ceramics are complex, exhibiting variation in the time and space, being found from Saskatchewan to Quebec and in Northern Minnesota (Coté and Inksetter 2001; Hamilton et al. 2007;

Nicholson et al. 2006). Because of this many researchers have independently defined and proposed typologies used for identifying decorative motifs, with very little cross-referencing between authors (Mather et al. 1996). Even though a universal taxonomy of Blackduck wares is not fully accepted, it is agreed that there are some universal attributes of Blackduck wares such as it being defined as a globular vessel with a constricted neck, rounded shoulder, flared rim, lip with a thickened wedge rim (Mather et al. 1996). Decorations consist of surface treatment by cord-mark impressions and circular punctates and diverse stamp forms on the interior rim, lip, exterior rim and neck, while body sherds are often not decorated (except for textile impressions) (Rapp et al. 1995; Arzigian 2008). Blackduck wares can be further broken down into three categories: large vessels with a conoidal or sub-conoidal base, more globular medium-sized vessels and small mortuary vessels (sometimes referred to as miniature vessels) (Wilford 1945).

Lugenbeal (1976) was one of the first researchers to refine the Blackduck complex in Minnesota. He identified several different phases within both Early and Late Blackduck complex based on decorative motifs, but these variations need to be further refined in terms of their stratigraphic relationship (Lugenbeal 1976). This taxonomy is particular to Minnesota and is more detailed than those used by Canadian researchers (e.g., Carmichael 1977; Dawson 1976).

Lithics associated with Blackduck composite include projective points that are unnotched and notched triangular points, Prairie Side-Notched and Plains Side-Notched points (Arzigian 2008; Lugenbeal 1976). These points are similar among Late Woodland cultures and diverse groups found throughout the northern Plains. Other lithic tools include end scrapers, oval and lunate knives, side scrapers, trapezoidal end scrapers, thumbnail scrapers, drills, steatite and clay pipes (Arzigian 2008). As many Blackduck complex sites are multi-components, it is difficult to directly associate worked bone, antler, and shell directly with Blackduck deposits due to bioturbation and other factors. Bone tools found in this context include bone awls, unilaterally barbed harpoons, flakes, bone spatulas, cut beaver incisors, and bear canine ornaments (Arzigian 2008). Other artifacts associated with Blackduck pottery include copper fishhooks, copper gorges and beads (Arzigian 2008).

During the Late Woodland period, sites tended to be larger and more numerous, suggesting a population increase from the Middle Woodland period (Dawson 1983; Mather et al. 1996). Several possible houses have been reported during this period. An Early Blackduck house at Petaga Point (21ML11) was described as rectangular, 6 x 11 m in size, a 2m entrance and a floor that was 50 cm below the original ground surface. The house was marked with post-moulds around its parameter and had an interior hearth (Arzigian 2008). This structure is very similar to those found in the Middle Missouri tradition (Arzigian 2008). Within Ontario, Dawson (1983) notes that features are uncommon on Blackduck sites but hearths, cache pits, and some post-moulds have been found.

2.5.2 Psinomani Culture/Sandy Lake Ware

Sandy Lake ware of the Psinomani culture was first identified in Minnesota by Cooper and Johnson (1964). It is now found across a wide geographic range and pottery sherds have been found in the Eastern Woodland, central Canadian Boreal Forest, and Plains ecotones (Taylor-Hollings 2017). Sandy Lake vessel are globular in shape with vertical or s-shaped walls, thickened at the shoulders and thinning towards the lip (Taylor-Hollings 1999). They are classified either as smoothed or corded exterior surface finished with plain or notched decorations (Cooper and Johnson 1964). In Northwestern Ontario, Sandy Lake wares may have a row of punctates/bosses, but the standard Sandy Lake vessel still appears within the region (Arthurs 1978; Taylor-Hollings 2017). Several Sandy Lake and Winnipeg Fabric-impressed vessels have been identified at the Macgillivray site during the 2016 and 2017 excavations.

Winnipeg Fabric-impressed ware of the Selkirk composite are composed of several regional complexes, but they are all globular in shape with fabric-impressed exteriors (Meyer and Russel 1987; Taylor-Hollings 2017). Decoration of vessels usually only include a single row of punctates but can be up to three on Clearwater Lake Punctate type vessels (Meyer and Russel 1987).

The earliest dates for the Selkirk composite are from northern Manitoba (Ca. 850 BP), which led to the interpretation that they originated from that area and moved down to more southern areas (Meyer and Russell 1987). Meyer and Russell (1987) suggested that the Selkirk composite assemblage represented the material remains of an interaction between late Laurel groups and Blackduck groups. Taylor-Holling (2017) suggest that there were multiple migrations of Anishinaabemowin speakers into Northwestern Ontario based on the oral history from current residents. The traditional migration oral history suggests an arrival into the region around 400 CE (Benton-Banai 1988). These arrivals correlate with the arrival dates of the Selkirk composite into the region suggesting that some of those people were early Algonquian speakers (Taylor-Hollings 2017).

2.5.3 Late Woodland Diet

There are few comprehensive faunal studies from the Whitefish Lake area or larger Northwestern Ontario context. This sections mainly focuses on the seasonality data that could be obtained for sites near the Macgillivray site. From the limited evidence, Late Woodland diets are considered to be similar to those of the Middle Woodland period, but archaeological evidence suggests more rigid seasonal rounds coupled with technological innovations (Arzigian 2008; Nicholson et al. 2006; Rapp et al. 1995). These analyses suffer with the same problem with taphonomy and recovery methods as the Middle Woodland period. There is still a bias for larger, more easily identifiable species such as beavers, cervids and large fish. There are a variety of Blackduck sites that demonstrate fishing and hunting activities: spring spearing of sturgeon; late summer fishing for suckers and other species; exploitation of riverine small mammals such as beavers; and hunting of large mammals such as cervids and bison (Hamilton et al. 1981; Lugenbeal 1976; Rapp et al. 1996).

In Northwestern Ontario there are at least four sites where extensive zooarchaeological analyses have been conducted. One in the Whitefish Lake area: McCluskey (DbJm-2) and three are in the Lake of the Woods area: Ash Rapids West (DjKq-5), Ash Rapids East (DjKq-4), and the Meek Site (DjKp-3). Dawson (1974) commissioned the McCluskey zooarchaeological report. It was conducted by James Burn, a student working within Howard Savage's zooarchaeology lab at the University of Toronto. Balmer (1983) analyzed the three faunal assemblage in the Lake of Wood region to assess the usefulness of zooarchaeological analysis on Woodland period sites in a Boreal Forest context.

The McCluskey site (DbJm-2) is located on the northeastern shore of Whitefish Lake and was also found by Dawson (1974). The stratigraphy of the site was disturbed by recent human activities. **Chapter 3** discusses this site in more detail. **Table 2.2** summarizes the faunal material recovered from the site (Dawson 1974). Due to the disturbed context of the McCluskey site, the faunal assemblage was split between surface remains and those below the surface, rather than by level, loci or component (Dawson 1974). However, the analyst noted that even this separation may be arbitrary. Evidence of post-contact period domesticated animals such as *Bos taurus* (domesticated cow), *Gallus gallus* (chicken) and *Felis catus* (domesticated cat) were present in the surface collection. The fish recoveries consisted of 10 bones, which based on the colour and state of preservation, were concluded to be recently caught pickerel (*Stizostedion* sp.) (Dawson 1974). The fish remains were both below and at the surface, suggesting a potential issue with the reliability of associating some of these faunal remains with a Woodland component. Dawson's (1974) does not report the unit, depth, or association of the faunal material, which may have helped in identifying modern intrusion versus possible archaeological material. Overall, the assemblage was composed of 252 specimens, with mammals' bones being the dominant class (83% of the assemblage). The assemblage had a low Minimum Number of Individual (MNI); therefore, Number of Identifiable Specimen Present (NISP) was used to quantify the material. MNI is the calculation of the minimum number of individual animals that could account for the assemblage. This calculation is based on the number of reoccurring elements belonging to a given species. NISP is the calculation of the overall abundance of specimens identified as a certain species rather than the number of individuals. The analyst may have chosen NISP over MNI due to the assemblage containing overly fragmented specimens. The three most abundant species were beavers, black bears, and the common loon. Of the assemblage, 100 bones were burnt, including one duck leg bone, several beaver bones, one bear phalanx and one elk phalanx (Dawson 1974). The analyst attributed the large number of burnt bones within the assemblage as a result of calcined bone degrading slower than unburned bones in acidic soil, therefore improving the survivability of the former (Dawson 1974). It remains unclear why the second half of the assemblage survived despite its uncarbonized condition. Based on the avian species present it can be inferred that the site was occupied minimally in the spring or fall as most species are present in the area during those seasons (red-throated loon, and Canada goose), and four are present from spring to fall (ring-necked duck, common merganser, red-breasted merganser, and bald eagles) (Dawson 1974).

Table 2.2: Fauna Material Recovered from the McCluskey Site (Taken from Dawson 1974:84-86)

		NISP (MNI)		
Taxa	Common name	McCluskey (Surface)	McCluskey (Below Surface)	Total
Mammalia	Unident. Mammals	144	24	168
Castor canadensis	Beaver	17	4 (2)	21
Erithizon dorsatum	Porcupine	2	1	3
Carnivora	Unident. carnivores	2	1	3
Ursus americanus	Black Bear	6	2	8
Felis catus	Domestic cat	1	0	1
Alces alces	Moose	2	1	3
Bos taurus	Domestic cow	1	0	1
Cervus canadensis	Elk	1	0	1
Aves	Unident. birds	2	19	21
Gavia immer	Common loon	0	6(2)	6 (2)
Gavia sp.	Loons	0	1	1
Aythia collaris	Ring-necked duck	0	2	2
Mergus serrator	Common merganser	0	3	3
Anas sp.	Duck	0	1	1

Haliatus leucophalus	Bald eagle	0	2	2
Gallus gallus	Domestic chicken	2	0	2
Actinopterygii	Unident. fish	3	3	6
Stizostedion sp.	Pickerel	4	0	4
Testudinae	Turtles	1	0	1

All three Lake of the Woods sites demonstrated reliance on mammals from aquatic habitats. Balmer (1983) found the lack of fish remains to be surprising based on the ethnographic literature and early journals from the Hudson's Bay Company post at the Lake of Woods, which describes hundreds of pounds of sturgeon being traded. Although sturgeon is reported as an important resource on Woodland period sites in Minnesota and has been identified in faunal assemblages (Morey et al. 1996), their skeletal system is mostly composed of cartilage with only a few ossified plates in the skull. This can result in rarer preservation of this species. Both Ash Rapids sites were occupied continuously in the spring, but there was a richer proportion of species on the West site, but lower density of specimens overall compared to the East site. Due to this, Balmer (1983) interpret the Ash Rapids West site was the primary occupation, and the East site may have been a processing area.

There are several issues with the zooarchaeological interpretation of the three Lake of the Woods sites. Balmer (1983) identified all specimens besides *Canis* sp. and *Ictalurus* sp. to the rank of species. There is no reporting of unidentifiable remains, or general categories such as "medium mammal". This confidence in identification is suspicious given that most osteological recoveries from archaeological sites in Northwestern Ontario are heavily fragmented and weathered.

There are also issues with the use of the ethnographic record as an analogue for animal procurement. Certain behaviours documented may be a result of the fur trade rather than traditional activity. For example, Balmer's (1983) suggested that the presence of animals such as muskrat and beaver to be indicators of a spring habitation but trapping these animals during this season could have been encouraged by European traders who wanted the fur while they were in their prime. Although more concrete seasonal indicators such as through the analysis of fish scales, otoliths, vertebral centra, migratory birds and tooth cementum would be preferred they are rarely possible in a Boreal Forest context. This is again due to issues of preservation, weathering and fragmentation of osteological material which makes these analyses difficult. It is also an issue of sampling, there are very few faunal assemblages within the region with an unambiguous context and as these sites were used continuously, their purpose and seasonal occupation may have changed.

Balmer (1983) compiled the abundance of faunal material from 16 other sites within the Northwestern Ontario, Eastern Manitoba, and Northern Minnesota. **Table 2.3** summarizes the abundance by class rank orders and the three most abundant species from each site. All the sites are dominated by mammal species. This does not necessarily prove the importance of mammals over other classes but could be the result of the recovery method used and differential preservation. Sample size does not fully affect the richness of mammalian species present. The composition of the faunal assemblage demonstrates strong inter-site similarities, often beaver is one of the most abundant species, moose is never the most abundant, but in nine sites it falls in second and third place (Balmer 1983). The dominance of beavers may be explained by their very distinctive morphology, which makes them easier to identify compared to more generalize terrestrial mammals. Balmer (1983) interprets this as the site being occupied during seasons of low hare population, or that they were not heavily exploited prior to the contact period. This could be the case, but it could also be the recovery method, as hare bones are quite small.

Table 2.3: Frequency of Fauna Material from Sites in Northwestern Ontario, Eastern Manitoba, and Northern Minnesota, Number Within Parenthesis Represents the Richness of the Class (Balmer 1983).

Site	Mammalia	Aves	Actinopterygii	Reptilia	Three Most Abundant Mammalian Species (NISP)
Kame Hills	34908 (12)	61 (5)	923 (4)	-	Beaver (334), Caribou (176), Muskrat (94)
Sil 257	244 (9)	24 (2)	41 (1)	-	Caribou (59), Beaver (35), Muskrat (33)
Notigi Lake	806 (9)	117 (-)	38 (3)	-	Beaver (121), Muskrat (67), Hare (12)
Wapisu Lake	17581 (7)	8 (-)	118 (2)	-	Beaver (81), Lynx (10), Muskrat (9)
Tailrace Bay	9595 (18)	2515 (34)	10498 (7)	5 (1)	Hare (341), Beaver (216), Moose (192)
LM-8	757 (7)	156 (2)	30 (2)	-	Beaver (18), Lynx (10), Muskrat (9)
Potato Island		Amount Not Specified			Beaver, Hare, Moose
Wenesaga Rapids		Amount Not Specified			N/A
Fisk	2350 (6)	13 (1)	25 (1)	80 (1)	Beaver (28), Deer (3), Moose (2), Muskrat (2)
Ash Rapids West	2133 (11)	219 (10)	576 (4)	209 (2)	Muskrat (119), Beaver (91), Moose (9)
Ash Rapids East	3355 (10)	123 (9)	98 (3)	218 (2)	Muskrat (169), Beaver (73), Hare (38)
Meek	2650 (14)	45 (4)	378 (3)	278 (2)	Beaver (168), Moose (62), Muskrat (38)

Long Sault Middle Woodland	2464 (8)	11 (1)	424 (4)	1 (1)	Beaver (21), Moose (6), Muskrat (2)
Long Sault Late Woodland					Beaver (135), Moose (27), Muskrat (6)
Smith Village	5092 (14)	37 (4)	4503 (1)	29(-)	Beaver (1086), Moose (42), Muskrat (38)
Smith Mound 4	559 (13)	15(4)	32(-)	-	Woodchuck (59), Muskrat (31), Beaver (25)
McKinstry Mound 1	2670(19)	48 (4)	4560 (3)		Beaver (382), Moose (191), Woodchuck (65)
Pike Bay Mound	154 (6)	-	3 (-)	-	Woodchuck (29), Hare (26), Beaver (11)
Lady Rapids	Amount Not Specified				Beaver, Muskrat, Moose
McCluskey	204 (5)	39 (7)	10 (1)	1 (1)	Beaver (21), Bear (8), Moose (3)

Avian remains mostly consisted of waterfowl; however, they appeared in incredibly low numbers. The Tailrace Bay site had a large amount of bird remains, but this may be due to the site being on a major migration route at the edge of the prairie duck breeding ground (Balmer 1983).

Most sites had an exceedingly small number of fish remains present, which is surprising as most of the faunal material would suggest that these sites were occupied during the spring, and the importance of fishing in the ethnographic literature would imply that fish remains should be more abundant (Balmer 1983). Tailrace Bay, Smith Village and McKinstry Mound 1 sites are exception to this observation, as they have fish bones numbering the thousands and outnumbering the NISP of mammals. These sites have a different sediment profile however, they are in a mixed-deciduous forest zone with rich alluvial and overbank flood sediment. This may result in less intensive podzolic conditions compared to more northern sites. The most common fish identified on these sites were sturgeon and pikes, which were well represented at Tailrace Bay (Balmer 1983). Fall spawning fish, such as whitefish and lake trout appeared to be poorly represented at these sites (Balmer 1983). The fact that many of these sites are interpreted as spring occupation but produce very few fish remains raises questions about (1) how the material was recovered, (2) the subsistence strategy of the Woodland period people, (3) if the seasonality is correct, and (4) the cultural behaviour of the people and how it affects the deposition (Balmer 1983).

To summarize the faunal assemblages from these sites: It would imply that beaver and moose were an important part of the Woodland period diet. Most of these sites were located near aquatic habitats and were occupied in the spring– but fish remains were low, suggesting a systematic bias in the subsistence data.

Similarly, as for the Middle Woodland period, macrobotanical remains are quite rare on Blackduck complex sites. Many archaeologists have written about the intensification of wild rice harvesting within this period; however, this is mostly hypothetical and based on circumstantial evidence such as sites being near wild rice stands, the presumed availability of wild rice and the assumption that if wild rice was available it would have been consumed (Arzigian 2008). At the Big Rice site, two wild rice grains were AMS dated to 894-1410 CE suggesting that they belong to the Late Woodland period, but the feature contained both Blackduck and Laurel pottery (Valppu and Rapp 2000). Wild rice phytoliths were identified on two pottery sherds from the Big Rice site (Burchill 2014). Several other wild rice grains were found in Middle-Late and Late Woodland strata at the McKinstry site, although not in a feature or directly associated with diagnostic artifacts (Valppu 1996). Michlovic (2005) identified maize phytoliths from residues on the interior of two Blackduck vessels from site 21CY39, but he did not think the inhabitants of the site had grown maize, but rather it was obtained through trade with farming communities along with lithic material such as Knife River flint or Grand Meadow chert.

At the Martin-Bird site (DbJm-5), which is also located on Bishop's Island, microfossil analysis identified starch and phytolith of cultigens on a variety of Woodland pottery (Boyd and Hamilton 2018). Starch analysis always has a risk of contamination, especially when it comes to the identification of maize, as corn biproducts are ubiquitous. To eliminate the possibility of contamination the authors used several methods of control (Boyd and Hamilton 2018). A high proportion of the samples (70%) from Martin-Bird yielded domesticated food remains. Evidence of maize was frequently found in more than one form (both in starch form and as a phytolith) (Boyd and Hamilton 2018). Wild rice was recovered in most of the same vessels that recovered maize suggesting they were cooked together (Boyd and Hamilton 2018). The other two cultigens of the Three Sisters crop complex were recovered less frequently; common bean (*Phaseolus vulgaris*) starch was recovered from four of the samples, and only one squash (*Cucurbita* sp.) phytolith was recovered (Boyd and Hamilton 2018). Furthermore, preliminary microfossil and soil chemistry surveys conducted on the site resulted in the identification of domesticated plant remains and wild rice found in association with the fire-cracked rock (FCR) pavement, which raises the possibility that some of the maize consumed at the site may have been grown or processed on the island (Barry 2017; Boyd and Hamilton 2018). The presence of Middle Woodland pottery also suggests an early introduction to these domesticated plant foods (Boyd and Hamilton 2018).

2.6 European contact (1615 CE - Present)

The start of this period is marked by the introduction of European trade goods into the region. Trade goods include non-Indigenous artifacts made out of glass, ferrous metals as well as a variety of ceramic material such as porcelain. Contact with Europeans profoundly changed the economy, settlement pattern and subsistence of the Indigenous people in Northwestern Ontario. This section will discuss the archaeology up to the expansion of the Fur Trade and its effects on the Indigenous people, it will not discuss Euro-Canadian archaeological sites, or the post-1900 CE settlement history.

2.6.1 Early Contact (1615 CE – 1821 CE)

There are no known early contact period sites in Northwestern Ontario with written documentation (Dawson 1987a). Prior to 1650 CE, Europeans did not make a significant effort to enter the interior of the country. Trade goods were brought into the interior of Canada through second-hand trading with other Indigenous groups or through piracy (Tooker 1964). Direct European trading in Ontario began to intensify between the French and Wendat, an Iroquoian-speaking group from Southern Ontario, approximately 1600 CE (Tooker 1964). This trade was motivated by the search for fur; the Wendat would trade with the surrounding Algonquin-speaking groups and then transport the furs to Quebec (Tooker 1964). The Wendat kept their sources a secret from the French in order to monopolize the trade. Both the Wendat and the Neenoilno, an Algonquian-speaking group that inhabited Quebec and Labrador, refused to take them to the Saguenay river for trade and the others would refuse to take them on their hunting trips (Tooker 1964). The Wendat were at war with the more Southern Haudenosaunee people, eventually, raids, and ambushes, by both the Haudenosaunee people and less friendly Anishinaabe groups, made trading difficult, affecting the supply of European goods into the interior (Tooker 1964). By 1650 CE the Wendat people were displaced from Southern Ontario (Tooker 1964).

The earliest recorded European to visit Northern Ontario would have been Étienne Brûlé in 1622 CE, but Pierre Radisson's 1661 CE expedition through Lake Superior provided more detailed information on early European-Indigenous encounters (Dawson 1987a). He travelled through Lake Superior, then to Lake Nipigon and the Albany River to the Hudson Bay. Through his travel where he encountered many different bands of Algonquian-speaking people (Dawson 1987a).

During this period, Winnipeg Fabric-impressed and Sandy Lake wares were still being produce in Northwestern Ontario (Taylor-Hollings 2017). However, there was a discontinuation of pottery styles found in earlier Blackduck sites, Dawson's (1977) interpretation is that the use of new decorative patterns appeared as bands in the region acquired potters from groups that practiced other pottery traditions which were then adopted into the northern people's style, or that regional varieties started to emerge (Dawson 1977). Variation between the region could possibly be due to innovation within the region, as well as more contact with other Algonquian and Iroquoian-speaking groups migrating out of Southern Ontario and Eastern Quebec. Lithic technology during this time remained consistent across the geographic area (Dawson 1977) but some began using metal tipped arrows.

2.6.2 Fur Trade Period (1821 CE – 1890 CE)

The intensification of the Canadian fur trade caused major changes in the lifestyle and settlement pattern of Indigenous people in Northwestern Ontario. In 1821 CE, the Hudson's Bay Company (HBC) amalgamated with the North West company creating a monopoly over the fur-trade in Northern Ontario (Rogers 1994). Its only opponent being the American Fur Company (AFC)– until the AFC were bought out of the region in 1833 CE (Rogers 1994). Before the monopoly, population increase by European migrants in the area as well as competition between the companies led to over-hunting of fur-bearing animals (Rogers 1994). As early 1824 CE, the HBC was instructing its traders to tell the Indigenous people to stop hunting furs in the summer (Rogers 1994). Two years later, traders in the Severen District banned the hunt of beaver (Rogers 1994). These rules ignored that the Anishinaabe people in the area relied on beavers and other fur-bearing animals as sources for food and clothing.

During this period, more historical information is available on the Anishinaabe people of the area. However, these accounts were written from an outsider perspective. The historic Anishinaabe people at the time would live in several traditional lodge types: the conical, ridgepole, dome-shaped lodges, and moss-covered conical lodge (introduced in the late 19th century) (Rogers 1994). At each campsite, they would also set up drying/smoking racks, smoke lodges, and cache racks (Rogers 1994). Further south such as in the Boundary Waters region and Lake of the Woods, it was documented that they started gardening and erected more permanent structures such as dwellings and livestock barns mimicking the Settler's models (Moodie and Kaye 1969; Rogers 1994).

The use of hunting and trapping equipment varied among the different bands. Traders supplied the Anishinaabe people with firearms to hunt; however, before the introduction of the breech-loading firearms in the 1890s, they would continue using their traditional hunting equipment (Rogers 1994). This was primarily due to the inefficiency of the early-fire arms– they would need constant repairs, could potentially injure the user, and most would use up all of their ammunition early in the year, making the rifle dead weight throughout winter (Rogers 1994). They would use bow and arrows with tips made from stone, bone and sheet metal, spears (although not well documented historically), and crossbows, which were most likely derived from the traders (Rogers 1994). For fishing, they would set up traps near rapids in the spring and fall and set lines on the ice during the late winter (Rogers 1994). By the late 19th century, the gill net fell out of use (Rogers 1994). They also relied on a variety of wooden snares and traps to hunt hares and beavers (Rogers 1994).

By 1830 CE big game had practically disappeared from the region, and beaver numbers were greatly reduced (Rogers and Black 1976). The northern Anishinaabe people had to shift their reliance from caribou and moose onto primarily focusing on fish and rabbit. This food source was much less reliable as every seven to ten years the rabbit population drastically decreases, and the fish population varied greatly year to year (Rogers and Black 1976). Due to a reliance on small game and fish, they would travel shorter distances, remaining mostly around favourable fishing locations and hare-snaring grounds (Rogers and Black 1976). Eventually, they would adopt gardening to supplement their diet. Although this practice was documented in the early 19th century in the southern region, groups further north began the practice around 1870 CE, mostly relying on potatoes (Rogers 1994).

In the mid 19th century, Anishinaabe people lived in small family groups throughout most of the year (Rogers 1994). They would then came together in a location where resources would be rich (Rogers 1994). As years passed, they would spend more and more time at trading posts during the summer, with some working directly for the company on the brigades transporting goods.

The social organization of the Anishinaabe people during the fur-trade period can be described as follows: the nuclear family, clans/hunting group, and the name group/trading post band (Rogers 1994). The nuclear family group consisted of a man, wife or wives, their children, and extended members such as an elder or an orphan taken in by the family (Rogers 1994). Related families would come together at winter camps (forming the clan unit). They were often formed by the heads of each family being brothers (Rogers 1994). When clans came together in the summer to form bands, they were often related to each other in someway. In Northern Ontario, bands were usually less than 100 individuals but, in the south, these gatherings could be as large as 1000 individuals (Rogers 1994).

2.6.3 Diet During the Post-Contact Period

The diet of Indigenous people of Northwestern Ontario was affected by the economic shift of the fur trade. Documents dating to period mostly discuss hunting methods and underemphasis plant-use. The Indigenous people during the early fur trade period continued to use traditional hunting equipment such as bow and arrows (Rogers 1994). To lure moose during the rutting season they would use a birchbark caller, and although not documented, it is possible they used spears to hunt big game during the winter (Rogers 1994). During the late winter, they would fish by setting up lines on the ice to jig for fish (Rogers 1994). In the spring they would use spears to kill sturgeons and other fish (Rogers 1994). Dipnets were used around the Great Lakes region to catch whitefish. Gillnets were relatively rare until the late 19th century. Initially, they would use them primarily in the summer, as it was difficult to set under the ice in winter (Roger 1994). A variety of traps and snares were used to capture games such as hare and lynx, and the occasional larger snare for bears and moose (Rogers 1994). The most employed trap was the Samson-post deadfall for taking small mammals such as martens, minks, foxes and fishers (Rogers 1994).

During the 19th century, with the intensification of the fur trade, the Anishinaabe people had to drastically alter their diet as big game had practically disappeared from the area by 1830 CE and the beaver population began to reduce in numbers (Rogers and Black 1976). Having to shift their diet from moose and caribou to fish and hare subjected them to great difficulties, as the cyclical nature of the hare population would cause hares to practically disappear from the country every seven to ten years, and fish varied randomly (Rogers and Black 1976). This resulted in food shortages as a source of meat became unreliable. This shift to smaller game affected their settlement behaviour– they no longer ranged as widely in search of food and furs and they became restricted to favourable fishing locations and hare-snaring grounds (Rogers 1994). Eventually, as trapping became more crucial, the Anishinaabe people would start claiming private ownership over beavers by marking the lodges. In time, all animals found within the territory came to be considered that group's property. This resulted in other groups vaguely recognizing boundaries to each hunting group land (Rogers 1994). Similarly, the head of wild rice plant were binded into bundles to signify ownership of the portion of the stand to a specific family (Vernnum 1988).

Wild rice is an important crop to the Anishinaabe people of Northwestern Ontario and Minnesota both as a food source and spiritually (Rajnovitch 1985; Reagan 1927; Smith 1932). Various families would have defined parts of the lake that they would harvest (Smith 1932; Vernnum 1988). They would set up camps while the plant was still in its milk stage and would make sampling trips to determine if the rice was ready (Smith 1932). When it was time to harvest, groups would come together for a ceremonial gathering and three to a canoe, two women and one man, would harvest enough wild rice for a preliminary feast (Smith 1932). The first harvest is prepared with songs (Smith 1932). After the preliminary feast the whole group would participate in harvesting and preparing the rest of the crop (Smith 1932).

Wild rice preparation was a very laborious task. Smith (1932) described the following procedure of harvesting wild rice which she observed at Mole Lake, Wisconsin. To harvest the wild rice, they would use a hooked stick held in a crescent with a string but sometime they would harvest it by hand. They would pull the head down into the canoe and beat the grains off with a stick (Smith 1932). Sometimes prior to the ripening they would tie the heads together. By doing this they would be able to collect grains from multiple plants at once (Smith 1932). Once the canoe was half full, they would return to camp and one of the women would trample the grains to remove the spiny beards or awns (Smith 1932). They would then parch or roast the grains. To roast the grains, they would use a large container over a fire stirring constantly to avoid burning (Smith 1932). To thresh the rice, they would first prepare the threshing floor by digging a hole in the ground. In the past they would line the holes with buckskin, but during the early 1900's they would often use a bucket (Smith 1932). A man with new moccasins tramples the rice to thresh it, then the chaffs are winnowed away by a woman using a large shallow birch-bark tray (Smith 1932). The wild rice is then washed and dry for storage.

Eventually, it is documented that the Indigenous people of Northwestern Ontario adopted gardening (Rogers 1994). Through documentation it would seem that the Anishinaabe people began gardening in the Boundary Waters area in the early nineteenth century, and then further north such as at the Lake of the Woods region by the 1870s (Rogers 1994). These gardens were often located on islands as the water acted as a physical barrier to keep pests away from the crop. The island would also create a favourable microclimate adding additional frost-free days for the plants to grow (Boyd and Hamilton 2018).

During the fur trade period, the seasonal round for the Anishinaabe people is described as follows: in the summers, families would come together at the trading post or other gathering spots, living principally off of fish and small game. Once the berries became ripe, they would go out gathering blueberries, and gooseberries (Rogers 1994). In the fall, families left their gathering centres and dispersed to their fall camps– there they would hunt as much game as possible to preserve for the winter (Rogers 1994). They took a large number of whitefish with traps during late October and early November. They filleted the fish and smoke it over a smouldering fire and process the remains into pemmican with berries (Rogers 1994). They would also capture waterfowl as they migrated south and gather cranberries once they ripened (Rogers 1994). Near the end of fall, they would prepare for winter, and break into smaller groups depending on how many resources they had– groups could range from families of 8 or less (Rogers 1994). The groups would move as needed depending on the availabilities of local resources (Rogers 1994). Once waterways opened in the spring, each group would move to their spring camp to hunt migrating waterfowl, spear sturgeon and other spawning fish (Rogers 1994).

Beginning around 1850 CE, natural resources along the north shore of Lake Superior had gained importance to Euro-Canadians who had started expanding their activities westward (Rogers 1994). Several treaties such as the Robinson-Superior Treaty (1850), Treaty No. 3 (1873) and Treaty No. 5 (1875) were signed. Although reserves were specified in the document, the Indigenous people of the area initially remained free to hunt and fish within their traditional territories on Crown lands (Rogers 1994).

Eventually, industrial activities began to affect the availability of traditional food sources to the Anishinaabe people of Northwestern Ontario. These activies were often accompanied by transformations in environments through forestry and water-level control measure. An example of the latter is the construction of the Norman dam near Kenora in 1887-1888 which raised the water level of the Lake of the Woods by an estimated one metre (Rogers 1994). This affected wild rice crops and the number of fish and muskrat within the region (Rogers 1994. It also flooded Anishinaabe farmlands, barns, and houses (Rogers 1994).

2.7 Summary

There are five main archaeological periods in Northwestern Ontario: The First Ancestor period, the Middle period, the Middle Woodland period, the Late Woodland period and post-contact period. Material culture dating from the Middle Woodland period, Late Woodland period and post-contact period were recovered at the Macgillivray site.

The First Ancestors of Northwestern Ontario appeared in the area following the last glacial retreat ca. 10,400 years BP. They probably migrated into the area from North Dakota, Minnesota and Wisconsin and may have been motivated by the presence of big game animals (Julig 1984; Ross 1991). However, their tool kits were non-specialized to one activity suggesting a more generalized diet (Dawson 1983).

The transition from the First Ancestors into the Middle period is poorly documented, and only a small numbers of sites dating to this period. During the Middle period there is a shift from lanceolate projectile points to side and corner notch point varieties (Wright 1972). People within the Southern Canadian shield started to use copper which they would manufacture into points, adzes, and fishhooks (Langford 2018).

The Middle Woodland period saw the production of pottery within Northwestern Ontario. These conical-shaped pottery vessels were decorated with a variety of pseudo-scallop shell, dentate and dragged stamped decorative techniques. They mostly lived in small family groups following season rounds and gather to form large communities in culturally important and resource-rich areas. During this period the Laurel composite started to construct burial mound, although these are generally rare in Northwestern Ontario. During the Middle Woodland period, we see the consumption of important plants food such as goosefoot, maize and wild rice; however, to what degree and if cultigen were being grown or traded is uncertain.

The Late Woodland period is marked by a new trend in the manufacturing of wares and lithic projectile points. The carriers of Blackduck material culture reused areas previously occupied during the Middle Woodland period. Very few single-component Blackduck sites exist within Northwestern Ontario. A generalized Blackduck vessel is defined as a globular vessel with a constricted neck, rounded shoulder, flared rim, lip and a thickened wedge rim. The Late Woodland period is limited by the lack of single-component sites, but microbotanical remains infer more consumption of cultigens.

Early contact with European in the area is poorly documented until the intensification of the Fur-trade in the area Ca. 1821 CE. Prior to this, early contact period site still contained Sandy Lake and Winnipeg Fabric-impressed vessels. The intensification of the fur-trade resulted in major changes in the lifestyle and settlement pattern of the Indigenous people in the area. The decrease of big game in the area forced a reliance on small game and fish which were less predictable sources of food. This resulted in the Indigenous people travelling less distance to secure food, mostly frequently known fishing spots and trapping areas.

Chapter 3 – The Archaeology of the Whitefish Lake Area

3.1 The Environment of Whitefish Lake

Two sediment cores taken from the lake in 2010 were used to reconstruct the Holocene vegetation history of the region (Boyd et al. 2013). The paleoenvironmental reconstruction of the area is as follows; 9400 years before present (BP), the Whitefish Lake area was wet with cool temperatures. This is inferred by the presence of species such as firs (*Abies* spp.) which are fire-intolerant and prefer swampy soils, along with other cold-tolerant species such as black spruce (*Picea mariana*), and larches (*Larix* spp.) (Boyd et al. 2013). At about 9000 ^{14}C yrs BP, the presence of ped-like structures and lower water content in the sediment core implied that a very shallow lake existed in the region at the time. Between 9000 and 9200 ^{14}C yrs BP the pollen sample demonstrated a short period of an early Boreal Forest dominated by spruce (*Picea* spp.). Then around 8900 ^{14}C yrs BP, non-arboreal pollen increased including Amaranthaceae (amaranth), *Ambrosia* (ragweed), and Poaceae (grasses) (Boyd et al. 2013). These arboreal plants suggest a more open landscape, akin to a parkland or woodland. During this time, the coniferous tree pollen switches from *Picea* dominant to *Pinus* (pine) dominant, and there is a decline in deciduous trees. This suggests drier, more open, vegetation (Boyd et al. 2013). Phytoliths were also identified in this section of the core. The identification of northern wild rice (*Zizania palustris*) suggests that the first wild rice stand established itself sometime between 6100 and 4500 Cal yrs BP (Boyd et al. 2013; Surette 2017). Around 4900 Cal yrs BP, the climate shifted from dry conditions to wetter ones as the lake level started to rise. The pollen record shows an increase in *Betula* (birch) and other thermophilous deciduous trees such as *Quercus* (oak), *Salix* (willow), and *Alnus* (alder) (Boyd et al. 2013; Surette 2017). There is also a decrease in most grass pollen as *Ambrosia* increases (Boyd et al. 2013; Surette 2017). Starting at approximately 2800 Cal yrs BP, there is an increase in *Alnus* and *Betula*, as well as *Ambrosia,* Poaceae, and *Nuphar* (water-lily).

Today, forest cover in the Whitefish Lake region is characterized as the Boreal Forest. It is described by a mix of coniferous and deciduous species such as red pine (*Pinus resinosa*), yellow birch (*Betula alleghaniensis*), eastern white pine (*Pinus strobus*), and eastern hemlock (*Tsuga canadensis*) (Barry 2017; Rowe 1972). Other species found in the area include baneberry (*Actaea* spp.), wild sarsaparilla (*Smilax* spp.), bunchberry (*Cornus* spp.), sedge (*Cyperaceae*), white spruce (*Picea glauca*), blueberry (*Vaccinium* spp.), Labrador tea (*Rhododendron* spp.), pin cherry (*Prunus pensylvanica*), chokecherry (*Prunus virginiana*), red maple (*Acer rubrum*), serviceberries (Amelanchier spp.), etc. (Ministry of Natural Resources 2012). Wild rice stands are also located on the west and south end of the lake. Fish located in the lake include northern pike (*Esox lucius*), smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), white sucker (*Catostomus commersonii*), and yellow perch (*Perce flavescenes*) (Ministry of Natural Resources and Forestry 2019). The fauna in the region would be similar to the surrounding Thunder Bay district, including a variety of mammals such as the snowshoe hare (*Lepus americanus*), gray wolf (*Canis lupus*), red fox (*Vulpes vulpes*), Canadian lynx (*Lynx canadensis*), North American river otter (*Lontra canadensis*), American marten (*Martes americana*), American black bear (*Ursus americanus*), moose (*Alces alces*), white-tailed deer (*Odocoileus virginianus*), beaver (*Castor canadensis*) and porcupine (*Erethizon dorsatum*). The lake is popular with many migratory birds as well (Thunder Bay Field Naturalist 2018).

3.2 Archaeology of the Whitefish Lake Area

This summary focuses on the Woodland period sites in the Whitefish Lake basin. Archaeological materials dating to the First Ancestor period have been recovered, indicating a long and continuous Indigenous occupation of the Whitefish Lake region from the last Ice Age to the post-contact period. Two possible First Ancestor sites are the Old Tower Road (DbJm-6) and Billing Bridge (DbJm-32) (Schweitzer 2014). The occupation of these sites by the First Ancestors was inferred by the sites' elevation and lack of pottery (Schweitzer 2014). Their locations are well above the modern water level of the lake. This is implied by the geological history of the basin and the higher water levels that were present until the Laurentide Ice Sheet retreated from the Lake Superior basin (Schweitzer 2014). Unfortunately, there were no diagnostic tools associated with these sites.

These sites are both located approximately 3 km from the northeast shoreline of the lake (**Fig 3.1**). Occupation of the Whitefish Lake area seemed to intensify in the Woodland period, with most of the sites around the lake belonging to this period. Dawson excavated the most well-documented of these sites from the 1960s through the 1980s. They include the Macgillivray (DbJm-3), Mound Island (DbJl-2), McCluskey Site (DbJm-2), and Martin-Bird (DbJm-5) sites.

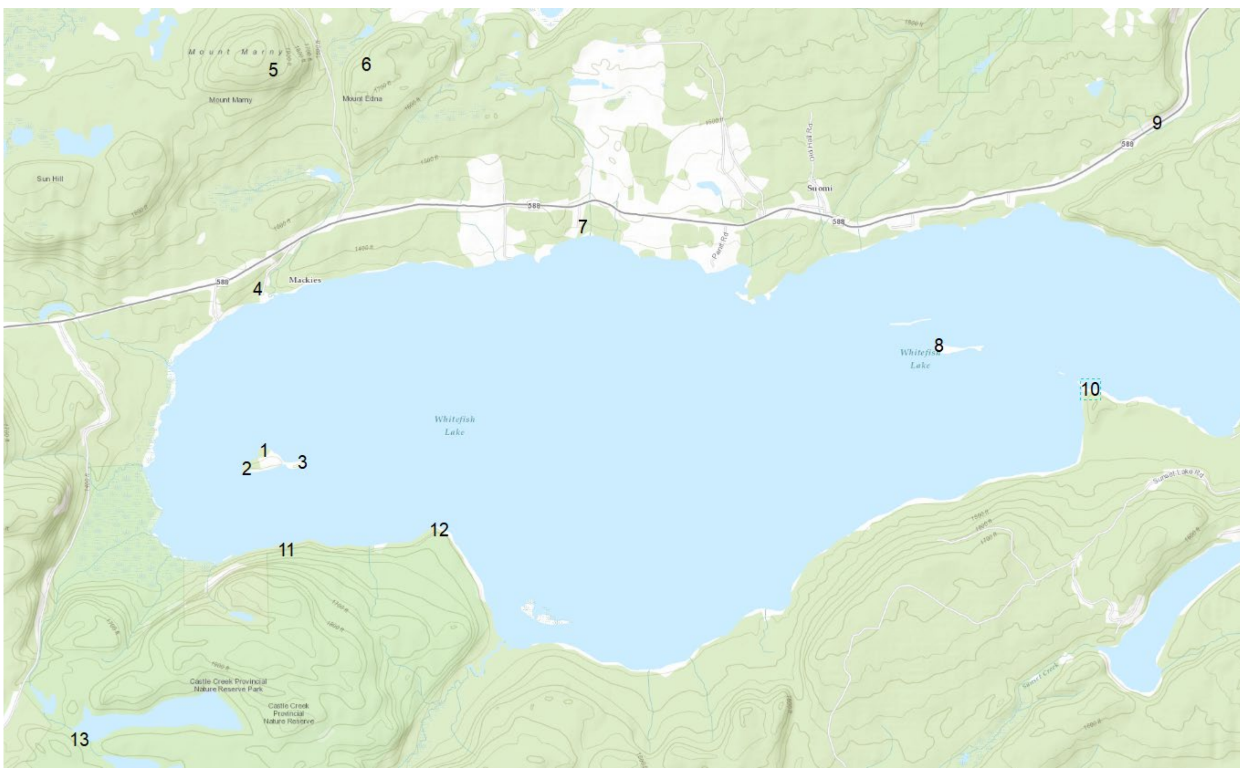

Fig 3.1 Approximate locations of archaeological sites around Whitefish Lake. (1) DbJm-3 Macgillivray, (2) DbJm-5 Martin-Bird, (3) DbJm-8, (4) DbJm-2 McCluskey, (5) DbJm-32 Billing Bridge, (6) DbJm-6 Old Tower Road, (7) DbJm-14, (8) DbJl-2 Mound Island, (9) DbJl-1, (10) DbJl-3, (11) DbJm-7, (12) DbJm-10, (13) DbJm-13.

3.2.1 The Mound Island Site (DbJl-2)

The Mound Island site (DbJl-2) is located on an island on the east side of Whitefish Lake. It is a multicomponent site, first occupied by carriers of the late Laurel composite (600-800 CE). Dawson

(1978) formed this timeline based on pottery seriation rather than absolute dating methods. The island has a drumlin that extends east to west off the southern shore. Dawson (1978) interpreted the site as only being inhabited for a short seasonal occupation. During his excavation, he recovered very little refuse, and the faint evidence of lensing in the stratigraphy (a thin layer of black organic loamy soil peppered with charcoal, and grey ash). Based on the interpretation of the pottery style, Dawson (1978) suggested that the occupation of the Mound site was close if not contemporaneous with the deposit associated with the mound at the Macgillivray site (DbJm-3).

3.2.2 Martin-Bird Site (DbJm-5)

The Martin-Bird site (DbJm-5) is located on Bishop island in the west end of Whitefish Lake (Barry 2017). The site is south of the Macgillivray site (DbJm-3). It is a multi-component site with a dominant Blackduck deposit, suggesting an occupation from 600 to 1800 CE (Dawson 1987b). There are three excavation areas identified: Area A, a habitation area north of the mound. Area B, a habitation area to the east of the mound, and Area C, the mound itself. The habitation areas surround the mound suggesting that the feature was significant to these occupations. Through the excavation of habitation Area A, Blackduck artifacts were found in direct association with European trade goods (Dawson 1987b). Very few Laurel ceramics and very sparse frequencies of ceramics belonging to other Late Woodland complexes were recovered. There were 14 features identified in total: six hearths, six refuse pits, a roasting pit and a post-mould (Dawson 1987b). The hearths were semi-circles of fire-cracked stones with some soil discolouration (Dawson 1987b). The roasting pit was below a hearth, identified by a concentrated layer of firestones and bone refuse. In the level below, there were large angular boulders in a heavy layer of black ash, sherds and debitage (Dawson 1987b). Deeper in the stratigraphy, the black ash turned to fire-reddened soil (Dawson 1987b). In Area B, a hearth feature was discovered in association with bone refuse, and underneath the hearth there was a circular pit. A copper cache, containing a hammerstone, a copper awl, and 35 copper fragments were recovered in this area as well. The cache was marked by black ash (dated to 1150 ± 60 BP) and boulders. Area C is a natural ridge but could also be man-made. Several features were identified during excavation: nine depressions were identified along the ridge, six were cross-sectioned and yielded the same artifact density as the surrounding area (Dawson 1987b). Dawson (1987b) interpreted these as storage pits for wild rice; however, he recovered no grains. These pits could very well be evidence of looters on the site, since there was evidence found of that during the most recent excavation. At the southern end of the ridge, there is a 1m high hummock with an irregular depression in the centre. It was a shallow depression of about 30 cm deep and 15 cm across. At its surface it contained some black ash and the remnants of a Blackduck vessel (Dawson 1987b). A burial pit was identified in Area C. The northern half of the pit was disturbed, and the southern half contained a secondary burial which appeared to have been contained in a birch bark container (Dawson 1987b). The burial faced south and was associated with a copper pendant (Dawson 1978b). A carbon sample from this feature dated between 630 CE to 885 CE, contemporaneous with late Laurel (Dawson 1987b). No Laurel ceramics were associated with the burial. A complete medium-size Blackduck vessel was identified to the west of the burial. Dawson (1978b) associated the mound as a product of the Laurel occupation due to the date received from the carbon sample. Due to the lack of Laurel ceramics, it is debatable if the mound is a product of the Laurel occupation or the Blackduck occupation.

Martin-Bird was later revisited by Lakehead University in 2009 and 2010. They conducted more shovel testing in habitation Area B, recovered artifacts for residue analysis, and used a variety of remote sensing methods such as ground-penetrating radar (GPR) and magnetic gradiometer to identify buried features for archaeobotanical analysis (Boyd and Hamilton 2018). The gradiometry survey results suggest in-situ heating of the minerals in both the rocks and the sediment realigning the magnetic field with no subsequent disturbance (Boyd and Hamilton 2018). When excavated, they identified a dense patch of fire-cracked rock. Besides one Late Woodland pot, the feature was devoid of artifacts suggesting that it was not a midden, but a cooking feature (Boyd and Hamilton 2018). Residue analysis also identified the maize, beans, squash and wild rice.

During the 2009 test pit survey, the most prominent diagnostic materials recovered were three projectile points, some stone tool fragments, and an assortment of Late Woodland pottery (Hamilton 2011). The three projectile points were likely arrow tips. They are consistent with the Late Woodland lithic assemblage (Hamilton 2011). The majority of analyzable rim sherds were Late Woodland derivatives, and consistent with the Blackduck complex (Hamilton 2011).

3.2.3 The McCluskey Site (DbJm-2)

The McCluskey site (DbJm-2) is located on the northwest shores of Whitefish Lake, across from the Macgillivray site (DbJm-3). Excavation of this site was conducted as a salvage excavation. This is due to the presence of buildings and other areas used by the landowners (Dawson 1974). The excavator decided to treat the site as a single component. There were few significant changes in artifact content with depth, except for a cluster of pottery found in the northwest edge of the mound (Dawson 1974). There are four visually separated zones within the cluster: first a 5 cm sterile sod-zone, second an 18 cm refuse humus zone, third a 20 cm multi-lensed cultural zone, and then a fourth stained sub-soil level (**Fig 3.2**) (Dawson 1974). Lensing in the third layer consisted of brown-grey soil overlaying three black ashy layers (Dawson 1974). Ash layers occurred at 22 cm, 33 cm, and 43 cm in depth, and were about 2 cm thick, appearing continuous, extending into the mound (Dawson 1974). This lensing may be a result of water deposition (Dawson 1974). Level 4 demonstrated staining/leaching from the cultural deposit overlaying it, as well as redden soil. The presence of redden soil suggested fire-oxidation (Dawson 1974).

The site was associated with an artificial/cultural mound. It was partially destroyed through construction and ploughing. It is located about 3.4 m back from the shore, extending 17 m in an east-west direction. Dawson recorded that the mound would have been 16.77 m wide and 30 cm tall (Dawson 1974). Remains of ancestors were recovered from the mound and associated with small mortuary vessels (Dawson 1974). Other features of the site included a large roasting pit, consisting of a patch of fire-cracked rock. Analysis of the lithics and pottery suggested that the McCluskey site was occupied for over 2000 years by a northern Anishinaabe adaptive pattern. Faunal material recovered suggested a spring-fall occupation dependent on small mammals, birds and fish (Dawson 1974). The site was first occupied by carriers of the Laurel composite, but recoveries were very faint suggesting a short-term occupancy. Transitional Laurel-Blackduck pottery was also found, and Late Woodland Blackduck pottery was dominant (Dawson 1974). The lack of European trade goods suggests that the site was not used after 1680 CE (Dawson 1974).

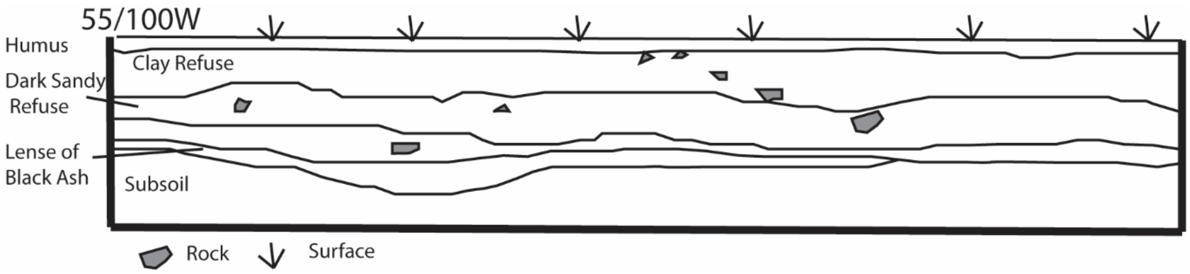

Fig 3.2 Wall profile demonstrating the stratigraphy of the pottery cluster (redrawn from Dawson 1974: 6).

During excavation there was no concentration of charcoal suitable for dating; however, Dawson (1974) took two samples: (1) residue obtained from a pottery rim, no date was published; (2) a sample from Level II below the pottery cluster at the west end of the mound received a date of 1990 ± 90 BP (Dawson 1974).

Most of the decorative rim sherds recovered at the site was described as a variant of Mode 1 Blackduck pottery: cord-wrapped object impressed with encircling punctates with oblique over two or more rows of horizontal encircling punctates between the first and second row (Dawson 1974). This variant of decorative pattern seems similar to the Laurel composite, and some researchers assume it has its influence from it (Dawson 1974). Ten rim sherds from eight vessels of other Late Woodland complexes were also recovered: A stamped Clearwater Lake punctate (Selkirk composite) rim, a Pickering Branch rim, and a Sturgeon Falls-like rim collected from the surface and a test-pit (Dawson 1974). A Peninsular Woodland rim, a Mackinac-like ware rim, two Winnipeg fabric impressed rims and one net-impressed rim were recovered from excavation (Dawson 1974). Four rim sherds described as Laurel-Blackduck transitional were recovered from the site, as well as two Laurel rim-sherds (Dawson 1974).

During excavation, Dawson recovered a total of 453 lithics. Of these, 33 were projectile points. They were described as 23 unnotched triangular, 5 triangular side notched, 2 stemmed points, and 3 unclassified (Dawson 1974). All 23 of the unnotched triangular points were recovered from the disturbed area or from test pits with no clear provenience (Dawson 1974). They are similar in form and metrical attributes to the Eastern Triangular points. A major type associated with groups in Southwestern Manitoba, and the Blackduck complex in Minnesota (Dawson 1974). Scrappers were the most frequent lithic class (n=83) besides flakes. Other lithics tools include bifaces, wedges, perforators, knives, choppers, drills and hammerstones (Dawson 1974).

3.2.4 Summary

An overview of the known archaeological information for the Whitefish Lake area has been discussed in this chapter based on earlier information from Dawson's (1974, 1978b, 1981) work and others modern works (e.g., Barry 2017; Boyd and Hamilton 2018; Hamilton 2011). Whitefish lake is one of the best studied areas in Northwestern Ontario and provides many examples of unique or unusual artifacts combined with a plethora of features. This study adds to that archaeological research by the use of additional, newer methods of capturing more information about faunal and macrobotanicals remains, providing even more information about the Indigenous people who lived in this region.

Chapter 4 – Archaeological Interpretation of the Macgillivray Site

4.1 Background

The Macgillivray site is located on the northwestern part of Bishop Island, on the west side of Whitefish Lake. Approximately 20 m from the eastern shore there is a small artificial mound that is 15 m wide, and 1 m tall. Associated with the mound is a Woodland period habitational area to the northeast. There is a shallow veneer of a post-contact deposit on the surface as well as other disturbances. On the northeastern side of the island, there is a cottage and a small camp still in use.

The site was first identified to Dawson in 1964 as Ian Macgillivray, the owner of the property, directed a survey crew to a small mound at the northwestern end of the island (Dawson 1980). Yet, local stories suggest that people have collected artifacts from the shores of the lake going back to 1882 (Dawson 1980; Winchell 1911). In 1966, Ken Dawson returned to the site, where he surveyed and excavated the site. Dawson's (1980) report focused on material from the mound. He interpreted the site as a Laurel composite encampment, however the 2016-2017 excavations also identified Brainerd, Blackduck, Sandy Lake and Winnipeg Fabric-impressed wares on the site.

4.2 Dawson 1966 Excavation

Dawson (1980) excavated 38 five-foot squares: eight squares to cross-section the mound, and the rest in the habitational area, including four at the extreme eastern end of the site near the centre of the island (Dawson 1980). He also excavated 38 test pits. His excavation revealed a dense but thin cultural layer about 30 m wide extending 200 m along the northern shore of the island (Dawson 1980).

The excavation of the mound was the focus of Dawson's 1980 report. The mound is a low circular formation with a central depression from an earlier excavation. Its internal structure consisted of black to mottled soil and did not contain any village debris. A burial was identified directly under the mound, sunken one-third of a metre below the original surface. It was sitting in a crib of logs and covered with large boulders. The burial was very disturbed, and its construction is uncertain (Dawson 1980). The upper level of the mound also recovered post-contact material such as a tobacco tin. The burial consisted of fourteen cranial pieces, an equal number of long bones, and a few miscellaneous bones. It was a secondary burial, belonging to both adults and children. It was associated with broken taconite bifaces and there was no evidence of red ochre (Dawson 1980).

Dawson obtained two radiocarbon dates from the mound. One, 2240 ± 80 BP (GaK-1278; charcoal; $\delta^{13}C$: -25.0‰.) from a carbon lens at the eastern edge of the mound and was initially considered to be associated with a hearth (Dawson 1980). A date of 1930 ± 200 BP (GaK-1492; wood; $\delta^{13}C$: -25.0‰.) was obtained from a wood sample recovered from the log crib area (Dawson 1980). The mound was interpreted as a product of an earlier Laurel Settlement as it did not overlay a living area (Dawson 1980). The pottery from the habitation area indicates that the settlement was several centuries later than the pottery found within the mound (Dawson 1980).

The 1966 excavation revealed several other features such as hearths, pits, and a linear rock structure. Dawson (1980) identified eight hearths. They consisted of a few large boulders forming a circular pattern, about one metre in diameter with a northwest-facing opening (Dawson 1980). This pattern was also noticed at the Wabinosh River Laurel Site on Lake Nipigon (Dawson 1981). Below 10-15 cm of O horizon, a clustering of pottery fragments and debitage occurred in a layer of fire-reddened soil.

Below the fire-reddened soil, there was a central shallow depression with a depth of 2.5 cm. Three pits, roughly 50 cm in diameter and 35 cm deep, with sloping sides, filled with clay and sparse refuse were identified. Dawson (1980) interpreted these as rice husking pits, but flotation was not conducted to confirm this.

Dawson (1980) compared the pottery and lithic assemblages to several other Laurel sites. Dawson (1980) found the most affinity with later Laurel sites, especially with the nearby Lake Nipigon component. However, these dates may not be accurate due to the older method being used on these sites.

4.3 Lakehead University Excavation 2016-2017

In 2016 and 2017, Matthew Boyd, Scott Hamilton and colleagues returned to investigate the site. These excavations focused on the habitation area and surveying the island. The brief 2016 excavation focused on test pitting to find the boundary of habitation zones and high potential zones for square metre unit excavation. The team returned in 2017 to excavate nine one-by-one metre square units and continue surveying the site with test pits (**Fig 4.1**).

During the 2016 field season, the Lakehead University crew carefully excavated 50 cm square test pits to examine the Macgillivray site in several locations. The matrix was screened through a 6.35 mm mesh. Soil samples were collected from features, so as to enable further lab analysis.

The 2017 excavations used 5 cm levels for vertical control and divided the units into four quadrants. Excavation of the units were conducted with a trowel and finished by shovel shaving using a 6.35 mm. 3.17 mm sieves were used for sampling select quadrant.

The following discussion is a preliminary overview describing the most relevant findings to this study from the 2016 test pits and all units excavated during the 2017 excavation. This information will provide background information for later chapters. A grid system was set up and used to located units and test pits. The grid is arbitrary with N500E500 and N500E546 corresponding with NAD'83 15U 718483/5344669 and 15U 718507/5344634 respectively. Both official site reports were being developed at the time of writing, since there is a large amount of data to include and interpret. The information presented in this section uses the field notes and preliminary artifact catalogues available at the Lakehead University Archaeology Lab. The follow section does not include the material recovered from Dawson's (1980) excavation.

2016 Test pit: JTH-1 and JTH-2

These 2016 test pits overlap with the northeast quadrant of Unit 1 (N559E520) and the southwest quadrant of Unit 2 (N559E521) of the 2017 excavation. More information will be discussed below. These test pits contained 43 pottery pieces, of which three were undecorated Laurel body sherds, four Laurel rim sherds and one textile impressed Sandy Lake body sherd. There were 273 non-diagnostic artifacts such as lithics and faunal material that were also recovered from this pit.

2016 Test pit: N525E510

This test pit was interpreted as including a possible hearth due to the presence of large rocks in the A horizon arranged adjacent to each other and associated with a large quantity of fire-cracked rock

(FCR). It contained 19 pottery pieces: 14 were Laurel body sherds and five Laurel rim sherds. 140 non-diagnostic artifacts were also recovered consisting mostly of lithics.

2016 Test pit: N530E510

This test pit had a high density of artifacts (n=236). Mostly non-diagnostic flakes (n=214). It did contain 13 Laurel body sherds and one Laurel rim sherd.

2016 Test pit: N535E515

Test pit N525E510 was interpreted as a possible hearth due to the presence of large rocks in the A horizon arranged adjacent to each other and the large quantity of fire-cracked rock recovered. It was confirmed as such in 2017. The test pit also contains 297 artifacts. This includes 29 Laurel pottery sherds, two Brainerd ware sherds and a copper nugget recovered at level V. Yellow ochre was also identified at level V and VI.

2017 Unit 1 N559E520

Most of the eastern part of the unit was excavated in 2016 as it overlapped with JTH-1 (described above). Level I of this unit contained a small amount of post-contact material. In the Northwestern quadrant, a metal ring from the fur trade period was recovered. The southeast quadrant shows post-contact intrusions up to level IV. Level III in the southeast quadrant also shows a mix of Late Woodland, and Middle Woodland pottery types. A Late Woodland deposit becomes apparent in level III and continues into level IV. In level III a patch of fire-cracked rocks becomes visible along with charcoal and faunal material. In this level a total of 29 pottery sherds were recovered; mostly Late Woodland (n=8), but Middle Woodland (n=5) and Laurel pottery (n=1) are also present. The Late Woodland deposit continues into level IV. The patch of fire-cracked rocks continues in level IV and fades in level V. In the southeast quadrant of level IV, a grinding stone was recovered. Level V represents a Middle Woodland deposit, although the number of sherds recovered was lower than the Late Woodland deposit. It consisted of nine pottery fragments, of which five were Middle Woodland.

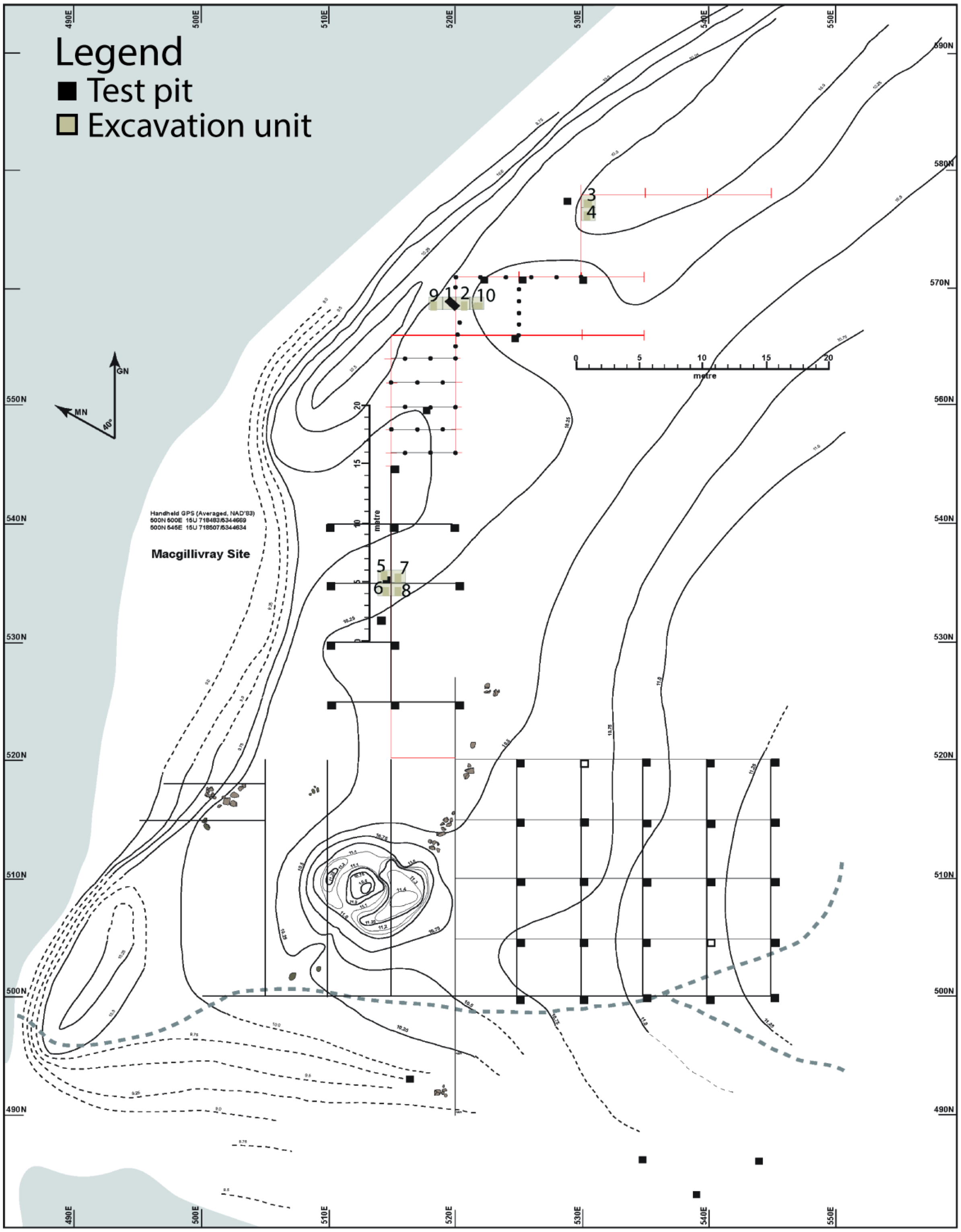

Fig 4.1 Maps of the 2016-2017 excavation at the Macgillivray site (Data from Hamilton 2018: unpublished).

2017 Unit 2 N559E521

This unit is located east of Unit 1. A test pit (JTH-2) from the 2016 excavation is present mostly in the southwest corner of this unit. There is a lot of mixing of Late and Middle Woodland material in the layers of this unit. The first level was sterile, but the second level had evidence of a Late Woodland deposit with eight pottery sherds recovered. There may be another Late Woodland component in level IV. Level V indicated limited Laurel ware (n=12 pottery sherds) in the northwest and southeast quadrants. A fire-cracked rock pavement became visible in levels III and IV of this unit (**Fig 4.2**). Another grinding stone was also located in the northeast corner.

Fig 4.2 Floor of Unit 2 level IV showing a large cluster of fire-cracked rock (Hamilton 2018: unpublished).

2017 Unit 3 N568E531

This unit is located further north than others. The first level was sterile of artifacts. In the southeast quadrant of level II, a five-cent Canadian coin minted in 1918 was recovered. Meanwhile, in the northeast corner, a few bone fragments were found alongside Woodland period pottery sherds. The post-contact evidence of digging into the lower layers of the site continues into the southwest quadrant of level III. Then, the rest of the quadrants show a mixing of Late and Middle Woodland deposits until the bottom of the excavation unit; however, the ratio of sherds shifts toward a Middle Woodland/Laurel dominant deposit in the lower levels.

2017 Unit 4 N567E531

This unit is located south of Unit 3**.** Level I was sterile. Level II contained a single lithic flake. Level III demonstrates post-contact intrusions and a mix of Middle and Late Woodland pottery. This level has a high frequency of pottery sherds (n=82), with two clusters near the centre of the unit. Level IV has a high density of pottery sherds (n=583). Of which 154 of these sherds are Late Woodland, eight are Middle Woodland, and three are Laurel. The artifact frequency is less dense in level V (n=115). Pottery recovered from this unit are as follows: 35 are Late Woodland, one each of Middle Woodland and Laurel. The frequency further decreases in level VI (n=45) still dominantly Late Woodland (n=22). At the bottom, level VII, only four pottery sherds were recovered, three Middle Woodland, and one Laurel pottery sherd.

2017 Unit 5 N536E515

Unit *5* is located approximately 25 metres north of the mound. This unit overlaps with the 2016 test pits N535E515. A high density of artifacts and potential hearth features was identified in the test pit. The test pit is located mainly in the southwest quadrant and is evident until level VI. Level I was sterile, and the unit does not show any major post-contact intrusions but there were several tiny seed beads recovered in the upper levels; these may have moved around substantially due to their size. This unit demonstrates mostly a Middle Woodland occupancy in what is clearly a hearth feature extending into Unit 6 and 7. In level II, 22 pottery sherds were recovered, of which one is Late Woodland, two are Middle Woodland, and seven are Laurel wares. Level III had a higher density of pottery (n=87) of which 18 are Laurel, 10 are Middle Woodland and one is Late Woodland. Level IV saw a high density of fire-cracked rocks (n=365; 3717.51g), and pottery sherds (n=114). 56 Laurel sherds and 15 Middle Woodland sherds were recovered for level IV. Besides the northeast quadrants, level V and VI are a Laurel component. The fire-cracked rock patch continues into level V (n=126; 2549.8g) and level VI (n=11; 857.08g) to a lesser extent. In level V an orange stain appeared in the bottom of the northeast quadrant and continued into level VI.

2017 Unit 6 N535E515

This unit is located directly south of Unit 5***.*** The excavation group introduced a level 0 to even out the surface to account for a mound that formed over the unit. This mound formed from the decomposition of a tree. Level I had a low artifact density. A piece of glass was in the northeast quadrant along with exfoliated pottery pieces. The fire-cracked rock started to emerge in this layer (n=55; 232.01g). A slight soil change is noticeable in the northwestern quadrant, with dark brown soil turning to light black soil. In level II more pottery was recovered (n=47). This demonstrates the beginning of a Middle Woodland deposit in the northern quadrants. Starting in level IV and continuing to level V fire-cracked rock is abundant in the unit. Level V also sees a shift to a dominant Laurel deposit.

2017 Unit 7 N536E516

This unit is located directly east of Unit 5*.* Unit 7 demonstrates a mixing of material culture. There is very little post-contact material present until level III, where it appears alongside Woodland pottery in the form of seed beads. Post-contact intrusions end at level IV. This level dates to at least the Late Woodland period but Middle Woodland pottery appears in higher numbers in the deposit. In the northeast quadrants, no Late Woodland pottery was found after level III. Late Woodland pottery is found in the other quadrants in all levels, but with a decreasing frequency as depth increases. In level II a cluster of fire-cracked rock becomes visible in the northeast quadrant that is part of the hearth feature. The matrix was a mottled grey/tan silty clay soil, which might show some disturbance. This matrix continues into level III, the FCR spread into the southeast quadrant. This mottled patch in the northeast was exposed along with the parental material. In level IV, the FCR spreads across the whole unit, except for in the northeast where it is absent.

2017 Unit 8 N535E515

This unit was marked directly south of Unit 7. It was not excavated during the 2017 field season as there was not enough time to do so.

2017 Unit 9 N559E519

This unit is located to the west of Unit 1. Level I and II had a very low artifact density. A bottle cap was identified in the centre of the north half of level I of the unit. Four exfoliated pottery sherds were identified in level II. There is an increase in the artifact density in level III. Mostly consisting of lithic flakes, but four pottery sherds were recovered. Two of which were in the eastern half of the unit and are from the Middle Woodland period. In level IV, two Late Woodland potsherds were recovered in the eastern half of the unit and two Middle Woodland sherds in the southwest quadrant. No diagnostic material was recovered in level V. This unit had a dense frequency of fire-cracked rock (n=329; 15289.81g); but it does not demonstrate the same spread as in Unit 1 and Unit 2.

2017 Unit 10

This unit is located to the east of Unit 2. Level I contained exfoliated Woodland pottery in the northwest quadrant and a metal rivet and a metal tin in the eastern half of the unit. Middle Woodland pottery was still recovered in the western portion– two of which were identified as Laurel wares. A tobacco plug and another metal tin were found in the southwest quadrant of level III. Woodland pottery was recovered in all the other quadrants. Four of which were Laurel, and one Late Woodland sherd in the northwest quadrant. Late Woodland pottery sherds were identified in all quadrants of level IV, but Middle Woodland sherds were more frequent. Level V represents a Middle Woodland period deposit. No Late Woodland sherds were identified, and Middle Woodland sherds were recovered in all quadrants of the unit. Fire-cracked rocks first appears in level II of this unit and is well represented in all but the southwest quadrant. A tree stump was in the centre of the unit and this continued until level V.

4.4 Features

Midden

Unit 3 and 4 had a high artifact density (n=1440; excluding FCR and seeds) consisting of a high concentration of fragmented Late Woodland pottery sherds (n=919), and lithic debitage (n=226). These units are located on the periphery of the site on top of a slope. The high concentration of artifacts and its location may suggest it to be a refuse deposit, but further excavation in this section of the site would be needed to confirm this.

Fire-cracked rock patch

During excavation, a hearth was described in Unit 1. Through excavating the units surrounding it (Unit 2, 9, and 10), the features seemed much more complex (**Fig 4.3**). During a test pit in 2016, a large amount of fire-cracked rock was recovered in this area. Further excavation of Unit 1 uncovered a large cluster of fire-cracked rock starting in level III. Level IV uncovered a cluster of large rocks with a concentration on the eastern edge of the unit. Unit 2 was opened to examine the extension of the feature. The fire-cracked rock began to appear in level III and covered the whole unit in level IV and V. Unit 10 was open to the east of Unit 2. The fire-cracked rock started to appear in level II, concentrated in the northwest quadrant. By level IV, the fire-cracked rock extended into all quadrants but was very faint in the southern quadrants (**Fig 4.4**). Unit 10 was more than likely on the periphery of this feature, which extended more north. Unit 9 was open to the west of Unit 1. Very little fire-cracked rock was uncovered in this unit. This unit was more than likely on the periphery of the feature. The amount of charred material may also support the concept of these units being a part of a heating feature. In total Units 1, 2 and 10 contained 25.02 g (n=977) of charcoal. Unit 9 contained no charcoal. This feature contained a total of 496 fragments of singed and calcined bone (23.29 g). A single fragment (0.3057 g) was found in Unit 9. A total of 102 charred seeds (0.69 g) consisting of *Amaranthus* sp., *Chenopodium* sp., *Crataegus* sp., *Prunus* sp., *Zizania* sp. and 30 unidentifiable seeds were recovered from this feature as well. This excludes Unit 9 which did not have any. The fire-cracked rocks were laid out in no particular pattern but formed a thick pavement (**Fig 4.5**). The matrix above the fire-cracked rocks was highly organic. It was a very dark black, fine silty-sand with charcoal throughout it. The soil turned to a dark brown once the fire-cracked rocks appeared. Unit 9 and 10 were dark brown starting in level I, which is inconsistent with the soil colouration in unit 1 and 2. A similar fire-cracked rock feature was identified at the Martin-Bird site (DbJm-5). Pottery sherds associated with the feature at the Martin-Bird site contained residues of *Zea mays* (Boyd and Hamilton 2018).

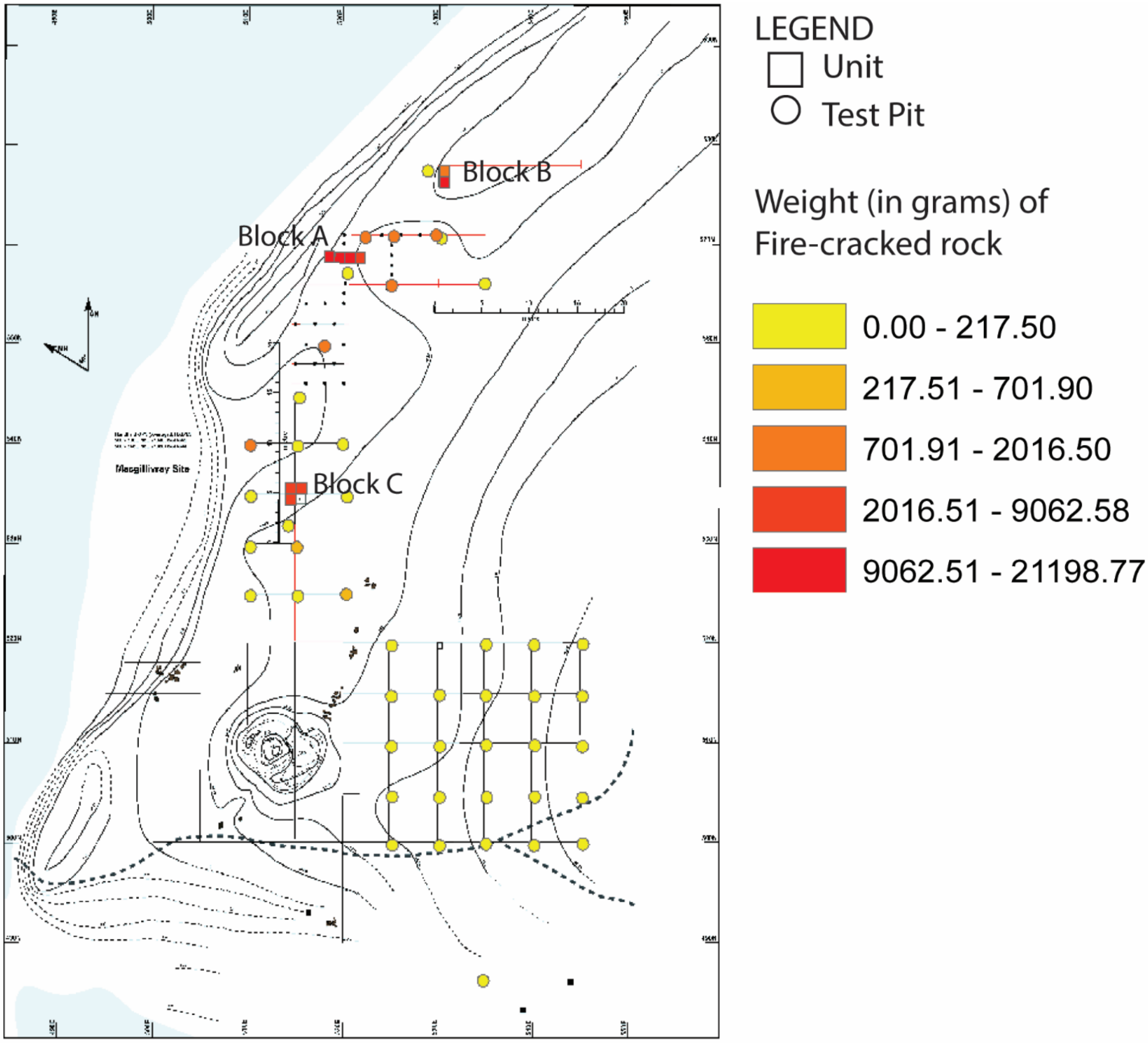

FIG 4.3 Spatial distribution of fire-cracked rock across the Macgillivray site.

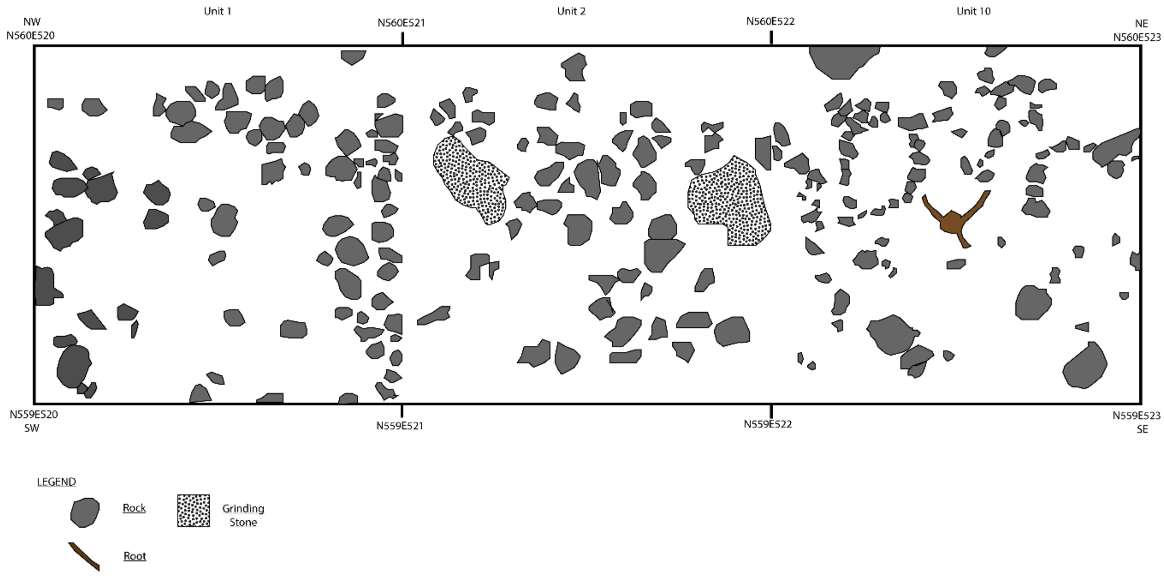

Fig 4.4 Floor plan of unit 1, 2 and 10 level IV, demonstrating the concentration of fire-cracked rocks.

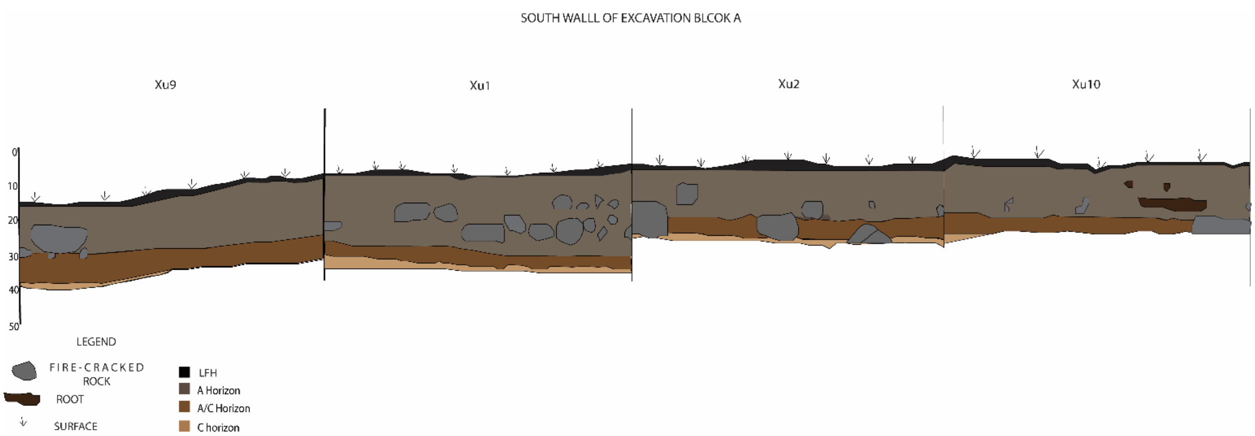

Fig 4.5 South wall profile of Unit 9, 1, 2 and 10.

4.5 Pottery Analysis

4.5.1 Overview

There were a total of 2387 sherds recovered from the 2016-2017 excavation of the Macgillivray site (**Table 4.1**). Of the assemblage, 2386 of the pottery sherds were Indigenous pottery. One European refined white earthenware was recovered in level III of Unit 7, and no other post-contact ceramic material was recovered. These counts are based on a preliminary catalogue to provide context for the fauna and floral remains. A vessel count for the Macgillivray site is beyond the scope of this work. Future works will include more detailed pottery analysis.

Table 4.1 Summary of Pottery Fragments Recovered from the Macgillivray Site from the 2017 Excavation and Selected 2016 Test Pits

Type	N	%
Unidentifiable sherd	763	31.96
Body sherd	1233	51.65
Neck sherd	269	11.27
Neck/shoulder sherd	2	0.08
Rim sherd	113	4.73
Shoulder sherd	6	0.25
European earthenware	1	0.04
Total	2387	100.00

Of the assemblage, 31.96% was unidentifiable sherds, 51.65% was body sherds, and 16.34% was diagnostic rim, neck, or shoulders sherds. A further breakdown of the cultural affiliation of the pottery demonstrates that 32.51% of the pottery assemblage is from the Middle Woodland period. Middle Woodland sherds consisted of 26.94% Laurel and 1.09% Brainerd. Late Woodland accounts for 14.45% of the assemblage. Post-contact ceramics account for 0.04%. 53% of the assemblage was not diagnostic of a specific period but was "Woodland" in origin (**Table 4.2**).

Table 4.2 Summary of Pottery Sherds by Cultural Affiliation from 2017 Excavation and Selected 2016 Test Pits

Cultural Affiliation	N	%
Middle Woodland	776	32.51
Laurel	643	26.94
Brainerd	26	1.09
Late Woodland	345	14.45
Blackduck	6	0.25
Selkirk	1	0.04
Sandy Lake	1	0.04
Post-contact	1	0.04
UnIdent. Woodland	1265	53.00
Total	2387	

Decorative elements on the Middle Woodland Laurel ware sherds include bosses, punctates, circular, dentate, forms of rocker stamping, incised lines, and pseudo-scallop impressions. Surface treatment includes mostly smoothing, parallel-grooved (Brainerd ware), and fabric-impressed (Late Woodland). The most common technical motif was the single use of dentate stamps, representing 41.5% of all exterior decorated sherds. Cord-wrapped object impressions were present on 2% of the assemblage. Ochre staining was present on six sherds (0.31% of the assemblage), which is a rare occurrence in Northwestern Ontario assemblages. One sherd had interior cord-wrapped object impressions (likely Sandy Lake ware).

4.5.2 Laurel

There was a total of 643 Laurel sherds recovered during the 2016-2017 excavation. The most common decorative style was plain (28%), followed by dentate (17%) (**Table 4.3**), although vessels numbers were not calculated here – since that was beyond the scope of this thesis. There were a surprisingly number of types including Pseudo-scallop shell incising.

Table 4.3 Summary of Laurel Types from Selected 2016 Test Pits and 2017 Units

Types	N	%
Pseudo-Scallop shell	28	4.35
Dentate	110	17.11
Incised	20	3.11
Bossed	0	0.00
Punctate	9	1.40
Bossed and Punctate	2	0.31
Oblique	2	0.31
Plain	181	28.15
Cord-Wrapped Stick	17	2.64
Exfoliated	2	0.31
Total	643	

4.5.3 Brainerd

In Northwestern Ontario, Brainerd ware has only been identified elsewhere at the nearby Martin-Bird site (Boyd et al. 2014). Twenty-six sherds from Brainerd wares were found at the Macgillivray site in the adjacent test pits from the 2016 and 2017 excavations. These rare examples may represent either trading or perhaps people travelling from what is now Minnesota to the site. It may indicate an even older component than the Laurel composite components, but it appears to be contemporaneous in terms of how they were found during excavation of the Macgillivray site. The majority of Brainerd ware sherds were parallel-grooved in surface finish with some having punctates.

4.5.4 Late Woodland wares

A total of 345 Late Woodland pottery sherds were recovered during the 2016-2017 excavation including Blackduck, Sandy Lake and Winnipeg Fabric-impressed (Selkirk) wares. Only 9.57% of the Late Woodland assemblage exhibits exterior decoration. The most common surface finish was fabric-impression (72.75%). Two sherds (0.58%) exhibit cord-wrapped object impressions decoration on the interior, which is characteristic of Sandy Lake ware. Both the Sandy Lake and Selkirk wares lack exterior decorations but were surface treated by fabric-impressions.

4.6 Spatial Distribution of Diagnostic Material

4.6.1 Vertical Stratigraphy

Vertical spatial analysis was only conducted on the data from the metre squared units. The units were further divided into three excavation blocks, block A (XU 1, 2, 9, 10), B (XU 3, 4), and C (XU 5, 6, 7). For each unit, a Harris matrix model (c.f., Harris 1992) was constructed demonstrating as much as possible to which time period each level corresponded with (**Fig 4.6**). Each unit was further divided by quadrant to maintain horizontal control.

Harris matrices (1992) are constructed based on four geological laws including the:

(1) Law of Superposition: In a non-disturbed environment with a series of layers, the uppermost layer would be the youngest and the lower layers would be older, unless if the deposit was created by the removal of a pre-existing mass;

(2) Law of Original Horizontality: Any archaeological layer deposited in an unconsolidated mass will tend toward into a horizontal disposition;

(3) Law of Original Continuity: Any deposited layer will either be bound by the basin wall of which it was deposited or will thin down to a feather edge; and

(4) Law of Stratigraphic Succession: Every deposit exists within its relations to the other strata. It exists in a sequence, based between its under-most deposit, and all higher-up deposits.

Through these geological laws, it can be assumed that a seriation of layers exists based on the order of artifacts recovered. For example, if a 25-cent coin dating to 1925 was found in level II of a unit, even if level I contained only Woodland period material culture, level I would also date to be older than 1925. Diagnostic material is based around pottery and lithics for the Woodland period, and the presence of post-contact material such as glass, iron, and modern refuse for the post-contact period. Levels devoid of diagnostic material will be categorized based on proxy to other quadrants. Smaller artifacts such as glass trade beads will be ignored as diagnostic material as they can easily move about the layers. The Harris matrix assumes that each layer was deposited horizontally as no cut-stratigraphic features such as cache, pits and post-moulds were identified.

Excavation block A (Unit 1, 2, 9, 10)

Excavation block A seems to be a mixed deposit. The recovered material is dominantly Middle Woodlands, but most layers contained intrusion of Late Woodland and post-contact artifacts. This excavation block is also associated with a large frequency of fire-cracked rock and may potentially be a roasting pit/hearth.

The stratigraphy of Unit 1 is not very complicated (**Fig 4.6**). Level V represents the only pure Middle Woodland component. Level IV and III are dominantly Late Woodland; however, Middle Woodland pottery sherds appear in a similar frequency (**Table 4.4**). An exception is the Southeast quadrant of Level III which contained five post-contact metal fragments. Level II and I contained no Middle Woodland pottery. Level II contained one Late Woodland sherd in the northeast quadrant. Level I contain only post-contact diagnostic material, including a fur trade era ring.

Unit 2 follows a similar stratigraphic sequence. Level V is mostly a Middle Woodland deposit, except for in the northeast quadrant which contained a single Late Woodland sherd. Levels IV and III represent a Late Woodland deposit except for in the northeast quadrant. There may be a mixing of material, as Middle Woodland sherds outnumbered Late Woodland sherds significantly in both levels. The northeast quadrant of level III contained a metal handle. Level II contained two Middle Woodland sherds and no other diagnostic artifacts. This demonstrates the mixed nature of the unit. Level I contained no diagnostic artifacts.

Unit 9 also presents some mixing of the stratigraphy. Level III to V represents a mostly Late Woodland deposit. Level V was devoid of diagnostic material. Level IV contained an equal ratio of Late to Middle Woodland sherds. Level III only contained Middle Woodland sherds concentrated in the southwest quadrant. A metal bottle cap was recovered from Level I.

In Unit 10, level V represents a pure Middle Woodland deposit. Level IV demonstrates a mixed Late Woodland deposit, but Middle Woodland sherds are more frequent. This is the case with level III as well. A metal tobacco plug and tin lid were recovered in the southwest quadrant of level III. Level II and I contained post-contact material. The northwest quadrant was an exception. It did not contain post-contact material or Late Woodland pottery sherds. Level II contains Middle Woodland sherds.

Table 4.4 Summary of Diagnostic Material from Excavation Block A

Unit 1 Level	Post-contact	Late Woodland	Middle Woodland
I	12	0	0
II	3	1	0
III	5	8	7
IV	0	14	16
V	0	0	5

Unit 2 Level	Post-contact	Late Woodland	Middle Woodland
I	0	0	0
II	0	0	2
III	1	12	19
IV	0	7	18
V	0	1	16

Unit 9 Level	Post-contact	Late Woodland	Middle Woodland
I	1	0	0
II	0	0	2
III	0	0	4
IV	0	2	2
V	0	0	0

Unit 10 Level	Post-contact	Late Woodland	Middle Woodland
I	0	0	0
II	4	0	2
III	2	2	8
IV	0	8	18
V	0	0	21

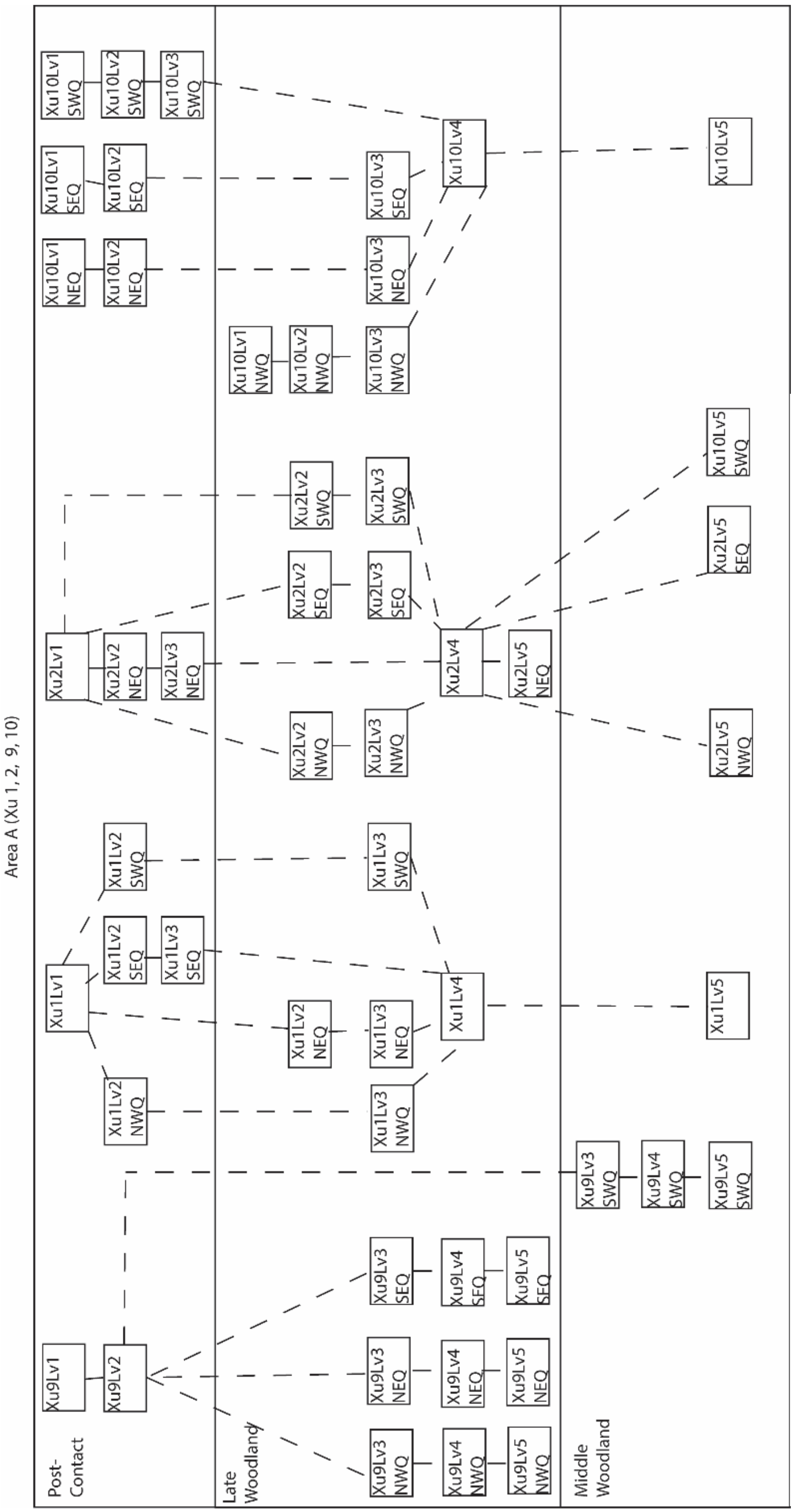

Fig 4.6 Harris Matrix of Excavation Block A (Unit 1, 2, 9, 10).

Excavation block b (Unit 3, 4)

Excavation block B represents a mostly Late Woodland deposit with a very high artifact density (**Fig 4.7**). This block may represent a midden. Unit 3's stratigraphy is quite simple. Level V and IV of the southeast quadrant represent a small Middle Woodland deposit. The other quadrants of the unit represent a Late Woodland deposit. Level III is a mostly Late Woodland deposit, except for in the Southwest where a large number of metal fragments were identified. Every quadrant except for the northeast quadrant demonstrates a post-contact deposit (**Table 4.5**). Level I is a post-contact deposit.

Unit 4 demonstrates more homogeneity between levels. Level VII is a small Middle Woodland deposit. Level VI to IV are a mixed deposit; however, the frequency of Late Woodland sherds outnumbers Middle Woodland sherds. The northeast quadrant of level III maintains a Late Woodland deposit. The rest of level III yielded post-contact material. Level II and I contained no diagnostic material.

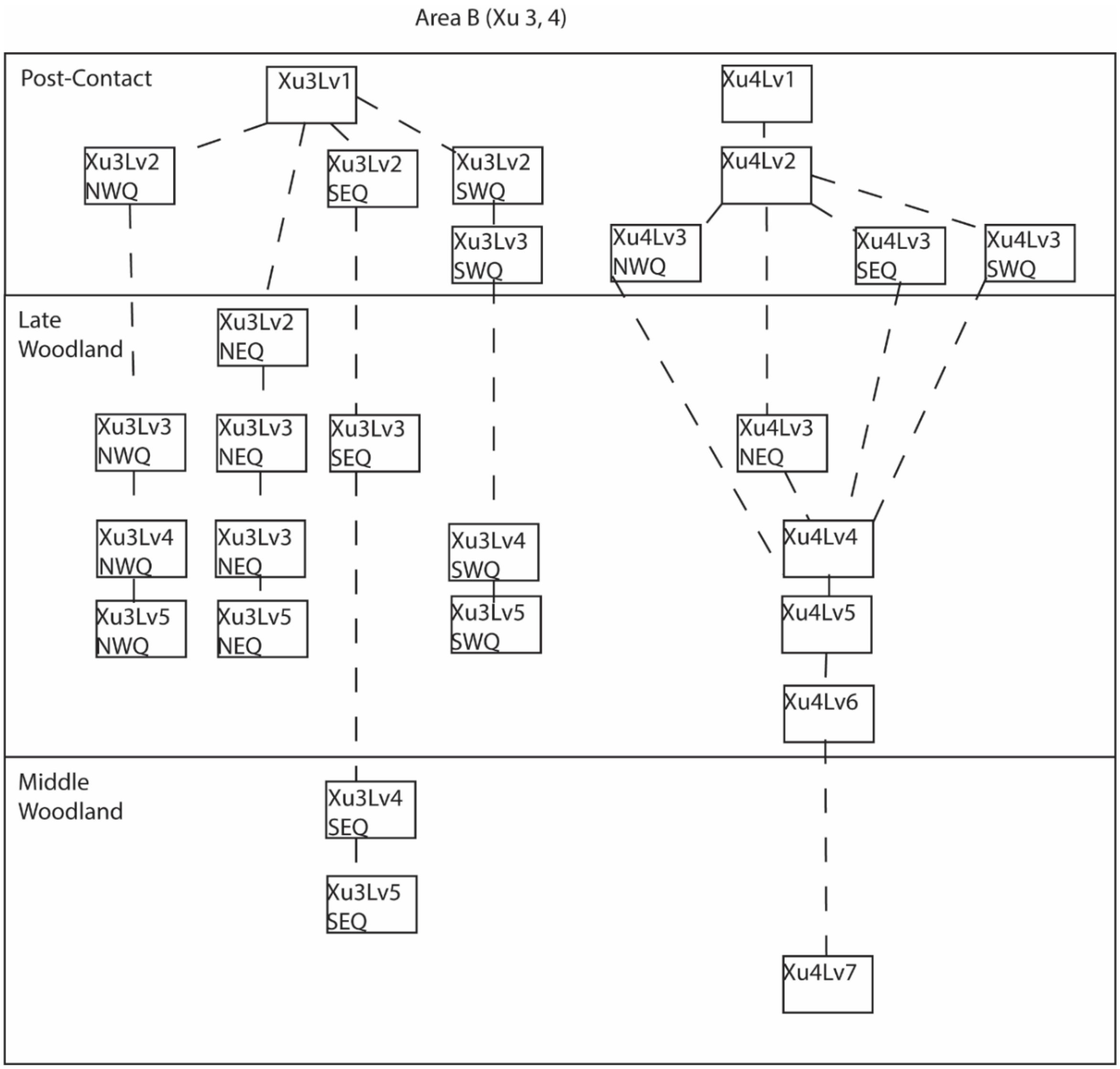

Fig 4.7 Harris matrix of excavation block B (Unit 3 and 4).

Table 4.5 Summary of Diagnostic Material from Excavation Block B

Unit 3 Level	Post-contact	Late Woodland	Middle Woodland
I	0	0	0
II	1	0	0
III	148	13	12
IV	0	1	5
V	0	1	0

Unit 4 Level	Post-contact	Late Woodland	Middle Woodland
I	0	0	0
II	0	0	0
III	10	24	7
IV	0	160	11
V	0	35	2
VI	0	22	7
VII	0	0	4

Excavation block C (Unit 5, 6 ,7)

Excavation block C contained a hearth feature. The stratigraphy of the block is more complex than the previous excavation blocks (**Fig 4.8**). Although a good amount of the levels contained Late Woodland material. The majority of diagnostic material is from the Middle Woodland period (**Table 4.6**).

Unit 5 represents the most simplistic stratigraphy of this block. Level VI to IV represent a Middle Woodland deposit. Level III demonstrates a Middle Woodland deposit in all quadrants, except for the northeast quadrant. The northeast quadrant contained a single Late Woodland sherd. In level II one Late Woodland pottery sherd was located in the same quadrant as nine Middle Woodland sherds. Level I did not contain any diagnostic material.

Unit 6 demonstrates a split between the north and south half of the unit. Level VI to IV represents a Middle Woodland deposit throughout. Starting in level III, a post-contact deposit begins in the southern half of the unit. In the northern half, a Middle Woodland deposit is present until Level I where the whole unit is a post-contact deposit.

Unit 7 contains a complex stratigraphy demonstrating a mixing of layers. In the northeast quadrant, level V-III contains a pure Middle Woodland deposit. Level V-II of the northwest and the southeast quadrants demonstrate a Late Woodland deposit. Late Woodland pottery sherds only appear in small frequencies compared to Middle Woodland sherds. Level V-IV of the southwest quadrant also contains Late Woodland sherds. The post-contact deposit starts in level III. This deposit starts in level II for the northeast and southwest quadrants, and it begins in level I for the northwest quadrant.

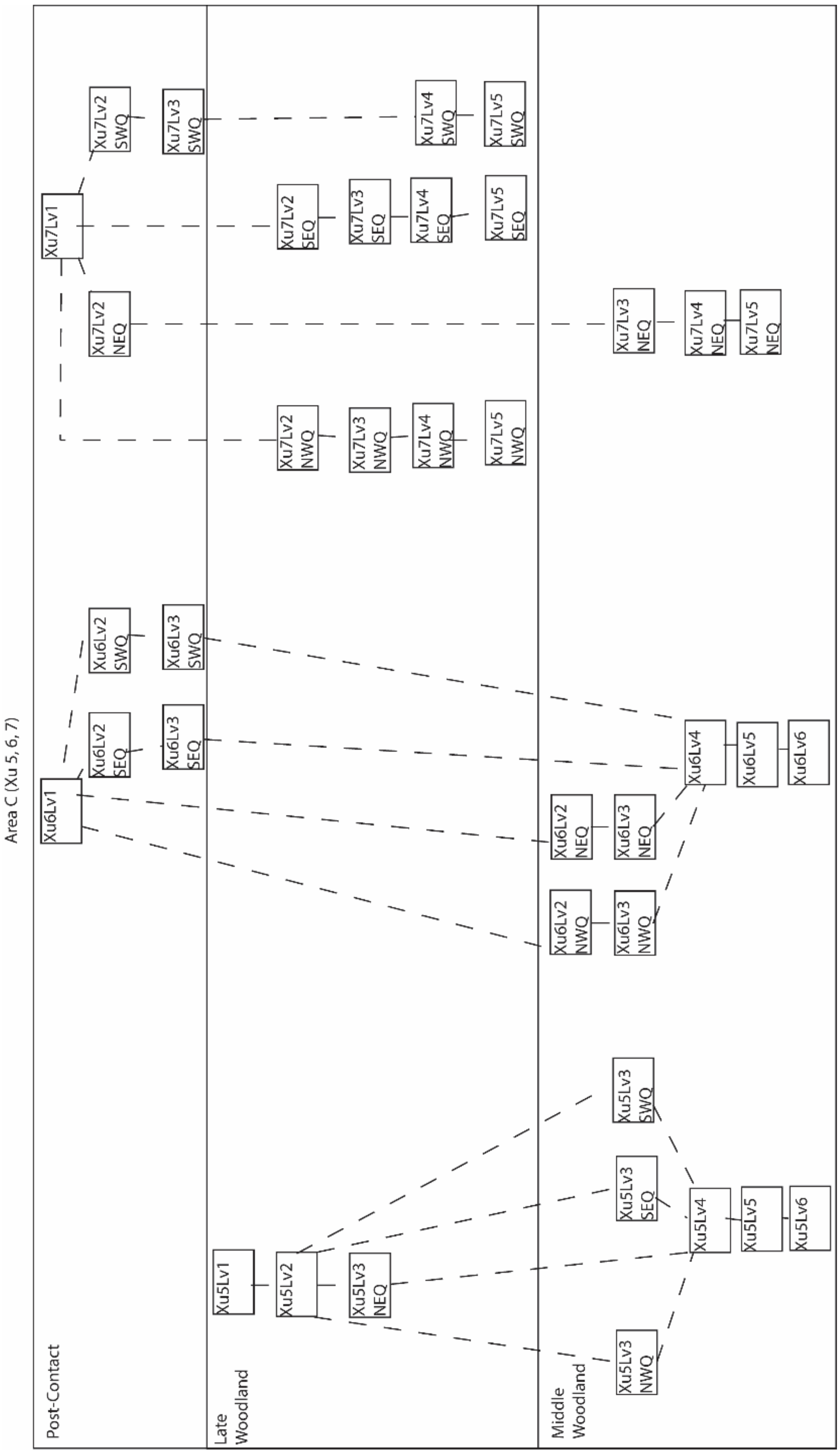

Fig 4.8 Harris matrix of excavation block C.

Table 4.6 Summary of Diagnostic Material from Excavation Block C

Unit 5 Level	Post-contact	Late Woodland	Middle Woodland
I	0	0	0
II	0	1	9
III	0	1	28
IV	0	0	72
V	0	0	25

Unit 6 Level	Post-contact	Late Woodland	Middle Woodland
I	1	0	1
II	0	0	9
III	1	0	55
IV	0	0	36
V	0	0	12

Unit 7 Level	Post-contact	Late Woodland	Middle Woodland
0	0	7	8
I	1	0	1
II	1	1	14
III	1	0	14
IV	0	10	42
V	0	1	5

4.6.2 Horizontal Analysis

This section will ignore the vertical stratigraphy and plot frequency through the horizontal plane of the site. This is to demonstrate "hotspots" based on different time periods. This section will focus on differentiating Middle and Late Woodland hotspots. The post-contact period is represented as a small veneer on the surface of a few units. Hotspots are locations where there is a higher frequency of material culture belonging to one period over the other.

Figure 4.9 demonstrates that the Middle Woodland deposits are concentrated to the northeast of the mound. All units have a medium to high Middle Woodland sherd count, except for excavation block B. Excavation block C has the largest concentration of Late Woodland sherds. **Figure 4.9** demonstrates that the Late Woodland deposit is very minimal compared to the Middle Woodland. Late Woodland is dominant in excavation block C. There is a very small concentration of Late Woodland in excavation block A, and unit 7. The minimal concentration of Late Woodland is further demonstrated in **Figure 4.9**. In all but five test pits/units, Middle Woodland sherd outnumber Late Woodland. In excavation block B, unit 4 is dominantly Late Woodland. Whereas in unit 3, both periods appear in similar frequencies.

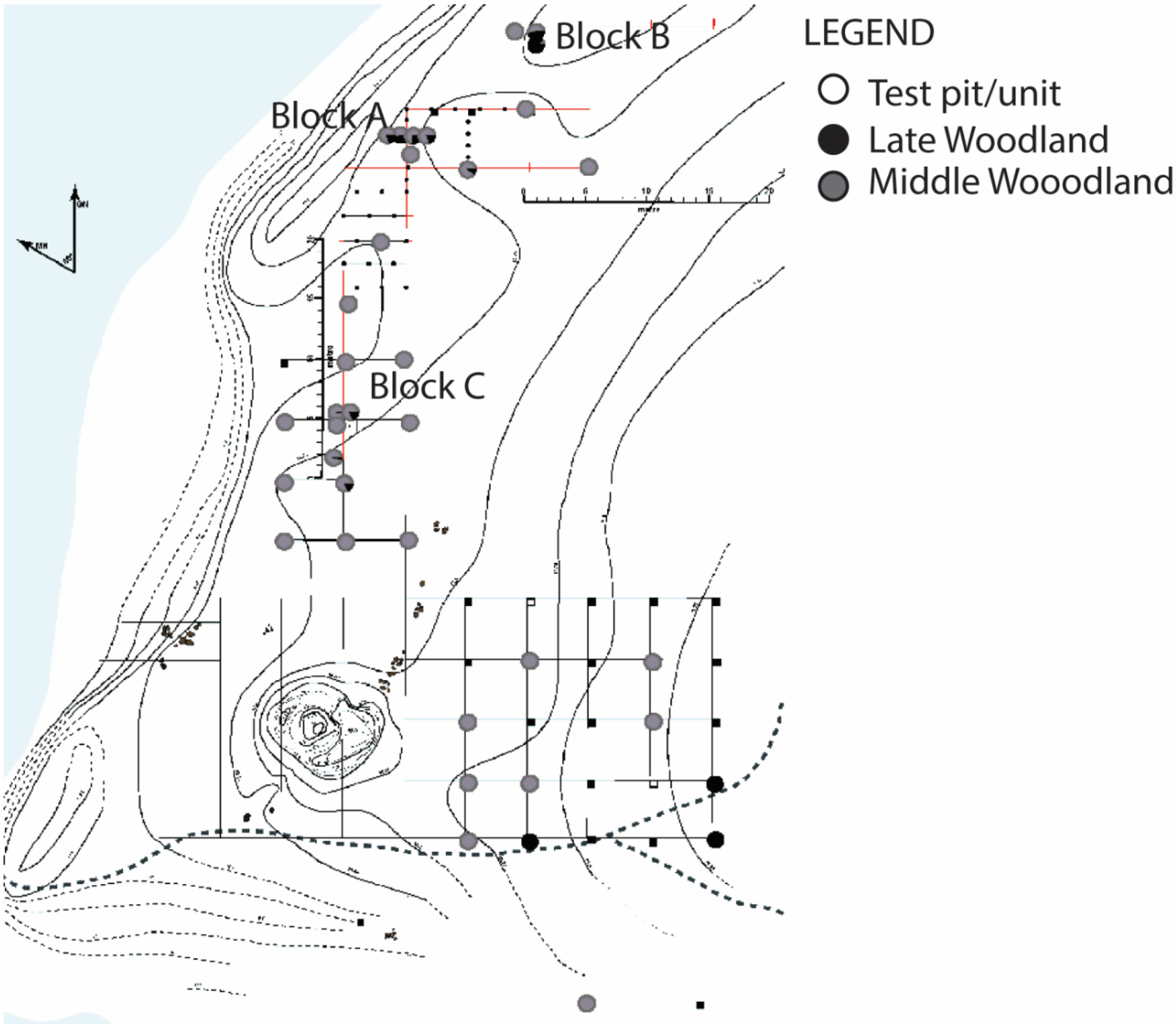

Fig 4.9 Horizontal distribution of Woodland pottery finds from 2017 excavation units and selected 2016 test pits.

Summary

The horizontal analysis demonstrates the high concentration of Middle Woodland period material recovered from the Macgillivray site. The vertical analysis highlight how problematic stratigraphic analysis can be in the central Canadian Boreal Forest. Deposits are often heavily mixed and disturbed through bioturbation, cryoturbation and other factors. This results in very few single component deposits following chronological order. This limits the use of association by stratigraphy for the analysis of non-diagnostic material. Levels and quadrants do not represent discrete time block and material found with diagnostic artifacts may not be from the same period. The Harris matrices presented support the use of a single analytic unit that generalizes about Woodland period diet and land use.

4.7 Lithics

4.7.1 Introduction

A total of 2977 lithic specimens were recovered from the Macgillivray site. It can be further broken down to 78 flaked tools, 23 ground tools, and 2876 pieces of debitage (**Table 4.7**). They were not analyzed in depth, since the main focus of this thesis is the fauna and flora samples; the point was to provide context for the dating and stratigraphy of the site using the preliminary catalogues.

Table 4.7 Summary of Lithic Artifact Recoveries

Artifact Class	N	%
Tools (total)	103	3.46
Flaked tools	78	2.62
Ground tools	23	0.77
Debitage	2876	96.61
Total	2977	100

4.7.2 Raw Material

Since the main focus of this thesis is the faunal and floral remains, a detailed analysis for the Macgillivray site is beyond the scope of this work. These counts are based on a preliminary catalogue to provide context for the faunal and floral remains. Future work will include more detailed analysis.

The lithic assemblage contained mostly stromatolithic chert (43.13%), which is often found in the Whitefish Lake basin archaeological sites. This is followed by taconite (15.47%) and Gunflint silica (14.52%). There are 26 different materials present, eight types had debitage but no tools (**Table 4.8**). Most tools are made from stromatolithic chert (n=22), Hudson Bay Lowland (n=12), and taconite (n=11). Of the debitage, 34 were primary flakes, 856 were secondary flakes, and 1538 were tertiary flakes. There are 10 flakes from an unknown stage, 427 block shatters, and 15 cores and core fragments.

There were three pieces of copper and one copper nugget recovered. Unit 6 level V contained a nugget and piece of copper. The other two pieces were found in Unit 7, one in level 0, and the other in level I. This may infer that the pieces were post-contact in provenience.

There were 44 pieces of ochre (20.34g) recovered during excavation. Both red and yellow ochre are present.

Table 4.8 Summary of Lithic Material by Artifact Class from the Macgillivray Site 2016 and 2017 Excavations

Raw Material	Debitage	Tool	Retouched/utilized flake	Total	% of material
Argillate	1	0	0	1	0.03
Banded Iron Formation	1	0	0	1	0.03
Carbonate chert	111	1	3	115	3.76
Calcedony	21	1	0	22	0.72
Copper	0	0	0	4	0.13
Granite	6	0	0	6	0.20
Gunflint chert	22	1	0	23	0.75
Gunflint Silica	428	8	4	444	14.52
Hudson Bay Lowland chert	291	12	3	306	10.01
Hudson Bay lowland/calcedony	1	0	0	1	0.03
Jasper	1	0	0	1	0.03
Kekabeka chert	9	2	0	11	0.36
Knife River Flint	1	1	0	2	0.07
Mudstone	5	0	0	5	0.16
Ochre	0	0	0	44	1.44
Quartz	29	1	0	30	0.98
Quartzite	4	0	0	4	0.13
Sandstone	10	6	0	16	0.52
Schist	0	1	0	1	0.03
Shale	13	7	0	20	0.65
Siltstone	51	2	2	55	1.80
Siltstone/granite	0	1	0	1	0.03
Slate	1	1	0	2	0.07
Solicified Limestone	1	0	0	1	0.03
Stromatolithic chert	1287	22	4	1319	43.13
Taconite	459	11	2	473	15.47
Unknown	134	16	0	150	4.91
Total	2887	94	18	3058	100.00

4.7.3 Tools

There are a total of 99 formal tools and three preforms. The assemblage consists of 17 different tool types. The most dominant type is scrapers (28.43%) followed by biface (19.61%) and grinding stone (11.76%) (**Table 4.9**).

Table 4.9 Summary of Lithic Tools Recovered from the Macgillivray Site 2016 and 2017 Excavations

Class of tools	n	%
Adze	1	0.98
Anvil	2	1.96
Awl	2	1.96
Biface	5	4.90
Biface fragments	14	14.71
Biface/projectile point	2	1.96
Blade	1	0.98
Chopper	5	4.90
Cutting tool	1	0.98
Drill	3	2.94
Grinding stone	11	11.76
Groundstone tool	2	1.96
Hammer stone	6	5.88
Hammerstone/grinding stone	1	0.98
Hand tool	1	0.98
Pecking stone	2	1.96
Pottery tool	1	0.98
Projectile points	2	1.96
Scraper	29	28.43
Spokeshave	4	3.92
Unifacial tool	2	1.96
Preform	3	2.94
Total	100	100

4.7.4 Spatial Distribution

The majority of lithic debitage material was located north of the mound (**Fig 4.10**). Excavation block C had the densest recovery rate. Block B and A also saw medium concentration. The medium density with block B and A, compared to the test pits. This may either be the result of the larger size of the excavation unit compared to test pits, or that lithic debitage was better recorded.

Table 4.10 summarizes the distribution of the tools. All three units of excavation block C (Unit 5, 6, and 7) contained the highest concentration of tools. Together the three units contain 10 scrapers (34% of all scrapers), four grinding stones (36% of all grinding stones recovered), 10 biface fragments (71% of all biface fragments recovered) and one biface. Unit 6 contained the most diverse amount of tool types recovered. This includes a blade, a chopper, a drill, grinding stone, four scrapers and a unifacial tool.

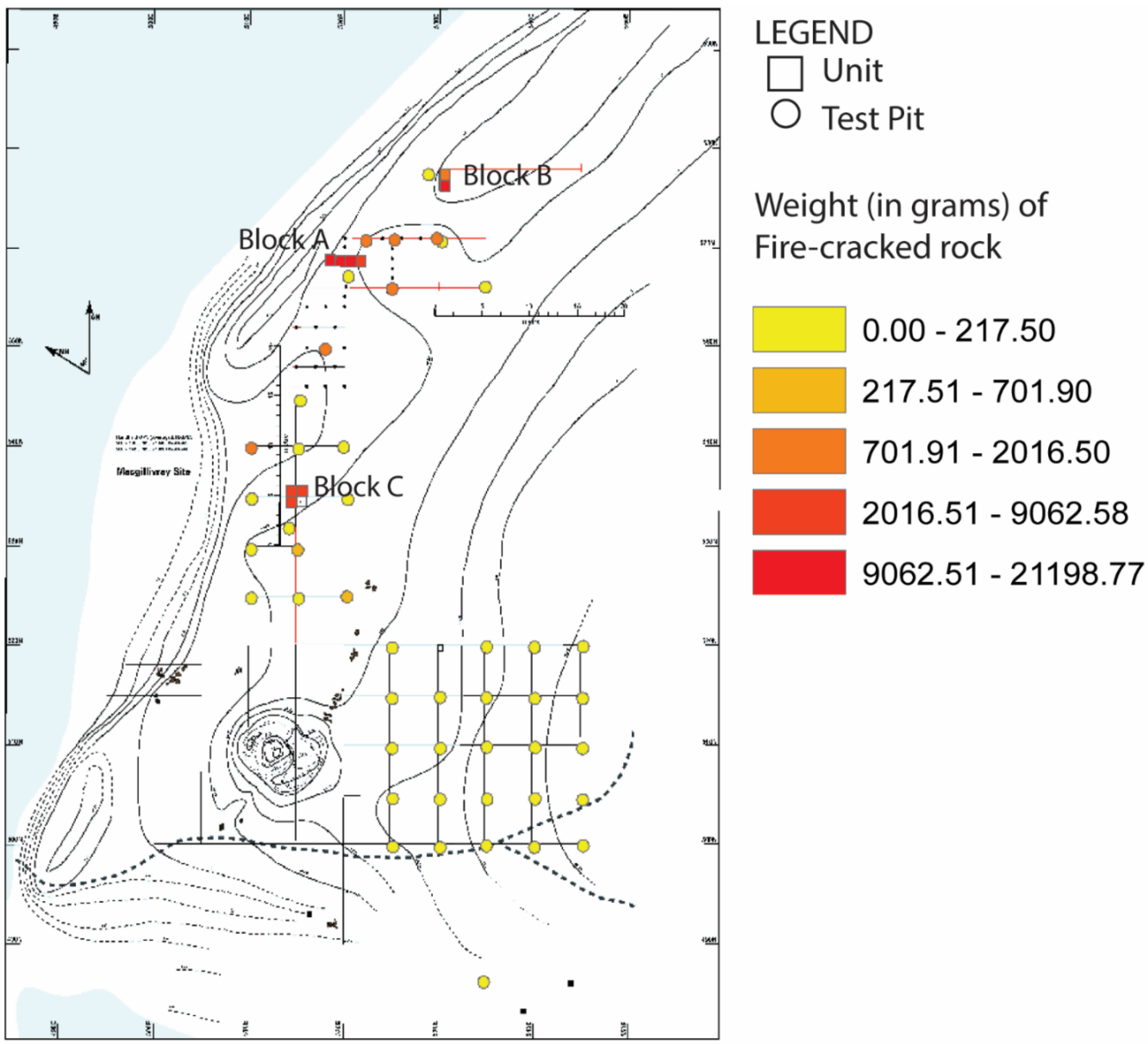

Fig 4.10 Spatial distribution of lithic debitage from all levels combined at the Macgillivray site from the 2016 and 2017 excavations.

Table 4.10: Summary of the Distribution of Lithic Tools from 2016 and 2017

Unit	Adze	Anvil	Awl	Biface	Biface Fragments	Biface/ projectile points	Blade	Chopper	Cutting Tool	Drill	Grinding Stone	Groundstone tool	Hammerstone	Hammerstone/ Grinding stone	Handtool	Pecking stone	Pottery tool	preforms	Projectile points	Scraper	Spokeshave	Unifacial tool	Total
Unit 1	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	1	1	-	-	2	2	-	9
Unit 2	-	-	-	2	1	1	-	-	-	1	1	-	-	-	-	-	-	-	1	1	-	-	8
Unit 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
Unit 4	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	4
Unit 5	-	-	-	1	2	1	-	-	-	1	1	1	-	-	-	-	-	2	-	2	1	1	13
Unit 6	-	-	-	-	1	-	1	2	-	1	1	1	1	-	-	-	-	-	-	4	-	1	13
Unit 7	-	-	1	-	7	-	-	-	-	-	2	-	-	-	-	-	-	-	-	4	-	-	14
Unit 9	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2	-	-	3
Unit 10	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-	4
Ms-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
MS-3	-	-	-	-	-	-	-	1	1	-	-	-	2	-	-	-	-	-	-	-	-	-	4
~N439E530	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
N500E530	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
N500E535	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
N500E540	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
N505E525	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
N505E530	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
N510E525	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
N510E535	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
N510E540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
N515E540	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	2
N525E510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
N525E520	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
N530E515	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
N532E514	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	3
N535E510	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
N540E515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
N545E515	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
Total	1	2	2	5	14	2	1	5	1	3	11	2	6	1	1	2	1	3	2	29	4	2	100

4.8 Post-Contact Material

A total of 245 post-contact artifacts and some modern refuses were recovered during the excavation; much of that was from the surface. They were not analyzed in depth, since the main focus of this thesis is faunal and floral samples; the point was to provide context for the dating and stratigraphy of the site. Two ceramics were recovered. A shooting target was recovered in test pit KS-2 but is not archaeological in nature. In Unit 7, level III, a refined white earthenware was recovered. Fourteen pieces of glass were recovered. Of those, seven were glass trade beads, six were white and one was blue. Trades beads do not have a strong correlation with chronology in Northern Ontario. Two plastic beads were also recovered from Unit 7, level 0 and level II. All other glass materials were fragmented and had no diagnostic information. Four pieces of leather were recovered, most likely from shoes.

Metal was the largest category of post-contact material, accounting for 221 pieces. They include the following a bottle cap (n=1), a can tab (n=1), coins (n=3), a grommet (n=2), a hairclip (n=1), a handle (n=1), a lard pail (n=1), a nail and a revit (n=2), a ring (n=1), a shotgun shell (n=1), a spring (n=1), a staple (n=1), tin cans (n=16), and a tobacco plug (n=1). Most materials were fragments. The first coin which is an American "Indian Head Cent" and had the following inscription: "United States of America 1899". The other side has an oak wreath and a shield design. It was recovered in test pit N530E515 level 4. In Unit 3 level II contained a five-cent Canadian coin minted in 1918. In Unit 4 level III, an American penny dating to 1918 was recovered.

4.9 Radiocarbon Dating

4.9.1 Previous Dates from the Whitefish Lake Basin Area

There are 14 radiocarbon dates from an archaeological context in the Whitefish Lake basin (**Table 4.11**). Some of the dates may be tenuous due to sample aggregation, which can affect the sigma value, and other issues with misreporting.

There are two dates from the McCluskey Site. One was from a carbon encrustation on a pottery sherd. Dawson (1974) reported that no date was received as of writing his report. The other sample was from a charcoal lens (level 2) below the pottery cluster located at the west end of the mound feature. It dated to 1990 ± 90 BP (GaK-1282; charcoal; δ13C: -25.0‰). Dawson (1974) relates the date received with early Laurel. However, the pottery cluster consisted mostly of Blackduck sherds. There were only a few Blackduck and Laurel-Blackduck transitional pottery sherds recovered in level 4 and 5. This may be due to some disturbance such as tilling, but it did not affect the layout of the pottery.

There are ten dates from the Martin-Bird site. A date of 180 ± 140 BP (S-774; charcoal; δ13C: -25.0‰) for a charcoal sample from a hearth feature located in square 9 level 3 (Dawson 1978). This sample was associated with Blackduck wares, and fauna refuse (Dawson 1978). Sparse historic material was found within the square but ceased below level 2 (Dawson 1978). Sq. 9 level 3 also featured a copper cache, the black ash at the bottom of the cache dated to 1150 ± 60 BP (S-891; charcoal; δ13C: -25.0‰) (Dawson 1978). There are two samples from sq. 12. One from the bottom of the hearth feature (level 2) associated with Blackduck sherds and sparse Winnipeg Fabric-impressed ware sherds. This sample dated to 660 ± 70 BP (S-775; charcoal; δ13C: -25.0‰) (Dawson 1978). A carbon sample dated to 890 ± 130 BP (S-851; charcoal; δ13C: -25.0‰.) from level 3 was associated with Blackduck wares (Dawson 1978). In sq. 5 level VU a date of 3480 ± 70 BP (S-773; charcoal; δ13C: -25.0‰) was obtained from a charcoal layer. It was below a row of fire-cracked rocks that were associated with a roasting pit feature. This layer contained no diagnostic material (Dawson 1978). Charcoal from sq 1 level 1 dated to 1470 ± 120 BP (S-772; charcoal; δ13C: -25.0‰), but no diagnostic material was recovered (Dawson 1978). Charcoal surrounding a burial in the mound dated to 1320 ± 90 BP (S-892; charcoal; δ13C: -25.0‰) which would date to the Middle Woodland period. Dawson (1978) associated the burial with the Blackduck component. He suggests this early date may be due to an overlap between Late Laurel and Early Blackduck culture. Charcoal from sq. 4 level 1 dated to 320 ± 90 BP (S-852; charcoal; δ13C: -25.0‰) (Dawson 1978). Two problematic dates were received. One was a charcoal sample from sq. 5 lv 2 which was associated with Blackduck cultural refuse but dated to 1750 ± 210 BP (S-852; charcoal; δ13C: -25.0‰) which is too early for the cultural affiliation, and sq. 9 lv 1, which was associated with Laurel pottery and dated to 2280 ± 150 BP (S-890; charcoal; δ13C: -25.0‰). This was however, recovered above Late Woodland sherds, demonstrating that the square was disturbed (Dawson 1978).

There are two samples from the Macgillivray site. A carbon lens from the eastern edge of the mound dated to 2240 ± 60 BP (GaK-1278; charcoal; δ13C: -25.0‰) (Dawson 1980). This carbon lens was initially interpreted to be associated with a hearth feature (Dawson 1980). A wood sample from the log crib area within the mound dated to 1930 ± 200 BP (GaK-1492; wood; δ13C: -25.0‰) (Dawson 1980).

Table 4.11: Previously Reported Radiocarbon Dates from the Whitefish Lake Basin Area

Site	Context	Association	Material	Date	Period	Source
Macgillivray (DbJm-3)	Eastern edge of Mound	n/a	Carbon lens	2240 ± 60 BP	Middle Woodland	Dawson 1980
Macgillivray (DbJm-3)	Log crib area of the mound	n/a	Wood	1930 ± 200 BP	Middle Woodland	Dawson 1980
Martin-Bird (DbJm-5)	Sq. 1 Lv 1	No diagnostic material	Charcoal	1470 ± 120 BP	Middle Woodland	Dawson 1987b
Martin-Bird (DbJm-5)	Sq. 4 Lv 1	n/a	Charcoal	320 ± 90 BP	Contact period	Dawson 1987b
Martin-Bird (DbJm-5)	Sq. 5 Lv 2	Blackduck	Charcoal	1750 ± 210 BP	Middle Woodland	Dawson 1987b
Martin-Bird (DbJm-5)	Sq. 5 Lv VU	Roasting Pit, no diagnostic feature	charcoal layer	3480 ± 70 BP	Middle period	Dawson 1987b
Martin-Bird (DbJm-5)	Sq. 9 Lv 1	Laurel	Charcoal	2280 ± 150 BP	Middle Woodland	Dawson 1987b
Martin-Bird (DbJm-5)	Sq. 9 Lv 3	Blackduck ware, hearth feature	Charcoal	180 ± 140 BP	Contact period	Dawson 1987b
Martin-Bird (DbJm-5)	Sq. 9 lv 3	Copper cache	Ash	1150 ± 60 BP	Middle Woodland	Dawson 1987b
Martin-Bird (DbJm-5)	Sq 12 lv 2	Blackduck wares sparse Selkirk	n/a	660 ± 70 BP	Late Woodland	Dawson 1987b

Martin-Bird (DbJm-5)	Sq. 12 Lv 3	Blackduck wares	n/a	890 ± 130 BP	Late Woodland	Dawson 1987b
Martin-Bird (DbJm-5)	Area C	Burial feature	Charcoal	1320 ± 90 BP	Middle Woodland	Dawson 1987b
McCluskey (DbJm-2)	n/a	n/a	Carbon encrustation	no date published	n/a	Dawson 1974
McCluskey (DbJm-2)	Pottery Cluster lv 2	Blackduck ware	Charcoal	1990 ± 90 BP	Middle Woodland	Dawson 1974

4.9.2 Radiocarbon Dates from the 2016-2017 Macgillivray Excavation

Three samples from the Macgillivray site were sent for radiocarbon dating. Two samples were sent to A.E. Lalonde AMS laboratory at the University of Ottawa, and one sample to Beta Analytics (**Table 4.12**). The sample sent to Beta Analytics consisted of four carbonized wild rice grains (34.2 mg). These grains were recovered in the northeast quadrant of level IV Unit 6 and received a date of 1680 ± 30 BP (Beta-567300; *Zizania* sp. seed; δ13C: -24.3‰) (**Fig 4.11**). This quadrant contained a high frequency of fire-cracked rock. This area also had an extension of the A horizon consisting of black silty-loam soil. This extension of the A horizon was not reported in the southwest quadrant of Unit 5 so it may either be the result of the shovel test pit or a natural undulation. In the rest of the unit this level consisted of C-horizon sandy loam (**Fig 4.12**). Level IV of Unit 6 recovered 36 pottery sherds diagnostic to the Middle Woodland period. Nine of which from the northeast quadrant and contained no other diagnostic material.

The two samples sent to the A.E. Lalonde AMS laboratory were a terrestrial carnivore bone and charcoal. The carnivore bone was also recovered in the northeast quadrant of level IV Unit 6. It failed to receive a date as there was not enough collagen preserved for the analysis. The second sample was charcoal recovered from the southeast quadrant of level IV Unit 2. It received a date of 353 ± 25 BP (UOC-13406; charcoal; $F^{14}C$: 0.95). This date was much younger than expected. This sample was associated with the fire-cracked rock pavement. The sample came from the matrix underneath a grinding stone associated with Laurel pottery. Vertically this level includes intrusion of Late Woodland pottery (n=7), but Middle Woodland is more abundant (n=18). Within the southeast quadrant, 11 Middle Woodland pottery sherds were recovered and only two Late Woodland sherds were recovered.

Table 4.12: Macgillivray 2016-2017 Carbon-14 Dates

Site	Borden Number	Context	Association	Material	Date	Period
Macgillivray	DbJm-3	Xu6Lv4SEQ	Laurel associated with FCR feature.	Carbonized Wild rice grains	1680 ± 30 BP (δ13C: -24.3‰)	Middle Woodland
Macgillivray	DbJm-3	Xu6Lv4SEQ	Laurel associated with FCR feature.	Carnivore lone bone	failed	n/a

Macgillivray	DbJm-3	Xu2Lv4SEQ	Underneath a grinding stone associated with Laurel pottery and FCR feature.	charcoal	353 ± 25 BP ($F^{14}C$: 0.95)	Late Woodland

Fig 4.11: Wild Rice grains from the Macgillivray Site (DbJm-3) dated to 1680 ± 30 BP (δ13C: -24.3‰).

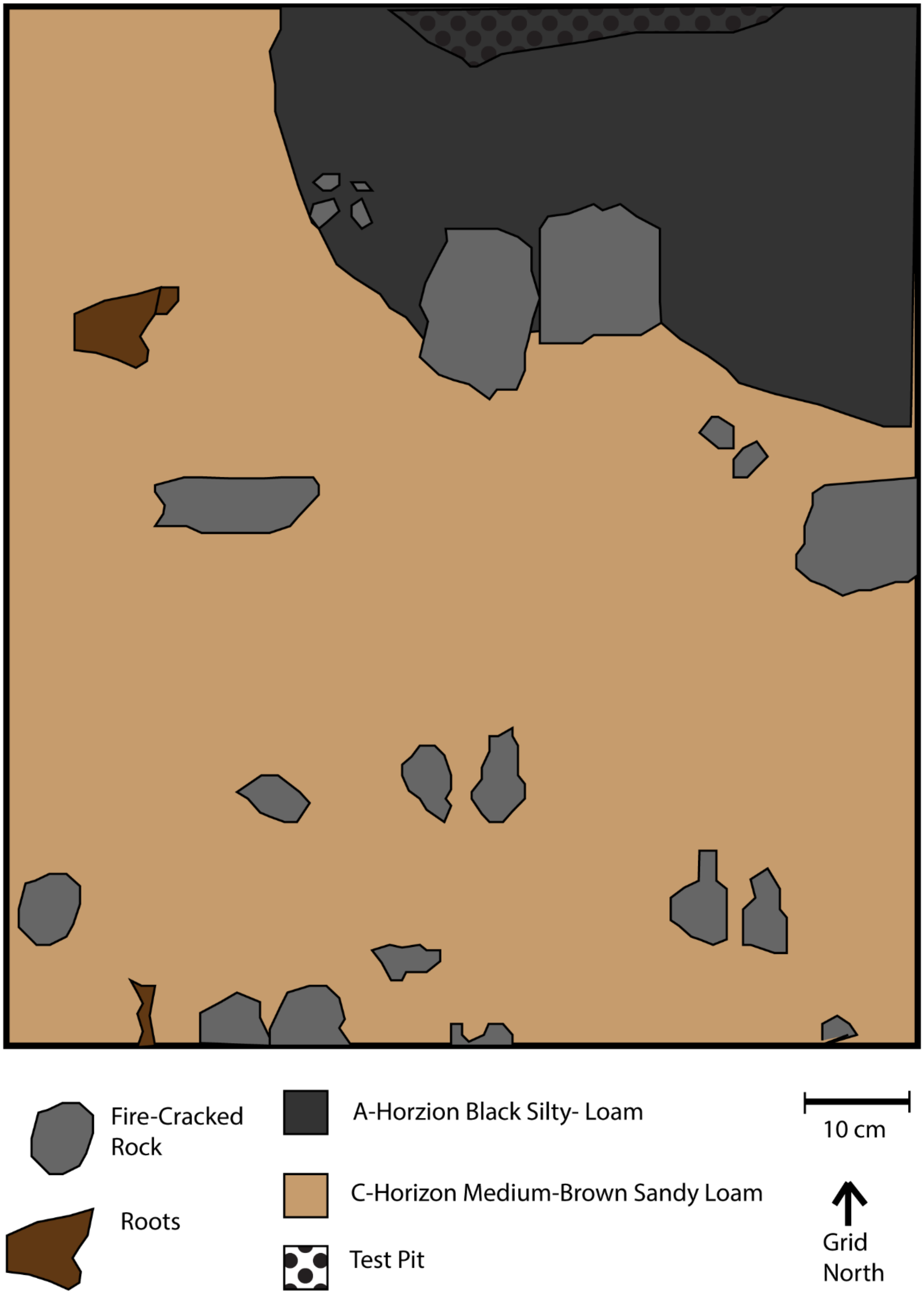

Fig 4.12: Floor plan of excavation unit 6, level 4 (15-20 cm below surface) note the continuation of the A-horizon in the Northeast corner.

4.10 Summary

The Macgillivray site was originally excavated by Dawson (1980) in the 1966. Lakehead University returned for further excavations in 2016 and 2017. This chapter uses field notes and the preliminary catalogues to summarize the excavations and artifacts recovered from the Macgillivray site. As the main focus of this thesis is the faunal and floral remains, the pottery and lithic analysis is based on preliminary data to contextualize the organic material recovered from the Macgillivray site. An in-depth analysis of other artifacts will be made available at a later date.

Over 2000 Indigenous pottery sherds were recovered from the Macgillivray site including Laurel, Brainerd, Blackduck, Sandy Lake and Winnipeg Fabric-impressed wares. Laurel was the most frequent sherds recovered, however at the time of writing, a vessel count has not been conducted. The Macgillivray site is a rare example of Brainerd ware being recovered in Ontario, it may indicate a component older than the Laurel component, but the way in which they were recovered would suggest that the two wares were contemporaneous at the site.

Spatial distribution of diagnostic material was analysed vertically and horizontally. Harris matrices were used to date the stratigraphy at the Macgillivray site. They highlighted how problematic the stratigraphy is. Due to pedoturbation and slow soil accumulation deposits were heavily mixed, resulting in very few single component deposits following chronological order. Horizontal analysis demonstrated the high concentration of Middle Woodland period material recovered from the Macgillivray site.

Over 2000 lithics specimen were recovered from the Macgillivray site including 78 flaked tools, and 23 ground tools. Most material was constructed from stromatolithic chert which is often found in the Whitefish Lake basin archaeological sites. Also found were copper nuggets and ochre.

During excavation, a hearth feature consisting of a fire-cracked rock patch was identified in excavation block A. A similar feature was identified at the neighbouring Martin-Bird site (DbJm-5), soil samples from this feature provided an excellent opportunity to study the diet of Woodland Period people.

Chapter 5 – Methods

5.1 – Introduction

Recovery is crucial to the archaeological process. The more data that archaeologists recover, the more they can say about the given culture under investigation. Sieves are widely used in archaeology for that reason. They improve interpretations by recovering artifacts that may be indistinguishable from the soil to the naked eye. There is a debate on how impactful sieve sizes can be. The standard 6 mm (1/4 inch) mesh is too large for the recovery of important cultural and organic material. Beads, seeds, and debitage can fall through the large apertures easily; however smaller sieve-size can also be inefficient and time-consuming.

The following sections will discuss previous research on flotation and fine-sieving. It will justify the use of flotation and fine-sieving method for the soil samples from the Macgillivray site. This study quantifies recovery amounts and the time it took to sort through the samples. It will investigate if using smaller sieve sizes increases the quality of data or just the quantity of it. This will be examined through floating and fine-sieving soil samples from the Macgillivray site.

The interpretation of the organic material from the site will use abductive reasoning rather than using a theoretical model to generate a hypothesis. As discussed in more detail in **Chapter 1,** the archaeological record can never be complete enough to validate theoretical ecological models, and this is especially the case in the Boreal Forest due to taphonomy and sampling issues. The interpretation of seasonality on the site will draw from the observable behaviour of animals within the region and the subsistence pattern of the Anishinaabe people documented within the ethnographic literature of the region. This is partly due to the lack of other sites reporting organic material in the central Canadian Boreal Forest.

5.2 – Previous research in Flotation and Fine Sieving

5.2.1 Flotation

Flotation is used to recover smaller, lighter and more fragile material from the soil matrix. It is often used primarily in archaeobotanical research. The concept of floating material goes back to at least 1860 when an Austrian botanist, Unger, floated ancient Egyptian adobe bricks to separate the grains and other seeds from the mud (Watson 1976). Since then, a variety of methods have developed to process soil samples. These include the use of chemical treatment to isolate organic material. For the concerns of this paper, it can be categorized into two overarching methods: hand-flotation and machine-assisted flotation.

Wagner (1982) conducted a “Poppyseed test” to test the effectiveness of different flotation methods. This experiment introduced a fixed number of distinctive non-indigenous charred seeds into the soil samples before floating (Wagner 1982). The test assumes that if a system properly agitates the soils, and does not have any leaks, approximately 100% of the poppy seeds would be identified during the sorting of the sample (Wagner 1982). Wagner’s (1982) experiment resulted in the following range of recovery rates: SMAP machine-assisted flotation had a recovery rate of 84-98%, hand-flotation in a river had a recovery rate of 45-91%, hand flotation in the lab resulted in a 82-100% recovery rate, and Cambridge froth machine flotation resulted in a recovery rate of 65-96%.

The goal of archaeobotanical analyses is to receive a representative sample of the plant material used by the people under investigation. The methods used by archaeologists do not always extract 100% of all charred material. The flotation method may depend on the research goal, the limit of the excavation and the nature of the soil matrix itself.

5.2.2 Fine sieving

The benefit of fine sieving archaeological samples is well-documented and is useful for the analysis of many different types of material. Most negative comments from archaeologists doing that extra analyses are based on research goals and logistics such as time and cost.

Ozbun (2011) summarizes how the use of smaller sieves can aid in identifying the boundary of archaeological sites. A cultural resource management company (CRM) surveyed a site in Washington, USA using a 6 mm sieve (Ozbun 2011). Another CRM company was commissioned to resurvey the area for a new project. They used a 3 mm sieve for excavation and went over the site boundaries again, including the area that was previously surveyed (Ozburn 2011). The new survey identified additional artifacts in the same area previously excavated and extended the boundaries of the site by more than three times the recorded area (Ozburn 2011). Ozburn (2011) further noticed that most technologically diagnostic artifacts' dimensions are small enough to pass through the 6 mm mesh with ease. This is due to the two smallest dimensions of a flake. A 3-dimensional artifact is more probable to pass through the 2-dimensional mesh if the smallest two dimensions are less than the maximum dimensions of the hole (Ozburn 2011).

Johnson (2016) experimented using the 6 mm and the 3 mm sieve. He would screened one bucket of excavated soil through a 6 mm mesh and another through the 3 mm. The total number of lithics recovered using the 6 mm mesh accounted for 27.1% of the assemblage while the 3 mm mesh accounted for 72.9% of the total assemblage (Johnson 2016). The rate of fauna remains recovered were similar. The 6mm mesh recovered only 29.6% of the assemblage, while the 3 mm recovered 70.4% of the total assemblage (Johnson 2016). He concluded that the 3 mm screen allowed for a larger data sample, but 6 mm was more time-efficient. The 6 mm allowed for a quicker excavation– but at the risk of having an incomplete or inaccurate interpretation of the site (Johnson 2016). A previous study of the effects of sieve size in Hohokam sites noted that the use of 6 mm sieves resulted in the loss of 90% of fish remains (James 1997). At these sites in the Great Basin, fish remains were not recovered until the use of 1.5 mm sieves (James 1997). This meant fish were absent from the Hohokam subsistence prior to their use. Casteel (1972) notes similarly that within his samples, freshwater fish vertebrae were completely absent when using 6 mm sieves.

Clason and Prummel (1977) argue that fine-sieving is inefficient except for identifying the ratio of domesticated to wild animals. In their study, they conclude that yes, fine-sieves recovered more specimens, but that all the species were already present in the hand-recovering and the 10 mm sieve (Clason and Prummel 1977). Furthermore, they argued that regardless of the quantitative data obtained, it would still be impossible to compare the relative importance of these species to one another (Clason and Prummel 1977). Yet, Shaffer (1992) demonstrates that recovery and loss of specific taxa can be predicted. For example, mammals with a live weight of 140 g are typically completely lost by the 6 mm sieve. Other specimens weighing between 71 and 340 g will be poorly represented, and taxa over 4500 g are greatly represented (Shaffer 1992).

The sieving experiment on Hohokam sites also demonstrates a bias against cottontail rabbits (*Sylvilagus* spp.) versus jackrabbits (*Lepus* spp.) in the 6 mm sieve (James 1997). Although cottontails and jackrabbits would usually fall in the same weight category, black-tailed jackrabbits (*Lepus californicus*) are about twice the size of desert cottontails (*Sylvilagus audubonii*). This results in an over-representation of jackrabbits in 6 mm sieves (James 1997). Within the context of Hohokam sites, this is an important distinction as archaeologists rely on the lagomorph index to assess both the extent of vegetative alteration by human populations within the vicinity of the site and the nature of hunting patterns used to capture the species (James 1997). The lagomorph index is based on ecological studies of the species and ethnographic data on hunting patterns. It assumes that if desert cottontails are more abundant than the environment would have more shrubby vegetation as they prefer these habitats to hide and escape from predators (James 1997). In this situation, cottontails are more likely to be hunted by individual hunters (James 1997). A higher frequency of jackrabbits would suggest that the environment would have been more open, where the jackrabbits would have more of an advantage in fleeing (James 1997). This example demonstrates how the sieve size can affect not only the economic interpretation of the site but also the environmental interpretation.

Ontario archaeologists are also not immune to issues of interpretation bias based on recovery methods. In 1983, Kenyon and Kenyon published a method to date Iroquoian sites in Southern Ontario by the glass bead assemblage. They proposed three main periods. The final period, Glass Bead Period III (GBP III) is composed of two sub-periods *GBPIIIa* 1600-1625CE, and *GBPIIIb,* 1625-1650 CE. The issue with this chronological scheme was that the rule that divided subperiod *a* and *b* was based on the percentage of red tubular beads within the whole assemblage (Kenyon and Kenyon 1983). If red tubular beads represented over 10% of the assemblage, then the site would date to 1625-1650 CE. If less, it would date to 1600-1625 CE (Kenyon and Kenyon 1983). Tubular beads are long beads averaging 12.5 mm compared to the more prominent cut beads which measure between 3.4 mm to 5.0 mm (Cousineau 2017). Analysis of the glass bead assemblage recovered from several excavations using different sieves sizes on the Thomson-Walker site (BdGx-3) demonstrates that this was not only a theoretical issue but a practical one as well (Cousineau 2017). Excavations that used 6 mm sieves placed the site within subperiod ***b.*** Whereas finer sieves placed it into subperiod *a* (Cousineau 2017). Excavations that used finer sieves would recover more small seed beads, diluting the dominance of red tubular (Cousineau 2017).

In Southern Ontario, a region dominated by sedentary Iroquoian sites, the use of finer sieves can aid in the identification of sites belonging to more nomadic Anishinaabe people. The Davisville settlement was a 19th century Methodist *Kanien'kehá:ka* (*Haudenosaunee* Mohawk) village on the Grand River near Brantford, Ontario. It had a brief *Misi-zaagiing* (Anishinaabe Mississauga) co-occupation. The Anishinaabe deposits on the site were completely different from the Haudenosaunee. The Haudenosaunee deposits were very similar to early contact deposits with large middens of a variety of both Indigenous and European material. Deposits considered to be Anishinaabe were far smaller with very little artifact refuse. The excavator had to use 1 mm sieves and water screening to extract very fragmented burnt bone bits, glass trade beads, lead shots and other small artifacts (Warrick 2005). Warrick (2005) interpreted these deposits as belonging to the *Misi-zaagiing* people as it seems to mirror what was found among post-contact period northern hunter-gatherer sites. Contact period hunter-gatherer sites can be less visible compared to previous periods. They would often reuse the same area as their ancestors, but rather than leaving behind their metal tools, they would bring them along during their seasonal rounds (Warrick 2005).

5.3 – Methods Employed at the Macgillivray Site

5.3.1 Soil Samples

This thesis uses the fauna and floral remains recovered from the Macgillivray site. Soil samples were processed using a nested manual flotation method and wet-sieving method. The goal of flotation is to recover organic material that would normally be missed or damaged during excavation. The goal of fine sieving is to recover smaller, heavier material culture such as beads, debitage flakes etc. Flotation involves agitating the soil with water causing the lighter material to loosen from the sediment and float to the top. Material recovered through this method is known as the light fraction. This is the first part of processing the soil sample. Fine sieving was conducted on the remaining sediment that did not float. This material was then water screened through three-sieves to clean the material and clear small particulates. The recovered material is known as the heavy fraction.

A small amount of soil (approximately 200 ml) was removed for microbotanical analysis. The results of which will not be discussed in this paper. The remaining soil was measured in a graduated cylinder with 500 ml of water. The volume of the soil was then recorded. Soil was agitated in small amounts with water. The floating material was then poured through the following four sieves sizes 4 mm, 2 mm, 1 mm, 500 µm (**Fig 5.1**). This process was repeated until the soil sample was completed and no floating material was present after agitation. The remaining heavy fractions were water screened through the following three sieve sizes: 4 mm, 2 mm and 1 mm. The fractions were then left to airdry indoors for several days until completely dry.

To get a better understanding of the type of material recovered from each sieve and method, the recovered material remained separate throughout the process. Light and heavy fractions remained separate from one another, as well as individual sieve sizes, creating seven fractions per sample.

The recovered material was sorted using a stereoscopic microscope. All culturally modified and organic material was recovered for later analysis. Charcoal was not collected from the 500 µm fraction as it was too small to weigh and quantify properly. The 4 mm fractions were sorted under 5x magnification. The 2 mm and 1 mm fractions under 10x magnification and the 500 µm under 20x magnification. The amount of time it took to sort the sample was noted in minutes.

Fig 5.1: Geological sieves and graduated cylinder used for sieving soil samples. Soil was agitated in the measuring cup.

5.3.2 Fauna Identification

Fauna remains were identified using the reference collection in the Department of Anthropology at Lakehead University. **Table 5.1** summarizes the number of species present within the study area and the number of which are present within the comparative collection. This exercise was done to indicate that there may be some examples unavailable for comparison with the zooarchaeological finds. Other issues may be from the lack of population variation within the available comparative collection. Many species are only represented by one or two individuals. This mean that some identification may be limited also by sexual dimorphism, age, and abnormal growth. Specimens' class were identified using the criteria outlined in Beisaw (2013). Those criteria are summarized in **Table 5.2**, which is accurate for most elements and species beyond a few exceptions. However, some criteria can be problematic in podzolic soil where surface features can be weathered by the acidity of the soil. Another issue is the variation within the mammalian class, the cortical wall of small mammals may be a similar thickness as similar size avian. In cases of ambiguity in identification, the specimen would be considered unidentified.

Specimens from the Macgillivray site were identified to the element and sided when possible. Fragmented elements were treated as one specimen and the number of fragments were noted. The number of diagnostic zones present was noted to aid in the calculation of minimum number of individuals (MNI). On mammalian and avian specimen's epiphysis fusion was identified for specimen ageing. Markers of sex, butchering, burning and other taphonomic signs were recorded for the analysis.

Specimens where species could not be identified but their size could be inferred were categorized as small, medium and large categories.

MNI and the number of identified specimens (NISP) are both calculated. Due to the fragmentation of the material, NISP will be the primary quantifying method. MNI is the calculation of the minimum number of individuals within the assemblage. This calculation is based on the number of reoccurring elements belonging to a given species. For example, if the assemblage has three right ulnae, one right femur, and one left femur. It could be assumed that the assemblage is composed of at least 3 individuals. Diagnostic zones were used to identify potential overlap or missing sections of the element. NISP is the calculation of the overall abundance of specimens identified as a certain species. Both calculations are an imperfect representation of animals' exploitation. MNI can over-represent species that were killed on-site rather than transported to the site. NISP may over-represent species with more diagnostic elements. An overly fragmented sample may be why an analyst chooses to use NISP over MNI. To choose the proper quantifier the nature of the assemblage needs to be considered. For example, the extraction of bone marrow may yield a high NISP count if the specimens cannot be mended together and identified to the smallest number of elements possible. This may result in a high NISP when only a few individuals are actually present.

Table 5.1 Species in the Study Area and the Reference Collection

Class	Mammalia	Aves	Amphibia	Reptilia	Actinopterygii
Number of families in the study area	18	47	8	3	17
Number of family with at least one specimen in the reference collection	15	12	1	1	12
Percentage of family represented in the reference collection	83.33	25.53	12.50	33.33	70.59
Number of species in the study area	55	236	14	3	~25
Number of species in the reference collection	32	20	1	1	16
Percentage Present	58.18	8.47	7.14	33.33	64.00

Table 5.2: Identification Criteria for Bones from Archaeological Sites (Taken from Beisaw 2013:19)

Class	Mammal	Fish	Bird	Amphibian	Reptile
Weight	heavy	light	light	very light	medium
Glossy	no	yes	maybe	no	no
Translucent	opaque	semi-translucent	no	no	no
Shape	rounded	flat and angular	angular at some ends	rounded and angular	rounded
Cortex	thick	n/a	thin	thin	medium thickness
Spongy Bone	dense at ends	absent	airy thin support web	absent	present
Texture	woody	woody	smooth	smooth	woody to smooth
Epiphysis	yes, fused in adults	no	cartilaginous in juvenile	cartilaginous caps may not fuse	cartilaginous in juvenile

5.3.3 Floral Recoveries

Both carbonized and non-carbonized seeds were identified, but only carbonized seeds will be used for archaeological interpretation. These were compared to the seed collection at the Department of Anthropology, Lakehead University. Seeds were weighed and identified to the highest taxonomic level. The primary key used to identify the seeds can be found in Montgomery's (1977) "Seeds and Fruits of Plants of Eastern Canada and Northeastern United States" . Once a possible identification was made through the key, the unknown seeds were compared to the comparative collection. All species of the genus within the study area were considered as possible candidates until they were excluded. Exclusions were made either by comparison with the reference collection or from a description of its size and morphology. For example, in the identification of *Prunus* sp., which is a large genus, certain types of species such as *Prunus dulcis* (almonds) can be excluded from a possible identification by its shape and availability within the study area. Plums and peaches such as *P. nigra*, and *P. persica* could be excluded based on the size of the seeds. It can then be inferred to be a cherry species (*P. pensylvanicus*, *P. pumilla*, or *P. virginiana*) based on the size and shape of the seed. Justification for the identification of species within the assemblage of the Macgillivray site is discussed in more detail in **Chapter 6.2**.

5.4 Summary

Beginning with a brief discussion about flotation and fine-sieving, several Ontario studies were reviewed for comparison to this one. Then, I discussed the methods used for identifying floral and faunal remains at the Macgillivray site. A detailed analysis of the actual Department of Anthropology, Lakehead

University comparative fauna collection also illuminates potential issues with being able to identify archaeological samples.

Chapter 6 – Results

6.1 Introduction

This chapter presents the results of the flotation and fine-sieving completed on soil samples from the 2017 excavation units at the Macgillivray site. Then, I consider the faunal remains identified from the adjacent 2016 tests pits, 2017 excavation units and also include the faunal remains recovered from Dawson's (1980) excavation to summarize the faunal recoveries for the majority of the site. Using that information, I consider the seasonality evidence for the Macgillivray site, which has never been done previously.

6.2 Criteria for Identifying Plant Remains

6.2.1 *Amaranthus* sp.

There are at least three species of the genus *Amaranthus* found within the Thunder Bay district (*A. albus, A. blitoides,* and *A. retroflexus*) (Thunder Bay District Field Naturalist 1994). All three species have seeds of similar shape and size. They are globular seeds with a margin ridge averaging in size of 0.9 x 0.9 x 09 mm (length, width, thickness) for the smallest species *A. albus.* The largest species *A. retroflexus* measures on average 1.0 x 0.9 x 0.5 mm.

There are three specimens that could be identified as *Amaranthus* sp. from the assemblage. They were compared to the *Amaranthus* sp. from the comparative collection. Although missing the hilum, the shape and presence of a slight ridge would suggest the seed to belong to this genus (**Fig 6.1**).

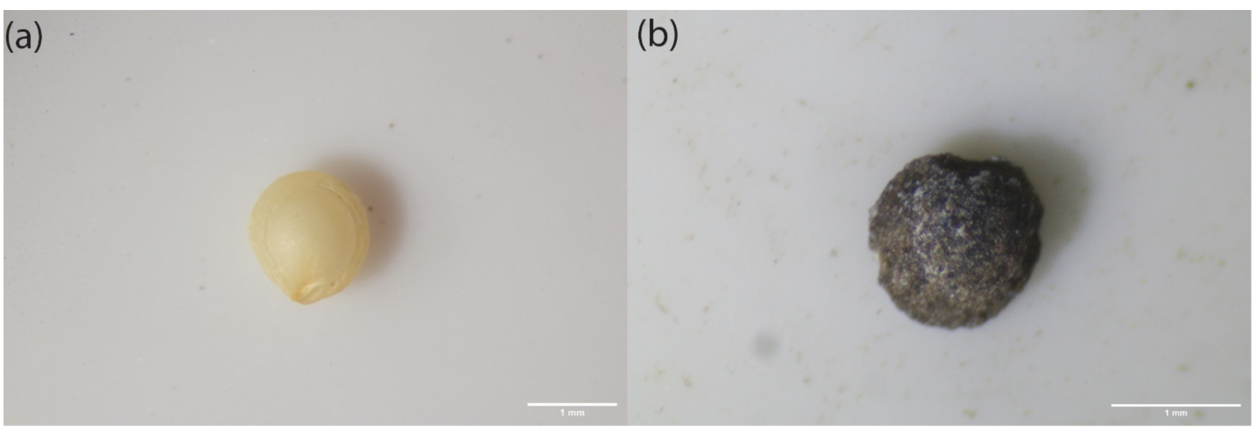

Fig 6.1: (a) Modern *Amaranthus sp.* from the reference collection. (b) *Amaranthus sp.* from the Macgillivray site (Fl-26).

6.2.2 *Chenopodium* sp.

There are at least six species of the genus *Chenopodium* found within the Thunder Bay District (*C. album, C. capitatum, C. glaucum, C. leptophyllum, C. polyspermum and C. simplex*) (Thunder Bay District Field Naturalist 1994). Most species of *Chenopodium* share a similar general elliptical shape but can be differentiated by the circumference of the seed, its size and the texture of their testa. The radicle of the seed curves outward creating a distinctive beak (**Fig 6.2**). The seeds present within the Macgillivray assemblage average in size of 1.0 x 1.1 mm, which is similar to the size of *C. album,* and *C.*

capitatum (**Fig 6.3**). The circumference is similar to *C. album, and C. simplex*, but the seeds are too small to be *C. simplex* which averages in size of 1.5 x 1.5 mm (Montgomery 1977). It was difficult to determine if the charred seeds' testa was textured naturally or were damaged. If the seeds within the assemblage are *C. album* it would likely be that they were deposited in the post-contact period. The plant is non-indigenous to North America. Another possibility is that the seeds are *C. berlandieri.* This species is indigenous to North America but not to the Thunder Bay District. It averages in similar sizes to *C. album,* but it can be distinguished from *C. album* by the pitted texture of its testa. The surface of *C. album* is smoothed, and *C. simplex* has numerous low linear radial ridges on its surface.

The charred seeds could not be directly compared to *C. leptophyllum, C. polyspermum,* and *C. simplex* as they were absent from the reference collection. There is also a lack of published visual reference guides for seeds belonging to *C. leptophyllum*. Images for seeds still attached to the fruiting tissues of *C. polyspermum* can be found in Cappers and Bekker (2013). Images of the seeds can be found at Legagneaux et al. (n.d.) who reports a mean seed size of 0.9 x 0.9 mm. The radicle shape seems similar to the seeds within the Macgillivray assemblage, but images of *C. polyspermum* would suggest the seed to be much too globular in shape.

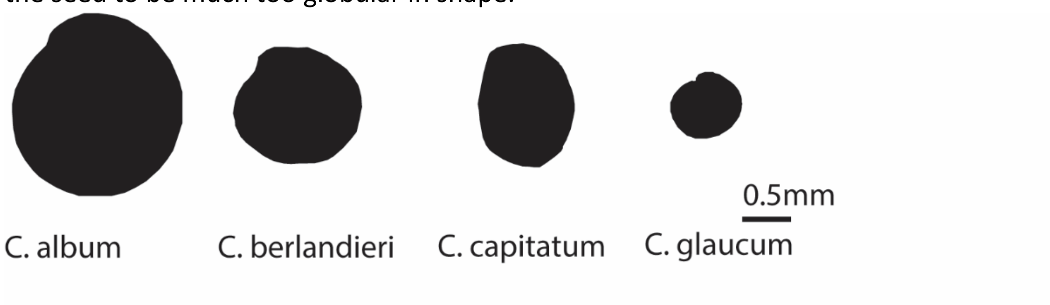

Fig 6.2: Outline of four species of *Chenopodium* note the curve of radicle.

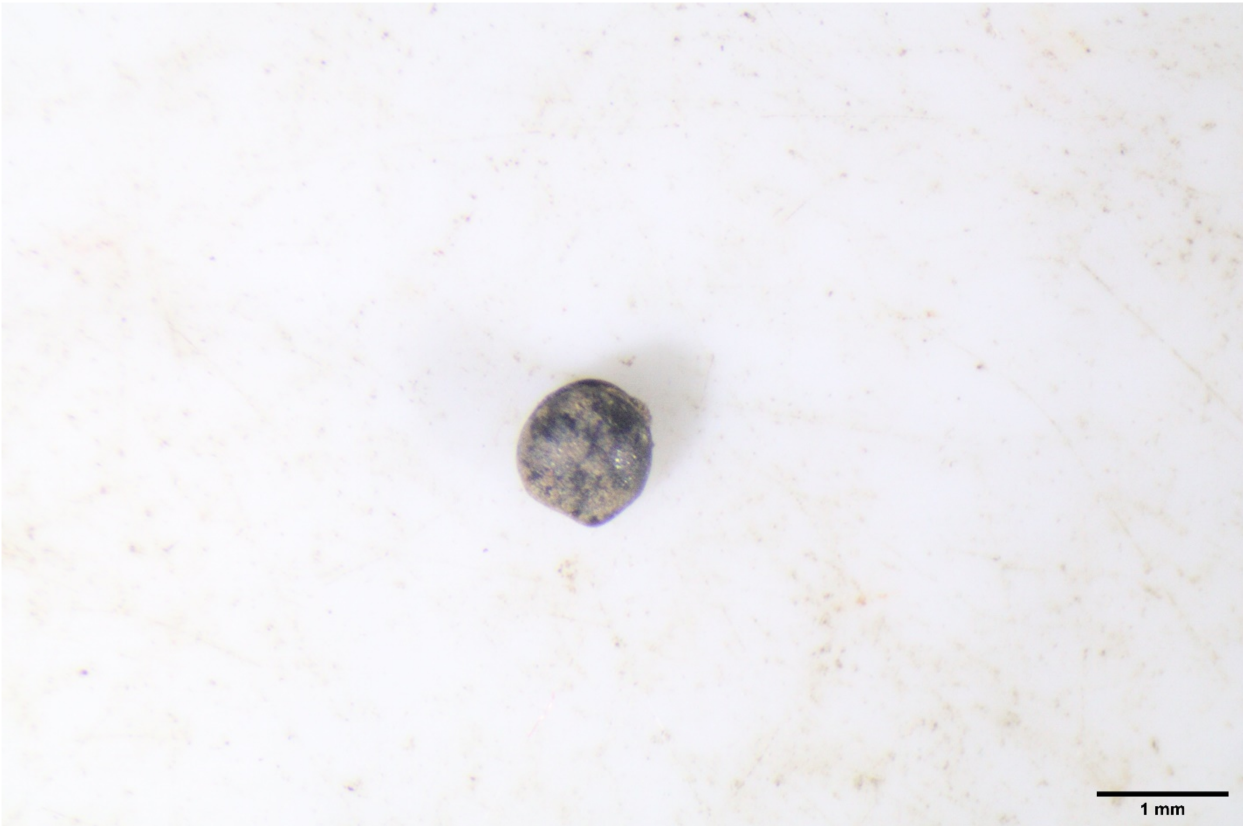

Fig 6.3: Charred *Chenopodium sp.* from the Macgillivray Site (Fl-577).

6.2.3 *Crataegus* sp.

There are at least five species of *Crataegus* in the study area (*C. douglassi, C. chrysocapra, C. flabellate, C. irrasa and C. maracantha*) (Thunder Bay Field Naturalist 1994). Only *C. douglassi and C. chrysocapra* were present in the reference collection. Seeds from the Macgillivray assemblage are more similar to *C. douglassi* than they are to *C. chrysocapra* (**Fig 6.4**). The ridge in the seeds from the assemblage and *C. douglassi* create a more prominent valley on its surface. The ridges on *C. chrysocapra* are sharper. There is a lack of available images, reference material, and measurements for seeds of *C. flabellate and C. irrasa* making them impossible to exclude as a possibility.

Fig 6.4: Charred *Crataegus sp.* from the Macgillivray Site (Fl-3).

6.2.4 *Prunus* sp.

There are four species of *Prunus* in the study area (*P. nigra, P. pensylvanica, P. pumilla and P. virginiana*) (Thunder Bay Field Naturalist 1994). The seeds present at the Macgillivray Site range from 3-5 mm in length which would suggest it to be one of the cherry species (*P. pensylvanica, P. pumilla and P. virginiana*). The seeds of *P. nigra* average 14 mm in length (Montgomery 1977). *P. pumilla* was absent from the reference collection but the reference guides describe a prominent ridge and sulcus on the seeds. Those in the assemblage are smooth and lacking a ridge or sulcus (Montgomery 1977). The seeds are either *P. pensylvanica* or *P. virginiana* (**Fig 6.5**).

Fig 6.5: Charred *Prunus sp.* from the Macgillivray Site (Fl-2).

6.2.5 *Zizania* sp.

There is a problem with modern distribution data of *Zizania* sp. due to the importation of wild rice for commercial harvesting. *Z. aquatica* has a more southern range, and only *Z. palustris* has been observe on Whitefish Lake but it is zone were both species could grow (Surette 2008). Due to this, the identification of wild rice grains will rely on morphological difference to differentiate the grains recovered. The grains present at the Macgillivray site were compared to *Z. palustris. Z. aquatica* was absent from the reference collection. Due to this, the seeds could not be identified to species level.

All grains of *Zizania* sp. recovered from the Macgillivray site were broken transversely. They were identifiable by their conical form and the presence of a longitudinal sulcus (**Fig 6.6**).

Fig 6.6: (a) Charred wild rice grain from the Macgillivray Site. **(b)** Modern Wild Rice grain (*Zizania palustris*).

6.3 Results of Sieve Size on Organic Recovery at the Macgillivray Site

A total of 46 soil samples were processed from the 2017 Macgillivray excavation. The samples were taken from 30 different contexts (**Table 6.1**). Soil samples from the 2016 excavations were also processed but they were sorted prior to the design of this study. Their results will be included in the identification, but the time they took to sort was not measured consistently and they will excluded from that measurement. Of these 46 samples, 27.5 L of soil was processed and 113 charred seeds, 18.62 g of charcoal and 982 fauna specimens were recovered.

Table 6.1 List of Soil Samples Processed from the Macgillivray Site

Unit	Level	Quadrant	Soil volume (ml)	Seeds n	Seeds weight (g)	Charcoal weight	Fauna n	Fauna weight (g)
1	3	SEQ	880	7	0.057	0.035	112	2.705
1	3	SWQ	1120	38	0.433	0.044	46	4.127
1	4	SEQ	5445	12	0.042	0.192	314	1.455
2	2	NWQ	550	0	0	4.262	0	0
2	2	SWQ	780	2	0.008	1.999	4	0.017
2	3	NEQ	1670	0	0	6.002	5	0.011
2	3	SEQ	250	0	0	1.579	0	0
2	3	SWQ	440	1	0.016	0.765	13	3.678
2	4	NEQ	400	2	x<0.001	0.006	8	0.01
2	4	NWQ	580	9	x<0.001	0.076	15	0.071
2	4	SEQ	410	2	0.008	0.115	5	0.009
2	4	SWQ	290	0	0	0.124	16	0.118
3	3	n/a	340	0	0	0.07	0	0
3	3	NWQ	390	3	0.023		7	0.02
3	4	n/a	230	1	0.01	0.011	2	x<0.001
4	4	NEQ	250	0	0	0.095	4	0.024
4	4	SEQ	470	2	x<0.001	0.384	10	0.009
5	3	NEQ	40	0	0	0.489	0	0
5	4	NEQ	280	0	0	0.364	2	x<0.001
5	5	SEQ	2720	0	0	0.277	130	1.02
6	2	NEQ	1270	0	0	0.033	3	0.012
6	4	NEQ	5970	24	0.285	0.556	244	1.603
6	5	NEQ	100	0	0	0.005	0	0
7	4	n/a	500	9	0.076	0.168	26	
7	4	SWQ	110	1	x<0.001	0.01	0	0
7	5	NWQ	10	0	0	0	0	0
10	3	NEQ	190	0	0	0.009	2	0.004
10	3	NWQ	880	0	0	0.197	13	0.101
10	3	SEQ	760	0	0	0.755	1	x<0.001
N519E530	n/a	n/a	220	0	0	0	0	0

Total	27545	113	1.09	18.62	982	14.994

Table 6.2 summarizes the recovery of charred floral material from each fraction. The light fraction was more productive than the heavy fraction, accounting for 90% of the total floral recovery. Of these fractions, the most productive was the light 2 mm fraction, which accounted for 42% of all floral recovery. When it comes to taxa richness, the light 2 mm and heavy 1 mm fractions identified the most, identifying 3 genera. The 500 µm sieve only identified *Chenopodium*. The heavy fractions did contain a small number of seeds, mostly large seeds such as *Prunus* and *Crataegus*.

Table 6.2 Summary of Botanical Recoveries by Sieve Size

Fraction	Number of seeds recovered	Weight of recovered seeds (g)	Taxa represented
Heavy 4 mm	0	0	n/a
Heavy 2 mm	7	0.064	*Crataegus*
Heavy 1 mm	12	0.054	*Chenopodium, Crataegus, Prunus*
Total	19	0.118	
Light 4 mm	21	0.468	*Amaranthus, Crataegus, Prunus*
Light 2 mm	51	0.443	*Crataegus, Prunus, Zizania*
Light 1 mm	18	x>0.001	*Amaranthus, Chenopodium*
Light 500 µm	12	x>0.001	*Chenopodium*
Total	102	0.911	
Total	121	1.029	

Table 6.3 summarizes the recovery of faunal material from each sieve size. The results are broken down into four assemblages: the handpicked/6mm sieve which were those excavated by hand or through sieving in the field. This assemblage also includes the material recovered from Dawson's initial excavation. The others are >4 mm, 4-2 mm, 2-1 mm and 1 mm-500 µm which were processed in the lab through the float sample. Light and heavy fractions were not differentiated since a significant portion of the material was recovered in the heavy fraction.

Faunal material was quantified using the Number of Identified Specimen (NISP) rather than the Minimum Number of Individual (MNI). This is due to the fragmentary nature of the assemblage. This made it difficult to both identify or side the elements, which caused taxa to be represented by either one or two individuals.

Table 6.3: Summary of Fauna Recovered by Sieve Size

		Handpicked/6 mm		4 mm		2 mm		1 mm	
Class	Family or genus	NISP	NISP %	NISP	NISP %	NISP	NISP %	NISP	NISP %
Actinopterygii		57	16.72	58	10.12	150	12.38	513	25.94
	Percidae	1	0.29	1	0.17	1	0.08	1	0.05
	Stizostedion vitreum	1	0.29	1	0.17	1	0.08	1	0.05
	Salmonidae	n/a	n/a	1	0.17	1	0.08	4	0.20
	Salvelinus sp.	n/a	n/a	1	0.17	1	0.08	1	0.05
Aves		16	4.69	63	10.99	247	20.38	393	19.87
	Anatidae	1	0.29	1	0.17	2	0.17	2	0.10
	Antigone canadensis	n/a	n/a	1	0.17	1	0.08	1	0.05
	Phasianidae	n/a	n/a	2	0.35	2	0.17	2	0.10
	Podicepidae	n/a	n/a	n/a	n/a	n/a	n/a	1	0.05
Bivalvia		n/a	n/a	1	0.17	3	0.25	3	0.15
Mammalia		220	64.52	352	61.43	455	37.54	621	31.40
	Canidae	n/a	n/a	1	0.17	1	0.08	1	0.05
	Canis sp.	1	0.29	1	0.17	1	0.08	1	0.05
	Castor canadensis	2	0.59	15	2.62	15	1.24	15	0.76
	Cervidae	20	5.87	24	4.19	24	1.98	24	1.21
	Alces alces	18	5.28	18	3.14	18	1.49	18	0.91
	Odocoileus virgianus	2	0.59	2	0.35	2	0.17	2	0.10
	Ondatra zibethicus	n/a	n/a	2	0.35	4	0.33	5	0.25
	Erethzion dorsatum	1	0.29	1	0.17	1	0.08	1	0.05
	Mustelidae	n/a	n/a	2	0.35	3	0.25	3	0.15
	Neovision vision	n/a	n/a	1	0.17	2	0.17	2	0.10
	Sciuridae	n/a	n/a	n/a	n/a	2	0.17	5	0.25
	Ursus americanus	1	0.29	1	0.17	1	0.08	1	0.05
Reptilia		n/a	n/a	2	0.35	4	0.33	6	0.30
Unidentifiable		n/a	n/a	21	3.66	270	22.28	351	17.75
Total		341	100	573	100	1212	100	1978	100

Table 6.4 summarizes the time it took to sort each sample, as well as the number of new taxa identified in each fraction. This excludes the time it took to identify the specimens. This assumes that all smaller sieve sizes would also recover the taxa present in the larger sieves. For example, if one were to only use the 2 mm sieve, it would assume that they would also recover everything within the 4 mm sieve, and through excavation with 6 mm. As can be seen through **Tables 6.2** and **6.3,** the number of specimens recovered increases significantly when using sieves with a smaller aperture. Yet, **Table 6.4** demonstrates that the number of new taxa increases slowly, and new floral taxa were not recovered after the 2 mm sieve.

Table 6.4: Summary of Sorting Time and the Number of New Taxa Identified Per Sieves

Fraction	Minute sorted	Cumulative time (in minutes)	N of samples	Average time/sample (in minutes)	N of new flora taxa	N of new fauna taxa
Excavated/6 mm	n/a	n/a	n/a	n/a	n/a	13
4 mm	191	191	16	11.94	3	10
2 mm	526	717	30	17.53	1	3
1 mm	3011	3728	45	66.91	0	1
500 µm	1035	4763	21	49.29	0	n/a
total	4763	n/a	112	42.53	4	27

Using smaller sieves led to the identification of more faunal taxa. Smaller sieves also created more noise by introducing more fragmentary bones that could not be identified past the class level (**Table 6.3**). This is still significant since through the handpicked/6 mm assemblage there would simply be dominance toward mammals– especially cervids. This shrinks with the use of finer sieves. It allows for the identification of lighter animals with smaller, more delicate bones such as those in the class Aves and Actinopterygii. When looking at the NISP ratio between mammals and fish, through the 6 mm sieve there are five mammal bones for every fishbone. Using the 4 mm sieve, this increases to seven mammal bones per fishbone. The ratio dramatically shrinks to approximately one mammal bone for every fishbone in the 1 mm sieve (**Fig. 6.7**).

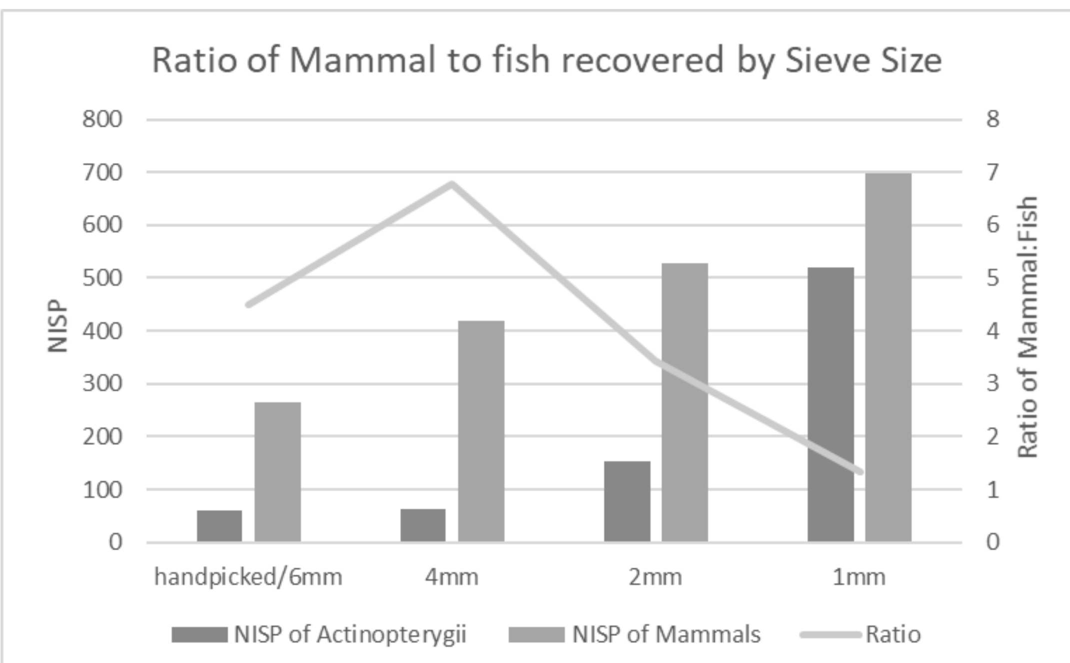

Fig 6.7: Frequency of Mammal and Fish by sieves size.

New taxa were introduced in the 4 mm and 2 mm sieves. The 4 mm introduces mussels (Bivalvia), turtles (Testudines), pheasants (Phasianidae), sandhill cranes (*Antigone canadensis*), and small weasel-sized animals such as minks (*Neovision vision*) and muskrats (*Odantra zibethicus*). The 2 mm introduces ducks (Anatidae) and squirrels (Sciuridae), while the 1 mm introduces grebes (Podicepidae).

6.4 Floral and Faunal Resources at the Macgillivray site

6.4.1 Introduction

A total of 142 charred seeds and 1978 faunal specimens were identified from the Macgillivray site. This section will break down the recoveries by the excavation blocks from 2017 and their association. It will then examine the site as a whole including those recovered by Dawson's (1980) excavation and the 2016 test pits.

6.4.2 Block A (Unit 1, 2, 9, 10)

Table 6.5 summarizes the faunal remains recovered from excavation block A. The most abundant class present was mammals (n=426), followed by birds (n=301), and fish (n=172). Beaver was the most abundant taxon that could be identified to species. Small mammals the size of beavers were the most abundant grouping. 84% of the assemblage came from the soil samples rather than through excavation. 79% of the assemblage was found in sieves smaller than 2 mm. This demonstrates the fragmented nature of this assemblage.

Also, worth noting is that 96% of the assemblage was burnt. This corresponds with the high level of fire-cracked rock within the excavation block (see **Chapter 4 Fig 4.3**). The lowest ratio of burnt bone to unaltered bone is found in Unit 10 (**Fig 6.8**). Only one bone was recovered in Unit 9 and it is worth noting that no soil samples were processed from this unit. Unit 9 had a low artifact density compared to the rest of the site. 96% (n=900) of burnt bone came from the soil samples.

In terms of the floral remains in excavation block A, over 102 seeds were recovered, of which *Chenopodium* and *Crataegus* were the most abundant genus. **Table 6.6** summarizes the charred floral remains from excavation block A.

Table 6.5: Fauna Remains from Excavation Block A

Taxa	Common name	NISP (MNI)
Actinopterygii	Fish	165
Esociformes	Mudminnows, and pikes	1
Perciformes	Perch-like fish	14
Salmonidae	Salmon, trout, whitefishes	1
Salvelinus sp.	Trout	1
Aves	Unident. Birds	59
Aves, large	Large birds	8
Aves, medium	Medium bird	47
Aves, small	Small bird	183
Anatidae	Ducks	1
Charadriiformes	Waders, gulls and auks	1
Phasianidae	Pheasants, partridge, turkey	2
Antigone canadensis	Sandhill crane	1
Passeriformes	Perching birds	12
Bivalvia	Mussels	2
Mammalia	Mammals	104
Mammal, large	Size of *Odocoileus virginianus*	28
Mammal, medium	Size of Canidae	65
Mammal, small	Size of *Castor canadensis* and below	188
Cervidae	Deer, moose, caribou	4
Carnivora, medium	Size of *Vulpes vulpes*	3

Carnivora, small	Size of *Martes pennati*	1
Canidae	Dog-like carnivores	1
Mustelidae	Badgers, minks, martens	3
Neovision vision	American mink	2
Rodentia, large	Size of *Castor canadensis*	8
Rodentia, small	Size of a vole	5
Castor canadensis	Beaver	15
Ondatra zibethiscus	Muskrat	5
Sciuridae	Squirrels, chipmunks	4
Testudines	Turtles	4
Unident.		297

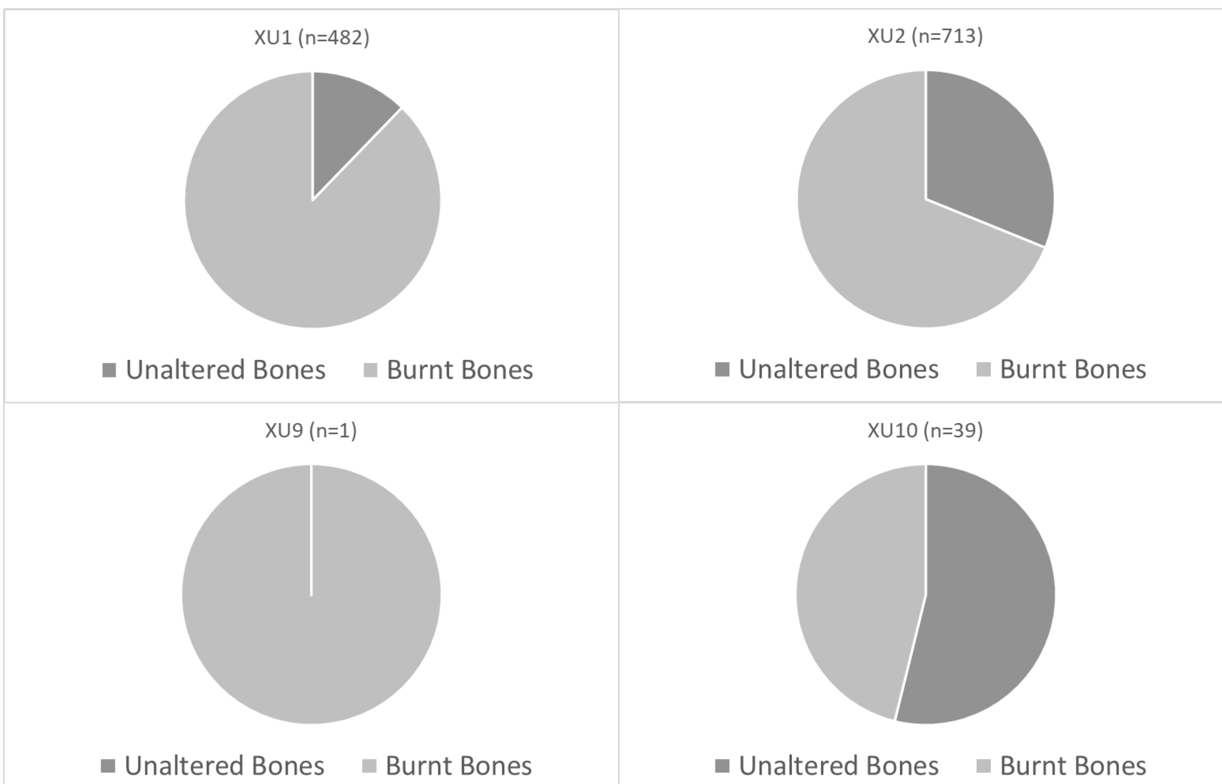

Fig 6.8: Ratio of burnt to unaltered bones in excavation block A.

Table 6.6: Charred Floral Material Recovered from Excavation Block A

Taxa	Common name	Xu1	Xu2	Xu 9	Xu 10	Total	weight
Amaranthus sp.	Amaranth	1	1	-	-	2	x>0.001
Chenopodium sp.	Goosefoot	4	17	-	4	25	x>0.001
Zizania sp.	Wild rice	-	2	-	-	2	0.008
Crataegus sp.	Hawthorns	25	-	-	-	25	0.429
Prunus sp.	Cherries	9	8	-	1	18	0.069
Unidentifiable		18	9	-	3	30	0.158
Total		57	37	0	8	102	0.664

6.4.3 Block B (Unit 3, unit 4)

The faunal assemblage of this area is summarized in **Table 6.7**. None of the material could be identified to species as it was too fragmented. All but three specimens were recovered from soil samples. Twenty specimens were recovered in 2 mm and smaller sieves (88%). Only 57% of the bones from this section were burnt, which is interesting considering the high frequency of fire-cracked rock in Unit 4. When only accounting for specimens from Unit 4 the ratio does not shift very much (43%). Perhaps the fire-cracked rocks were refuse that was placed in the area rather than a hearth.

The floral assemblage is summarized in **Table 6.8**. A total of six charred seeds were recovered. Three taxa were represented, *Amaranthus* sp., *Chenopodium* sp., and *Crataegus* sp.

Table 6.7: Fauna Material Recovered from Excavation Block B

Taxa	Common name	NISP (MNI)
Actinopterygii	Fish	15
Aves, small	Small bird	5
Mammalia	Mammals	2
Mammal, small	Size of *Castor canadensis* and below	1
Cervidae	Deer, moose, caribou	1
Unident.		1

Table 6.8: Charred Floral Remains from Excavation Block B

Taxa	Common name	Xu3	Xu4	Number of seeds	Weight (g)
Amaranthus sp.	Amaranth	1	-	1	x<0.001
Chenopodium sp.	Goosefoot	1	-	1	x<0.001
Crataegus sp.	Hawthorn	1	-	1	0.023
Unidentifiable		1	2	3	0.01
Total		4	2	6	0.033

6.4.4 Block C (Unit 5, 6, 7)

Excavation block C contains a complicated history of deposits, especially in Unit 6 and Unit 7. Although the majority of recovery are diagnostic of the Middle Woodland period, there are post-contact and Late Woodland intrusions up to 15 cm below the surface in all units. Even though 81% of all pottery recovered in the units dates to the Middle Woodland period, Late Woodland material is present in a minuscule quantity (n=1) in level 5 of Unit 7.

Table 6.9 summarizes the faunal remains from this excavation block. Fish was the most abundant recovery; however, it could only be identified to the family level. Furthermore, two left dentaries were present, but an identification could not be made further than class. Avian specimens were the second most abundant but were in similar frequencies to mammalian species. Avian specimens could not be identified to species, but the presence of smaller Passeriformes and unidentifiable small birds is worth noting. The only specimen that could be identified to species in this excavation block was a long bone fragment from *Alces alces*. Both large and small unidentifiable mammal specimens appear in similar frequencies. Of the bones, 64% were burnt, which is relatively small given the amount of FCR present. The soil samples were taken from a lower level than excavation block A and these remains may have been deposited prior to the construction of the fire-cracked rock feature.

The floral assemblage in Excavation Block C is similar to the other two blocks. Evidence was found of *Chenopodium* sp., *Crataegus* sp. and *Prunus* sp. and similar to excavation block A, wild rice (*Zizania* sp.) was identified. **Table 6.10** summarizes the charred floral remains from this block. There is an absence of charred material recovered from Unit 5. Approximately 3 L of soil was floated from level II, III, and IV of this unit (see **Table 6.1**). It is interesting as to why there is a lack of charred remains when the frequency of fire-cracked rock is similar to the surrounding units.

Table 6.9: Fauna Material Recovered from Excavation Block C

Taxa	Common name	NISP (MNI)
Actinopterygii	Fish	257(2)
Esociformes	Mudminnows, and pikes	1
Perciformes	Perch-like fish	3
Salmonidae	Salmon, trout, whitefishes	3
Aves	Unident. birds	8
Aves, large	Large birds	1
Aves, medium	Medium bird	27
Aves, small	Small bird	35
Passeriformes	Perching birds	1
Podicipedidae	Grebes	1
Bivalvia	Mussels	1
Mammalia	Mammals	5
Mammal, large	Size of *Odocoileus virginianus*	19
Mammal, medium	Size of Canidae	9
Mammal, small	Size of *Castor canadensis* and below	7
Cervidae	Deer, moose, caribou	1
Alces alces	Moose	1
Carnivora, medium	Size of *Vulpes vulpes*	1
Sciuridae	Squirrels, chipmunks	1
Unident.		41

Table 6.10: Charred Floral Material Recovered from Excavation Block C

Taxa	Common name	Xu5	Xu6	Xu 7	Number of seeds	Weight
Chenopodium sp.	Goosefoot	-	2	2	4	x<0.001
Zizania sp.	Wild rice	-	4	2	6	0.039
Crataegus sp.	Hawthorns	-	10	2	12	0.259
Prunus sp.	Cherries	-	6	-	6	0.054
Unidentifiable		-	2	3	5	0.005
Total		0	24	9	33	0.357

6.4.5 Faunal and Floral Remains from the Macgillivray Site

This section analyses the cumulative results from the Macgillivray site including the material from selected 2016 test pits, the 2017 excavation and Dawson's (1980) earlier excavation. Within this section, Balmer's 1983 seasonality model will be used along with animal migration patterns in the region to examine the site's seasonality. Post-mortem bone alteration will also be discussed.

Table 6.11 summarizes the faunal assemblage for the whole site. Mammals were the most abundant class (n=643), both large and small mammals appear in similar ratios. Moose and beaver were the most abundant species that could be identified. Fish was the second most abundant class (n=520). Perciformes were the most abundant fish order. A total of 43 Perciformes specimens were from the same unit of Dawson's excavation, and they may be from the same two individuals. Aves came third in abundance. The majority of which were from small species such as perching birds, but larger species such as pelicans and cranes were present. Also, worth noting is the small presence of turtles and mussels.

Table 6.11: Faunal Material Recovered from the Macgillivray Site

Taxa	Common name	NISP (MNI)			
		Total	2017	2016	Dawson
Actinopterygii	Fish	453 (3) (L. Dentary)	393	45	15 (3) (L. Dentary)
Esociformes	Mudminnows, and pikes	2	2	-	-
Perciformes	Perch-like fish	58 (2) (R. Cleithrum)	3	14	41 (2) (R. Cleithrum)
Percidae	Walleye, perches	1	-	-	1
Stizostedion vitreum	Yellow pickerel/walleye	1	-	-	1

Salmonidae	Salmon, trout, whitefishes	4	3	1	-
Salvelinus sp.	Trout	1	1	-	-
Aves	Unident. birds	67	40	27	-
Aves, large	Large birds	11	5	4	2
Aves, medium	Medium bird	76	40	35	1
Aves, small	Small bird	224	126	98	-
Anatidae	Duck, Geese, Swans	2	1	-	1
Charadriiformes	Waders, gulls and auks	1	1	-	-
Phasianidae	Pheasants, partridge, Turkey	2	1	1	-
Antigone canadensis	Sandhill crane	1	1	-	-
Passeriformes	Perching birds	13	2	2	-
Pelacaniformes	Pelican	1	-	-	1
Podicepidae	Grebes	1	1	-	-
Bivalvia	Mussels	3	2	1	-
Mammalia	Mammals	67	26	27	14
Mammal, large	Size of *Odocoileus virginianus*	193	-	49	144
Mammal, medium	Size of Canidae	83	43	32	8
Mammal, small	Size of *Castor canadensis* and below	197	131	66	-
Cervidae	Deer, moose, caribou	24	6	1	17
Alces alces	Moose	18	1	-	17
Odocoileus virginianus	White-tailed deer	2	-	1	1
Carnivora, large	Size of *Ursus*, *Canis lupus*	4	1	1	2

Carnivora, medium	Size *Vulpes vulpes*	5	-	1	4
Carnivora, small	Size of *Martes* pennati	3	1	1	1
Canidae	Dog-like carnivores	1	1	-	-
Canis sp.	Dogs, wolves	1	-	-	1
Mustelidae	Badgers, minks, martens	3	3	-	-
Neovision vision	American mink	2	1	1	-
Ursus americanus	Black bear	1	-	-	1
Rodentia, large	Size of *Castor canadensis*	8	1	7	-
Rodentia, small	Size of a vole	5	4	1	-
Castor canadensis	Beaver	15	1	14	-
Ondatra zibethiscus	Muskrat	5	5	-	-
Erethezion dorsatum	Porcupine	1	-	-	1
Sciuridae	Squirrels, chipmunks	5	5	-	-
Testudines	Turtles	6	4	2	-
Unident.		351	103	248	-

Table 6.12 summarizes the charred floral remains from the Macgillivray site. Test pits from the 2016 excavation were included in their corresponding excavation block. **Fig 6.9** lists the frequency of seeds per 100 ml of soil. *Chenopodium* sp. is the most abundant type of plant recovered, followed by wild stone fruits (*Prunus* sp*., Crataegus* sp.), then *Zizania* sp. Looking at abundances, the average amount of seeds per 100 ml is 0.41 seeds with a standard deviation of 0.73. This is not surprising with the range present. Several contexts have little to no seeds, and four outliers having over twice as many seeds as the average. *Crataegus* sp. was the most abundant taxa in the assemblage followed by *Chenopodium* sp.

Table 6.12: Charred Floral Material from the Macgillivray Site

Taxa	Common name	Block A	Block B	Block C	Total
Amaranthus sp.	Amaranth	2	1	-	3
Chenopodium sp.	Goosefoot	25	1	4	30
Zizania sp.	Wild rice	2	-	6	8
Crataegus sp.	Hawthorns	25	1	12	38
Prunus sp.	Cherries	18	-	6	24
Unidentifiable		30	3	5	38
Total		102	6	33	141

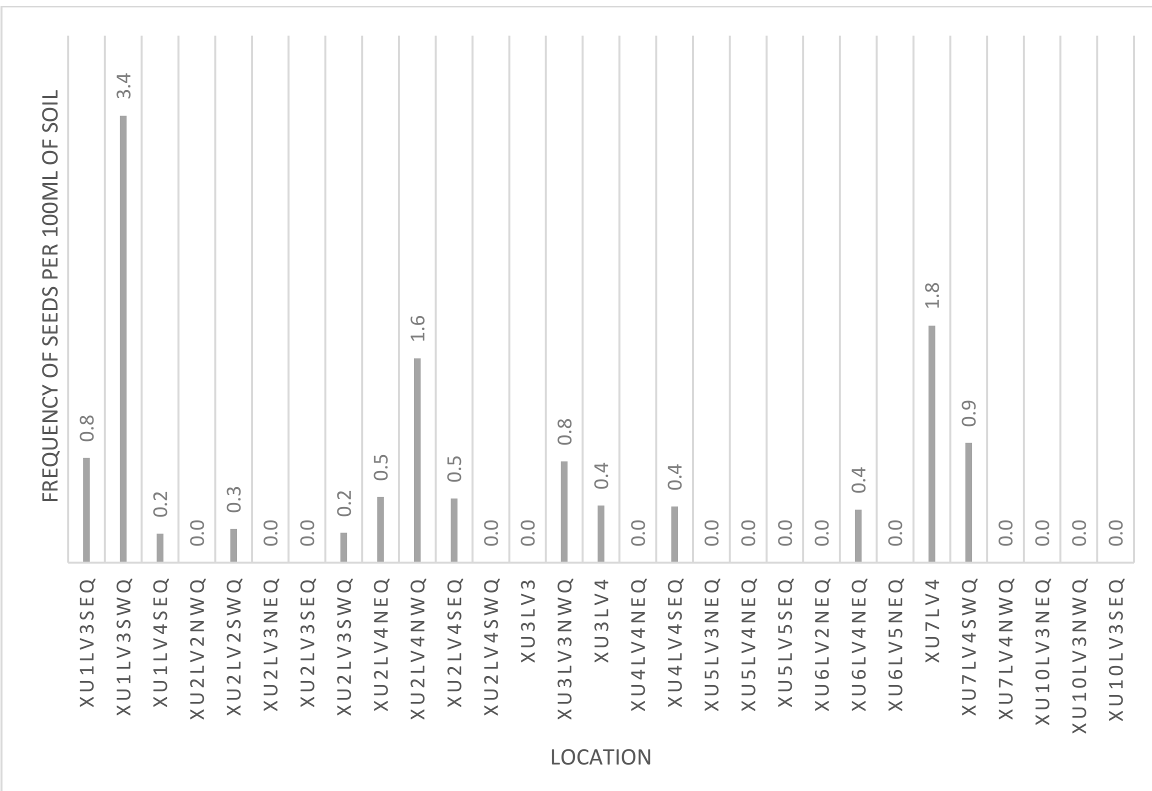

Fig 6.9: Number of seeds per 100 ml of soil based on stratigraphic context.

6.4.6 Seasonality

Seasonality and Balmer's model are discussed in more detail in **Chapter 7.2**. Balmer's (1983) model uses the ethnographic literature along with animal life cycles to infer site seasonality on Boreal Forest sites. The model uses the frequency of specific fauna resources as an analogue. Abundance is measured by the following NISP count: rare specimen should be represented by less than 10 specimens; moderate by 10-68 specimens; common by 69-127 specimens; and abundant by 128 to 186 specimens. **Table 6.13** describes the expected value of faunal resources per given season. This study will also discuss the presence of other seasonal markers to further define the minimum seasonal occupation of the site.

Table 6.13: Expected Abundancies of Fauna Remains from an Archaeological Site Based on Seasonality (Taken from Balmer 1983:94)

Species	Spring	Summer	Fall	Early Winter	Mid Winter	Late Winter
Moose	rare - moderate	rare	moderate-common	moderate	rare	common
Caribou	rare	rare	rare	moderate	moderate	moderate-common
Deer	rare	?	common	moderate	moderate	rare
Bear	moderate	rare	moderate	rare	rare	rare
Beaver	common-abundant	rare	abundant	rare	rare	rare
Hare	moderate	rare	common	abundant	abundant	common-abundant
Muskrat	abundant	rare	common-abundant	rare	rare	common-abundant
Grouse	moderate	rare	common-abundant	com	common	moderate
Waterfowl	common-abundant	moderate-common	absent	absent	absent	absent
Fish (Spring Spawning)	abundant	common	rare	rare	absent	absent
Turtle	moderate	moderate	absent	absent	absent	absent

Spring

The faunal remains from the Macgillivray site had three out of 11 of the expected recoveries for spring occupancy. Moose, and deer were all rare, and fish were abundant. Yet, bear, beaver, hare, muskrat, grouse, turtle and waterfowl were far below their expected value. Another indicator of spring occupation is the presence of medullary bone on a medium sized avian long bone found in Unit 2 (**Fig 6.10**). Medullary bone is the calcification of the medullary cavity in female birds. This occurs during its breeding period (Rick 1975). The formation of medullary bone occurs right after mating and during the pre-laying period of 7-14 days (Rick 1975). The quick accumulation and deterioration of medullary bone as well as the strict seasonal mating pattern of wildfowl make it a good indicator of spring occupation (Rick 1975).

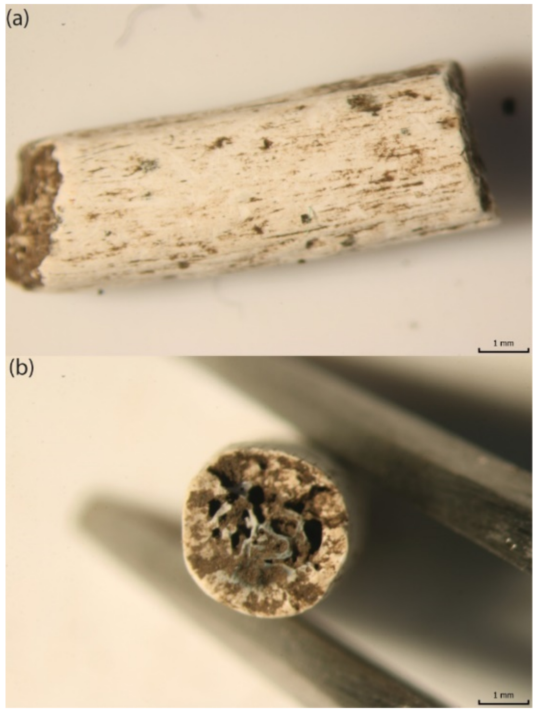

Fig 6.10: Accumulation of medullary bones within the medullary cavity of an Avian specimen from the Macgillivray site. (A) anterior view, (b) cross-section of the bone.

Summer

The summer season is not well defined by Balmer (1983). It is assumed to be a time where the search for wild game is more relaxed– that during this time, people were gathering together socially rather than hunting or fishing. They would feast on dried and smoked meats and gather whatever plants were available. If this is true, then most fauna resources in this season would be expected to be rare, besides waterfowl, fish and turtle.

The Macgillivray site demonstrates five out of the 11 markers for a summer occupation. Bear, muskrat and grouse were all rare. Waterfowl were present but were rare rather than moderate-common. Turtles were present but rare. Beavers were present but moderate, while hares were absent.

Other seasonal indicators for summer include the presence of *Antigone canadensis.* This species is only a summer resident in the Thunder Bay District (Thunder Bay Naturalist 2017). Floral remains such as wild rice (*Zizania* spp.) and goosefoot (*Chenopodium* spp.) also ripen in the late summer to early fall. *Prunus* spp. and *Crataegus* spp. also usually ripen in the summer.

Fall

The fall criteria for the Macgillivray site contains one out of the 11 markers, the rarity of deer remains. This season is contradicted by the presence of waterfowl. This contradiction may not be an issue as some waterfowl return to the Thunder Bay District in the fall while travelling south. The low quantity of waterfowl may also suggest that they were not a priority to capture and may be out of season. Floral indicators of fall occupation include the presence of wild rice, goosefoot, and hawthorn which may ripen either in the late summer or fall.

Winter

Each of the winter criteria only had two out of the 11 markers. Including the rarity of bear for all three sections, the moderate amount of moose for early winter, the rarity of muskrat for mid-winter, and the rarity of deer in late winter. They are contradicted by the presence of turtles and waterfowl.

6.4.7 Post-Mortem Processing

The majority of faunal materials showed evidence of processing. Only five specimens had butchering marks. Four of which were small striations. The other mark was more complicated, it wrapped around the interior and exterior of the bone. The specimen was recovered from level I of test pit N530E515 may have been a game piece or a pendant. The specimen is a flat bone (possible cranial piece) from a Cervidae. The marking is linear, it goes around the specimen along with a small circular incision. The mark lacks any striation which is typical of cutting or chopping actions, which may suggest it to be natural; however, no indigenous animals have natural sutures/marks that size in the geographical region (**Fig 6.11**). Perhaps the striations were either polished or weathered away or the mark was made pre-mortem and healed. Another interpretation may be that it was scored and snapped to control the break in the bone.

The four small striations may be the result of skinning and removing meat from the bone. Four out of the five butchering marks were found on long bones. The other was on an unidentifiable flat bone. Three were on cervids bone, one on a Carnivora, and another on an unidentifiable mammal.

The only bone tool present was a flesher found at level III of N530E510. The flesher is made from the metapodial of a small ungulate. It was damaged by a shovel during excavation, splitting the bone transversely (**Fig 6.12**). There were additional cut marks on the proximal epiphysis. This more than likely occurred during the removal of tissues from the bone.

Most of the specimens were fragmented and could not be identified to the element beyond flat bone or long bone. This accounts for approximately 85% of the assemblage. 83% of mammal bones were fragmented of which 57% were burnt. This may be due to some form of processing, perhaps to extract marrow or to create bone meal. Overall a large portion of the assemblage was burnt (62%). It is unclear if this may be due to soil acidity preserving carbonized bones easier than unaltered or if this was a significant part of processing.

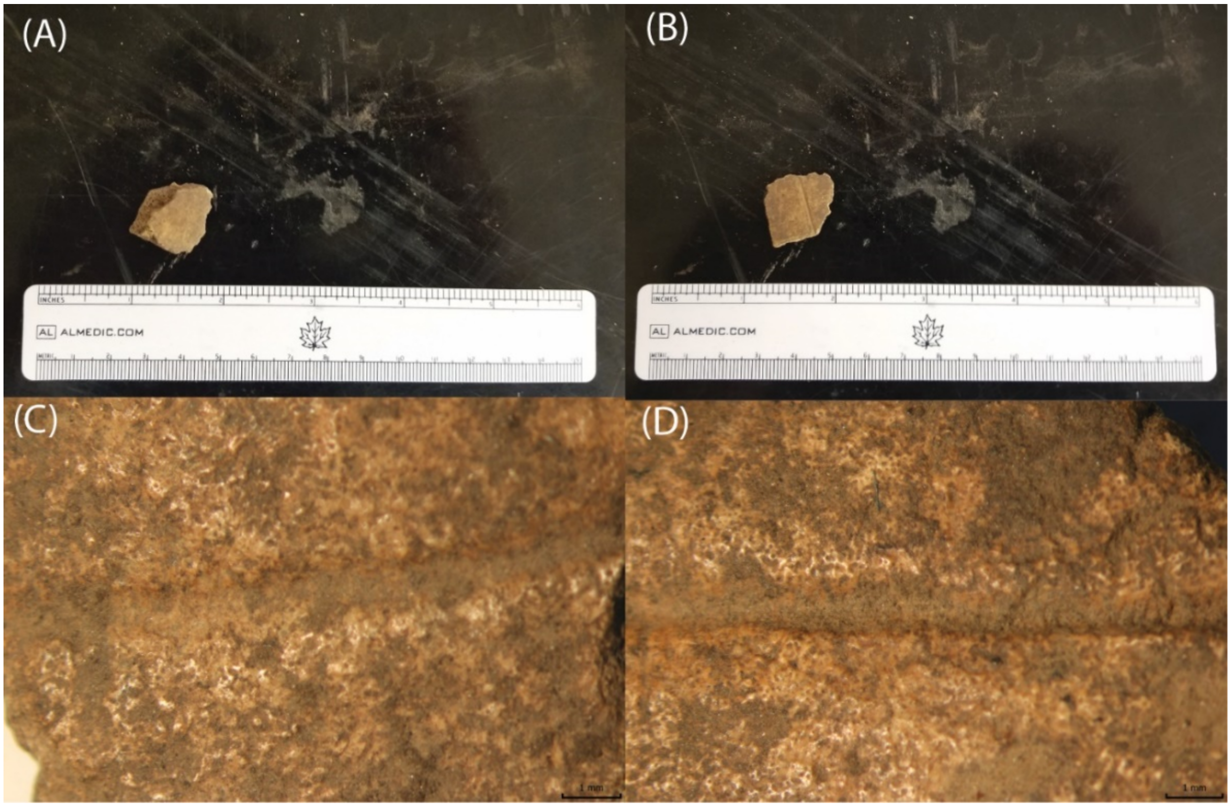

Fig 6.11 Bone with a marking but no striation (A) Posterior view. (B) Anterior view. (C) Posterior marking. (D) Anterior marking.

Furthermore, the lack of cranial pieces and axial elements of large mammals may suggest some hunted game were processed off-site and brought to the habitation area. This is to be expected as the site is located on an island. The transportation of unneeded weight especially of large mammals would be inefficient. The only two cranial pieces recovered were from large mammals. One is a small flat bone which may be a cranial piece, and a temporal bone, both of which are from cervids. Sixteen premolars and molars from cervids were also present. Interesting was the number of fishbones, but lack of cranial pieces. Twelve percent (n=64) of the fishbones were cranial. Perhaps fish heads were discarded during fishing, or before cooking.

Fig 6.12 Flesher made from the metapodial of a small ungulate.

6.5 Summary

At the Macgillivray site a diverse range of animal resources were recovered accounting for 31 categories of identification. Of these identifications the abundance of fish and mammal would suggest them to be an important source of food on the island. The fauna assemblage from the site was also heavily modified with 85% being burnt.

Only five unique taxa of floral remains were identified to the genus level, but over 141 seeds were recovered. Genera identified include *Chenopodium* and *Zizania* which may have been important source of nutrition and have further implication on the complexity of Woodland period diets. Wild rice grains recovered from the Macgillivray site were contemporaneous with the Middle Woodland period and dated to 1680 ± 30 BP. Perhaps the wild rice stand on the lake were motivation for the Woodland period people to settle around the Whitefish Lake area.

Processing the soil samples from the Macgillivray site demonstrated its productivity on central Canadian Boreal Forest sites. Although the use of fine-sieving is productive to optimize the recovery of faunal material, it is inadequate for the recovery of floral material. Flotation is needed as only 15% of seeds (n=19) were recovered in the heavy fraction mostly consisting of large stony seeds, whereas the light fraction recovered 85% of the assemblage and identified two other taxa, including *Zizania* sp.. The use of fine-sieving on Boreal Forest site would aid in reducing biases for large mammalian species and increase the richness of faunal assemblage. Use of finer sieves increase the recovery of fish remains with 1 mm having recovery on par with mammal.

Chapter 7 – Discussion and Interpretation of Results

7.1 The Effect of Sieve Size on Organic Recovery at the Macgillivray Site

The nested-sieves demonstrated the usefulness of fine sieving on Boreal Forest sites. Using a standard 6 mm sieve to excavate creates an obvious bias toward large mammal species. Because the Macgillivray site is located on an island it would be unusual for fish and waterfowl to not be a significant part of the diet. Although the best identifiable fish specimens were recovered through excavation. They represent an insignificant amount of the faunal assemblage compared to mammals (17.30% to 77.71%). The number of identifiable Aves species were both impacted by the lack of identifiable elements, as well as their limited representation within the reference collection. Aves initially accounted for 4.96% of the faunal assemblage in the 6 mm sieve and ended up accounting for 19.88% when using the 1 mm sieve. The results of this study are similar to studies conducted on Hohokam sites (see James 1992; Johnson 2016)– 90% of fish remains would have been lost using only the 6 mm sieve (see **Table 6.3**).

This study is not the first to note the effects that sieve size has on the interpretation of faunal remains on Woodland period sites in the Boreal Forest. Morey et al. (1996) remarked that of the very few Laurel composite sites that have had faunal reports conducted, those that have used fine sieving have appeared to present contradictory trends to those using the standard 6 mm sieve. Excavation using fine-sieving showed similar results to this study. Large species such as moose and sturgeons were recovered from the sieves with larger apertures. Whereas small species such as suckers and small mammals were coming from the finer screens (Morey et al. 1996).

The recovery frequency of mammals increased by more than twice as much using the 1 mm sieve which demonstrates a potential loss in data by using a 6 mm sieve. The mammal assemblage benefited from the identification of five new taxa through the sieving experiment. The recovery of 1236 burnt fragmented specimens could represent a potential loss in data. 95% of burnt bones were recovered through the nested sieves as opposed to handpicked. Warrick (2005) demonstrates the nuanced nature of contact period Anishinaabe deposits beyond the identification of small burnt bones, and other small trade goods. Their deposits were almost invisible, which he compared to post-contact period sites in Northern regions. The trend of burning and fragmenting faunal remains could have an early origin. Its purpose may be to either extract bone marrow as a dietary supplement or as a fertilizer.

Table 7.1 describes the recovery rate of faunal material by the time it took to sort through 600 ml of soil based on sieve size. This excludes the time needed to identify the specimen. Sort time may seem very high and may be inefficient and costly in a CRM setting. These times were affected by the samples being divided into both heavy and light fractions. This would not be expected to do in the field, and smaller pieces of charcoal and modern seed may be ignored to decrease the time needed to sort. Soil type may also affect the amount of time needed for sorting. Silty soil may decrease sorting time for large sieves, while sandy soil may increase the sorting time of other sieves depending on the particulate size. Depending on the nature of the excavation, the results would suggest the use of 4 mm to 2 mm sieves for accurate interpretation of faunal material from Northwestern Ontario.

Table 7.1: Average Time to Sort a 600 ml Samples and Fauna Material Recovered

Fraction	Average time/600 ml soil sample (in minutes)	Faunal material recovered	Cumulative faunal recovery	Percentage of total assemblage
Excavated/6 mm	n/a	328	328	16.59
4 mm	6m22s	244	572	28.93
2 mm	10m31s	631	1203	60.85
1 mm	23m10s	774	1977	100.00

Future Studies and Limitation

To better understand the limitations of the standard recovery method, nested sieves should be used on more Boreal Forest sites. At the Macgillivray site, sieving increased not only the recovery of faunal material but also taxa richness. This may not be the case on other Boreal sites. The soil composition as well as animal and plant pedoturbation may affect the results and preservation of the material. As well, the context of the site may need to be taken into consideration. This could help answer subsistence questions such as is the increase in Actinopterygii and Aves specimen only significant because of the site's closeness to water? Were hunters in the Boreal Forest as reliant on cervids as we thought, or were they more focused on smaller games?

Furthermore, this study did not look at how soil type affected sorting time and processing time was not measured. Clay and waterlogged soils are notoriously hard to pass through even with the large aperture of the standard sieve size. Although not impossible, it would affect the efficiency of fine sieving. However, a dry clay soil type may aid in the preservation of faunal material (Kibblewhite et al 2015). Is the time needed to process this soil type worth the effort?

Another topic is that of anthropogenic modification of the material. The Macgillivray samples came mostly from contexts associated with fire and most of the material was either calcined or singed. Could this modification help the preservation of the material, and are samples from middens less dense?

The results of the study were limited by the reference collection. **Table 5.1** summarizes the number of species and families of the classes within the study area, and how many were represented within the reference collection. Identification was made by ruling out other possible species. This becomes difficult when there was a possible overlap between the osteological morphologies of the species or genera. For the most part, this is not a huge issue when identifying mammals. Identification of mammals up to the family level is sufficient to infer dietary and seasonal information. It was mostly very small rodent-like fauna that were absent from the collection. As for the fish, the issues of identification fell more on the assemblage than the reference collection. It was dominated by non-diagnostic rays and lacked identifiable cranial pieces. Vertebrae were present, but they are only morphologically distinct between certain families. Amphibians and reptiles were poorly represented in the reference collection. This is not a major issue as amphibians are quite rare to preserve on archaeological sites due to the fragility of their bones. The orders of Reptilia are quite distinct from one another and a large collection was not needed. The reference collection hinders the identification of Aves which may be useful for determining seasonality. Only a quarter of avian families were present and only 8% of species from the study area were present. Aves is a remarkably diverse class dominated by smaller Passeriformes which are rare to recover, and their osteology is barely distinguishable from one another. If we were to ignore Passeriformes, 14% of Aves species would be present, and 37% of all the families would be represented. There is still quite a bit of variation between the residencies of genera within a family. For example, when considering the identification of ducks (*Anas* spp.). There are four species that are present in the study area. Three are summer residents (*A. rubripus, A. platyrhynchos, A. carolinus*), and one which is a spring/fall migrant (*A. acuta*). If an identification could be made between these species, the study would benefit from additional seasonal information.

Summary

The experiment demonstrated the positive benefits of fine sieving for the recovery of faunal data. Overall, organic material density increased and identified taxa broadened with the use of smaller sieves. Identification was limited due to the fragmentation of the remains, the lack of diagnostic specimens, and the paucity of avian species in the reference collection. Based on the Macgillivray site, the 2 mm sieve would be the most efficient to use for sampling faunal remains. It recovered 60% of the total faunal assemblage and identified all but one taxon (Podicepidae). The 2 mm sieve can be sorted twice as fast as the 1 mm sieve. As for flora material, the 500 µm should be used since many small seeds could potentially be lost but all taxa were represented by the 1 mm sieve. Ultimately more sites in the Boreal Forest with a variety of context and soil types should be experimented on. This would provide more insight into the most efficient strategy for recovering organic material.

7.2 Seasonality at the Macgillivray Site

Table 7.2 describes the population characteristics for some important faunal resources within Northwestern Ontario. The species described in the tables are those most emphasized as subsistence resources in the ethnographic literature (Balmer 1983). Fish and waterfowl are the only animals that aggregate seasonally in large numbers within the region. Small game such as hare, muskrat and grouse aggregate, but in smaller groups (Balmer 1983). Moose, caribou and beavers are commonly dispersed, but they do come together in family groups. Because of this, there is a variable degree of predictability of geographical and seasonal changes in resource availability. It would be expected that certain species would be consistently more important than others during certain months. **Table 7.3** demonstrates the availability of certain species in the study area, as well as their expected period of exploitation.

Table 7.2: Fauna Schedule in Northwestern Ontario (Taken from Balmer 1983: 69)

	Taxa	Live Weight range (kg) Range	Average	Biomass kg/km^2	Density no/100km^2	Stability[a]	Recurrence[b]	Short-term Reliability[c]	population aggregation[d] Spring	Summer	Fall	Winter	Early Winter Group Size
MAMMALS													
Large Mammals													
	Alces alces Moose	F M 385-535	350 435	17.2±	5.6	moderate	irregular short-term	low	D	D	D	D	1.8 individual 680 kg±
	Rangifer tarandus Woodland Caribou	F 63 - 94 M 81-153		0.7±	0.5	moderate	irregular long-term	low	D-F	D-F	D-F	F	6.0 individual 900 kg±
	Odocoileus virginianus White-tailed deer	F 57-63 M 86-96		NA	NA	moderate	NA	NA	D-F	D-F	D-F	F	
	Ursus americanus Black bear	F 92-140 M 115-270		NA	NA	NA	NA	NA	D	D	D	D	
Medium Mammals													
	Castor canadensis Beaver	F <15 M >35	20	20.9±	185	moderate	irregular short-term	moderate	D	D	D	D	5.0 individual 100 kg±
Small Mammals													
	Lepus americanus Snowshoe hare	F M	1.4 1.5	1610 - 18.2	115000 - 1300	low	cyclic 10 years	moderate-high	D-F	D-F	D-F	D-F	1.0 individual 1.5kg
	Ondatra zibethicus Muskrat		1	34.2±	3800	low	irregular cyclic, 10 years	moderate	D-F	D-F	D-F	D-F	1.0 indivudal 0.9kg
birds													
	Bonasa umbellus ruffed grouse		NA	54.0 - 6.0	8600 - 1000	low	cyclic 10 years	moderate	D-F	D-F	D-F	D-F	3.0 indivudal 1.8 kg ±
	Waterfowl		NA	NA	NA	NA	NA	moderate-low	F-F++	D	F-F++	absent	
	Fish		NA	675	NA	high	NA	high	F+	D	F+	D-F	

(a) Stability refgers to pupulation stability. (b) Recurrence refgers to recurrence from points of low population density. (c) Short-term reliability of capture once the species in located. (d) D-diffuse, F- Focal, F+ - 25-100+, F++ 1000+

Table 7.3: Seasonal Availability of Animal Resources in Northwestern Ontario (Taken from Balmer 1983:76)

Species	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Moose	. . .	. . .	. . .	. . .	. . .	. . .	XXX	XXX	. . .	. . .	. . .	XXX	. . .
Caribou	. . .	. . .	. . .	. . .	. . .	. . .	. . .	XXX	XXX	XXX	XXX	. . .	. . .
White-tail deer	. . .	. . .	? ?	? ?	. . .	. . .	XXX	XXX	XXX	XXX	. . .	. . .	. . .
Black bear	XXX	XXX	. . .	. . .	. . .	XXX	XXX	XXX	. . .	. . .	. . .	. . .	. . .
Beaver	XXX	XXX	. . .	. . .	. . .	. . .	XXX	XXX	. . .	. . .	. . .	. . .	. . .
Muskrat	XXX	XXX	. . .	. . .	. . .	. . .	XXX	XXX	. . .	. . .	. . .	. . .	. . .
Snowshoe Hare	. . .	. . .	. . .	. . .	. . .	. . .	. . .	XXX	XXX	XXX	XXX	XXX	XXX
Grouse	. . .	. . .	. . .	. . .	. . .	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Waterfowl	XXX	XXX	. . .	. . .	. . .	XXX	XXX	XXX	. . .	. . .	. . .	. . .	. . .
Fish (Spring spawning)	XXX	XXX	XXX	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Other species in the study area and their season availability													
Wapiti		. . .	. . .	. . .	. . .	. . .	. . .						
Canis sp.	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Lynx	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .				. . .	. . .
Raccoon	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .				. . .	. . .
River Otter	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Porcupine	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Skunk	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .					
Mink	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Marten	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Eastern Cotton-tail rabbit	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Turtles	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .					

(…) - available in the study area, (XXX) expected period of main exploitation

Balmer (1983) suggests the following model for seasonal faunal exploitation: In the spring (mid-April – May) beaver, muskrat, waterfowl and spring spawning fish are expected to dominate the assemblage.

Any of these species could be more represented than the other depending on the habitats associated with the site. For example, while a group remains at base camp fishing and/or drying meat, another group may be out snaring smaller game. In the summer (June - early September), groups may have relied on a broader range of resources than in the other seasons. More emphasis may have been placed on plant resources, but moose snaring, and summer fishing may have also taken place (Balmer 1983; Rogers 1962). A large number of fish captured during their spring spawning period could have been dried to last throughout the summer (Rogers 1962). Waterfowl such as ducks undergo a moult around midsummer, rendering them flightless and easy to catch (Rogers 1962). Beaver, muskrat and bear populations are low during this time of year and are usually avoided (Balmer 1983; Nelson 1973; Winterhalder 1977). During the late summer, wild rice may have been a priority where it grew (Balmer 1983; Rajnovitch 1985). In the fall (mid-September – mid-November), emphasis may have been placed on vulnerable waterfowl who are undergoing their second moult and during their fall migration (Balmer 1983). Moose become active along lakeshores during their rutting season and may be hunted.

Fall is also projected to be the main season for beaver procurement, their activity intensifying between the moose rutting season and before the waters freeze-up (Balmer 1983). Balmer (1983) was uncertain about fall fishing, under the assumption that the Woodland period people in the area did not have access to nets. During the early winter (mid-November – December), hare and grouse snaring would have been important. Moose hunting would have expected to decline with the weather conditions. During mid-winter (January to February) hare snaring would have been the primary focus. Secondary emphasis would be placed on grouse procurement. Caribou would have been hunted during stormy weather as this is when they are the easiest to approach. Moose could be captured, but it is often described as difficult to do so during this period (Rogers 1962). During late winter (March – Mid April), as it started to warm, moose hunting would have become more important. Groups would move toward camps with proximity to the moose population. Grouse and hare snaring would decrease but may still be exploited due to their reliability compared to moose hunting (Balmer 1983; Winterhalder 1981).

Balmer (1983) also suggests that settlement location may be used to infer seasonality and fauna exploitation. During the spring**,** the prime settlement location would have been the first open water near a spawning site. Rogers (1973) notes that spring camps were located near the fall camps so that canoes and their caches could be retrieved. During the summer, the site location could have been chosen to give access to foraging areas for aquatic and terrestrial plants. Later in the season, camps may have been moved closer to rice beds during harvesting (Balmer 1983). Rogers (1973) describes summer as a period of human population aggregation and socializing with a decrease in subsistence activities for modern Indigenous populations. Balmer (1983) suggests that the lull in faunal resource procurement could have been a great opportunity for large gatherings to occur. Wall (1981) observed that the summer pattern of group aggregation on shoreline encampments may have been a common phenomenon in the Boreal Forest. As the lakes would have been open, canoes could easily be used to facilitate the gathering. During fall, site locations would favour marshes or vegetated bays for fowling, and places with access to moose and muskrat would also be prefered. Summer groups would start to split up during this period. During the early and mid-winter, groups would move into the interior of the forest to hunt hare, grouse and moose. They all prefer forested habitation– this would also provide shelter from the weather (Winterhalder 1977). During the late winter, groups would move toward moose populations. These populations would be expected in upland areas with stands of white birch, aspen and balsam fir (Winterhalder 1977). **Table 7.4** describes the expected abundance of faunal resources, quantified by NISP. Rare specimens should be represented by less than 10 specimens, moderate by 10-68 specimens, common by 69-127 and abundant by 128 to 186 specimens (Balmer 1983).

Table 7.4: Expected Abundancies of Fauna Remains from an Archaeological Site Based on Seasonality (Taken from Balmer 1983: 94)

Species	Spring	Summer	Fall	Early Winter	Mid Winter	Late Winter
Moose	rare - moderate	rare	moderate-common	moderate	rare	common
Caribou	rare	rare	rare	moderate	moderate	moderate-common
Deer	rare	?	common	moderate	moderate	rare
Bear	moderate	rare	moderate	rare	rare	rare
Beaver	common-abundant	rare	abundant	rare	rare	rare
Hare	moderate	rare	common	abundant	abundant	common-abundant
Muskrat	abundant	rare	common-abundant	rare	rare	common-abundant
Grouse	moderate	rare	common-abundant	com	common	moderate
Waterfowl	common-abundant	moderate-common	absent	absent	absent	absent
Fish (Spring Spawning)	abundant	common	rare	rare	absent	absent
Turtle	moderate	moderate	absent	absent	absent	absent

At the Macgillivray site, the presence of fish, and other organic material argues for a late summer/fall occupation of the site. Seasonal indicators suggest a warm weather occupancy of the site through the spring and summer. The site could have functioned as a spring and fall camp or as a gathering spot occupied during the late summer and fall. As the site spans a long occupation and the assemblage was treated as a single Woodland period component, the purpose of the site could have changed throughout the periods. The accumulation of fauna material reflects multiple visits during warm weather seasons.

If the site were a fishing/fowling camp, the Woodland period people would occupy one of the multiple habitation areas on Whitefish Lake while they fish or hunt waterfowl, moving around and camping at whichever is closest. During the summer they would leave and gather elsewhere. In the fall they would return to harvest wild rice on the south and west shores of the lake. They would catch other fall migratory birds, dig pits, and leave caches for their return in the spring. They would then disperse into the interior of the forest to hunt winter game.

The reoccupation of spring and fall camps is documented in the ethnographic literature (Rogers 1994). Two features of the site would suggest occupation by a large group. The first is the mound, which would have taken quite a bit of energy to create and would have to be constructed during a period of warm weather where the soil was not frozen and could easily be moved. The second feature is the large FCR patches present in excavation block A and block C.

The use of seasonal indicators gave mixed results. This may be due to two reasons: (1) that recovery method was not considered in the formation of the expected values in Balmer's (1983) model; (2) the ethnographic model does not reflect the seasonal rounds of the Woodland period. Fine sieving skewed the number of fish remains expected, which is a weakness of the model. The model expected the capturing of large spring spawning fish such as sturgeons, rather than smaller fish. A small number of fish remains would probably be expected year-round as ice fishing is a part of the Anishinaabe peoples' winter subsistence (Rogers 1973, 1994). The recovery method may have biased the seasonal interpretation of some other sites in the central Canadian Boreal Forest as well, especially when floral remains were not considered.

The high number of fish remains can be explained by the use of fine sieves which skewed the expected number of fish remains. Balmer's (1983) model needs to be refined to reflect the possibility of fine sieving. This is a known issue of other models which use an expected values as a diagnostic tool such as Kenyon and Kenyon's Glass Bead chronology (see Cousineau 2017), and Hohokam Lagomorph's index (James 1997). Fishing in seasons other than spring may be more important than it was during the post-contact period. The inability of identifying the fish remains to species hinders the ability to interpret the fish population that was recovered. There are at least six individuals based on MNI and taxonomic ranks. These individuals could easily explain ~450 fragmented fish remains. Two possibilities for the fish remains would be either small-scale fishing activities during the occupation or that the fish were caught while people were relocating toward the site.

If the site functioned as a gathering site rather than as a seasonal camp, the inhabitants could have fished and hunted while they travelled to the site from their spring camps. This would explain the lack of axial skeletal elements. Historically Anishinaabe people have preserved their meat while travelling. In Southern Ontario, the Anishinaabe people that wintered in Iroquoian villages would fish and preserve the meat as they travelled to the village before winter (Tooker 1964). Smoking and drying meat was also reported during the early contact period in Northwestern Ontario (Rogers 1974). This interpretation of the site would suggest a similar activity. The people would accumulate surplus food acquired in their spring round to use for trade or feasting. While at the gathering areas, people may have had a decreased focus on subsistence activities. They may have focused more on recreational and cultural activities, while also hunting and gathering minimally. This explains foraged food sources such as cherries, wild goosefoot, as well as the sandhill crane. During late summer early fall, they may have harvested the wild rice on the south and west shores of the lake before departing to their fall camps and moving into the interior for the winter.

This interpretation of the site puts the features of the site into a proper perspective. If occupied by a large group of people in the summertime, it would make the construction of the mound much easier than if it was constructed by an extended family. Similar to the Martin-Bird site (Boyd and

Hamilton 2018), the mound acts as a focal point with the sites' habitation zone being found around it, demonstrating continual cultural significance. The boundary of the mound was respected as it contained the Ancestors of the inhabitants. The FCR patches could be interpreted as large cooking features that could support feasting activities or as an area to dry wild rice and other produce.

7.3 Human-Plant Interactions in Northwestern Ontario

7.3.1 Wild Rice Consumption in Northwestern Ontario

Wild rice (*Zizania* spp.) has a long history of use by Indigenous people in North America. The earliest historical writing of the harvesting of wild rice in Ontario was at the Lake of the Woods region. In the account, LaVerendrye wrote to the Governor-General of New France about how the crop of wild rice failed in 1733 due to the excessive rain the region received (Rajnovich 1985).

Archaeological interpretation often associates the spread of wild rice with the spread of the Laurel composite (Buchner 1980; Rajnovich 1985; Wright 1999). This idea is not often based on physical evidence, but on site locations. Analysis of site location does indicate that both Middle and Late Woodland period sites tend to be near wild rice stands (Rajnovich 1984). Yet there is very little evidence of wild rice macroremains or processing features associated with the Laurel composite in Canada (Boyd and Surette 2010). Other issues stem from the assumption that the Laurel composite and wild rice first appear at the same time in Northwestern Ontario (McAndrew 1969). There is not enough evidence of this as there is only a small number of dated Laurel components, as well, there is an absence of palynological studies of northern wild rice in Canada (Boyd and Surette 2010; Reid and Rajnovich 1991). If the Laurel composite are assumed to be to the direct descendants of the preceding Middle period people, then the spread of the Laurel composite would not necessarily occur at the same time as the dispersal of wild rice (Boyd and Surette 2010). Although evidence of the consumption of wild rice has been identified from food residue on Laurel pottery, macroremains are rare (Boyd and Hamilton 2018; Boyd and Surette 2010; Burchill 2014). In Minnesota, wild rice was present in limited quantities at the McKinstry site and the Big Rice site (Rapp et al. 1990; Valppu 1996; Valppu and Rapp 2000).

Wild rice stands from Whitefish Lake predate the Laurel composite occupation. The wild rice stands first appeared around 6100 and 4500 cal yrs BP during the Middle period (Boyd et al. 2013). Perhaps the occupation of the site was motivated due to the presence of wild rice. Radiocarbon dating of wild rice grains found associated with Laurel wares dated to 1680 ± 30 BP (Beta-567300; *Zizania sp.* grain; $\delta^{13}C$: -24.3‰) at the Macgillivray site (**Table 4.12**). This supports the likely consumption of wild rice during the Middle Woodland period.

7.3.2 Amaranth and Goosefoot

Chenopodium spp. is a group of fast-growing plants that are widespread across North America. *Chenopodium berlandieri* is believed to be first domesticated as part of the Eastern Agricultural Complex. It spread into the East Coast and Midwest region by the Late Woodland period (Ahler 2007; George and Dewar 1999; Smith 2007). The use of *Chenopodium* has been documented in more detail in the surrounding areas such as Minnesota (Valppu and Rapp 2000), Southern Ontario (Crawford 2019), and Manitoba (Ahler 2007; Halwas 2017). In Northern Ontario, it is only mentioned as a potential food source but never documented as recovered (Arizigan 2008). *Chenopodium* seeds within the Macgillivray assemblage could not be identified to the species level (see **Chapter 6.2**).

The modern population of goosefoot in its northern range prefer naturally disturbed areas along riverbanks, either in exposed soil along the upper banks or along upper terraces. Populations in these areas can grow in packs of up to 100 plants (Halwas 2017). In the southern region, large populations are more common in both anthropogenic and naturally disturbed habitats (Smith 2007). They grow in small clusters along highways, ditches, gardens etc. Very large populations are still restricted to open, flat floodplains along major rivers, or next to agricultural fields (Halwas 2017). These low populations could be due to competition with other plants that prefer disturbed soils as well such as *Rumex* spp*.* and *Polygonum* spp*.* (Halwas 2017). Halwas (2017) argues that if groups were using *Chenopodium* spp*.* as a food source they would have to deliberately take care of these plants. These plants would need tending if large populations were not common in the past, especially as disturbed soils only support small populations.

Chenopodium spp*.* would also act as a good source of nutrition for the Woodland period people. Wild *Chenopodium* spp*.* has a similar nutritional profile as store-bought *Chenopodium quinoa* (Halwas 2017). It is higher in fiber and protein, but lower in carbohydrates (Halwas 2017). It has similar carbohydrate levels as maize and beans but double the carbohydrate count of pumpkin and sunflowers (Halwas 2017). It has similar fat content to maize, but a quarter of the fat that sunflower seeds have (Halwas 2017). Microfossil analysis from pottery sherds in the Boreal Forest/Prairie ecotone demonstrates limited use in beans (*Phaseolus vulgaris*). Perhaps goosefoot could have acted as a replacement nutrition-wise.

It is unclear if the *Chenopodium* from the Macgillivray site was tended or foraged for. In theory, the location could be ideal. Especially if goosefoot and other crops were planted on the island in the late spring after the last frost, and the island was cleared of herbivores. Goosefoot prefers disturbed areas and does not need much tending to be profitable (Asch and Asch 1977; Halwas 2017). The growth of this plant in the central Canadian Boreal Forest could have been a low energy method to supplement their diet. Perhaps by tending to the crop in the late spring/early summer during times of “low-subsistence activities” to help boost their productivity, they could continue with their summer activities. Then when they return in the fall, they could harvest both the crops and the wild rice on the shores of the lake.

Ethnobotanical reports indicate that Anishinaabe people in Northern Minnesota and Wisconsin would eat the leaves and young seeds of goosefoot plants (Smith 1927; Stowe 1940). The seeds were also grounded into a flour and made into a bread (Stowe 1940). Amaranth is not often discussed as a plant used by the Indigenous people of Canada (Kuhnlein and Turner 1991). Waugh (1916) mentions that the Haudenosaunee people used *Amaranthus retroflexus* but provided no other information. Amaranth was a major cultivated plant in Central America, and its used was common by Indigenous groups of southwestern United states (Fritz 1984; Kindscher 1987; Kuhlein and Turner 1991). Amaranth like goosefoot is a good source of fiber and protein (Kuhlein and Turner 1991; Pedersen 1990). The plant was also identified from archaeological sites in the Red River Valley in southern Manitoba (Halwas 2017).

Gilmore (1931) suggested that there was a possibility that amaranth was cultivated in precontact times in eastern North America. Gilmore (1931) suspected that these plants were purposely grown as seeds of these plants were found along with caches of corn, chenopods, beans, sunflowers, squashes and pumpkins seeds in the Ozark region of Arkansas (Gilmore 1931). However,, amaranth could have also been gathered to supplement the people’s horticultural practices. Amaranth is not often found through flotation in Eastern North America and when they are recovered their frequency is often low (Fritz 1984). Today, amaranth is often excluded from the list of potential domesticated plants in the Eastern Agricultural Complex (Asch and Asch 1978; Fritz 1984; Yarnell 1976)

7.3.3 Cherries and Hawthorns

Prunus is a large genus covering many fruits such as cherries, plums, and almonds. Charred *Prunus* sp. seeds recovered from the Macgillivray site were more likely to be either *Prunus virginiana* (chokecherry) or *P.* pensylvanica (pin cherry) due to their size and shape. In New York State *Prunus* trees are often associated with *Haudenosaunee* villages, which suggest that they were purposely planted (Day 1953). They would tend to their favourite fruit trees by thinning the forests, clearing the underbrush and remove competing tree species, as well as periodically burning the understory of the forest (Abrams and Nowacki 2008). On the East Coast, the planting of fruit trees by Anishinaabe people was reported by 1660 CE (Trigger 1978). It is unclear if this was done within the Upper Great Lakes region.

Both pin cherries and chokecherries have been widely reported as a food and medicinal resources for the Anishinaabe people of Canada (Marles et al. 2012; Reagan 1927; Smith 1932). In Northern Minnesota, Reagan (1927) reported that the *Zagaakwaandagowininiwag* of Forte Bois used cherries extensively as a food source. The fruits were eaten fresh or dried and crushed into a powder for soups (Reagan 1927). Medicinally the plant has several uses such as to treat coughs, and gastric trouble (Marles et al. 2012; Smith 1932).

Hawthorn berries are often described as a less favourable food source to the Indigenous people of Canada (Kuhnlein and Turner 1991; Smith 1932). Although the fruit is edible the berry's flesh is small dry and flavourless. Anishinaabe people would eat them fresh or dry (Kuhnlein and Turner 1991). Other uses of the plant by Anishinaabe people include using the thorns as an awl and smoking the bark to attract deer (Smith 1932). The bark and berries can be used as a medicine (Smith 1932).

East of the mound on the Macgillivray site there is an orchard of fruit trees. According to the Macgillivray family, the orchard area used to be completely open. Tests pit in the orchard during the 2016 field season would support this claim. Excavation suggests the orchard to be relatively recent; all test pits in the area show disturbances such as heavy mottling and stone cairns are found in several places on the island from land clearance. The orchard was likely created after the location was plowed.

7.4 Taphonomy, Limitation and Future Studies

7.4.1 Introduction

In 1988, Reid suggested nine principles to be addressed to further archaeological excavation and interpretation in the Boreal Forest. These methods focused mostly on how sites should be excavated. He also suggested that laboratory analysis of the material should be occurring at the same time of excavation and that analytical and reporting techniques need to be drastically improved (Reid 1988). Thirty-two years later, the quality of the methods used has improved but there are still data deficiencies. Hamilton's (2000) discussion on the viability of predictive models in the Boreal Forest highlighted the remaining issues surrounding Reid's (1988) interpretation. Indeed, more features and habitation areas have been identified, but the archaeological record in the area is still biased toward larger warm-weather habitation sites.

An issue mentioned but not addressed in Reid's (1988) paper is the assumption that Boreal Forest sites are devoid of faunal and floral remains due to its acidic soil and taphonomy. The Boreal

Forest is not void of organic material. Similar to the solution Reid (1988) provided toward the other conditions and syndromes, the methods used within the Boreal Forest should be unique from other geographic areas to tackle these issues. How an archaeologist should approach the issue of acidic soil and taphonomy should not be to devalue the interpretation power of organic material from the area, rather it should be the utilisation of a unique sieving and flotation standard for the recovering of organic material from the Boreal Forest to optimize their recovery. Faunal material from the central Canadian Boreal Forest that are reported are usually heavily fragmented, and altered by fire (e.g., Balmer 1982, Dawson 1974). Both are the result of purposeful human behaviour. The use of finer sieves on archaeological sites may aid in the recovery of both fragmented and culturally modified fauna specimens as well as smaller specimens such as fish.

Reid (1988) did advocate for archaeologists in the Boreal Forest to retain soil from features for flotation and seed analysis. However, the results of which are rarely reported within Northwestern Ontario. Initially the goal for this thesis was to include samples from multiple sites. After a visit to the Ministry of Tourism, Culture and Sport in Thunder Bay, approximately 537 unprocessed soil samples from 31 sites were gathered. These soil samples were collected from field work completed in the last four decades (going back to the 1980's). Although preserving samples for future studies is normal within archaeology, the lack of minimal flotation perpetuated the myth of the Boreal Forest being devoid of interpretable organic material. The analysis of soil samples needs to be taken into consideration when formulating research design and creating a budget for the excavation.

7.4.2 Taphonomy and Macrobotanical Remains

Direct evidence for the consumption of wild rice in Northwestern Ontario is rare. This lack of evidence does not rule out the large-scale use of wild rice on Woodland period sites in Northwestern Ontario. It highlights the need for new methods. A large issue in the interpretation of the archaeological history of the central Canadian Boreal Forest is the condition of the soil and its formation. The survival and condition of buried objects and its stratigraphy depend on both the particular soil environment that they are buried in and the material they are made of.

The processing of food resources can also explain some biases in the botanical assemblage. The majority of macrobotanical remains stem from accidental burning such as spills, or from being burnt to dispose of. Several factors influence the likelihood of carbonization and preservation. Plants and their organs preserve differently based around their composition. The physical condition of the specimen and the specifics of the exposure itself also dictate the likeliness of preservation (Wright 2003). Because of all these factors, there is a very narrow window for the preservation of macrobotanical material. The presence and absence of certain species is a reflection of its ability to carbonize and/or the circumstances involved in its thermal exposure (Wright 2003). This is to say that preservation of plant taxa is not a reflection of its importance to the people of study. It reflects both the physical state of the plant and the way it is processed. However, the more a plant is cooked the more likely it is to eventually be exposed to this narrow window of preservation. For example, wood is far more abundant than seeds and rinds in floral assemblage. This is due both to high tolerance to heat, being able to withstand 900 ^{o}C for an hour– which most seed cannot stand, as well as it being the primary fuel for heating. This makes it more likely to be placed directly into the heat source and experience different exposure factors (Wright 2003).

The lack of wild rice grains may be due to their physical state such as moisture level or fire tolerance. Traditionally the wild rice grains could be exposed to fire twice. The first time would be right after the harvest as the wild rice is parched over a fire (Moodie 1991). Unsecure grains could easily fall into the fire during this period. The second time of potential carbonization would be while cooking. Wild rice is cooked by being boiled (Smith 1932). A potential boil over or spill before being placed into the pot could lead to carbonization. Experiments on the factors dictating the carbonization of wild rice may be beneficial to our understanding of its recovery rate on archaeological sites.

Although the taphonomic process occurring in the central Canadian Boreal Forest can make the identification of organic material difficult, it is not a futile task. The processing of soil samples needs to be conducted regularly to understand human-plant relationships in the Northwestern Ontario. More sites need to be examined to be able to accurately describe the diet of the Woodland period people in Northwestern Ontario and raise the possibility of potentially identifying these rarer taxa. With a larger dataset of sites, we may be able to understand the distribution and use of plant species across the central Canadian Boreal Forest. The identification of faunal remains from these sites will always be daunting, but fine-sieving samples may be useful for identifying fish and avian remains.

Chapter 8 – Conclusions

The Macgillivray site is a multi-component site in the Boreal Forest of Northwestern Ontario first excavated by Dawson (1980). Although he identified the site as having a Laurel composite affiliation, recent excavation in 2016 and 2017 by Lakehead University resulted in updated information indicating that Brainerd, Blackduck complex, Psinomani/Sandy Lake, and Selkirk composite components are also present. With the advent of improved methods of data collection and processing, we were able to learn much more about this site. For example, the study of organic material can be a powerful tool to Boreal Forest archaeologists if the correct methods are used to retrieve any possible remnants.

This thesis examines the fauna and floral archaeological evidence from the Macgillivray site to assist with reconstructing the diets of the precontact Indigenous Woodland period occupants. There is a lack of direct evidence for the consumption of wild resources on sites in Northwestern Ontario. The early ethnographic record overemphasis the role of hunting and plant use is often minimally described. This thesis presents a preliminary overview of the artifacts found during the 2017 unit excavations and associated test pits from the 2016 excavations at the Macgillivray site to provide context for discussions. The MNI and NISP of identified faunal remains were calculated for those test pits and units, along with consideration of Dawson's 1980 findings. Then, the flotation and fine-sieving of soil samples from 2017 was discussed.

This study demonstrates how fauna and floral recoveries can be used in tandem to generate hypothesis about site usage. Both materials can give an idea of site seasonality and infer subsistence activities. The use of fine-sieving and flotation also increases the recovery rate and interpretation power of organic material. The use of 2 mm sieves is recommended for sampling faunal remains within Northwestern Ontario. This recommendation is due to how it increases the recovering of fauna remains by 60% of the total assemblage and can be sorted twice as fast as the 1 mm sieve.

The primary issue with relying on the standard 6 mm sieve for excavation is that it creates a bias for large and medium mammalian taxa and large fish species. The sieving experiment demonstrates a decreasing trend in the ratio of mammal to fish specimen. By the 1 mm sieve, fish and mammals appear in similar frequencies. The issues remains that the majority of fish remains were unidentifiable past the class rank. This still provides some insight into the diet and seasonality of the site, especially when considering Balmer's (1983) model for seasonality in the central Canadian Boreal Forest. Her model does not take into consideration the use of fine-sieving and it assumes that fish were not captured outside of the spring season due to the lack of netting technology prior to the Late Woodland period. Netting technology more than likely existed even in the First Ancestor period, and fish were likely captured in smaller quantities throughout the year (Petersen et al. 1984). The results of this thesis demonstrate that 90% of all fish remains would have been lost using only 6 mm sieves. The amount lost is not unique to the central Canadian Boreal Forest and has also been seen on sites in the American Southwest (James 1992; Johnson 2016) and in California (Casteel 1972). This demonstrates that we archaeologists do not fully understand the fishing economy in Northwestern Ontario and that more intensive zooarchaeological analysis is needed. Morey et al. (1996) also noted that fine sieving resulted in different trends from the traditional assumption of the Woodland period people's fishing economy. Morey et al. (1996) note that smaller fish were recovered in smaller sieves on Laurel composite sites. These smaller fish, who were absent in the standard size sieve, were assumed to be caught with netting technology new to the Late Woodland period.

The lack of macrobotanical material from most central Canadian Boreal Forest sites is not surprising when considering the lack of flotation used or reported. Reid's (1988) call to action for collecting soil samples was beneficial, but seldom is the flotation done. At the Macgillivray site very rarely were seeds recovered in the 4 mm sieve, but the few that were present were large seeds such as cherries and hawthorns. The results of the experiment suggest that all taxa would be represented using the 1 mm sieve. This study only examines one site, and more sites in the central Canadian Boreal Forest need to be further examined by floatation to define which sieve size is appropriate for the research goal. For example, a radiocarbon date was assessed from wild rice grains recovered in association with Laurel wares and dated to 1680 ± 30 BP (Beta-567300; *Zizania* sp. seed; $\delta^{13}C$: -24.3‰) at the Macgillivray site. This demonstrates the likely consumption of wild rice during the Middle Woodland period.

Applying Balmer's (1983) seasonality model to the faunal and floral date from the Macgillivray site yielded mixed results. The representative faunal resources would suggest either a spring or summer habitation, while the floral assemblage would suggest a late summer or fall occupancy. The summer season in Balmer's (1983) model is not well defined as she assumes it to be lull in subsistence activities. So, the summer occupancy was diagnosed purely based on the rarity and absence of some species. The floral results suggest a late summer or fall occupancy based on the ripening and blooming of the plants found most of which ripen in the late summer, with the exception of wild rice which is often harvested in the fall. Minimally, the site was occupied during warm weather seasons. The Macgillivray site could represent a spring/fall camp which was used during both seasons. The site could also be used as a gathering spot with people arriving during the late spring, after which they socialized or participated in other activities during the summer when there is a "lull" in hunting and fishing. In the fall they would gather wild rice from the area before leaving to their winter camps. However, the occupation of the site spanned over 2000 years and the purpose of the site and the activities that occurred on it could have changed throughout time.

Further archaeobotanical research is needed to understand human-plant relationships within Northwestern Ontario. This study adds evidence to the consumption of wild rice and goosefoot by the Woodland period Indigenous peoples, two potentially important food sources. Although there is ample evidence of later and present day growing, gathering, and eating of wild rice by modern Anishinaabeg, there is very little physical evidence of archaeological examples. This factor is partially due to the soil conditions and the taphonomic processes on central Canadian Boreal Forest sites, but it is also due to the lack of flotation being conducted. More intensive recovery methods must be put into place to fully understand the archaeology in Northwestern Ontario. This study also identified amaranth and two wild berries (cherries, and hawthorn). Further research into the consumption of wild resources on northern Woodland period sites would also help contextualize the use of cultigens identified through food residue analysis.

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