Preliminary Agricultural Study Municipality of Greenstone

NORTHWESTERN ONTARIO, CANADA

– initiated by –

Greenstone Economic Development Corporation
Geraldton, Ontario

– completed by –

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LIST OF ABBREVIATIONS

AAFC	Agriculture and Agri-Food Canada
ALUS	Alternative Land Use Services Canada
AYBI	Aroland Youth Blueberry Initiative
CFFO	Christian Farmers Federation of Ontario
CLFC	Cloverbelt Local Food Co-op
CNR	Canadian National Railway
ECCC	Environment and Climate Change Canada, Government of Canada
EFRI	Enhanced Forest Resources Inventory
ENDM	Ministry of Energy, Northern Development and Mines
FBO	Food and Beverage, Ontario
FSRN	Food Security Research Network
GEDC	Greenstone Economic Development Corporation
GFO	Grain Farmers of Ontario
GIS	Geographic Information System
GPS	Global Positioning System
GSC	Geological Survey of Canada
ha	Hectare
Hwy	Highway
IAPO	Indian Agricultural Program of Ontario
KDSCIA	Kenora District Soil and Crop Improvement Association
KFMA	Kenogami Forest Management Area
Km	Kilometre
LFFC	Local Food and Farm Cooperative (Ontario)
LIO	Land Information Ontario
LRIC	Livestock Research Innovation Corporation
MEDJCT	Ontario Ministry of Economic Development, Job Creation and Trade
m	Metre
MNDM	Ministry of Northern Development and Mines
MNRF	Ministry of Natural Resources and Forestry
MOG	Municipality of Greenstone
NAN	Nishnawbe Aski Nation
NFDN	Northern Food Distribution Network
NOFIA	Northern Ontario Farm Innovation Alliance
NTS	National Topographic System
NWO	Northwestern Ontario
OAFIA	Ontario Agri-Food Innovation Alliance, University of Guelph
OFA	Ontario Federation of Agriculture
OGS	Ontario Geological Survey
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
OSCIA	Ontario Soil and Crop Improvement Association
RAIN	Rural Agri-Innovation Network
TBAFS	Thunder Bay and Area Food Strategy
TBCM	Thunder Bay Country Market
TBFA	Thunder Bay Federation of Agriculture
UTM	Universal Transverse Mercator (map projection)

SUMMARY

This preliminary study was initiated by the Greenstone Economic Development Corporation (GEDC), Geraldton, Ontario, to assess the agricultural potential of the Municipality of Greenstone (MOG) in Northwestern Ontario (NWO). The resulting study identified 4 site areas within the MOG using available data.

The MOG occupies a large area east of Lake Nipigon within the southern portion of Canada's Boreal forest (Figures 1 and 2). The communities (from west to east) of MacDiarmid, Beardmore, Jellicoe, Geraldton, Nakina, Longlac and Caramat fall within the municipal boundaries and represent one of the largest municipalities by land area (3172 km^2) in the Province of Ontario. The population of the MOG from a 2016 census, indicated a total of 4,636 residents (Municipality of Greenstone website, Sept. 10, 2019).

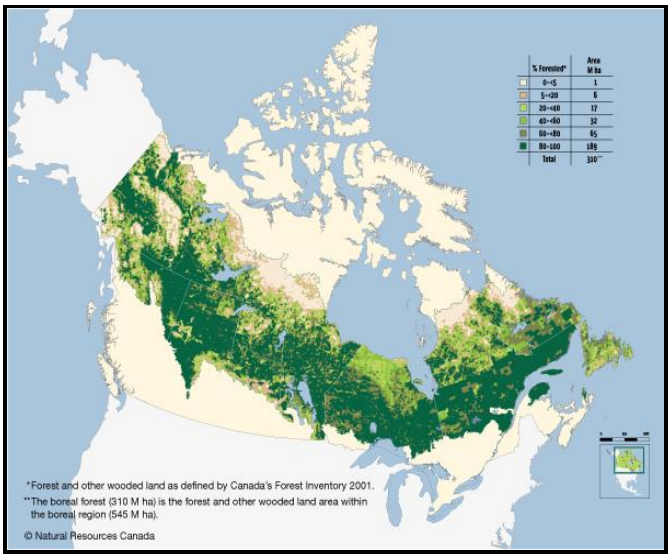

Figure 1. Boreal Forest in Canada (Natural Resources Canada).

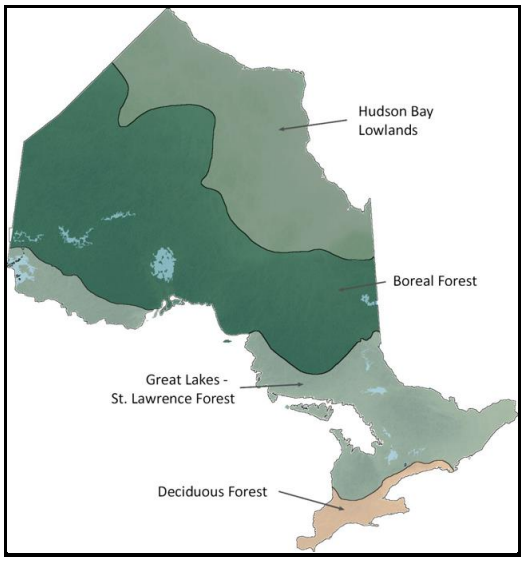

Figure 2. Ontario's Boreal Forest (MNRF)

The task of this preliminary work was to identify the most usable land areas for agricultural activities (Arable land) based on soil type, terrain and accessibility. As a result, the study was limited to within a 10 km wide strip along the major transportation corridors across the municipality. The identification of the most potentially productive agricultural lands within the MOG not only included new areas but also as important, the documentation of historic farming and harvesting sites across the region (Figure 4). These historic sites provide a base or starting point for future agricultural endeavours.

In reference to the capturing of data for this project, an ArcGIS (geographic information system) program was used to assemble layers of digital information from computer web searches. Much of the information is sourced from the Ontario Ministry of Natural Resources and Forestry (MNRF) and the Ministry of Energy, Northern Development and Mines (ENDM) websites.

While sourcing information for this study, a comprehensive list of all potential agricultural-related groups, societies and organizations within the province of Ontario was compiled. The long-shared experiences and advice from these groups should be utilized by the MOG to help guide development in the area.

A comprehensive follow up to this preliminary report should be conducted following the release by MNRF of very detailed high resolution imagery data covering the Kenogami Forest Management Area, scheduled within the next 2 years. This would provide critical information in the selection of the most favorable sites from those identified in this report and should also result in the identification of additional sites for potential development.

INTRODUCTION

In 2019, Superior Rift Geoconsulting Inc. of Thunder Bay, Ontario was retained by the Greenstone Economic Development Corporation (GEDC) to initiate a preliminary agricultural study covering the Municipality of Greenstone (MOG). In recent years, climate change, initiating a potentially longer growing season, and a desire by the public to access healthier less-processed food, has led to the increased importance of locally sourced production and related farmers markets. This has spurred agricultural development across the province.

The information used to identify new potential agricultural sites in the MOG was captured from MNRF and ENDM website databases. The specific categories used in the selection process are listed below:

- **Surficial Geology (ENDM)**

- **Ecosite classifications in the Kenogami Forest (MNRF)**
- **Ontario Land Inventory soil type, soil texture, soil depth and soil moisture**
- **Topography – 1:20,000 and 1:50,000 scale maps / field observation**

The information was analysed and disseminated into digital layers on the maps provided in this report as per the categories listed above. The topography was also a key consideration in the site selection process. If a site hosting all of the favorable attributes was not located on relatively 'level' ground where the local relief of the land was too variable, it was considered unfavorable for agricultural development, primarily related to ease-of-access issues.

As stated, the secondary goal of this study was to identify and document all known historical sites of agricultural activity in the MOG. The data related to these activities was difficult to obtain and few records exist. Much of the information was obtained from personal conversations with retired members of the Geraldton District MNRF office. The sites that were identified are confined to the eastern portion of the municipality, specifically, immediately north of Geraldton and east of Longlac. All but one of these known sites were visited by the author, photographed and described as part of this report. They provide a potential starting point for any future agricultural activities in the MOG.

LOCATION and ACCESS

The Municipality of Greenstone is located in the southern portion of Canada's Boreal Forest and occupies a large area east of Lake Nipigon and north of Lake Superior (Figure 3). The communities (from west to east) of MacDiarmid, Beardmore, Jellicoe, Geraldton, Nakina, Longlac and Caramat fall within the municipal boundaries and represent one of the largest municipalities by land area (3172 km^2) in the Province of Ontario (second only to the City of Greater Sudbury).

The City of Thunder Bay, a major service center in the region, lies approximately 145 km southwest of the MOG on the northwestern shore of Lake Superior. Access to the MOG is via Highway 11/17 east from the city and northeast along Highway 11 from the town of Nipigon. Highway 11 bisects the municipality and continues east to the communities of Hearst, Kapuskasing and Cochrane.

Ease-of-access to any potential agricultural site was a major consideration in the selection process and as a result, the study was limited to within a 10 km wide strip along the major transportation corridors across the municipality. This included Highway 11 east from MacDiarmid to a point 30 km east of Longlac, Highway 625 southeast to Caramat, and north through Geraldton to Nakina and Aroland along Highways 584 and 643. Local access to potential sites away from the main transportation corridors, is provided by an extensive network of unpaved all-weather logging roads.

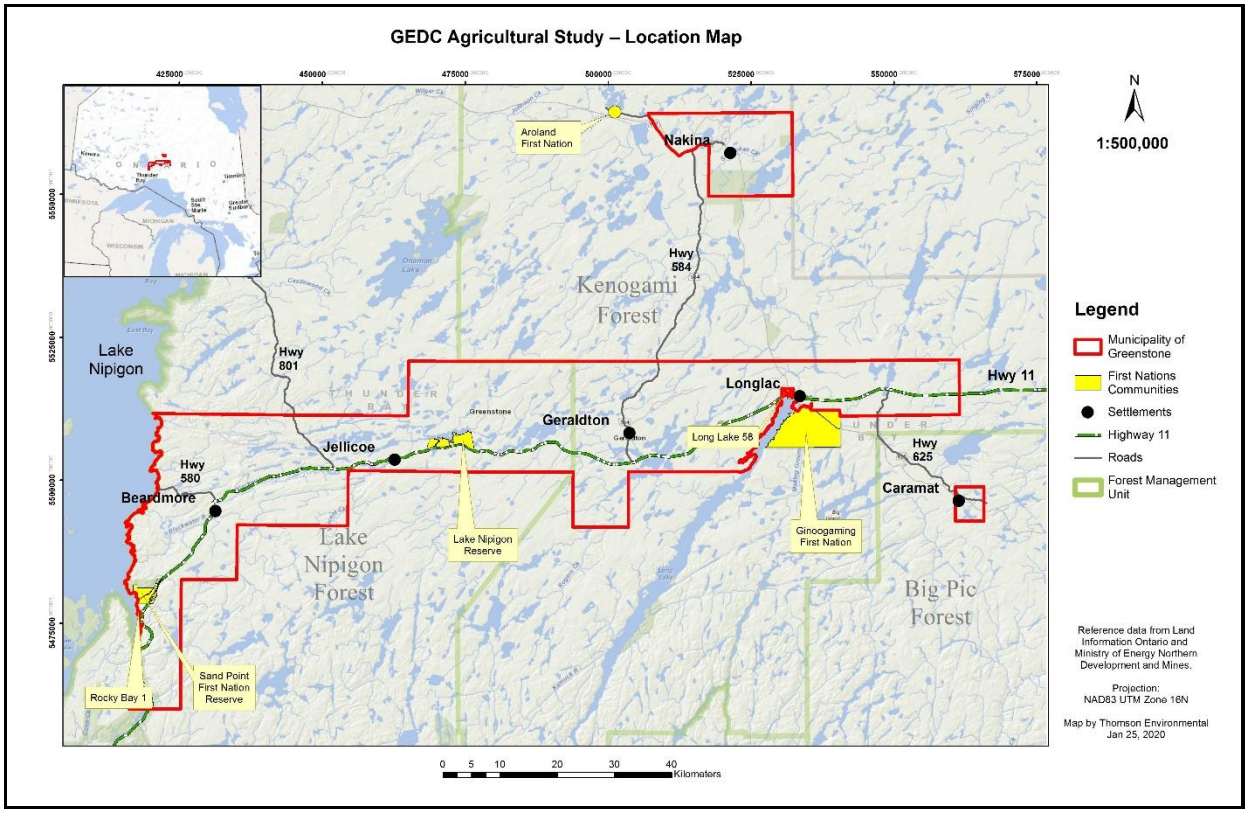

Figure 3. Location Map, GEDC Preliminary Agricultural Study.

HISTORICAL SETTING

Agricultural activities in NWO were practiced by Indigenous groups and settlers since the mid-1700's. They generally depended for their sustenance on hunting, trapping, fishing, gathering and some small-scale farming of root crops such as potatoes (Kuhlberg 2016). During the first half of the 20th Century, the 'typical' agricultural operation found in Northern Ontario consisted of cutting timber in the bush during the fall and winter, and operating small farms during the warm summer months. The agricultural operations would grow a self-sufficient supply of foodstuffs, mostly root vegetables and raise feed crops to support very small herds of livestock and draught horses (Kuhlberg 2016).

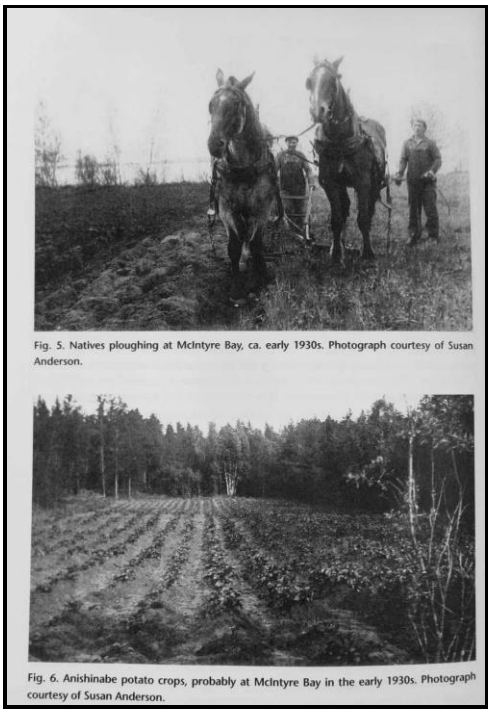

Fig. 5. Natives ploughing at McIntyre Bay, ca. early 1930s. Photograph courtesy of Susan Anderson.

Fig. 6. Anishinabe potato crops, probably at McIntyre Bay in the early 1930s. Photograph courtesy of Susan Anderson.

Fig. 8. Lumber sawn and piled to dry by Natives at McIntyre Bay, ca. mid-1930s. Photograph courtesy of Susan Anderson.

Figure 4. Farming and timber processing operations in the 1930's, McIntyre Bay Reserve (Kuhlberg 2016)

One of the first successful 'local' examples of this type of operation, initiated in the 1930's by 'Indian Agent' J. G. Burk of the Federal Department of Indian Affairs, was located along the southern shore of Lake Nipigon in the Grand Bay area. The Indigenous people of the McIntyre Bay Reserve from roughly 1931 to 1947, conducted a successful logging, timber cutting, commercial fishery and farming operation in this area (Figure 4). Homes were built from wood harvested on the

reserve and the surplus was used to supply local businesses manufacturing fish boxes, snowshoes, canoes and wooden boats. Most of these operations ceased when the local timber supply was exhausted (Kuhlberg, 2016). However, this example demonstrates that the successful growth and cultivation of root vegetables can occur in certain areas (relatively flat terrain hosting favorable soils) within the Boreal Forest of Northwestern Ontario.

Figure 5. 'Clay Belt' Area across Northeastern Ontario and Northern Quebec (virtualmuseum.ca)

A prime example of farming operations over a large area within the Boreal Forest, can be found in the 'Clay Belt' of Northeastern Ontario underlying the communities of Hearst, Kapuskasing, Timmins, Cochrane and New Liskeard (Figures 5 and 6). This unusually large flat and fertile area within the Canadian Shield, formed from glacial lake deposits (known as glaciolacustrine sediments), has been farmed since 1917 when settlement began near the end of World War

I. The original settlers during this period found the conditions for crop growth somewhat limiting due to the long cold winters and unpredictable rainfall during the short growing season. However, many farms persevered and managed to grow some grains (mostly oats), vegetables and raise cattle (Wikipedia, Clay Belt, 2020).

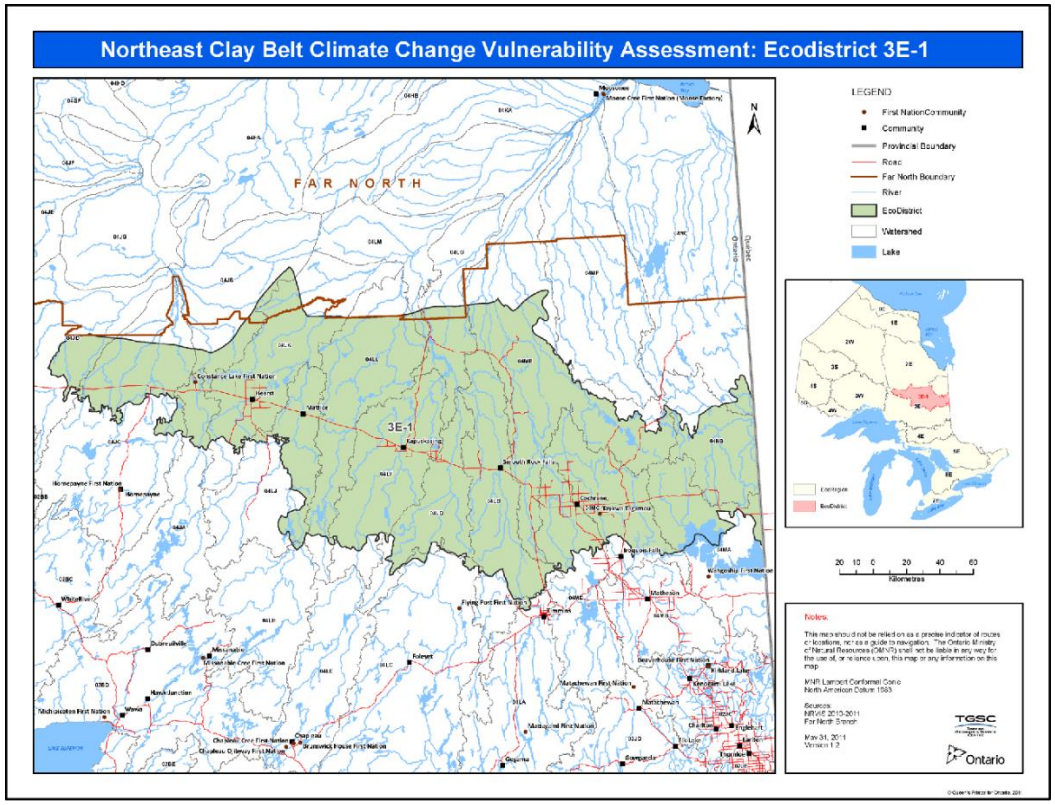

Figure 6. Detailed Map of the 'Clay Belt' region in Northeastern Ontario (MNRF 2011).

Until recently, farming in the clay belt area had been on the decline. Climate change, bringing with it a potentially longer, warmer growing season, combined with new genetically adapted northern crop varieties, has attracted young farmers to the clay belt. Although land prices have risen over the past 10 years in this area due to increasing demand, lots are still considerably cheaper than those found in southern Ontario. The Government of Ontario is also considering the release of additional crown land for farm production (White 2019).

MODERN AGRICULTURE IN NORTHWESTERN ONTARIO

The Boreal Forest in Northwestern Ontario (NWO), and elsewhere in Canada, has always been an important source of food and medicine since Indigenous people first arrived as the glaciers retreated 9,000-10,000 years ago. Northwestern Ontario encompasses an area of 526,417 Km^2 (representing 57.9% of Ontario's land area) and today (2020) hosts a total population of just under 232,000 people which includes 88 First Nation communities (Ojibway, Cree and OjiCree tribes) (Nelson et al. 2019). People utilize local foods like wild blueberries, as a source of nutrition and food security while building connections to land and a respect for nature (Nelson et al. 2019). The plants added essential vitamins and nutrients to their predominantly meat-based diet. In addition to fish and game, many Indigenous communities still harvest a variety of plant foods including green vegetables, root vegetables, fruits, wild rice and other plants used for beverages, flavourings and medicinal treatments. Vitamin rich berries used to add flavour and sweetness to foods, include the bog lowbush blueberry, raspberry, Saskatoon berry, lingonberry, cloudberry, small cranberry, bearberry, rosehips and highbush cranberry (Tacorda 2012).

Considering the importance and current high demand for vitamins and natural medicinal supplements in todays society, a commercial operation involving the growing and harvesting of a combination of these boreal plant foods is worthy of further research. The harvesting of natural blueberry crops over recently burned areas of Northern Ontario by commercial operators, is a viable and lucrative business opportunity. As an example, if these growing conditions could be transferred to a large, controlled site, again in the right location, an economic opportunity may be realized.

Northwestern Ontario is bounded by key landscape features, including the province of Manitoba to the west, Hudson Bay to the north, Lake Superior to the south, and the irregular eastern boundary of James Bay, the Albany River and then south to the municipality of White River. The landform features are primarily of glacial origin circa 9 – 10,000 years ago. This includes the vast waterways that flow north to Hudson Bay or south to Lake Superior, the largest

surface area of fresh water in the world. Scattered rich deposits of clay (smaller versions of the previously discussed northeastern 'Clay Belt') laid down by glacial streams and lakes support grain and vegetable production, as well as notable lush pastures for animal production. Northwestern Ontario features areas with Agriculture Soil Classed 2 to 4 soils that are suitable for sustained production of common field crops (Natural Resources Canada 1969, Nelson et al. 2019).

For food production, climate change is expected to have major implications for the length of the growing season, the variety of crops grown, as well as grain yields in Northern Ontario. It is predicted that by mid-century (2050) climate change will increase growing times in Northern Ontario by 30-45 days, pointing to emerging growing opportunities and challenges due to earlier springs and later falls (Qian et al. 2005, Cummings 2009, Nelson et al. 2019).

Younger families moving into the rural areas of Northern Ontario are concerned about locally sustainable food production and are part of a growing 'natural food' trend and increased presence of Farmer's Markets across the province. The relatively recent success of new specialty farms (vegetables, malting grains, dairy and beef products) in the Slate River Valley south of Thunder Bay, combined with the regional popularity of the Thunder Bay Country Market (now open all year round), is part of this food trend. It is also important to discuss the success and growth of the Dryden-based Cloverbelt Local Food Co-op (CLFC) since its inception in 2013, the first online food co-op in NWO. It has grown from its original 85 members in Dryden to a current membership (2018) of over 1,700 in ten communities across NWO (Streutker et al. 2017, Nelson et al. 2019) (Figure 7).

Food security has always been an issue in the 'north', especially among First Nation communities and more isolated centers. Food cooperatives such as the CLFC, have proven to be a highly adaptable, successful pathway to overcoming this lack of food security. It brings together independent agents – consumers, suppliers, producers and processors – into an interdependent non-competitive, non-profit business network. CLFC operates primarily as an online food co-op where members can buy and sell local products, but it is also involved in a

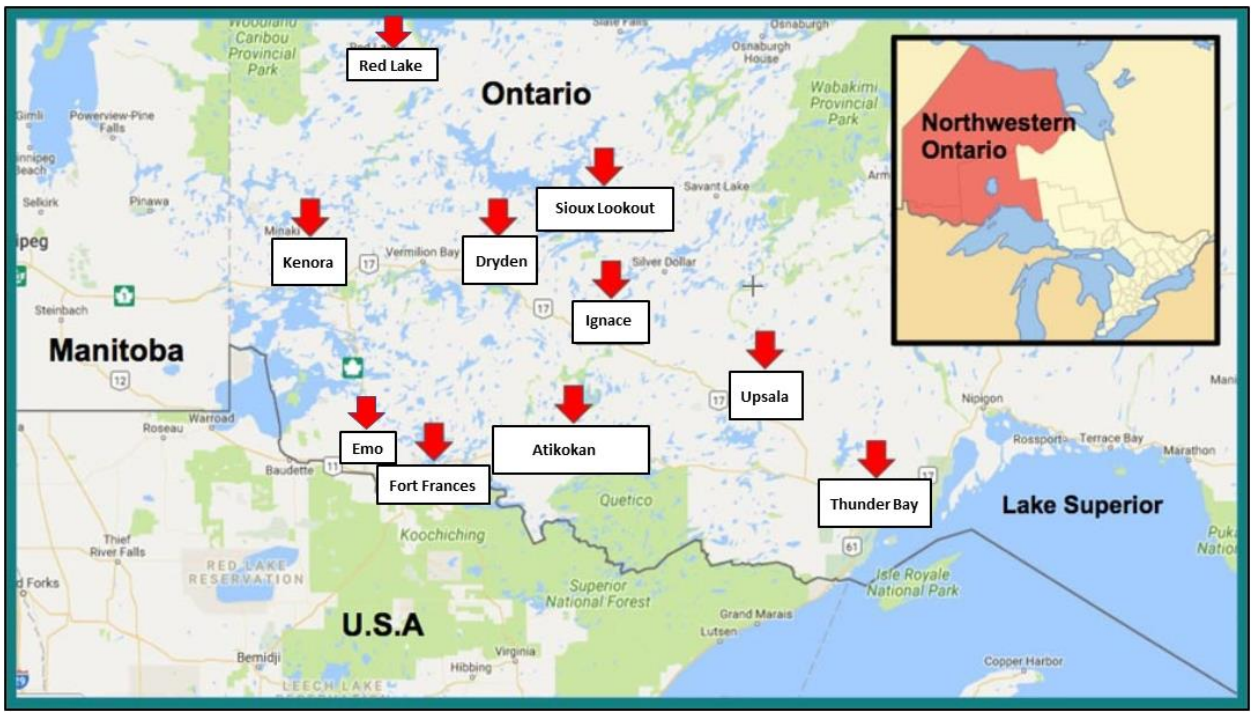

Figure 7. Cloverbelt Local Food Co-op, Distribution Hubs in Northwestern Ontario (Streutker et al. 2017)

number of other activities intended to "foster a thriving local food community" across NWO (Figure 8). These activities include making local food more accessible, promoting relationships between farmers and consumers, and educating community members about the benefits of eating healthy, local foods. The co-op model promotes an environment where food producers share their resources and capital versus competing against one another (Streutker et al. 2017).

To support the collaboration of producers and processors, the CLFC initiated a Regional Food Mapping and Distribution Project which pinpoints the locations of local food contributors in NWO on an interactive online map. This includes producers, distribution centres, processing facilities, and restaurants serving local food, along with a description and contact information. Having all this information on one site allows consumers to know exactly where their food comes from and tells producers which restaurants they might sell their products to, as well as other producers with whom they might share transport, storage, or equipment. New producers or those looking to expand their production can use the map to identify what types of products are not currently available and the location of potential markets (Streutker et al. 2017).

The development of the CLFC community greenhouse in Dryden (2015) has also been a valuable resource for the co-op in terms of both education and research. It has added to the amount and diversity of food that the co-op produces and lengthens the growing season, an advantage in cool northern climates. The greenhouse also acts as a visible structure for the CLFC and local food production, as well as an education center for teaching events and workshops (Streutker et al. 2017).

Figure 8. Cloverbelt Local Food Co-op in Northwestern Ontario, Promotional Poster (CBC News 2018)

Finally, the CLFC is attempting to establish additional food distribution hubs in more communities, especially fly-in First Nation communities. Providing these communities with fresh food from the Northern Ontario area would help to

address health issues including high rates of diabetes and heart disease. However, the cost of transporting fresh food via airplane is a major impediment to this goal. Assisting the First Nation people with the development of their own on-site greenhouse facilities leading to the larger scale cultivation of local food crops is ongoing. The Boreal Garden Project initiated by the North Caribou Lake First Nation (north of Pickle Lake) in 2016, is a successful example of an isolated community supplementing their diet with locally grown fresh produce. These are the types of projects being fostered by the CLFC along with grants from the NAN Community Food Initiative (Bohunicky 2018).

A recent addition to the 'local food network' in NWO was the 2019 upgrading and modernization of the Cloverbelt Country Meats Cooperative's abattoir, located just west of Dryden, Ontario. Improvements included adding new equipment for slaughter, processing, value-added production, storage and packaging, helping the facility to increase its capacity. The not-for-profit facility in Oxdrift provides an essential service to local farmers, First Nations, communities, hunters and tourist outfitters alike to process their beef, bison, pork, poultry, lamb and elk, as well as moose and deer when in season. The cooperative is also now attracting a number of livestock producers from Thunder Bay where there is no facility to butcher poultry. It is also accommodating any beef or pork overflow as the need arises. In addition, the co-op is processing a growing number of animals from Kenora (Government of Canada FedNor Website Article 2020).

Other successful ventures were documented as part of a case study released in 2017, which examined four blueberry foraging initiatives in Northwestern Ontario (Figures 9 and 10). The first describes the Aroland Youth Blueberry Initiative (AYBI), where community members harvest and sell blueberries to support programs for youth in the community. The second initiative highlights Arthur Shupe Wild Foods, a commercial operation which sells blueberries through the Dryden Cloverbelt Local Food Co-op. A third initiative, the Nipigon Blueberry Blast festival, provides opportunities for individuals to pick their own blueberries and participate in a variety of other activities. The fourth initiative documents the Algoma Highlands Wild Blueberry Farm and Winery in the Wawa area, which is the first and only privately owned commercial blueberry farm in Northern Ontario (Stolz et al. 2017).

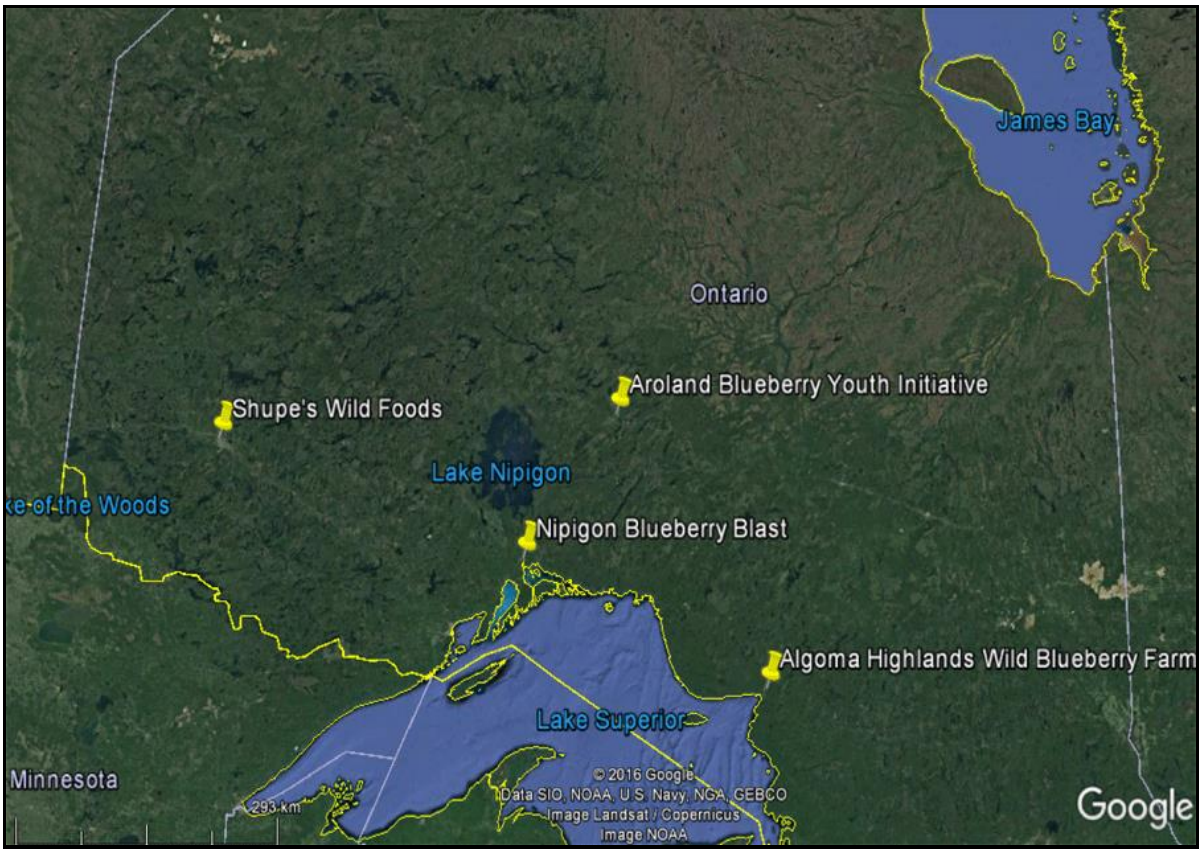

Figure 9. Map of the four Blueberry Initiatives IN Northern Ontario (Google Earth 2020)

Figure 10. Blueberry Initiatives Highlighting Economic Opportunities in Northern Ontario (2017)

'Local' food-led projects and related business networks, such as those discussed here, provide examples and direction for the Municipality of Greenstone (MOG) to develop its own business-related models, whether they are based on local food sustainability, moving products outside the region on a profit-based system or a combination of both initiatives.

HISTORICAL AGRICULTURAL SITES
MUNICIPALITY OF GREENSTONE

There are several identified historical agricultural sites in the Greenstone area, which are confined to the eastern portion of the municipality (Figure 11). The area immediately north of the Geraldton townsite hosted a collection of small farm sites, including a larger multi-field potato farm and a smaller strawberry growing operation just north of the pipeline (Figure 12). To the east in the

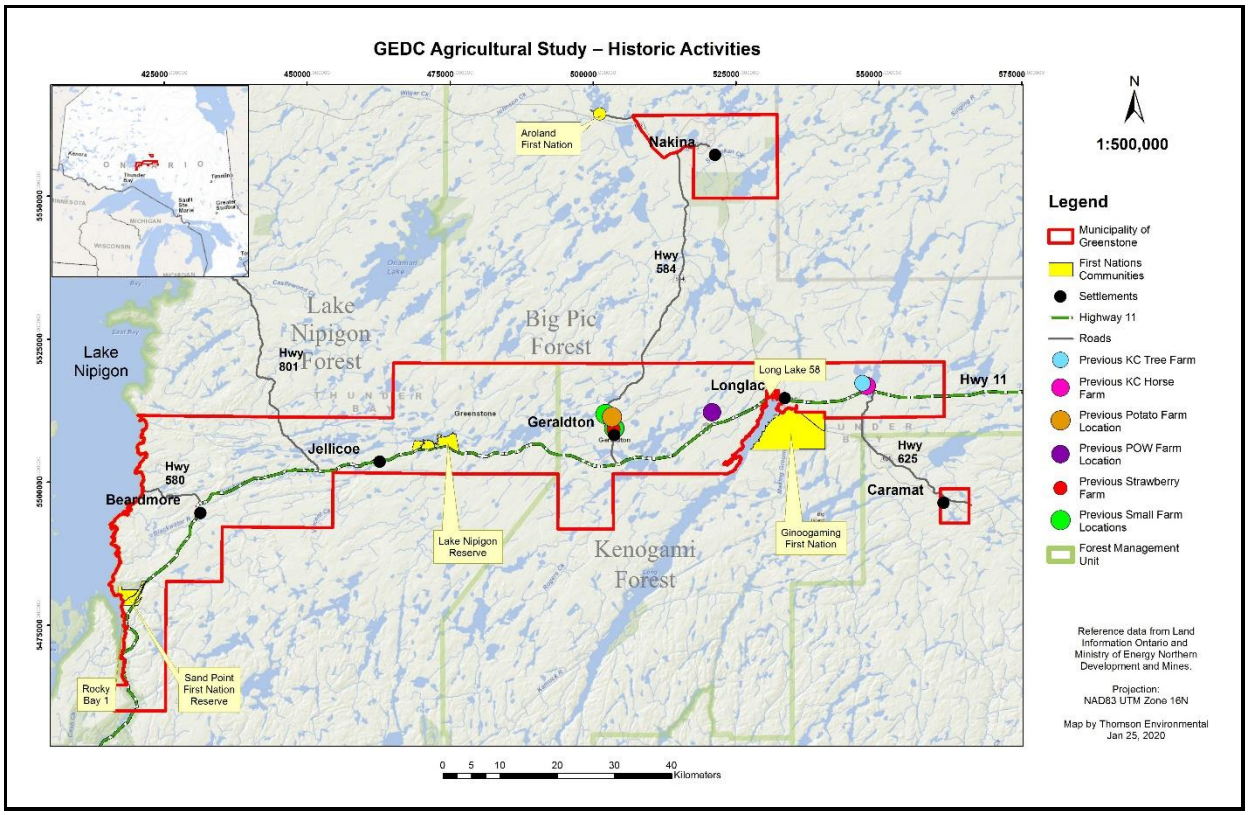

Figure 11. Historic Activities in the MOG, GEDC Preliminary Agricultural Study.

Caramat area, Kimberley Clark had developed an extensive tree and horse farm north of the junction of Highways 11 and 625 (Figure 15). In addition, there appears to be evidence from satellite imagery, of a large, cultivated field associated with a WW II prison farm located north of Highway 11 between Geraldton and Longlac (Figures 18 and 19). The existence of these historic sites was primarily obtained through interviews conducted with current and former Ontario Ministry of Natural Resources and Forestry, Geraldton District

employees. Further preliminary research did not identify additional sites. However, a detailed study of historical files, including tax records, at the Municipality office in Geraldton, might assist in identifying other sites associated with past agricultural activities in the MOG.

A very preliminary field assessment of each of the known historical sites was conducted by the author in September of 2020. The key information has been summarized and documented as follows.

Geraldton North Sites

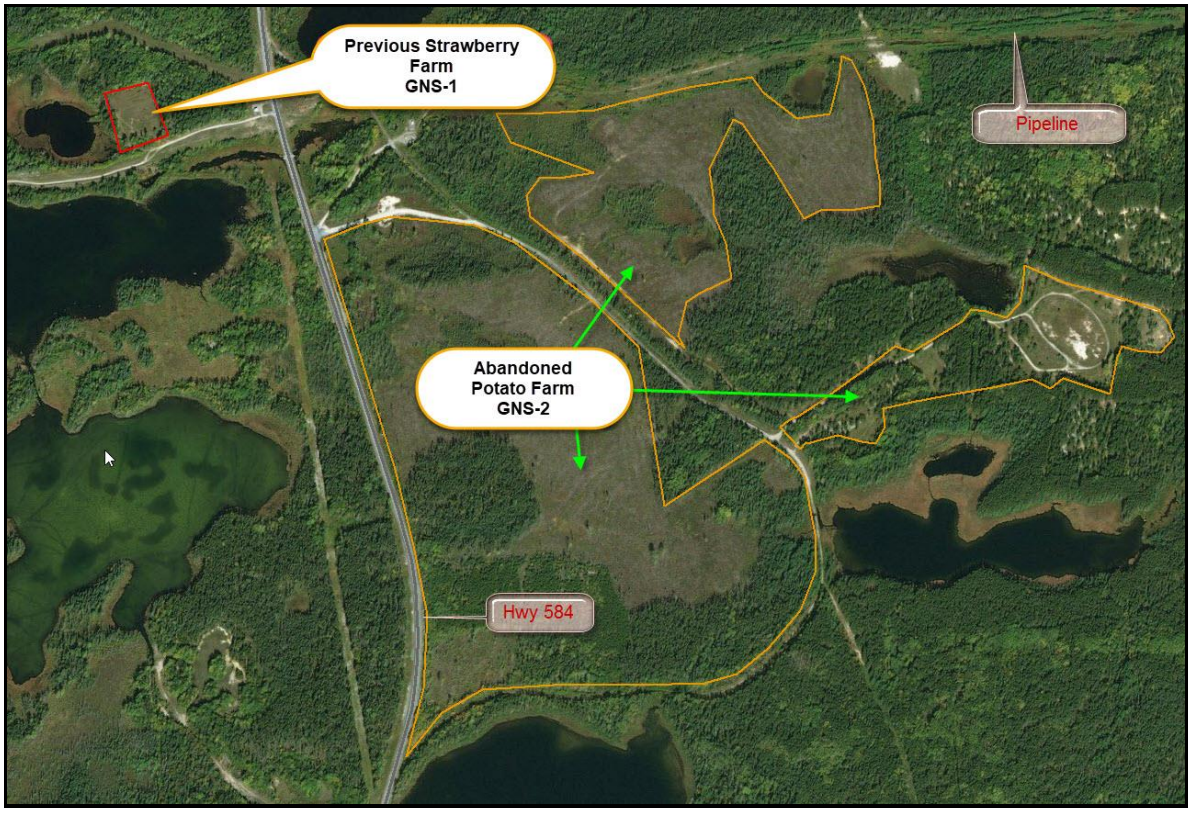

Figure 12. Satellite Image, Historic Potato and Strawberry Farm sites North of Geraldton (Google Earth 2020)

GNS-1 (Strawberry Farm) (Figure 13):

- **GPS location – UTM Zone 16, 502161E, 5511862N**
- **Topography: Very flat, well-drained area approximately 100 m x 100 m**
- **Soil type: Fine sand and clay**

GNS-2 (Potato Farm Area) (Figure 14):

- **Consists of 3 irregular shaped blocks – northeast, west and east**
- **GPS location (largest west block) – UTM Zone 16, 502996E, 5511539N**
- **Topography: flat low-lying terrain, overall a less well-drained area specific to the northeast and west blocks. The eastern portion of the east block is higher and dryer, dominated by fine sand.**
- **Soil type: fine sand, minor clay**

Figure 13. Photo of Site GNS-1, former Strawberry Farm North of Geraldton (2020)

Figure 14. Photos of Site GNS-2, former Potato Farm Lots north of Geraldton (2020)

East Longlac Sites

Figure 15. Satellite Image of the Historic Kimberly-Clark Tree and Horse Farms east of Longlac (Google Earth 2020)

ELS-1 (abandoned Kimberly-Clark Horse Farm) (Figure 16):

- **GPS location – UTM Zone 16, 548075E, 5516804N**
- **Topography – Flat, well-drained area**
- **Soil type – sand, silt and clay**

ELS-2 (abandoned Kimberly-Clark Tree Farm) (Figure 17):

- **GPS location – UTM Zone 16, 547469E, 5517404N**
- **Topography – Flat, well-drained area**
- **Soil type – Fine gravel and sand to silty-clay**

Figure 16. Photo of Site ELS-1, Former Kimberly-Clark Horse Farm (2020)

Figure 17. Photos of Site ELS-2, Abandoned Kimberly-Clark Tree Farm Lots (2020)

PFS-1 (World War II Prison Farm)

Figure 18. Satellite Image, Access to WW11 Prison Farm East of Geraldton (Google Earth 2020)

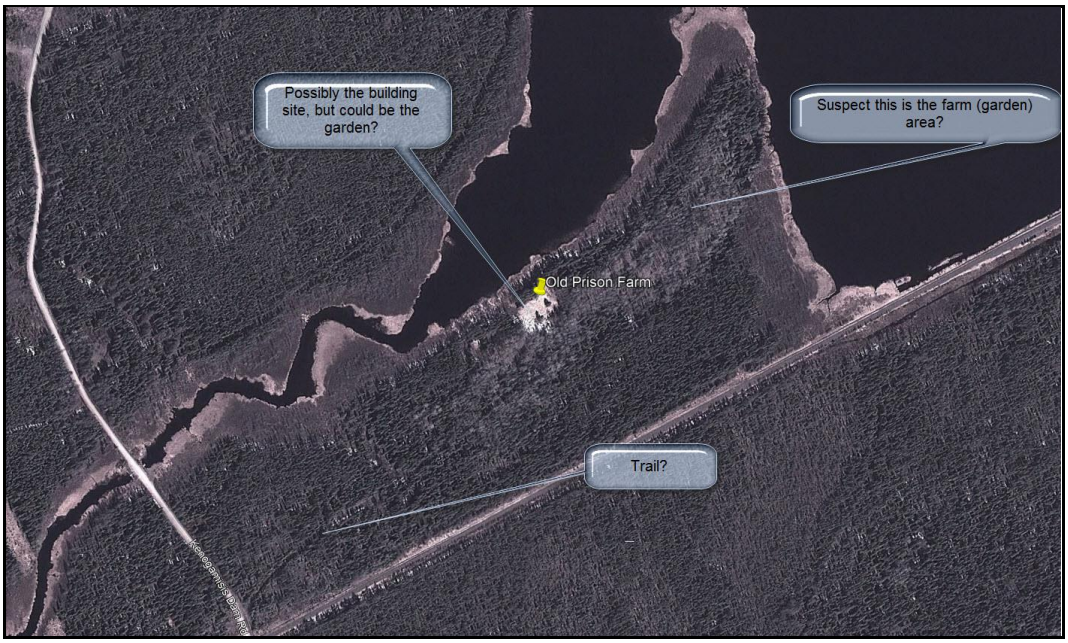

Figure 19. Satellite Image, Location Details, WWII Prison Farm East of Geraldton (Google Earth 2020)

The World War II Prison Farm site is located along the southwestern shore of Octopus Lake north of Highway 11 between Geraldton and Longlac (Figures 18 and 19). Access is via the Kenogamisis Dam Road north for approximately 2 km and east for 1 km along an old trail to the site. East of the prison facility and along the northern peninsula, there appears to have been a large farm (garden) area. This site was not visited by the author since access is limited by a locked gate approximately 700 m north of Highway 11. The road provides access to the dam site on Kenogamisis Lake and permission must obtained from the MNRF in Geraldton to enter this area.

POTENTIAL AGRICULTURAL SITES
MUNICIPALITY OF GREENSTONE

The identification of suitable sites (the optimum soil type and topography close to transportation corridors) where agricultural operations could be initiated in the Greenstone area, is one of the main objectives of this study. All 3 of the areas discussed previously – the clay belt in Northeastern Ontario, the Slate River-Shabaqua area surrounding Thunder Bay and the Dryden-Vermillion Bay area – overlie glaciolacustrine sediments composed mainly of silty-clay and minor sand (Barnett et al. 1991). Surficial geology data identifying these types of sediments, was captured for a portion of the MOG from the Ontario Ministry of Energy, Northern Development and Mines (Map 2535, Kristjansson and Thorleifson 1991) and used to assist in the selection of suitable agricultural sites (Figure 20). Various additional data sets from the Ontario Ministry of Natural Resources and Forestry (MNRF) were also researched and captured for the Greenstone area to further refine the selection process. This information included primary soil material, soil texture, soil depth, soil moisture and ecosite classification data from Land Information Ontario (MNRF database). Map representations of each of these databases 'clipped' to the Greenstone area are provided in this review (see Figures 21 to 26).

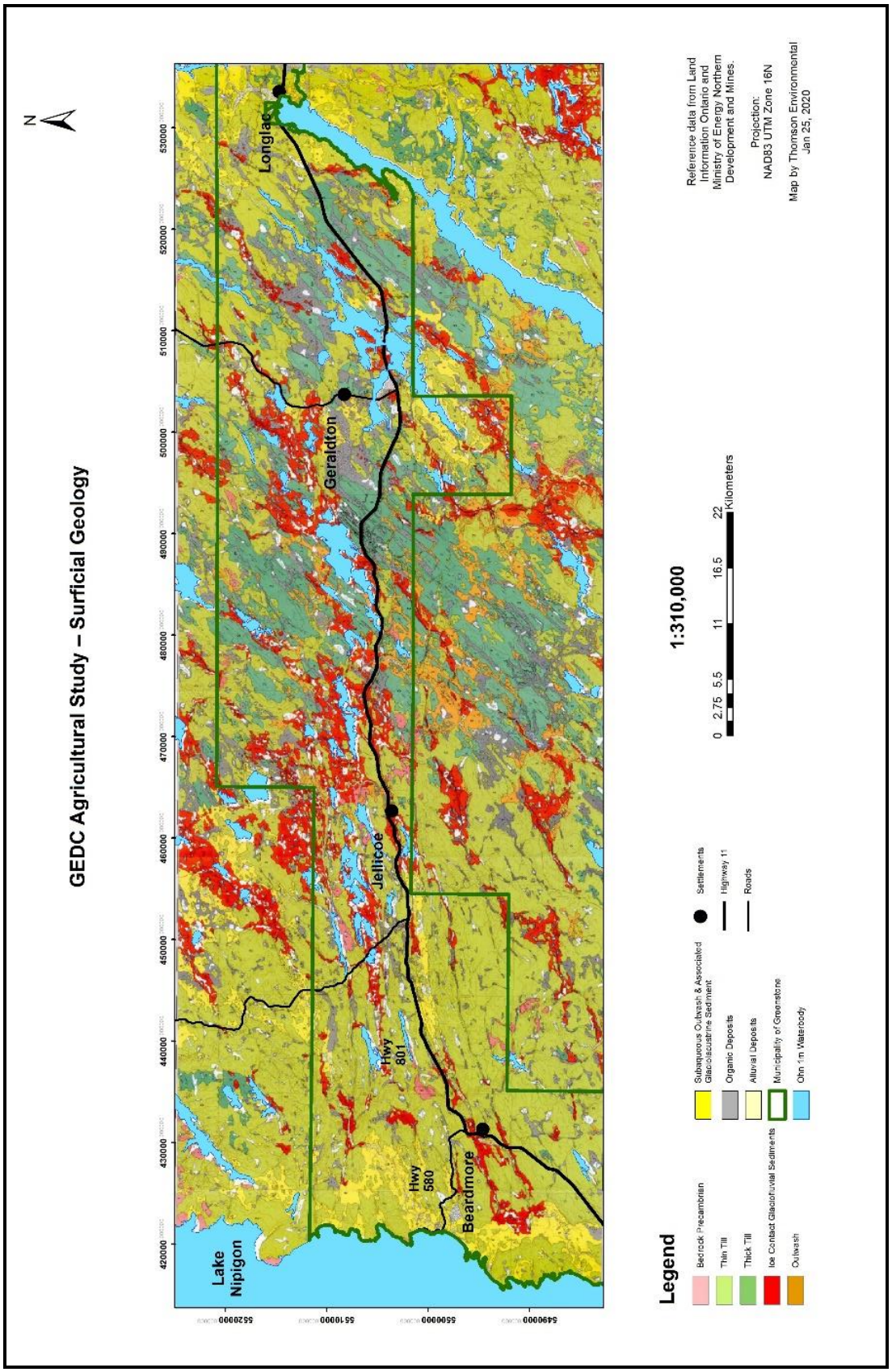

Figure 20. Surficial Geology Map, Greenstone Area (from OGS Map 2535, Kristjansson and Thorleifson 1991)

Analysis and identification of the most favorable attributes for potential agricultural development from each of these maps or data sets, has resulted in the selection of 4 site areas within the MOG. Field examinations of 2 areas identified in this initial study, located east of Longlac and north of Geraldton, were conducted during the fall of 2020. These sites are described below. Detailed analysis and field work as part of the Stage 2 project using the enhanced forest resources inventory data (MNRF release date 2022), will further refine and very likely add to the presented inventory of suitable sites identified in this report. Each site should be examined and considered for its accessibility (close to highway corridors), topography (elevation changes and drainage) and cultural availability (land status and existing structures). The comprehensive follow-up report should include a complete description of each of the candidate sites for potential use as arable land.

As indicated, this 'Preliminary Agricultural Study' is the first stage in the development of an agricultural 'program' for the MOG. The second stage, in addition to the general site assessments discussed, would involve detailed groundwork including soil analysis, suitable agricultural uses, site designs and required infrastructure, among other considerations.

AREAS IDENTIFIED FOR POTENTIAL AGRICULTURAL ACTIVITIES, MOG

Four areas were identified as part of this initial study using current (2020) available data from the ENDM and MNRF (Figures 20 through 26), as previously described:

1. **North Geraldton Area – Highway 584**
2. **East Longlac-Caramat Area – Highway 11 - 625 Junction**
3. **West Nakina-Aroland Area – Highway 643**
4. **West Jellicoe Area – Highway 11 - 801 Junction**

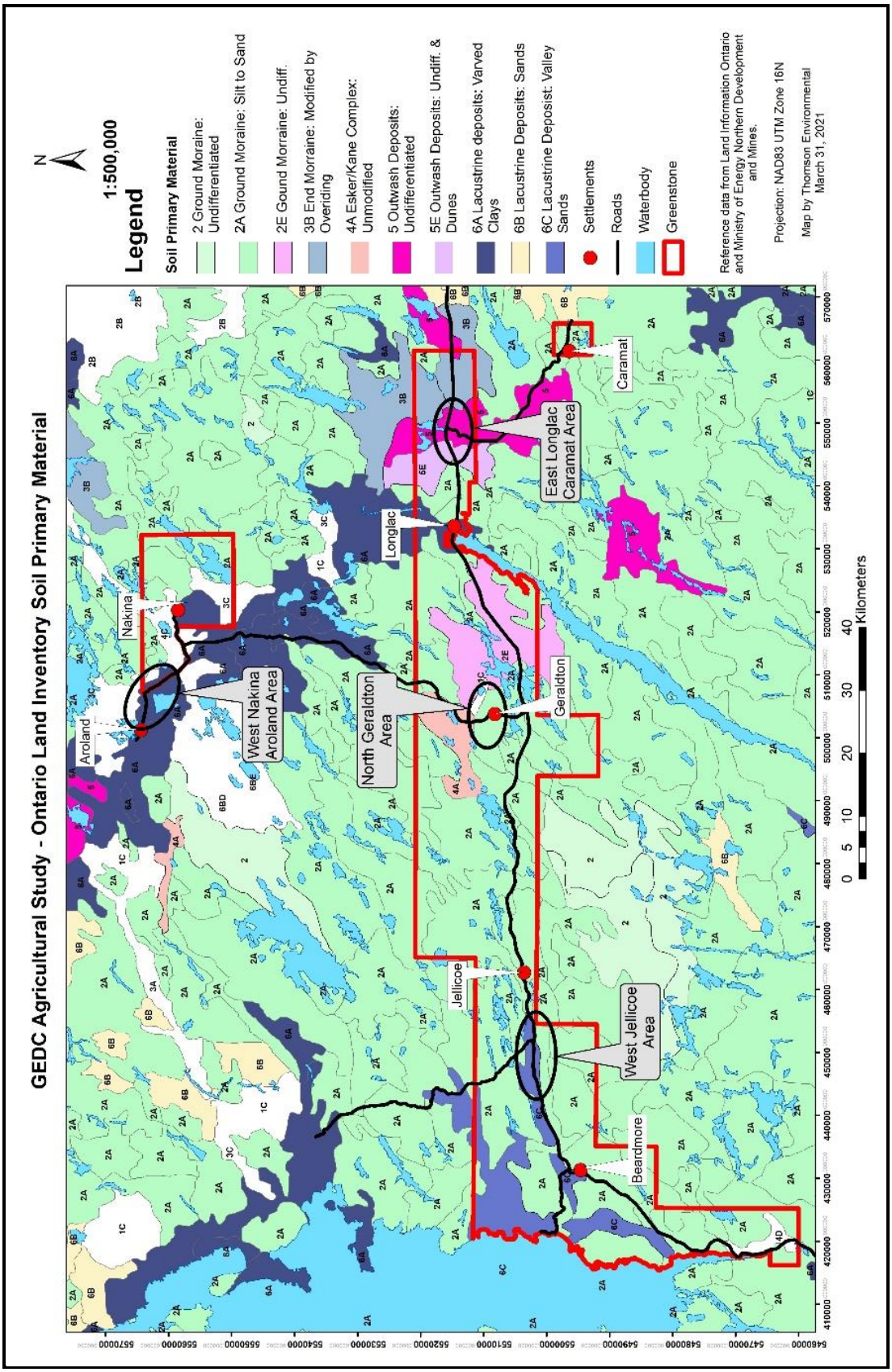

Figure 21. Soil Parent Material, Greenstone Area (MNRF)

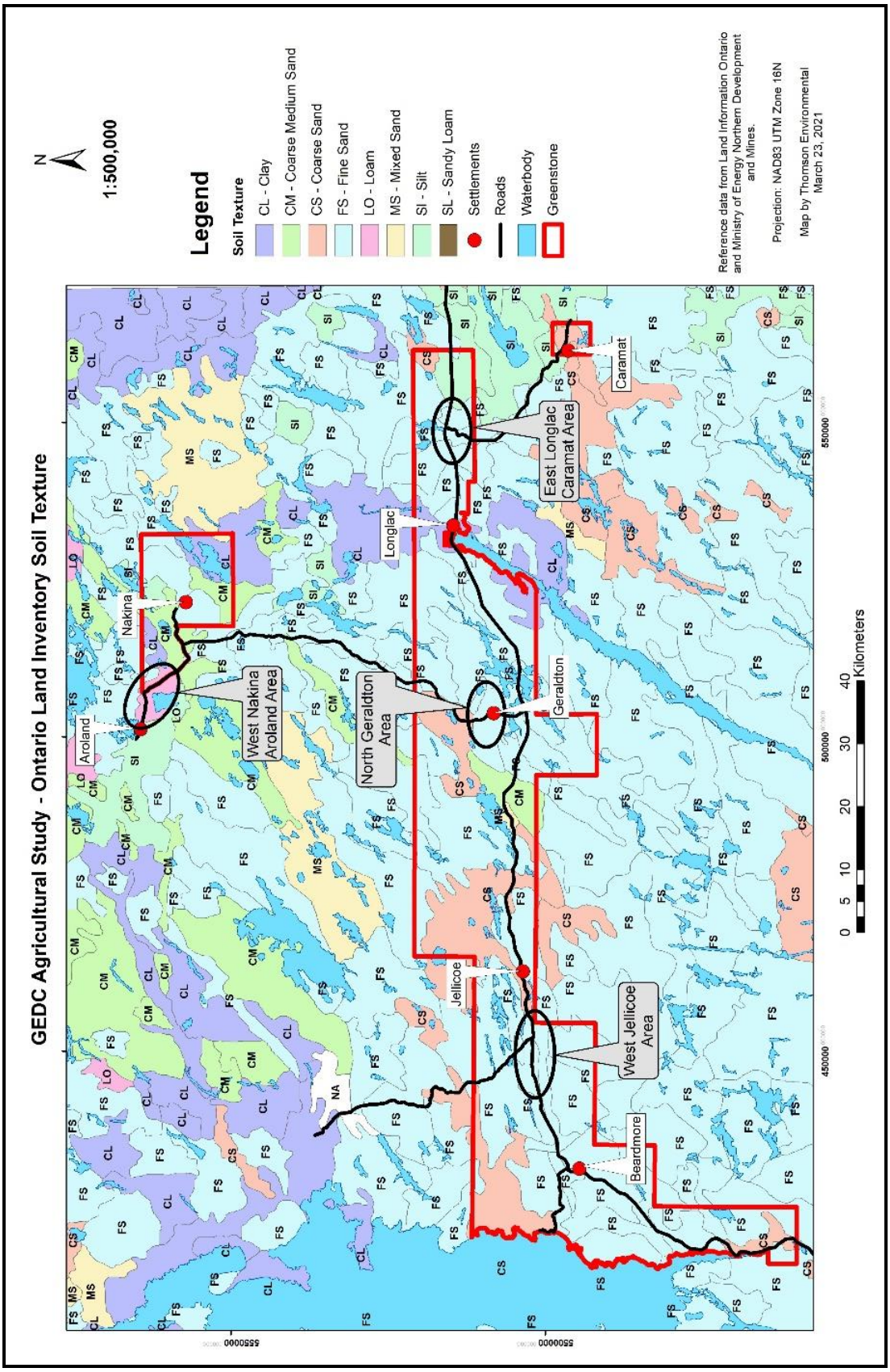

Figure 22. Soil Texture, Greenstone Area (MNRF)

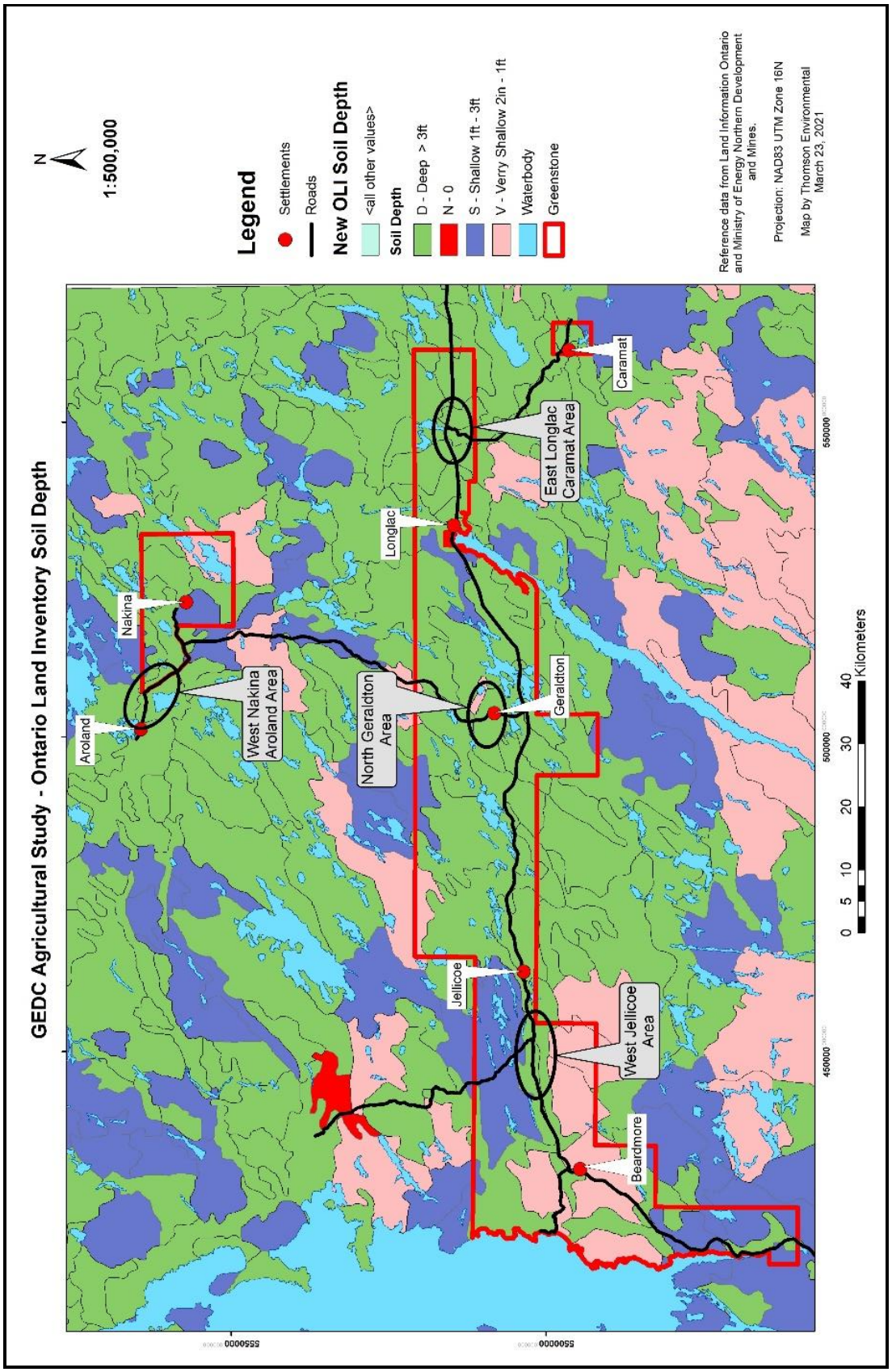

Figure 23. Soil Depth, Greenstone Area (MNRF)

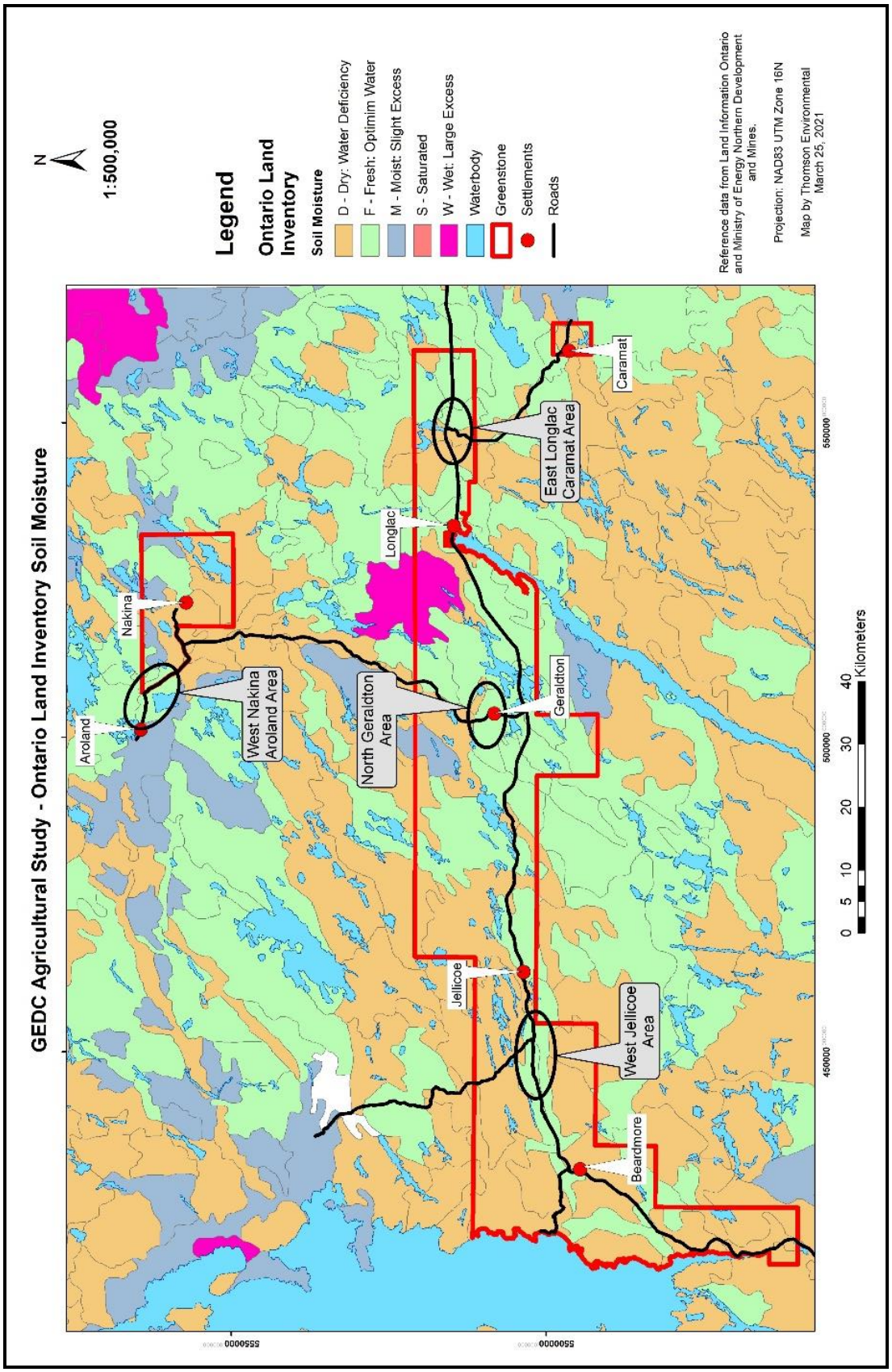

Figure 24. Soil Moisture, Greenstone Area (MNRF)

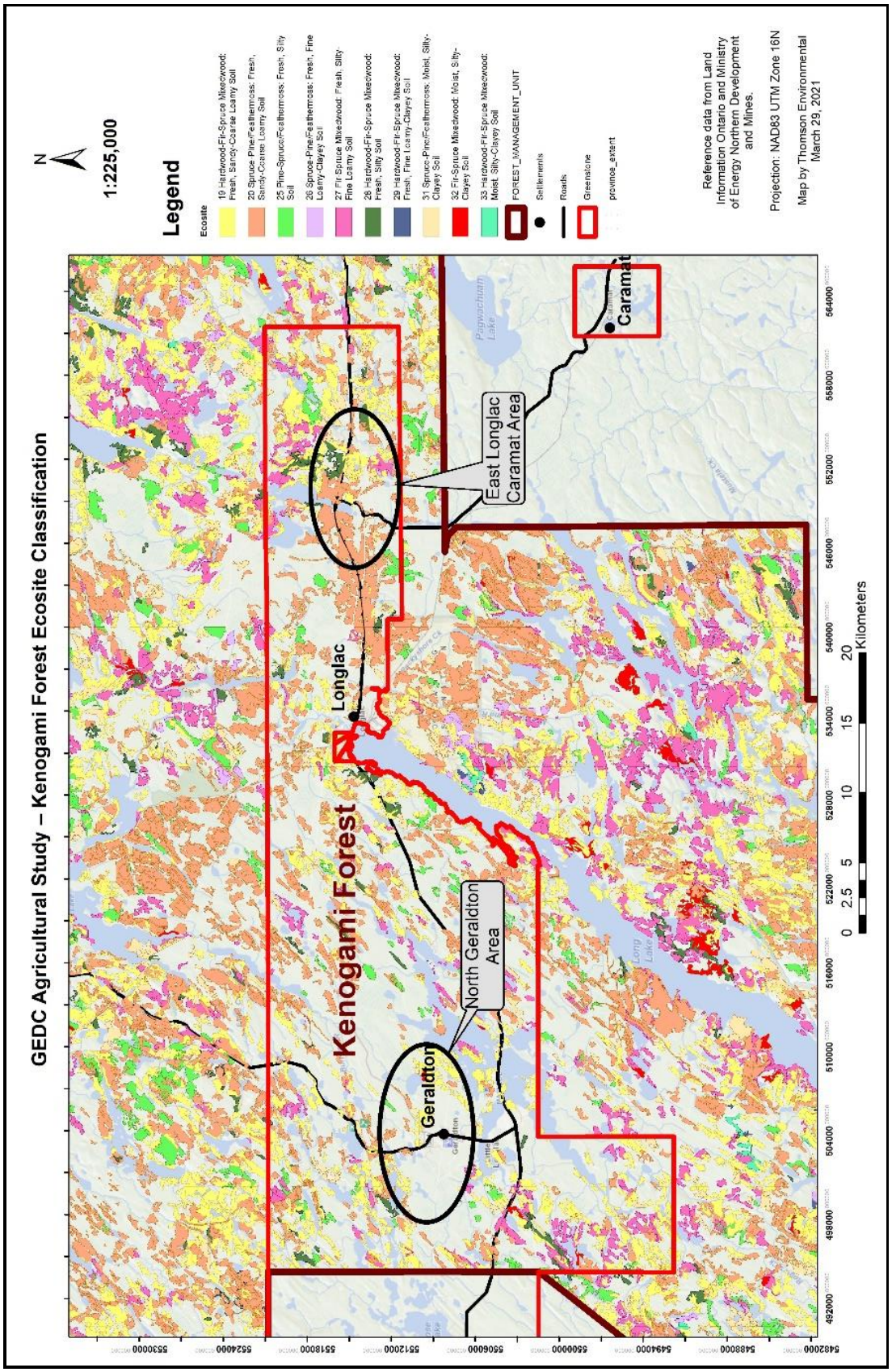

Figure 25. Ecosite Classification for the Kenogami Forest, Geraldton-Longlac-Caramat Area (MNRF)

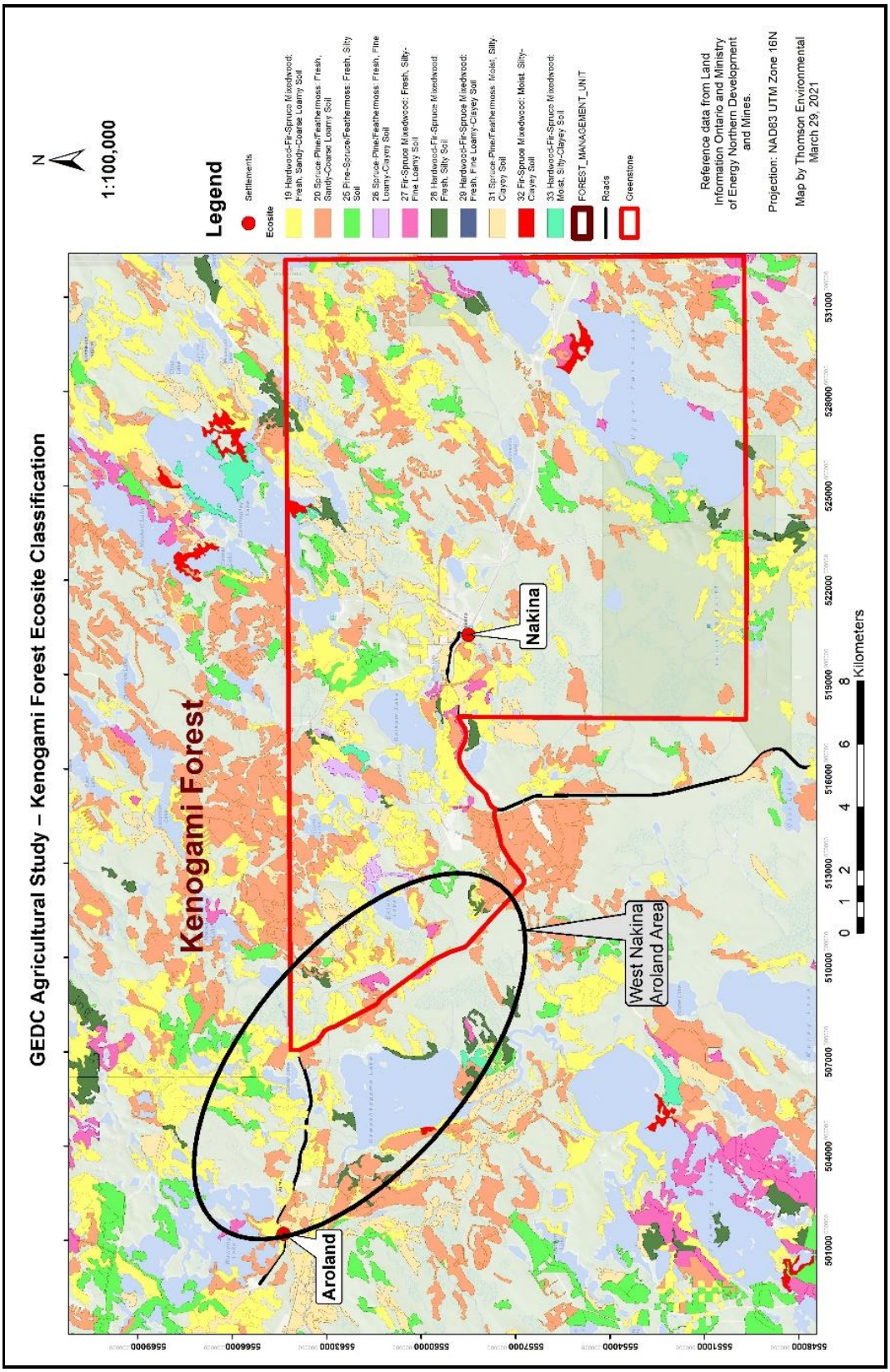

Figure 26. Ecosite Classification for the Kenogami Forest, West Nakina-Aroland Area (MNRF)

SITE EXAMINATIONS

1. North Geraldton Area – Highway 584

This area has been previously discussed and documented under Historical Agricultural Sites (the Potato and Strawberry farm fields). The key reasons for selecting this area as a potential agricultural site are provided as follows:

- **History of past agricultural development**
- **Proximity to the town of Geraldton**
- **Low topographic relief i.e., relatively flat**
- **Land Inventory maps indicate deeper (>0.90 m) sandy-silty soil with minor clay (identified from field observations) and optimum water supply (Figures 21 to 25)**

2. East Longlac-Caramat Area – Highway 11-625 Junction

Four sites were visited in this area during the fall of 2020 and are documented below (Figures 27 to 31). This area also incudes the previously discussed historical sites covering the extensive Kimberly-Clark Tree Farm lots and Horse Farm just west of the four sites examined.

The key reasons for selecting this area as a potential agricultural site are provided as follows:

- **History of past agricultural development (Tree and Horse farms)**
- **Proximity to Highway 11 and Caramat Highway 625**
- **Low topographic relief i.e., relatively flat**
- **Clear-cut area from 'recent' (past 10 to 15 years) logging activities**
- **Land Inventory maps indicate deeper (>0.90 m) silty-sandy loamy soil (Figures 21 to 23, 25) and optimum water content (Figure 24)**

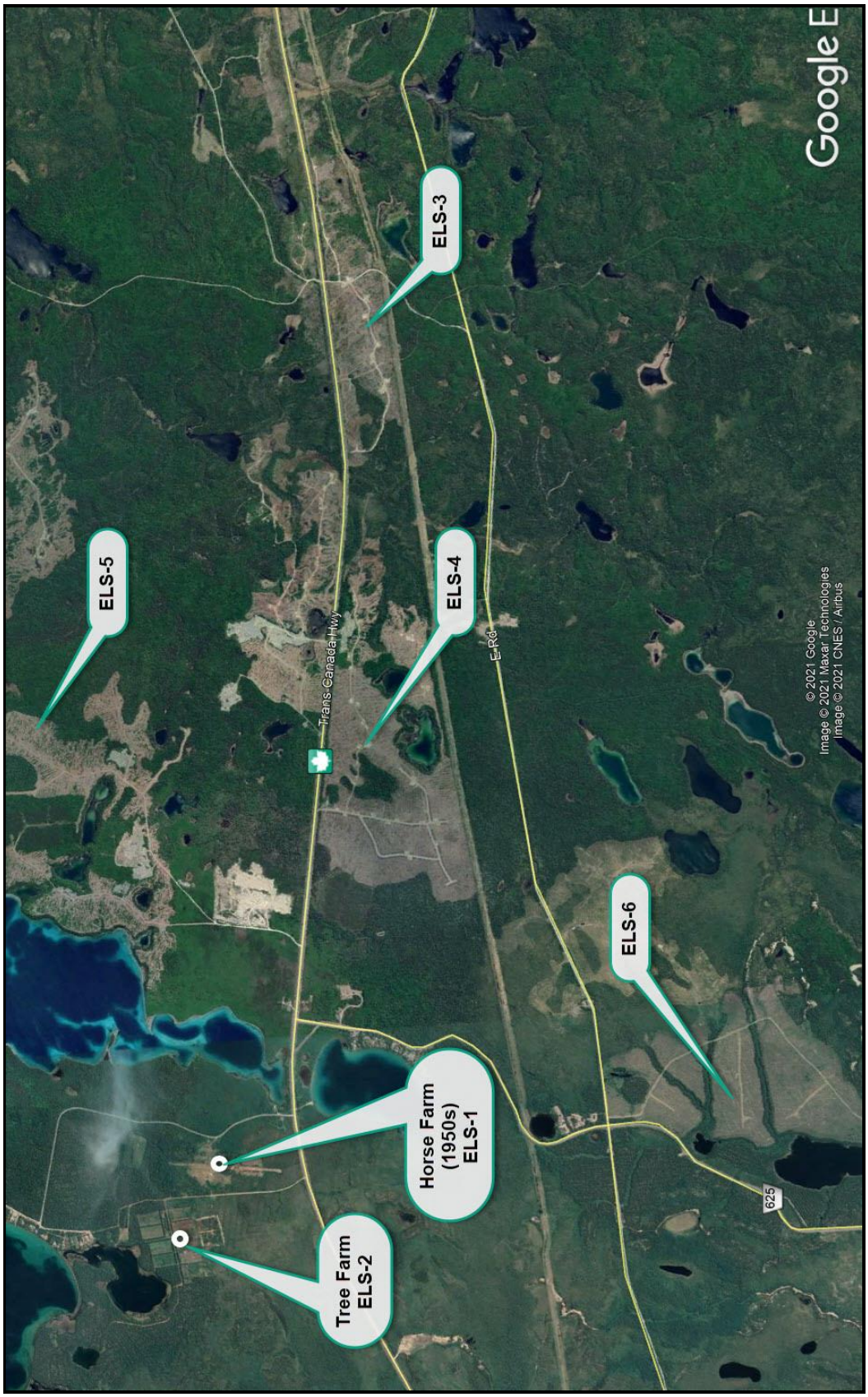

Figure 27. East Longlac-Caramat Area, Potential Sites (ELS-3 to ELS-6) (Google Earth 2020)

ELS-3 (South of Hwy 11, east of Caramat Hwy 625):

- **GPS location – UTM Zone 16, 555308E, 5514494N**
- **Topography – Elevated, rolling terrain**
- **Soil type – Fine sand and silt**

Figure 28. Photo of the East Longlac Area Site ELS-3, South of Hwy 11 and East of Caramat Hwy 625 (2020)

ELS-4 (South of Hwy 11, East of Caramat Hwy 625):

- **GPS location – UTM Zone 16, 550719E, 5514565N**
- **Topography – Flat, well-drained terrain**
- **Soil type – Sand to fine gravel**

Figure 29. East Longlac Area Site ELS-4, South of Hwy 11 and East of Caramat Hwy 625 (2020)

ELS-5 (North of Hwy 11, east of Hwy 625 Jct.):

- **GPS location – UTM Zone 16, 551936E, 5518434N**
- **Topography – Low rolling terrain**
- **Soil type – Sand to fine gravel**

Figure 30. East Longlac Area Site ELS-5, North of Hwy 11 and east of Caramat Hwy 625 (2020)

ELS-6 (East side of Caramat Hwy 625, south of Hwy 11):

- **GPS location – UTM Zone 16, 548737E, 5512108N**
- **Topography – Flat well-drained terrain**
- **Soil type – Fine sand, silt and minor clay**

Figure 31. East Longlac Area Site ELS-6, South of Hwy 11 along the east side of Caramat Hwy 625 (2020)

3. West Nakina-Aroland Area – Highway 643

The key reasons for selecting this area as a potential agricultural site are provided as follows:

- **Proximity to Highways 643 and 584**
- **Area lies between the communities of Nakina and Aroland**
- **Low topographic relief, i.e., relatively flat**
- **The Soil Texture (Figure 22) and Ecosite classification (Figure 26) maps indicate the presence of large areas of favorable Loamy soil at this site**

The Wikipedia (2020) definition indicates the importance of these soils to agricultural growth by stating, "Loam soils generally contain more nutrients, moisture, and humus than sandy soils and have better drainage and infiltration of water and air than silt and clay-rich soils".

- **Ontario Land Inventory maps also indicate the favorable primary soil source to be glacial-lacustrine (Figure 21) hosting soil depths > 0.9 m (Figure 23) and optimum water content (Figure 24).**

West Nakina-Aroland Area Site Description (57 km north on Nakina Hwy 584, 7 to 10 km northwest on Hwy 643, west side) (Figures 32 and 33):

- **GPS locations – UTM Zone 16, 509202E, 5560443N (WNA-1)**
  – UTM Zone 16, 509557E, 5560040N (WNA-2)
- **Topography – Flat to gently rolling terrain, well drained**
- **Soil type – very Fine sand to mostly silt and clay**

Figure 32. West Nakina-Aroland Site WNA-1, West along Hwy 643

Figure 33. West Nakina-Aroland Site WNA-2, West along Hwy 643

4. West Jellicoe Area – Highway 11 - 801 Junction

The key reasons for selecting this area as a potential agricultural site are provided as follows:

- **Proximity to Highway 11**
- **Area lies between Beardmore and Jellicoe**
- **Low topographic relief i.e., relatively flat**
- **Ontario Land Inventory maps also indicate the favorable primary soil source to be glacial-lacustrine hosting fine sandy soils (Figures 21 and 22) at depths > 0.9 m (Figure 23) with optimum water content (Figure 24).**

NOTE: Ecosite Classification data was not available for the West Jellicoe Area.

West Jellicoe Area Site Description (south of Hwy 11, west of Hwy 801 Junction) (Figure 34 and 35):

- **GPS locations – UTM Zone 16, 451814E, 5501668N (WJA-1)**
  – UTM Zone 16, 451797E, 5501861N (WJA-2)
- **Topography – Flat, well-drained**
- **Soil type – Fine sand to silt, with minor clay**

Figure 34. West Jellicoe Area Site WJA-1, South along Hwy 11, West of Hwy 801 Junction

Figure 35. West West Jellicoe Area Site WJA-2, South along Hwy 11, West of Hwy 801 Junction

Results and Conclusion

It must be stressed that the data collected and presented in this report is of a preliminary nature. A detailed attempt was made to document all known historical agricultural activity within the Municipality of Greenstone (MOG). These can act as 'ground zero' for any future planning and provide immediate test site locations. The land areas identified immediately north of the Geraldton townsite (former potato and strawberry farm sites, Figure 12) could act as a convenient starting point for any agricultural field testing.

The information used to identify potential agricultural sites along the transportation corridors in the MOG was collected from the Forest Resources Inventory Branch of the MNRF and is limited by the age of the database and lack of detail, specifically related to the Kenogami Forest Management area (KFMA) (Figure 32). The current available information related to the KFMA (Imagery data - 1990's, Forest Resources Inventory data - 2002) has not been updated for over 20 years and represents the oldest database set in the province. However, the KFMA along with the Dog River Manitoulin Unit west of Thunder Bay, were only recently covered by detailed airborne surveys in an effort to modernize the available data. As a result, they are now part of the Enhanced Forest Resources Inventory (EFRI) which includes High Resolution Imagery and LIDAR data. This state-of-the art digital data was scheduled to be released by MNRF during the summer of 2021 but due to the COVID-19 Pandemic, has now likely been pushed ahead to 2022 (personal communication, MNRF, 2020).

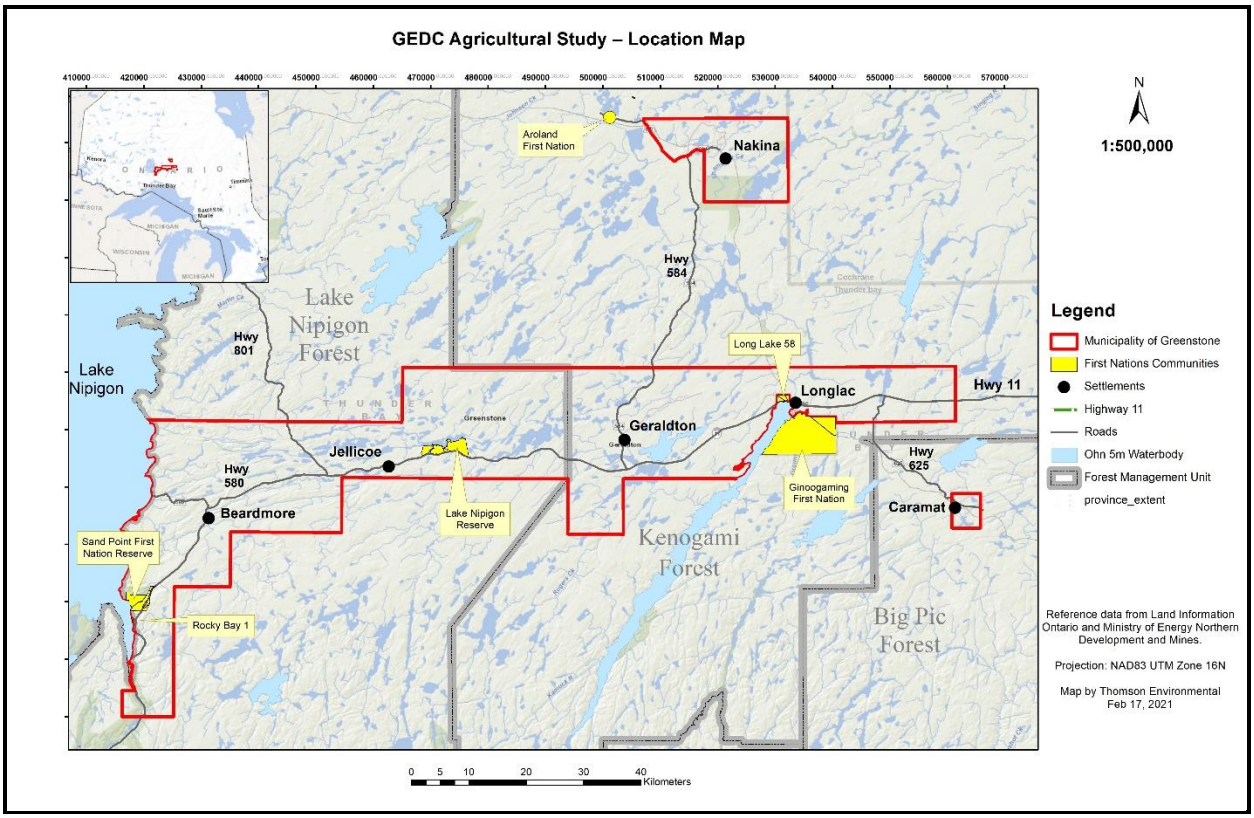

Figure 36. Forest Management Units, Municipality of Greenstone (MNRF)

Recommendations

It is recommended, as part of a comprehensive stage 2 follow-up study (to this report), that the newly released Enhanced Forest Resources Inventory (EFRI) data from the Ministry of Natural Resources and Forestry be used to identify sites of potentially arable land in the Municipality of Greenstone (MOG). The greatly enhanced data will allow for very detailed analysis and precise site selection in the Kenogami Forest Management Area.

The successful goal of these studies involving the capture of recently released high-resolution data, will hopefully support the establishment of agricultural 'activities' in the Greenstone area. The projected longer growing season brought on by climate change and the desire by the general population to access locally sourced 'natural' (vs processed) food options should help drive this goal. Seeking assistance from such organizations as the Northwestern Ontario based Cloverbelt

Local Food Co-op and the Thunder Bay Federation of Agriculture (which is affiliated with the Ontario Federation of Agriculture) should also offer valuable guidance. A list of agricultural-related organizations active in Ontario is provided below and can be a valuable source of experience-based information for the MOG.

List of Agricultural Organizations Active in Ontario

- AAFC – Agriculture and Agri-Food Canada
- ALUS – Alternative Land Use Services Canada
- CFFO – Christian Farmers Federation of Ontario
- CLFC – Cloverbelt Local Food Co-op
- ECCC – Environment and Climate Change Canada, Government of Canada
- FBO – Food and Beverage, Ontario
- FSRN – Food Security Research Network
- GFO – Grain Farmers of Ontario
- IAPO – Indian Agricultural Program of Ontario
- KDSCIA – Kenora District Soil and Crop Improvement Association
- LFFC – Local Food and Farm Cooperative (Ontario)
- LRIC – Livestock Research Innovation Corporation
- MEDJCT – Ontario Ministry of Economic Develop., Job Creation and Trade
- NFDN – Northern Food Distribution Network
- NOFIA – Northern Ontario Farm Innovation Alliance
- OAFIA – Ontario Agri-Food Innovation Alliance, University of Guelph
- OFA – Ontario Federation of Agriculture
- OMAFRA – Ontario Ministry of Agriculture, Food and Rural Affairs
- OSCIA – Ontario Soil and Crop Improvement Association
- RAIN – Rural Agri-Innovation Network
- TBAFS – Thunder Bay and Area Food Strategy
- TBCM – Thunder Bay Country Market
- TBFA – Thunder Bay Federation of Agriculture

References

Barnett, P.J., Henry, A.P. and Babuin, D. 1991. Quaternary Geology of Ontario, west-central and east-central sheets; Ontario Geological Survey, Maps 2554 and 2555, scale 1:1,000,000.

Bohunicky, M. 2018. North Caribou Lake's Boreal Garden Project Posted Article, Nishnawbe Aski Nation website. Retrieved from https://kiitigaanaskihub.ca/2018/03/north-caribou-lakes-boreal-garden-project/

Cummings & Associates. 2009. Thunder Bay District Agriculture Impact Study. Guelph, ON: Harry Cummings and Associates. Unpublished report. Retrieved from http://www.nodn.com/upload/documents/thunder-bay-district-agri-impact-report-final-oct.-26-2009.pdf

Government of Canada FedNor website. 2020. Article describing "Upgrades to Cloverbelt Country Meats Cooperative helping 'meat' demand" retrieved from https://fednor.gc.ca/eic/site/fednor-fednor.nsf/eng/fn04599.html

Kristjansson, F.J. and Thorleifson, L.H. 1991. Surficial Geology, Beardmore-Geraldton, Ontario; Geological Survey of Canada, Map 1768A; Ontario Geological Survey, Map 2535, Scale 1:100,000.

Kuhlberg, M. 2016. Lake Nipigon Aboriginal History Article; Journal of Canadian Studies, 45(1), pp. 58-89.

Nelson, C.H., Stroink, M.L., Levkoe, C.Z., Kakegamic, R., McKay, E., Stolz, W. and Streutker, A. 2019. Understanding social economy through a complexity lens: Four case studies in Northwestern Ontario; Canadian Food Studies Original Research Article through Lakehead University, 59p.

Qian, B., Hayhoe, H., & Gameda, S. 2005. Developing Daily Climate Scenarios for Agricultural Impact Studies. Presented at the 16th Conference on Climate Variability and Change, January 9, San Diego, CA.

Streutker, A., Levkoe, C. Z., and Nelson, C. 2017. The Cloverbelt Local Food Co-op, A Case Study; Centre for Sustainable Food Systems, Wilfrid Laurier University, 25p.

Stolz, W., Levkoe, C.Z., Nelson, C. 2017. Blueberry Foraging as a Social Economy in Northern Ontario, A Case Study; Centre for Sustainable Food Systems,

Tacorda, J. 2012. The Boreal Food Forest, the role of Canada's boreal forest in global food security, and efforts to protect the priceless natural resource; in the online December 2012 Food and Culture blog, Greater Toronto Area, 3p.

White, E. 2019. Agriculture industry sets sights on the unused fields of northern Ontario; CBC Online News Article, September 20, 2019, 7p.