



County of
Renfrew
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2017–2026

FOREST MANAGEMENT PLAN

for the

RENFREW COUNTY FOREST

Date: January 17, 2017
Prepared by: Lacey Rose, RPF



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Renfrew
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Lacey Rose

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Forestry & GIS Division
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Date

Presented to and approved by Development & Property Committee on: February 7, 2017

Presented to, approved by and signed at County Council on: February 22, 2017

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Executive Summary

General

This update to the Renfrew County Forest Management Plan outlines objective and strategies for the sustainable management of the County's forests, as well as operational details for the time period of January 1, 2017 to December 31, 2026.

The Renfrew County Forest (RCF) landbase is 6,527 hectares scattered over 53 different parcels, representing about 0.8% of the total land within the administrative area of the County of Renfrew. The first forest, the Beachburg Tract, was purchased in 1951 under the Agreement Forest Program with the Ministry of Natural Resources and Forestry. The County assumed full responsibility of managing these lands on April 1, 2000.

The forested area of the RCF amounts to 5,493 hectares, with the remaining area in wetlands, rock, swamp or otherwise unproductive area. Most of this area is dominated by intolerant hardwoods (21%) and mixedwoods (14%), as well as a large component of red pine plantations (17%) and white pine dominated forests (15%). Smaller components of cedar, upland and lowland conifer, tolerant hardwood, red oak and spruce forest are also present on the RCF.

Objectives of the Forest Management Plan

The objectives of the Renfrew County Forest Management Plan are as follows. Explanations of each, as well as associated strategies are included in the plan text.

1. Manage the forest in a way that maximizes the economic sustainability of forest products, and plan for a balanced forest structure
2. Protect and enhance wildlife and fisheries values
3. Promote the RCF and sustainable forest management
4. Provide recreational opportunities
5. Rehabilitate waste lands and lands unsuitable for agriculture
6. Protect and conserve water resources by preventing erosion and establishing vegetative cover
7. Maintain certification under an internationally recognized, 3rd party standard

Long-term Management Direction

Several objectives and strategies span far beyond the 10-year term of the Forest Management Plan (FMP). The intent of sustainable forest management is to make management decisions that will provide for future generations, ensuring that those that come after us will be able to derive the same economic, ecological and social benefits from the forest that we do today.

The age structure of the RCF limits the ability to plan for sustained revenue through time. Almost 65% of the RCF is between the ages of 60-100, and therefore approaching, at, or past optimal harvest age. Strategies will be put in place over the course of this plan term, and future plan terms, to prolong economic benefits from RCF, but ensure that responsible utilization of material occurs.

Red pine plantations, most 50-65 years old now, will produce most of the revenue from RCF over the next 20-25 years. Harvest area and revenue from these plantations will fall as they become depleted, starting in about 2040. Investing in renewal activities (e.g. tree planting red and white pine) now will help manage this future shortfall and maintain species diversity in the RCF. Artificial renewal activities (e.g. tree planting) are expensive but necessary to ensure a future pine component on the RCF. This FMP includes recommendations on the renewal for RCF.

Planned Operations

Operations scheduled to take place on RCF from 2017-2026 are outlined on the maps included with this plan. Each harvest area will have a detailed Forest Operation Prescription prepared before the area is tendered, which provides information about silviculture systems, values protection, access, and other operational concerns.

An average of 2.8% of the RCF forest landbase is scheduled for harvest annually, from 2017-2026. This aligns with a sustainable level calculated that would demonstrate an even harvest level over time, if the forest is renewed back to the same forest type post-harvest. Some forest units will have harvest areas above a sustainable, long-term even harvest level, including mixedwood and red pine. This is due to the current age class structure.

The total area scheduled for harvest from 2017-2026 is 1,607 hectares. The total estimated volume is 130,521 m³. Annual harvest areas will be scheduled in a manner to attempt to produce an even revenue level over the 10-year plan term. If all tendered harvest areas are successfully sold at expected prices, projected total revenue from 2017-2026 is \$1.8 million. It should be noted that this revenue amount is completely dependent on the state of the local market and demand for species and products.

If all planned operations occur, artificial regeneration will be necessary on approximately 130 hectares of RCF to maintain or increase the pine component from the pre-harvest condition. The total projected costs for these treatments are estimated at approximately \$260,000.

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LIST OF ACRONYMS

AOC: Area of Concern

AGS: Acceptable Growing Stock

CoR: County of Renfrew

DBH: Diameter at Breast Height

ELC: Ecological Land Classification

ESA: Endangered Species Act

FMP: Forest Management Plan

FOP: Forest Operation Prescription

FRI: Forest Resource Inventory

GIS: Geographic Information Systems

MNR/MNRF*: Ministry of Natural Resources/Ministry of Natural Resources and Forestry

OLT: Ontario Landscape Tool

OMNR/OMNRF*: Ontario Ministry of Natural Resources/Ontario Ministry of Natural Resources and Forestry

SRNV: Simulated Range of Natural Variation

RCF: Renfrew County Forest

RPF: Registered Professional Forester

Tree Species Codes:

PW	White pine	MH	Hard maple (sugar maple)
PR	Red pine	MR	Soft maple (red maple)
PJ	Jack pine	BW	White birch
TA	Tamarack	BY	Yellow birch
SW	White spruce	BE	Beech
SB	Black spruce	OR	Red oak
CE	White cedar	BD	Basswood
BF	Balsam fir	AB	Black ash
L	European larch	AW	White ash
HE	Hemlock	EW	White elm
PO	Poplar	IW, ID	Ironwood

* For simplicity purposes, MNRF/OMNRF is used to describe the Ministry in most cases in this document, even if the organization was under a different name at the particular time of discussion.

1. INTRODUCTION

1.1 Overview and General Perspective

On April 1, 2000, the Corporation of the County of Renfrew assumed the responsibility of managing 6,256 hectares¹ of community forest land owned by the County and previously managed by the Ontario Ministry of Natural Resources and Forestry (OMNRF) under a Forest Management Agreement.

In the spring of 2000, the County of Renfrew retained the services of Madawaska Forestry Inc. to prepare a five-year Operating Plan for the County Forests. This plan focused on forest operations. In 2006, County of Renfrew forestry staff prepared a new 5-year plan that would address strategic and long-term management goals. It established objectives, strategies and targets for timber and other forest resource values. Although there is no legal requirement for private property owners to have a forest management plan, the desirability of having a forest management plan is recognized in the County of Renfrew Official Plan. The 2006 Forest Management Plan (FMP) was consistent with the Objectives and Policies of the County of Renfrew Official Plan that was approved on June 16, 2003, and this has been carried forward in subsequent plans.

The 2011-2016 Forest Management Plan was adopted by County Council in May 2012, and expanded on the 2006-11 FMP. Increasing attention was given to relevant topics, including FSC® certification, invasive species and forest health concerns, and the long-term economic realities of the Renfrew County Forest (RCF) landbase.

During the development of this and past forest management plans, forestry staff reviewed archived land acquisition and forest operations information, historic operation and forest management plans and current forest resource inventory². Stands were inspected, timber cruising conducted, silvicultural treatments prescribed and areas of concern identified. Forestry is an evolving science, and this updated 2017-2026 Forest Management Plan incorporates the newest science, new legislative requirements and information and experience gathered over the course of the last five years³. Areas scheduled for harvest have been updated and refined to provide a 10-year operational plan. In addition, the FMP includes a longer term outlook on wood supply from the Renfrew County Forest over the next 40 years.

Since January 2009, the forests owned and managed by the County of Renfrew have maintained Forest Stewardship Council® (FSC®) certification (FSC® C018800) through the Eastern Ontario Model Forest's Forest Certification Program. The FSC® is an international,

¹ Note: This area is what was determined at the time of development of the County of Renfrew Official Plan in 2002. Since then, digitization of map data, sale and purchase of land has affected the total area.

² ³ See Appendix 2 for complete references.

membership-based, non-profit organization that supports environmentally appropriate, socially beneficial, and economically viable management of the world's forests.

Guidelines for effective forest management, both governmental and non-governmental, are continually consulted to develop forest management strategies. These include guidelines for wildlife protection and enhancement, watershed and non-timber value protection, cultural and archaeological site protection and other technical and scientific information where applicable.

1.2 Background and Resource Information

1.2.1 Sources of Direction

The guiding document for the preparation of this plan is the County of Renfrew Official Plan, particularly Section 10, "County of Renfrew Forest". The Official Plan was undergoing review and updating at the same time with this FMP update. This FMP incorporates the draft updates to Section 10 of the Official Plan. Existing forest management plans from Crown Forest Management Units, private lands, and other community forests were used to develop formats and organize data.

1.2.2 Reports of Past Forest Operations

From 1951 until 2000, the Ontario Department of Lands and Forests, subsequently the OMNR and now OMNRF, managed the Renfrew County Forest. During this time, there were significant evolutions in forest management philosophy and forest products markets, as well as modifications to harvesting, renewal and tending operations. Annual Reports were produced starting in 1979, describing forest management activities that took place that year. These continued to be completed until the end of the Forest Management Agreement in 2000 and offer valuable insight into the activities completed on RCF during that time.

In more recent years, records have become less reliant on paper maps and files, and spatial mapping systems have enabled a streamlined, consistent record keeping system. Geographic Information System (GIS) databases are used to track harvested areas in the Forest Inventory annually, and silviculture treatments are tracked in a way that allows for efficient and regular follow-up surveys and monitoring. Spatial data collection and database management is especially valuable for mapping and protecting values on RCF and ensuring this information is passed on to future forest managers. Starting in the calendar year of 2015, a brief annual summary of forest operations, silviculture and other activities undertaken by County Forestry staff is produced annually to highlight the accomplishments and notable activities of the program.

A detailed paper file exists for each RCF Tract, including purchase history, harvest history, boundaries, silviculture and issues over the years. The value of these records cannot be overstated. Efforts are made on an ongoing basis to move as much of this information as possible into a digital format, especially when it can be depicted spatially (e.g., forest values,

boundary information, harvest history, etc.) to ensure it is carried forward in today's digital world.

1.2.3 Reference Manuals

A very complete and evolving series of technical manuals exist for forest managers to use in forest management plan preparation. Furthermore, internet resources continue to increase and develop.

A list of manuals and information sources used in the development of this plan appear in Appendix 2. Many are included in the footnotes of this document.

2. FOREST DESCRIPTION

To set objectives and develop long-term strategies, it is important to look at the landbase from a number of different perspectives: administrative, geological and historic. This section describes how the Renfrew County Forest has reached its current state.

2.1 Renfrew County Administrative Area

Renfrew County encompasses 37 geographic townships that are amalgamated into 17 separate municipalities. RCF tracts are located in 10 of these municipalities and in 20 different geographic townships (see Map 1).

Approximately 50% of Renfrew County is Crown land (including Federal lands, water surface, leased Crown lands and Provincial Parks) with the remainder being privately owned. The RCF land base of 6,527 hectares represents about 0.8% of the total land in the County, or 1.4% of the total private land in the County. Two new tracts have been added since the 2011 FMP (Sperberg and 150th Anniversary), bringing the total number to 53.

Renfrew County is within the traditional territory of the Algonquin First Nation. The Crown lands within the region are currently the subject of comprehensive land claim negotiations between the Province of Ontario and the Algonquins of Ontario. The Proposed Agreement-in-Principle⁴ has identified two Renfrew County Forest Tracts (Deacon and Golden Lake) as proposed settlement lands. These lands total 468 ha or 7% of the total RCF landbase.

⁴ [Proposed Agreement-in-Principle among the Algonquins of Ontario and Ontario and Canada](#). June 2015.

2.2 Ecological Land Classification^{5 6}

In Ontario, the Ministry of Natural Resources and Forestry (MNR) defines ecological units on the basis of bedrock, climate, physiography and corresponding vegetation, creating the Ecological Land Classification (ELC) system. The current classification system (2009) is based on Angus Hills' Site Regions and Districts, first adapted in the 1950s, with further development and enhancement over time. Ontario's ELC system is presently composed of three upper level nested ecological units: ecozones, ecoregions and ecodistricts and two non-nested finer scale units, ecosites and ecoelements (see Glossary in Appendix 3 for definitions).

Table 1 summarizes the upper level ELC units, which hold the RCF landbase. A description of the units is included in the following sections.

Table 1. Ecozones, Ecoregions and Ecodistricts in RCF

Ecozone	% of RCF	Ecoregion	% of RCF	Ecodistrict	% of RCF
Ontario Shield	92	Georgian Bay (5E)	92	Brent (5E-10)	52
				Bancroft (5E-11)	40
Mixedwood Plains	8	Lake Simcoe-Rideau (6E)	8	Pembroke (6E-16)	8

2.2.1 Ontario Shield Ecozone and Georgian Bay Ecoregion^{7 8}

The Ontario Shield Ecozone occupies more than half of Ontario, and contains almost all of the Precambrian bedrock in the province. The varying topography is controlled by bedrock and frequented by rounded knobs, rocky knolls, outcrops and ridges. Soils are generally shallow, but depth can vary significantly over short distances due to the rugged nature of the bedrock. Sandy texture and stones are common. Soils are also mainly acidic and low in nutrients.

The Georgian Bay Ecoregion, also known as 5E, occupies the same area as the Renfrew County portion of the Ontario Shield. The climate is cool-temperate and humid. The mean annual temperature of ecoregion 5E is 2.8-6.2°C. Mean annual precipitation is 771mm to 1,134mm, and the average growing season length is 183-219 days. The ecoregion is situated within the Great Lakes Watershed, and contains portions of numerous river systems, as well as several large lakes. Underlying bedrock is comprised of mainly magmatic gneisses and felsic igneous rocks, and predominantly covered with ground moraine (till) of variable depth. Main substrates include Humo-ferric Podzols and acidic bedrock. These have a low capacity to buffer the impacts of acidic precipitation.

⁵ Crins, William J., Paul A. Gray, Peter W.C. Uhlig, and Monique C. Wester. 2009. The Ecosystems of Ontario, Part I: Ecozones and Ecoregions. Ontario Ministry of Natural Resources, Peterborough Ontario, Inventory, Monitoring and Assessment, SIB TER IMA TR- 01, 71pp.

⁶ OMNRF, 2007. Ecological Land Classification Primer: Central and Southern Ontario. ISBN 978-4249-4066-0 PDF

⁷ Crins, W.J et al. 2009.

⁸ Chapman. L.J & Putnam, D.F, 1966.

Fire cycles in mixed forests in this ecoregion are between 70-210 years, the cycle being shorter with a higher coniferous component. In pine-dominated forests, the fire cycle ranges between 36-258 years. Tolerant hardwood cycles are much longer, between 300-2,700 years. Lowland forest fire cycles are even longer, between 150-6,000 years.

*2.2.1.1 Brent Ecodistrict (5E-10)*⁹

The majority (52%) of the RCF landbase is in the Brent ecodistrict. Most of the ecodistrict is bedrock controlled topography, overlain with an acidic, shallow to moderate layer of morainal material. However, along the Ottawa River is a thin strip of glaciofluvial and glaciolacustrine sediment. Humo-Ferric Podzols dominate the ecodistrict, developing in coarse-textured, well-drained mineral material.

Much of the ecodistrict is covered by mixed forests, including the majority of RCF Tracts in this area. Sugar maple, beech, yellow birch, red maple, large-toothed aspen, eastern hemlock, eastern white pine, ironwood, black cherry, red oak and red pine are typical in upland areas. In the north of the ecodistrict, mixed forests of trembling aspen, white birch, eastern white pine and red pine are more common. In lowlands, eastern white cedar, eastern larch, black spruce, black ash, balsam poplar and red maple make up mixed forests. Coniferous forests of white and red pine occur on dry, rocky ridges. White spruce and balsam fir occur on upland sites with deeper mineral material. Deciduous forests are scattered, as are wetlands.

The climate in the Brent Ecodistrict is drier and warmer than 5E-9 to the west, due to the rain-shadow affect from the adjacent Algonquin Dome.

2.2.1.2 Bancroft Ecodistrict (5E-11)

40% of the RCF landbase falls within the Bancroft Ecodistrict. This area is characterized by an undulating to rolling landscape covered by a variable layer of acidic, morainal material. This material is typically moderate in depth. There are extensive areas of base-rich bedrock, which is one of the major distinguishing characteristics of 5E-11 versus 5E-10. The dominant substrate is Humo-Ferric Podzol, which have developed in coarse-textured, predominantly morainal material in well-drained areas. Melanic Brunisols cover about one-fourth of the ecodistrict.

Calcareous soils are common in the east (Map 3). While calcareous soil types are generally more fertile than non-calcareous types, they aren't suitable for all tree species. Over the last several years, ongoing studies have shown that calcareous soil types are contributing in a large way to the deterioration of mature red pine stands in Southern Ontario. When the roots of larger, mature red pine reach the "C" soil horizon, trees have been frequently observed to be dying at an alarming rate from a condition known as "pocket decline". Some pocket decline has been observed in RCF red pine plantations, following the 2012 drought. Locations of decline and mortality seem to be linked to shallow soils in most cases, but there does appear to be a

⁹ DRAFT The Ecosystems of Ontario, Part 2: Ecodistricts. Ontario Ministry of Natural Resources and Forestry. 2015

higher level of incidence on calcareous soils. Secondary pests and disease have also played a role. Future tree planting of red pine should consider soil type when evaluating suitable sites.

Mixed forests, dominated by sugar maple, yellow birch, red maple and eastern hemlock cover about a third of the ecodistrict. On drier, warmer sites, eastern white pine, red pine, trembling aspen, white birch, and red oak commonly grow. Minor components of large-toothed aspen, beech, white spruce, balsam fir and ironwood are typical on upland sites.

The climate of 5E-11 is warmer than 5E-10. RCF tracts in this ecodistrict tend to have a higher tolerant hardwood component than in 5E-10.

2.2.2 *Mixedwood Plains Ecozone and Lake Simcoe-Rideau Ecoregion*

The Mixedwood Plains Ecozone is situated on limestone and dolostone formations south and east of the Precambrian Shield. The climate is cool to mild, with cool winters and relatively warm summers, and is identified as one of the mildest climates in Canada. The bedrock in this ecozone are primarily limestone, sandstone and shale. Marine silt and clay deposits associated with the post-glacial Champlain Sea occur in the Ottawa River valley. In the Renfrew County portion, terrain is fairly flat.

The Lake Simcoe-Rideau Ecoregion (6E), is completely contained within the Mixedwood Plains Ecozone. The mean annual temperature of ecoregion 6E is 4.9-7.8°C. Mean annual precipitation is 759-1,087mm, and the average growing season is longer at 205-230 days. The ecoregion is within the Great Lakes Watershed and is bounded by major water bodies, including the Ottawa River. Substrates tend to be significantly deeper than 5E, and are mineral in nature. Most substrates provide a high capability to buffer acidity of precipitation before it reaches surface waters.

Single-tree mortality is the most common form of natural disturbance in this region. Stand-replacing events are typically in the form of major weather events and insect outbreaks. In the absence of fire suppression, deciduous forests had a fire cycle of 300-2,700 years. Intolerant hardwoods and mixed forests with a conifer component had fire cycles between 70-200 years.

2.2.2.1 *Pembroke Ecodistrict*

8% of the Renfrew County Forest landbase falls into the Pembroke Ecodistrict (6E-16). This area marked the western most extent of the Champlain Sea, almost 11,500 years ago. The topography is gently rolling, occasionally interrupted by predominant rock ridges and escarpments. Some of these ridges are the crests of fault blocks, and are typically Precambrian, and represented islands in the Champlain Sea. About half of the total area has been converted to cropland and pasture.

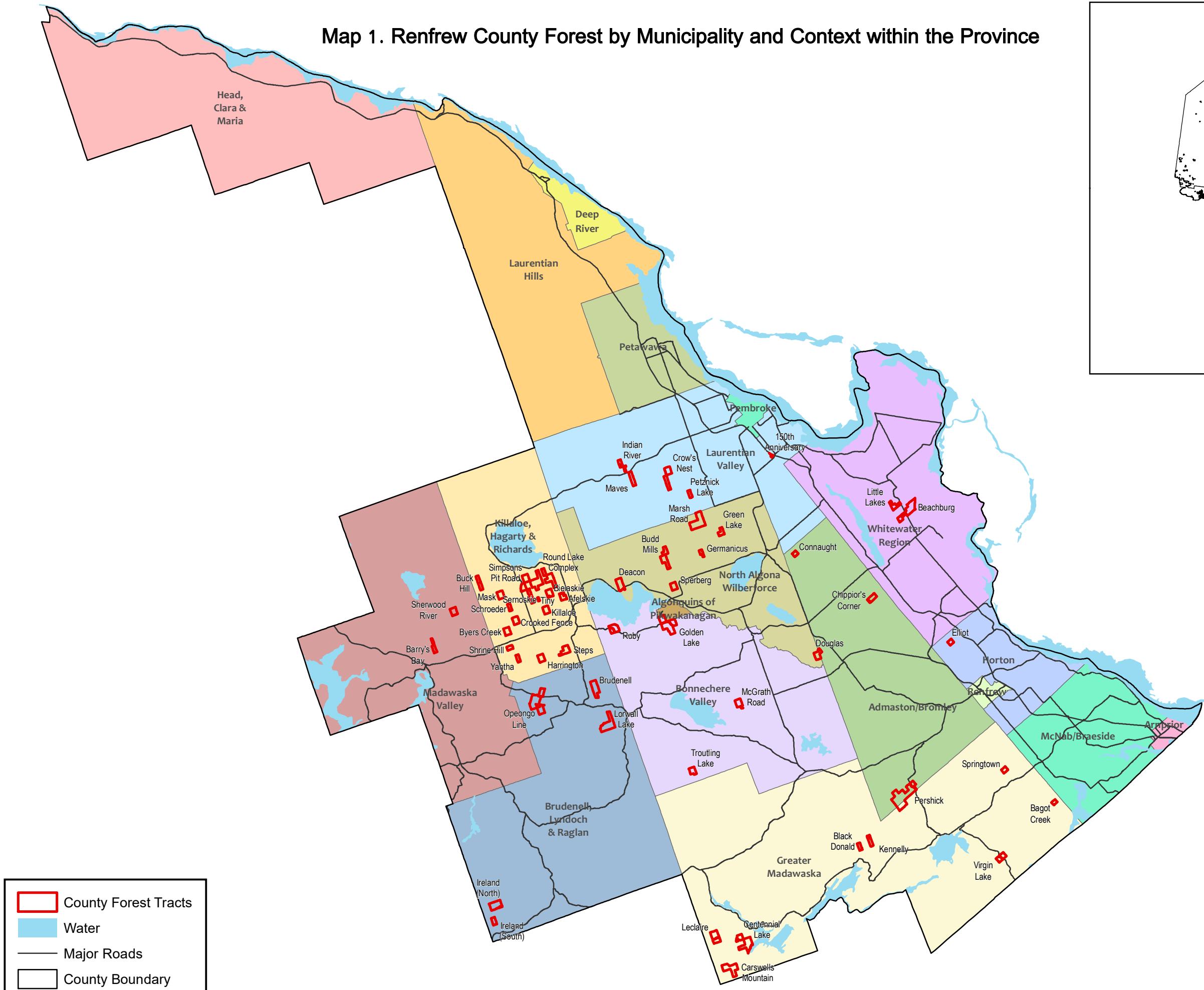
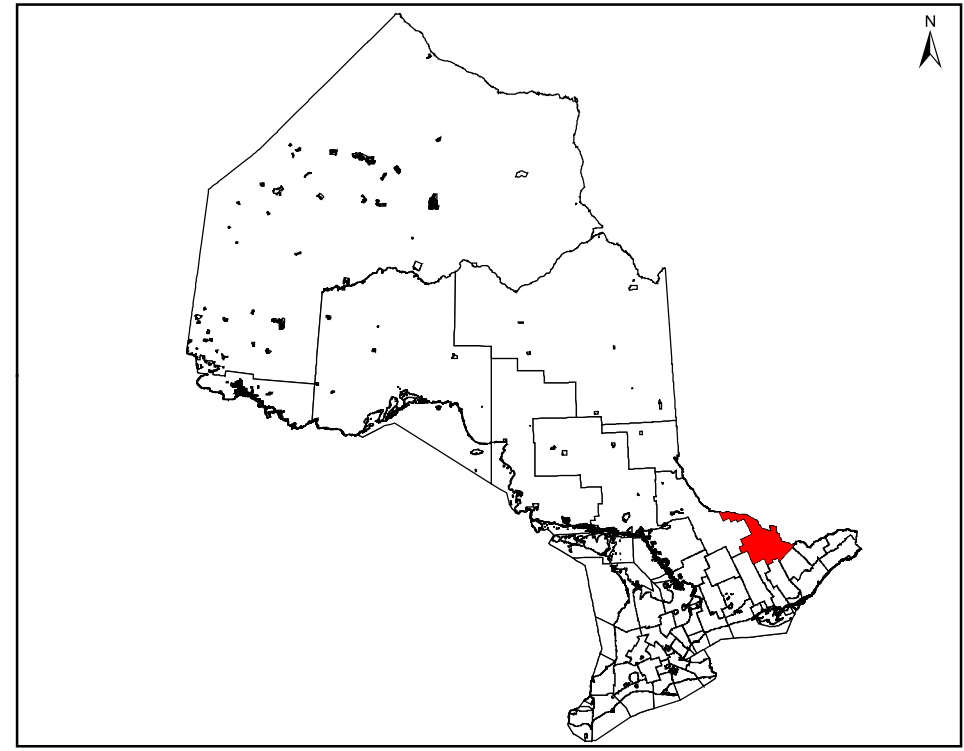
The mineral material in 6E-16 is generally a mix of non-calcareous material carried by glaciers and glacial melt water from the west, overlying calcareous material deposited by the Champlain Sea. Gray Luvisols are present on about half the ecodistrict. In calcareous, well-drained





material, Melanic Brunisols have developed. Several other substrate types are scattered throughout the area.

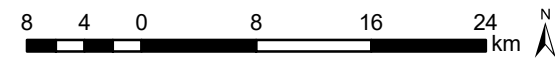
Most forests in 6E-16 are mainly mixed and deciduous. Mixed forests include sugar maple, beech, white spruce, balsam fir, and eastern white pine. On moister sites, eastern hemlock and yellow birch may be present, and on drier sites, red pine, red oak and large-toothed aspen may occur. Lowlands are typically dominated by eastern white cedar and black ash. On deeper, fine-textured mineral material, deciduous forests were historically dominated by sugar maple and beech but now most often contain early successional species such as trembling aspen, large-toothed aspen and white birch, since much land was cleared for agriculture but determined to be unsuitable. Uncommon species include butternut, shagbark hickory, white oak and silver maple. Some conifer forest areas are present, but mainly as red pine plantations on old farmland. Natural white and red pine forests do exist on dry, typically coarse-textured sites.

The Pembroke Ecodistrict differs from other ecodistricts in Renfrew County due to site conditions that are advantageous to the growth for more southern vegetation, including warmer, drier climate and deeper mineral material.

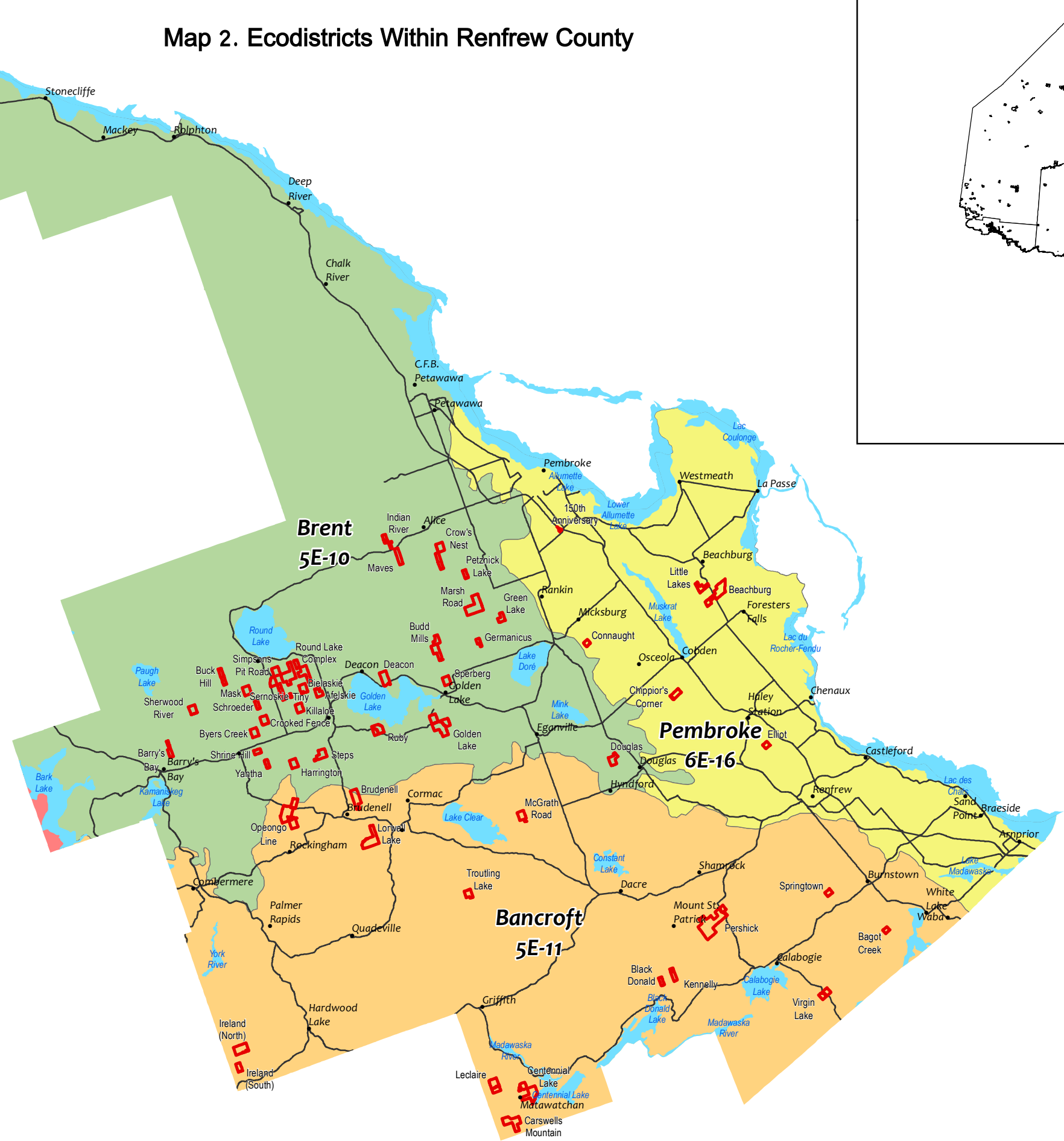
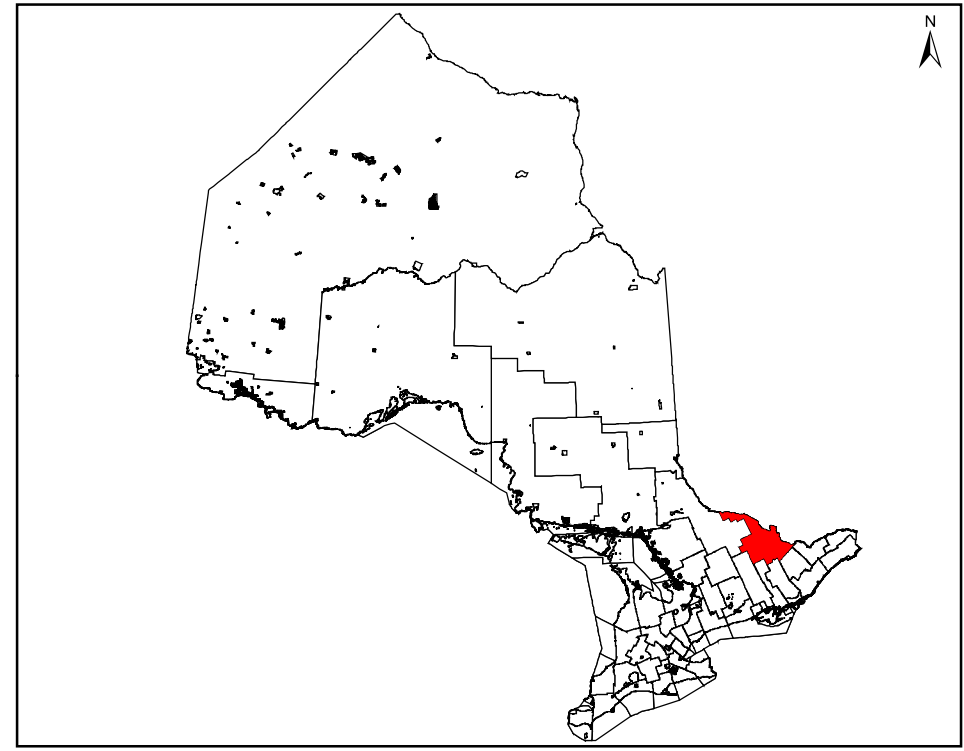
Map 1. Renfrew County Forest by Municipality and Context within the Province



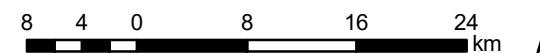
-  County Forest Tracts
-  Water
-  Major Roads
-  County Boundary



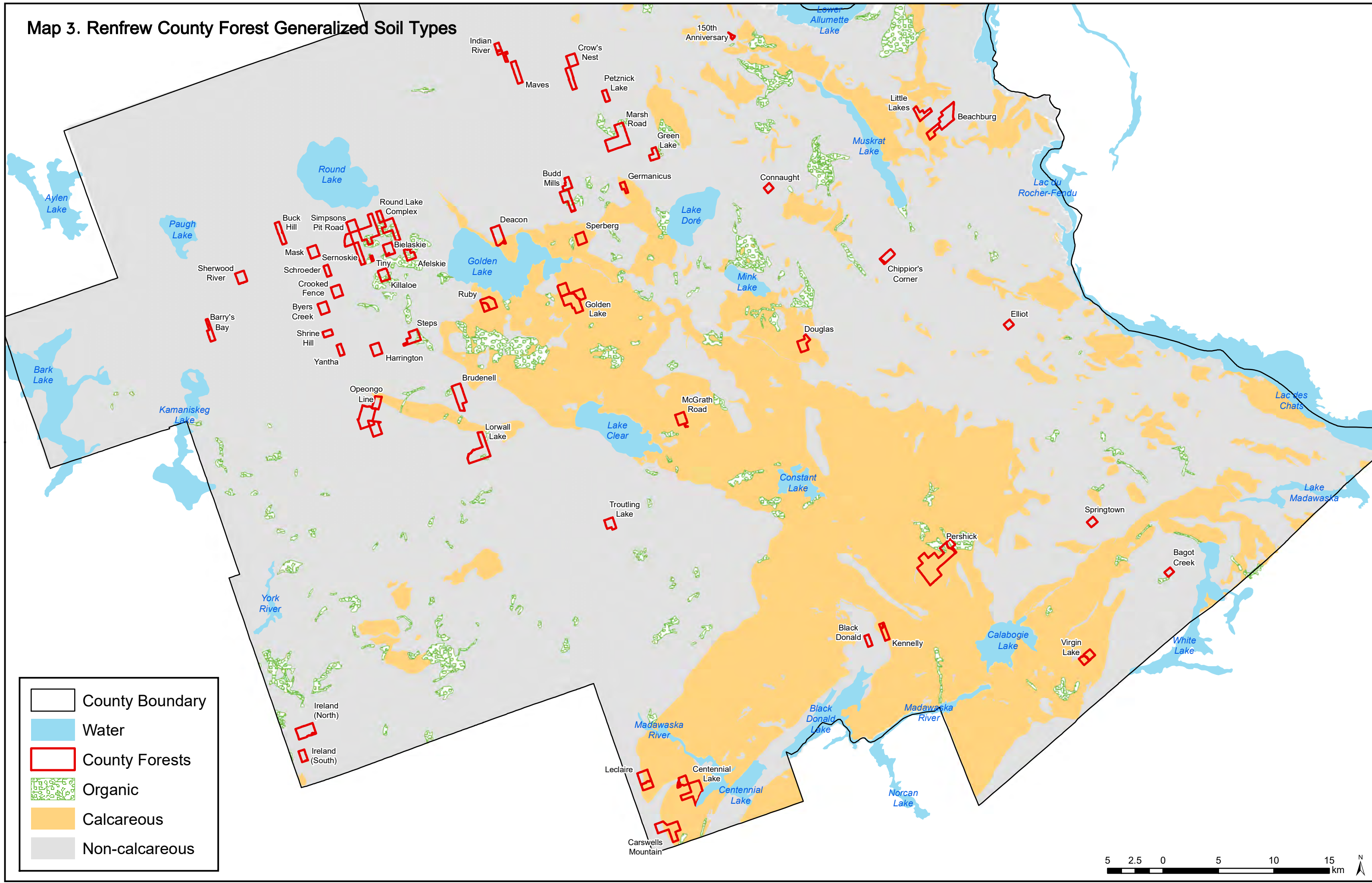
Map 2. Ecodistricts Within Renfrew County



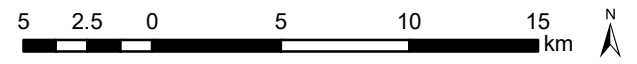
- Settlements
- County Forest Tracts
- Water
- Major Roads
- Ecodistrict**
- Algonquin Park
- Bancroft
- Brent
- Pembroke



Map 3. Renfrew County Forest Generalized Soil Types



	County Boundary
	Water
	County Forests
	Organic
	Calcareous
	Non-calcareous



2.2.3 Forest Ecosite Classification

At the stand level, forest ecosites have been developed to provide a basis for classifying forests by vegetation and site conditions. This helps forest managers by providing a common basis for silvicultural prescriptions, wildlife habitat monitoring, and stand level planning. The ecosite determines which types of forests can be grown on a specific site.

While extensive ecosite classification surveys have only been conducted for a few RCF tracts, they can be determined with some degree of accuracy from current forest inventory data, combined with field observations at the time of prescription writing. For this reason, ecosites are not included in the Forest Resource Inventory. They are determined using field data and included in stand descriptions of Forest Operation Prescriptions. The method of determining ecosites and complete site descriptions are found in *The Field Guide to Forest Ecosystems of Central Ontario*¹⁰.

2.3 History of Renfrew County Forest

Forests are constantly changing and evolving - current or historic conditions are only a snapshot in time. Natural processes - aging, insect or disease infestation, changing water tables, drought and catastrophic events like fire or windstorms - can drastically change forest conditions in a very short period of time. In more recent times, changing climate, invasive species and other factors have altered forests in ways that could not be anticipated. Renfrew County accepts that the “human factor” will always be present and that this will contribute to a changing forest land base.

2.3.1 Comparison to Historic and Natural Forest Condition

In the absence of major disturbances, forests develop according to natural pathways of forest succession. The goal of most forest management for the RCF is to emulate natural processes, creating forests that are diverse and reflective of ecosystems typical of Renfrew County, at levels that would occur in the absence of human intervention. Given the small-scale, fragmented, scattered nature of the RCF landbase, this is not always possible. However, it is important to keep natural processes and development in mind when making management decisions.

A review of Ontario Land Survey (OLS) data from 1816-1934 for areas in Site Region 5E, which covers most of the RCF forest landbase (Map 2), compared to Forest Resource Inventory (FRI) data for the larger landscape area of the Ottawa Valley Forest from 1998-2009 shows an increase of maple and poplar as dominant species. Red and white pine-dominated stands have

¹⁰ Chambers, B. et al. 1997. *The Field Guide to Forest Ecosystems of Central Ontario*. Queen’s Printer for Ontario.

decreased. Hemlock, cedar, larch and balsam fir have also become less dominant within stands and are found in fewer stands today than in pre-settlement times.¹¹

The Forest Management Guide for Great Lakes – St. Lawrence Landscapes (also known as the Landscape Guide) provides insight into what type of forest structure, composition and patterns might arise from natural disturbances and landscape patterns that would occur in the absence of human intervention. Instead of the traditional methods of comparison to pre-industrial conditions alone, which only represent one instance in time, or current forest condition, which exists as a result of over 100 years of management, the Landscape Guide provides estimates based on simulation models of what the forest would look like if allowed to develop from its current condition without human intervention for long enough to “erase” the management footprint¹². A Simulated Range of Natural Variation (SRNV) was created by the MNRF as part of the development of the Landscape Guide for different forest types and structures in the Great Lakes-St. Lawrence South Region. The Landscape Guide classifies the forest into Landscape Classes. Landscape Classes are groupings of forest units by development stage, which express meaningful differences in wildlife use. This is not necessarily equal to the traditional definitions of “mature” and “undermature” in terms of timber value. For the purposes of comparison with Renfrew County Forests, generalized comparisons can be made by analysing the trends identified for Landscape Classes in the Crown land that comprises the Ottawa Valley Forest.

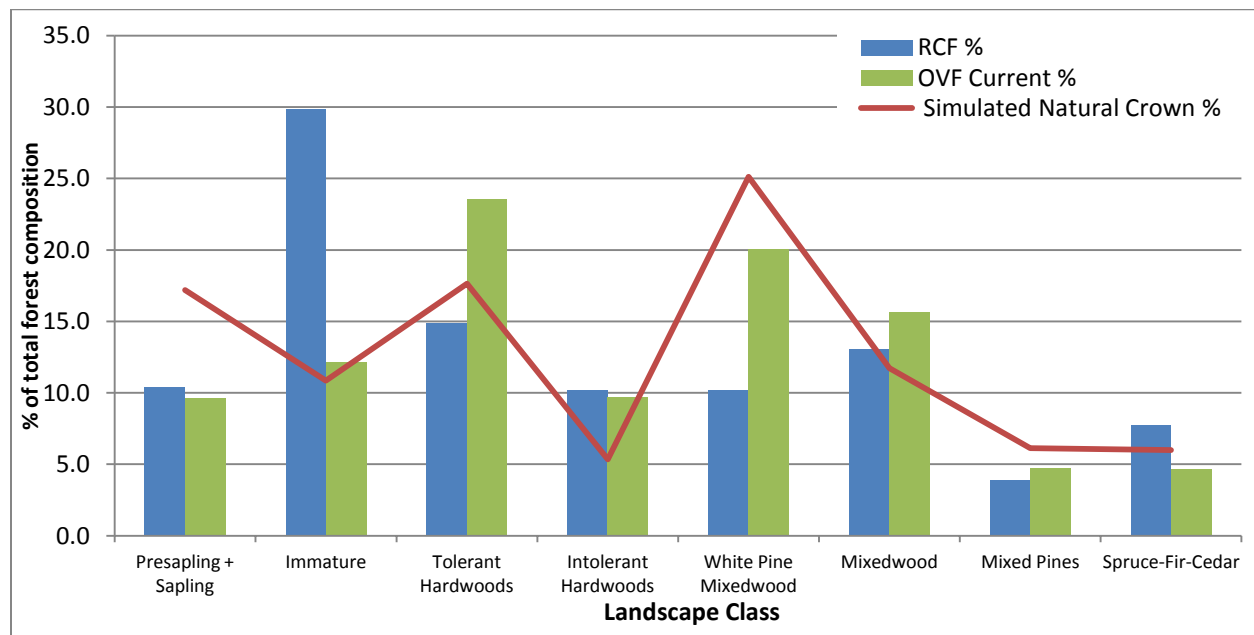


Figure 1. Comparison of Landscape Class Proportions of Ottawa Valley Forest 900-1,000 year simulations and Current Renfrew County Forest (RCF) and Current Crown (Ottawa Valley Forest) Composition.¹³

¹¹Elkie, P. Et al. Science and Information in Support of Ontario’s Forest Management Guides for Landscapes. Science Package A. 2013. OMNRF. Electronic.

¹² OMNR. March 2010. Forest Management Guide for Great Lakes – St. Lawrence Forests. Toronto: Queen’s Printer for Ontario. 57 pp.

¹³ This comparison is based on several assumptions. These are discussed in Appendix 8.

The results of Figure 1 loosely align with key forest trends that will be discussed in following sections. Landscape Class percent of total forest composition was calculated to make the comparison on such different scales as relevant as possible. The “Crown %” in Figure 1 represents the median value the natural range of Landscape Classes on Crown land in the Ottawa Valley Forest, as modelled 900-1,000 years from the current forest condition. The comparison holds little scientific weight due to the differences in landscape scales (entire Crown 222,566ha forest landbase for the Ottawa Valley Forest vs. scattered 5,493ha forested area of RCF) but some interesting points can be made.

- There is a low level of representation of white pine forest in the RCF in contrast to the modelled, natural amount of the larger landscape. This is likely due to fire suppression that has occurred in the past 100 years, coupled with the historic low level of artificial regeneration efforts in natural forests in the RCF and white pine being preferentially removed in early logging days, but would also be impacted by the absence of RCF tracts in the north “handle” of the County, where white pine forest dominates the landscape.
- There is a very high representation of immature stands of all forest types on the RCF. The “immature” age range is different for all landscape forest units but can generally be described as from age 30-70¹⁴. This aligns with the era in which most County Forests were purchased (1951-1970), and the reality that most areas were cut over before being sold to the County, or previously used for agriculture and planted after purchase.

Forest management in the RCF can help attain a more natural forest composition and structure. Present and future impacts of the current forest structure and strategies for future sustainability are discussed in Section 4.2.1.1.

¹⁴ See Appendix 8 for more details.

2.3.2 *Impacts of First Nations and Early European Settlement*

Archaeological information indicates that Algonquin people lived in the Ottawa Valley for at least 8,000 years prior to European arrival¹⁵. In the early days, the Algonquin people lived a semi-nomadic existence, moving about within their territory, following a seasonal round of resource harvesting activities: hunting, trapping, fishing and gathering¹⁶. Some slash and burn agriculture was practiced along the lower Ottawa and Samuel de Champlain noted cornfields at Muskrat Lake and peas, beans, squash and corn on Allumette Island¹⁷. The people lived lightly on the land, using resources sustainably and leaving little footprint behind. European immigration, logging and settlement activities had more far-reaching effects.



Figure 2. Logging in the Upper Ottawa Valley circa 1871.
Source: McCord Museum.

Logging in the Ottawa Valley started in the early 1800s, and had reached the Upper Valley and much of what is now Renfrew

County by the 1830s. Early logging extracted only the very best white pines that were notably utilized as masts and decking for the Royal Navy. Timbers were square-hewn in the woods resulting in considerable waste. It was estimated that only one white pine in ten was sufficiently high quality to be used for this trade.

By the 1850s, rapid population growth in the northern United States created a huge demand for pine lumber, which gave birth to an extensive sawmilling industry in the Ottawa Valley. Reaching its peak by the turn of the century, the sawmilling industry was less demanding of quality than was the square timber trade, resulting in the harvest of many more trees.

¹⁵ Algonquin Nation in present day Ontario, Canada. History of the Algonquins.<http://www.tanakiwin.com/wp-system/uploads/2013/10/a-History-of-the-Algonquins.pdf>

¹⁶ ¹⁷ Algonquin History in the Ottawa River Watershed. 2009. James Morrison, Sicani Research and Advisory Services. <http://www.thealgonquinway.ca/pdf/algonquin-history.pdf>

Settlers followed the loggers. When the productive timber was exhausted in an area, the loggers moved on, believing that the timber would last forever. As settlers used fire as a land clearing method and to remove logging debris, uncontrolled forest fires frequently raged throughout the entire Ottawa Valley. Organized efforts to control forest fires occurred only after the First World War (1914-1918). However, these efforts were hindered by the lack of an



Figure 3. McLachlan's Mill, Arnprior. Late 1800s.
Source unknown.

early fire detection system, as well as generally poor access and response times. Today, with advances in technology, fire suppression methods have advanced to the point that the County of Renfrew experiences virtually no large forest fires. The result of this intense fire suppression is a skewed age-class structure with mature and old forest types over-represented and an unnaturally low proportion of young forest area on the larger landscape.

2.3.3 *Evolving Timber Use*

Red and white pines were not the only species historically harvested in Renfrew County. Particular tree species have been singled out to meet the demands of different eras. The early settlers used cedar extensively for buildings and fences. Hemlock was harvested for its bark, which was used in the tanning industry and later, to provide timber for the construction of the Toronto Subway System. Yellow birch was utilized during the Second World War (1939-1945) to provide veneer used in the construction of the de Havilland Mosquito fighter-bomber. Other “heavy” hardwoods (beech, maple, oak, etc.) did not receive much attention until the 1950s, when they started to be harvested for the sawmill industry. For years, there was a good demand for rail ties, which utilized some lower-grade material from many species. By the mid-1980s, poplar and low-grade hardwoods were being utilized for pulpwood. Historically, the sawmill and forest products industry has continued to evolve, creating markets for trees and wood residuals that promote minimal waste.

2.3.4 *Agriculture and the Forest*

Throughout the early to mid-1800s, with promises of deep, rich soils and superior growing conditions, Ontario worked very hard to attract settlers. Water was the chief transportation route; hence earliest settlement followed the navigable rivers, particularly the Ottawa, the Bonnechere and the Madawaska. Colonization roads (e.g., the Opeongo Line) were developed to open up the wilderness for land-hungry European settlers. However, the best of the agricultural land was located in the river valleys and by the 1950s, most marginal lands unable to grow worthwhile crops had been abandoned. These marginal lands became the sites of most RCF tracts.

2.3.5 *The Agreement Forest Story*

By the late 1800s, much of Southern Ontario had been cleared for cultivation. However, removal of the forest cover had resulted in some unforeseen problems. Soils, which had once supported thriving farms, had become depleted. Furthermore, open fields of sandy soils gradually became barren deserts. Creek and river systems became choked with sediment as hilly areas were eroded. By 1909, the government of the day recognized that these wastelands should be reforested to prevent further deterioration of the land base.

In 1911, The Counties Reforestation Act was passed. This Act authorized Counties to pass by-laws for acquiring land suitable for reforestation. In 1921, The Reforestation Act was passed which enabled the Minister of Lands and Forests to enter into an agreement for reforesting and managing lands held by counties. This agreement assured necessary work would be completed and funded by the provincial government. After the County bought the land, the Provincial government planted and managed the trees. In 1922, Simcoe County was the first to enter into such an agreement.



Figure 4. Wastelands such as this one in Norfolk County (before 1912) spurred the establishment of Agreement Forests in Ontario. Photo by E.J.Zavitz.

By 1926, 1,600 hectares of former "wastelands" had been planted in Ontario and when the program was discontinued in 1998, there were 56 agreements totaling 128,853 hectares of land¹⁸. These areas included mainly County Forests and Conservation Authorities. As the forests matured, the need for the province to act as the sole manager of Agreement Forests declined. The owners were becoming increasingly involved in the day-to-day management, and in 1994, the Ontario Ministry of Natural Resources began negotiating the termination of the formal agreements to transfer all management responsibilities to municipalities or conservation authorities that owned the forests. The former Agreement Forests, now often referred to as Community Forests, form a network of small-scale, owner-managed forests.

The County of Renfrew entered into its first forest agreement on December 3, 1951 with the acquisition of 90 hectares in Westmeath Township, which now makes up part of the Beachburg Tract. Land acquisition throughout the County continued until the 1970s and culminated in a total acquired area exceeding 6,400 hectares. A supplementary agreement of April 1, 1960, which had replaced the original forest agreement, expired on March 31, 2000. On this date, the Corporation of the County of Renfrew assumed full management responsibility for its forested lands.

¹⁸ Community Forests in the Southern Ontario. Eastern Ontario Model Forest Website. April 29, 2016. http://www.eomf.on.ca/index.php?option=com_k2&view=item&layout=item&id=206&Itemid=367

While the majority of the Agreement Forests in Southern Ontario were truly “waste” lands, this was not the case in Renfrew County. While approximately 20% of the area acquired by the County was poor quality, abandoned farmland, the remainder was woodlots. Hence, no tree planting was done on 80% of the area - these were, and remain, forested lands or were pastured for a short time period before nature reclaimed them. In many cases, the forested areas were heavily cut over by previous owners before being sold to the County of Renfrew. This has led to a majority of the forest landbase being in the same age class – 60-70 years old. The “high-value” products of the day were cut out (pine, hard maple, and other species depending on the vintage of the cut) and intolerant species thrived. This practice explains why almost 40% of the landbase is occupied by intolerant hardwoods and mixedwoods. Stone fences, stone piles, ironwood and other indicators of pasturing can be seen in many of the County forest tracts, a reminder of the settler’s attempt to tame the landscape. The implication of this history is a considerable amount of lower-value mixedwoods that present an array of management challenges: most reaching peak volume at the same time; dominated by low-quality and low-value products that are difficult to market; and few high-quality trees to work with to create a more profitable future stand. Through active management, tree marking and retaining or emphasizing high-quality trees over time, the forest will eventually return to a healthier, more diverse composition.

2.3.6 *Lessons Learned from the Past*

Based on the knowledge gained over time and the lessons learned through past management, the following strategies for forest management are always of high importance when planning harvest operations:

- A detailed forest description based on field data is crucial in assigning the appropriate silvicultural treatment. Tree marking should be carried out when appropriate to retain healthy and high-quality trees, increasing the acceptable growing stock (AGS)¹⁹ of the forest over time. This often means some harvests are less-profitable because the “bad” must be harvested over the “good” – sustainable forest management always plans for the next intervention to be better, continually improving the health and vigour of the forest.
- Although red pine plantations were planted as a transition into a natural forest condition, it cannot be expected that the future forest condition will be desirable without intervention in the form of artificial regeneration in many cases. Consideration will have to be given in the 10-30 year time horizon of red pine plantations to encourage natural regeneration of equally desirable species (e.g., red or white pine) but also prepare for the probability of having to plant these areas to maintain the pine component on the RCF.
- When clearcutting even-aged, shade intolerant forest areas, operations must be mindful of leaving too many low-quality or unmerchantable residuals that could impede natural

¹⁹ Acceptable Growing Stock (AGS) is a term used to describe trees that can be expected to maintain and/or improve their quality and contribute significantly to future crops in the form of vigorous, high-quality stems. Source: Ontario Tree Marking Guide. OMNR. 2004. Version 1.1. Queen’s Printer for Ontario. Toronto. 252pp.

regeneration. Wildlife trees, conifer patches and other habitat values are important to retain but leaving a surplus of poor quality or suppressed undersized trees can leave an undesirable legacy for the next harvest similar to the current condition of many RCF tracts. Attempts shall be made to leave areas as clear as possible to facilitate regeneration of shade-intolerant species if that is the management objective. If seed trees are left, they should be long-lived species with healthy crowns that will make a positive contribution to the future stand.

- Landscape level climate is discussed for the various ecoregions of Renfrew County in Section 2.2. On a smaller scale, slope and aspect affect site-specific growing conditions by affecting the local climate. South slopes are hotter and drier than north slopes. Low areas with poor air movement contribute to the development of fungal diseases such as white pine blister rust and create frost pockets that allow for the establishment of more frost-hardy species.

2.4 Current Importance of Forest Sector to Ontario and Renfrew County

Traditionally, the forest industry in Ontario has been heavily reliant on export markets, particularly markets in the United States. In the fall of 2008, the forest industry in Ontario started a decline from which it has yet to fully emerge. This world-wide downturn in the economy forced the shutdown of many wood processing facilities in Ontario and created unprecedented challenges for the forestry sector. The unique structure of the forest industry in Renfrew County - primarily family-owned, smaller firms with diverse markets - and the diverse nature of the area's forests helped the local industry survive this recent recession. However, as a result of continued high levels of competition with US producers, numerous small and medium sized harvesters and sawmills have closed, merged or cut back on production.

Although prices have yet to improve, wood is moving again, mostly as a result of the current US/CAD exchange rate. The resilience of the local industry is the leading factor for the sector being one of the top employers in the area. Ongoing challenges include the cost of fuel, high electricity rates, competition from US markets and limited markets for low-end material. Also, a growing concern exists for operators and producers in Central Ontario regarding access to wood²⁰. Significant harvest area has been lost, or become too costly to access due to species at risk restrictions, resulting in an estimated \$1.50-\$2.00/m³ added cost to producing forest products²¹. Approximately 30% of the productive forest land base on Crown lands in Renfrew County has some form of species at risk restriction on regular operations²².

Hope exists for the future of the bio-energy market, as well as increased wood use in construction with the recent change to the Ontario Building Code to allow 6-storey wood

²⁰ Personal communications with local sawmill owners. June, 2016.

²¹ ²² Improving the Endangered Species Act: Impacts on Renfrew County. February 2014, County of Renfrew.

framed residential and office buildings. The US housing market has also recently started to rebound, which is sure to have a positive impact on the local lumber industry. Recent “buy local” movements, including OttawaValleyWood.com and Ontario Wood, shine a light on the many wood producers in our area, and the diverse products they have to offer.

Ontario’s forest industry directly employed 55,600 people in 2012, and paid \$2.8 billion in wages and salaries²³. There are approximately 6,900²⁴ people in Renfrew County directly or indirectly employed by the forest sector, a significant number for this area with a total population of 101,326 and 41,760 households²⁵. Many rural communities are highly dependent on the local forest industry: 17% of the total labour force in Madawaska Valley and 15% of Killaloe, Hagarty and Richards are directly employed by the forest industry²⁶. The forestry sector in Renfrew County has a 3.4 employment dependency ratio²⁷, higher than any other sector in the local economy²⁸. According to a recent local labour study, 43% of workers in the forest sector are over the age of 45²⁹. Like the rest of the forest sector in Canada, there is increasing worry about an age gap in the workforce and filling future vacancies.



Figure 5. Two generations working together on a conventional RCF harvest operation.

²³ Forest Products Association of Canada. <http://www.fpac.ca/canadian-forestry-industry/economy/>

²⁴ Approximately 2,800 direct jobs with an additional 4,100 indirect jobs, using a regional employment multiplier of 1.48 based on an economic model developed for MNRF. 2,800 is as reported in a 2015 Labour Market Group Report referenced below.

²⁵ 2011 Census Data. Statistics Canada Profile for Renfrew County.

²⁶ 2011 Ottawa Valley Forest Management Plan, Supplementary Document D. Social and Economic Description.

²⁷ This means that 3.4 times more of the population in Renfrew County is employed by the forest industry than the average population base in Ontario.

²⁸ 2011 Ottawa Valley Forest Management Plan, Supplementary Document D. Social and Economic Description.

²⁹ Labour Market Information Study: Regional Forestry Sector 2015. The Labour Market Group of Renfrew & Lanark.

3. CURRENT FOREST CONDITION

3.1 Forest Resource Inventory

During the OMNRF term of the Agreement Forest management, the Forest Resource Inventory (FRI) was the basis for all planning. Designed as a broad planning tool, a useful, reliable FRI needs to be supplemented with contemporary ground surveys. FRI convention was to conduct ground reconnaissance to support aerial photo interpretation. However, extensive ground survey is prohibitively expensive, so the amount completed on the RCF was quite limited in the early days. Although economical, air photo interpretation tended to overestimate site class, age and the growing capability of a defined stand, which led to an overestimation of tree growth rates. In the final OMNR Forest Management Plan (1993 to 2013), harvest levels were projected to be approximately 279 hectares per year.

When the County of Renfrew assumed management responsibility for its forests in 2000, Madawaska Forestry Inc. was contracted to produce an Operating Plan focusing on the 2000-2005 period. Based on a significant proportion of “on-the-ground” inspections, the revised inventory was superior to previous records. The resulting plan identified the harvest potential of stands as a high, medium or low priority. It calculated an Annual Allowable Harvest area of 200 to 240 hectares per year for 2000-2005.

In the 2006-2011 Plan, much effort was expended to accurately determine forest inventory using intensive field surveys. This improved inventory confidence and allowed for adjustments to the Annual Allowable Harvest (AAH), creating a harvest level of about 280 hectares per year.

Volume recovery data and extensive stem analysis of harvested trees over the term of the 2006-11 and 2011-16 plans allowed further refinements to the planned harvest levels and volume estimates. A new inventory tool - Digital Raster Acquisition Project East or DRAPE (digital aerial photography in leaf-off conditions) – became available in 2008/09, and a subsequent version (DRAPE II) in 2014. DRAPE has greatly improved the forestry staff’s ability to delineate areas and identify special features. The forest resource inventory was also updated based on stand delineation and field surveys for the 2011-16 Plan. The AAH for 2011-16 was 285 hectares per year, a reflection of the carried-over unharvested area from the 2006 FMP, as well as the large majority of area that is mature/overmature on the RCF landbase. In past plans, the inventory included assigning a plan term for next harvest as “mandatory” or “optional”, based solely on readiness for harvest. Many areas classed as “mandatory” harvest in 2011-16 remained unharvested due to market conditions or operational logistic issues (e.g., too small of an operating area to be successfully tendered, access concerns, etc.).

For this updated 2017-26 Forest Management Plan, significant operational pre-planning occurred to select areas that would be harvested over the next 10 year term. The “mandatory/optional” inventory classification was replaced with a “next harvest term” to illustrate the 5-year term when harvest should occur and a “next harvest year” for those set to

occur from 2017-2021. Recognizing the age-class gap that exists in RCF, focus was put on achieving an even harvest level over the short and medium term and postponing the harvest of areas that are not at immediate risk of declining significantly if left to develop further. The intent of this approach is to prolong the economic benefit from RCF before the inevitable time when now-mature stands are depleted, and implement strategies as described in Section 4.2.1.1 to lessen the impact so that future generations will be able to generate the same economic benefits as today. The FRI continues to be improved and updated using cruise data, especially during the preparation of Forest Operation Prescriptions.

Other changes to the FRI increased consistency of data format to improve analysis, including species composition and species codes. The Forest Information Manual for Forest Resources Inventory Technical Specifications (2009) was consulted and internal Technical Specifications were created to improve inventory consistency.

3.2 Land Base Summary

The RCF properties include a small proportion of area that cannot be considered productive forests for forest management planning purposes. Although important from the “landscape” perspective some areas such as water, swamp and other unproductive areas are not included in the calculation of the Annual Harvest Area (AHA). Consequently, the RCF is broken down into productive or non-productive land classifications (Table 2). Note that “productive forest” or “non-productive” refers only to the land’s ability to produce timber products. Protection forest area is not included within the productive forest landbase, explaining the different between this number and the total forest area in Table 5.

Table 2. Land Classification of Renfrew County Forest

Land Classification	Hectares	Acres	% of Total
Productive Forest	5,493	13,567	84
Non-productive	1,034	2,555	16
Total	6,527	16,122	100

Source - County of Renfrew Forestry & GIS Division

3.3 Non-productive Land Classification

The categories listed below and shown in Table 3 include geographically different areas that will not produce timber products, now or in the future. Notably, the extent of areas classified as wetlands, brush/alders or treed and open muskeg can change due to local conditions that include drought, seasonal fluctuations in water levels or beaver activity.

1. Brush/Alders (B) – Poorly drained depressions supporting shrubs such as alder and willow or non-commercial tree species.

2. Protection Forest (PF) – Lands where no harvesting will occur due to inaccessibility, inoperability, sensitive values, low growth capacity, or difficulty to regenerate.
3. Treed and Open Muskeg (M) – Wetlands (i.e., bogs, fens and beaver meadows) dominated by stunted trees, sedges, mosses and other low vegetation.
4. Rock (R) – Areas dominated by rock outcrop that may support scattered trees and sparse vegetation.
5. Unclassified (U) – Developed areas including road right of ways, gravel pits or landings that do not presently support forests.
6. Wetlands (W) – All areas identified as permanent or seasonal water bodies, including ponds, fens, swamps, bogs, marshes, or areas where the water table is at or very near the surface.
7. Grass (G) – Abandoned agricultural land that has failed to successfully regenerate, due to depleted soil. May be sparsely stocked with trees and/or shrubs.

Table 3. Categories of Non-productive Land

Non-Productive Land Type	Description	Hectares (ha)	Acres (ac)
B	Brush/Alder	64	158
G	Grass	6	16
W	Wetland	773	1,910
PF	Protection Forest	64	158
R	Rock	10	24
M	Muskeg	72	178
U	Unclassified	45	112
Total		1,034	2,556

3.4 Productive Forest Land Classification

Productive forest land includes all areas dominated by tree cover that are available for harvest (e.g., not Protection Forest), or those not currently dominated by tree cover but have the capacity for timber production. The land base is broadly sub-divided into naturally developed stands (AN³⁰) or artificially developed stands; i.e., plantations (AP). Productive forest land is further divided into forest units that categorize forest stands by their similarity in species composition, natural development and silvicultural management. RCF Forest Units are summarized in Table 4 and the cumulative area of each Forest Unit is listed in Table 5. Figure 6 graphically displays the area by forest unit. In some cases, stand size and variability will result in a forest unit classification according to the forest manager's discretion that will vary from the general parameters listed in Table 4.

³⁰ These codes are only used for inventory purposes, similar to those described under Section 3.3 above for Non-Productive land. Stand identification numbers are depicted as Tract #-Land Code-Unique Identifier, for example, 45AN02.

Some minor changes have occurred to the forest units parameters since the 2011-16 Plan, for clarification purposes only.

3.4.1 Forest Unit Descriptions and Regeneration Considerations

Each forest unit has different potential and desired future forest conditions are determined by site and management objectives for the individual tract. This section provides some general context and forest cover goals by forest unit, and also provides direction for regeneration efforts to be detailed at the time of FOP writing.

Cedar (CE)

About 7% of the RCF is made up of cedar-dominated forest, with cedar making up at least 40% of the stand composition. It has high wildlife value as both food and shelter for white-tailed deer and other mammals. The County will attempt to maintain existing cedar area in the future and harvest will strive to create conditions that will encourage the natural regeneration of the species. Regeneration of cedar is often slow, since it is a slow-growing species and can sometimes be hampered by deer browsing. Lowland areas are often inoperable but are a significant contribution to wildlife habitat. County forest staff will monitor conditions periodically post-harvest and note regeneration. There have been few cedar harvests on County forest in recent years, and those that have occurred will continue to be monitored. Past attempts at harvesting cedar through patch or strip clearcut areas have had mixed results with regenerating cedar.

Recent attempts at tendering small cedar areas have yielded no bids, presumably due to stand size, quality and operational feasibility. There are several overmature cedar stands that would benefit from harvests that would encourage cedar regeneration. Efforts will continue to manage these areas, taking guidance from other forest manager's experience, as well as the updated Forest Management Guide to Silviculture in the Great Lakes-St. Lawrence and Boreal Forests of Ontario (2015).

Mixed Conifer (CM)

A small proportion (4%) of the landbase is made up of conifer-dominated forest, including balsam fir, jack pine and white spruce. Some of this area on RCF, particularly jack pine, has received little attention in the past due to unmerchantability of the species in its current age class and condition. Jack pine is often of poor quality and is subject to much natural mortality in plantations if left unthinned. Plantations will remain a priority for thinning if market opportunities arise, since most are past the point of requiring a row removal. Long-term regeneration goals for these plantations will be soil and site class dependant but if the species is thriving on the site, later thinnings will be carried out in a way to encourage growth to the same species. For example, if jack pine is well suited, seed trees will be left as a seed source for regeneration or planting will occur. For natural stands of upland conifer, clearcutting is the preferred harvest technique to encourage the natural regeneration of shade-intolerant conifer species. Where desirable advanced regeneration is present in the understory, it will be protected during harvest.

Tolerant Hardwood and Hemlock (HD)

Tolerant hardwood and hemlock make up about 13% of the RCF. The goal of managing tolerant hardwood and hemlock forest is to create an uneven-aged condition with high-quality stems that facilitate return harvests every 20-40 years. Each harvest removes about 30% of the basal area (without going below 18m²/ha), taking the unhealthy or defective trees first and improving the acceptable growing stock with each harvest. Single trees are removed and shade-to-mid-tolerant species (e.g., sugar maple, beech, hemlock, yellow birch, oak, ash) regenerate in the resultant canopy openings. Current conditions are mostly even-aged and require management and time to improve quality, due to the method of origin (e.g., previously cleared) or past management practices (e.g., removing high-quality stems only). This forest type is slightly under-represented on the RCF landbase and it is desired to maintain or increase the proportion of tolerant hardwood and hemlock area in the long term.

Shelterwood management may also be considered in tolerant hardwood stands where decline is evident, uneven-aged stand structure is lacking (e.g., two-aged stand), site productivity is limiting or regeneration of mid-tolerant species is desired.

Intolerant Hardwood (INT)

The largest proportion of the RCF (21%) is made up of intolerant hardwood-dominated (greater than 50% stand composition) species, including poplar, white birch and red maple. As previously discussed, this is a legacy of the clearing, burning and farming that occurred during settlement of the area (1860-1940s). These pioneer species thrive in open conditions and require full sunlight to regenerate. Clearcutting is the preferred harvest method to facilitate the natural regeneration of this forest type. If conditions exist (e.g., white pine regeneration in the understory, significant representation of more tolerant species in the overstory) to transition to other forest units that will increase the diversity of the RCF, those will be outlined as management goals in the FOP. Overall, it is a long-term goal to decrease the component of intolerant hardwood on the RCF to be more in line with the natural forest condition (see Section 2.3.1 Comparison to Historic and Natural Forest Condition) and increase the component of partial-harvest systems that yield financial return in shorter intervals (e.g., tolerant hardwood selection or white pine or oak shelterwood) that are underrepresented on the landbase. It is recognized however, that intolerant hardwood species are aggressive competitors and intentional conversion to other forest types is rarely successful without significant management intervention. RCF forest managers will evaluate naturally-occurring opportunities as they arise but it is unlikely that any artificial regeneration efforts would occur in these areas due to high competition levels.

A common condition of Intolerant Hardwood stands in the RCF is low stocking and poor quality stems. Over 35% of the area classed as Intolerant Hardwood in the RCF inventory is identified as having less than 50% stocking. This is mainly a result of properties being cut over before being sold to the County in the 1950s and 1960s, with species that were desirable at the time being removed (pine, tolerant hardwood), and poor quality or unmerchantable stems left standing. This has left a legacy of scattered areas that are difficult to market but would benefit

from management. Efforts will be continued to harvest these areas so that they may have a fresh start. The current condition emphasizes the importance of cutting intolerant hardwood stands clear, and not leaving suppressed or poor quality stems standing. These stems do not respond well to release, and impede vigorous regeneration of shade intolerant species.

Mixedwood (MW)

Since the mixedwood forest unit is a “catch-all” for stands that do not fit the description of any other forest unit, it can have a variety of conditions. In most cases, there is a high component of red maple and other intolerant hardwoods but balsam fir, tolerant hardwoods and pine can also be present in lesser quantities than in their characteristic forest unit. Harvest of this forest unit is usually prescribed as a clearcut with natural regeneration but unique conditions can lead to other harvest types being implemented to achieve long-term objectives. If a tolerant hardwood component is present, it will be emphasized through selection patches with a long-term objective of increasing the area on the RCF that is uneven-aged. Seed trees such as white and red pine or oak are often left when present on site to encourage some diversity of regeneration but active conversion to other forest units is generally not carried out due to difficulty dealing with competition from intolerant species, especially on rich sites. Mixedwood is well represented in the RCF, at 14% of the total area.

Other Conifer (OC)

This forest unit includes lowland areas dominated by black spruce and tamarack which are usually wet and slow growing with terrain that is difficult to operate. Often areas are placed into this forest unit based on site conditions – it represents the typical conifer thicket in low-lying areas, but also a very small component of European larch plantation. These plantations have impressive growth rates and some first thinnings have occurred. This forest unit is a very minor component of the RCF, at only 1%, and is uncommon in most of the Great Lakes-St. Lawrence (GLSL) forest. It is important for wildlife habitat, acting as thermal cover in hot summer temperatures for moose, and also important for wintering habitat for ungulates and small mammals. In many cases, these stands are bypassed due to terrain limitations or unmerchantability. When areas are operable, clearcutting in patches or strips is often the most suitable silviculture system to provide light for regeneration of the dominant shade-intolerant conifers, while leaving an adequate seed source. It is desired to maintain area in this forest type, mainly for the ecological benefits and diversity that it provides. Operations in these areas must be especially mindful of protecting against site damage and frozen conditions would be required.

Red Oak (OR)

Oak is generally found on well-drained upslopes or rocky ridges with shallow soil. This forest unit makes up about 5% of the RCF and is characterized by stands containing at least 40% red oak. Oak is an important food source for many wildlife species and has traditionally been a valuable forest product for flooring, cabinetry and furniture. It is a difficult species to regenerate in the absence of fire since it is easily overtaken by maple and other faster-growing species. It has a competitive advantage in dry, shallow soils against species that require more productive conditions. The most common silviculture system used for oak is a three-cut

uniform shelterwood. The stage of harvest implemented depends on the condition of the oak on site. Preparatory harvests are appropriate when trees are young (40-60 years) and crowns are underdeveloped or crowded. Post-harvest conditions are conducive to developing oak crowns for seed production and increasing the size and vigor of residuals in general. The seeding or regeneration cut occurs when crowns are fully developed and producing seed (60-80 years), removing the appropriate amount of trees to create light conditions in the understory that encourage the establishment of oak regeneration. This is a difficult objective to achieve since animal browse and competition from faster-growing species can be limiting. To maintain oak on the landbase, artificial regeneration may be necessary and progress should be closely monitored post-harvest. County forest managers will be mindful of the challenges and limitations of regenerating oak and participate in information exchange with other forest managers in the GLSL facing the same challenges. A removal harvest occurs once desirable regeneration is established, typically less than 10 years after the seeding cut.

Red Pine (PR)

The second largest forest unit in RCF (17%), and currently the most profitable, is red pine. The majority of this area is made up of plantations, and as previously discussed, most are of the same vintage (40-60 years old). Most areas are at the stage to receive a second or third commercial thinning and some are overdue. Commercial thinning will continue in these areas and natural regeneration of tolerant hardwood or white pine will be encouraged. In areas where regeneration is absent or of undesirable species (e.g., balsam fir, poplar, soft maple that are already prevalent on the landbase), artificial regeneration may be considered at the second-to-last or final thinning to regenerate the area to an equally valuable species so that revenue generation, or at least product diversity if markets change, can continue in the long term. Health concerns for this forest unit include Armillaria Root Rot, where if present at high levels and causing mortality, regeneration of red pine should not be encouraged, drought susceptibility and Diplodia. If Diplodia is present at high levels at the time of final harvest and the site is suitable for regeneration of red pine, very limited seed trees should be left.

White Pine (PW1)

Many old white pine stump remnants can be seen throughout the County, an indicator of the forests that dominated before European settlement and early lumbering years. Thought to have been more well-represented in the Ottawa Valley in the absence of human intervention³¹, pine-dominated (>40%) stands represent 12% of the current RCF landbase. It is desired to maintain or increase the component of white pine dominated stands in County forests. Uniform shelterwood harvesting is implemented to create optimal regeneration conditions, similar to the manner in which harvest is carried out in oak areas (discussed above). In addition to the regular competition concerns that exist in other forest units, there are concerns over forest pests and disease that affect white pine regeneration success. Excessive opening of the canopy by harvesting can leave white pine regeneration susceptible to white pine weevil. If white pine blister rust is present in the stand, it will likely challenge the success of regeneration.

³¹ OMNR. 2010. Forest Management Guide for Landscapes. Science Package B – GLSL South: Landscape Simulation Results: Forest Units and Landscape Classes.

Preparing a receptive seed bed and coordinating regeneration harvest with good seed years are important factors when planning for natural regeneration success. However, white pine is famously difficult to regenerate naturally in the absence of fire and County staff will need to carefully consider regeneration strategies and monitor success. Artificial regeneration will be necessary to maintain the white pine component on the landbase. Many white pine stands were previously harvested with varying levels of renewal commitments over time, and thus varying success of white pine regeneration. There are a number of stands which require rehabilitation and regeneration efforts to ensure successful regeneration of white pine.

White Pine Mixedwood (PW2)

Sometimes stands are encountered that have too low a pine component to qualify for shelterwood harvest or to be managed specifically for pine. It is likely, on well-suited sites, that there was historically a greater pine component that was harvested prior to being acquired by the County. The inventory reports 3% of the RCF as PW2. Harvest in these areas will passively try to encourage regeneration of pine through leaving seed trees, implementing summer harvest, encouraging ground disturbance for germination of pine seedlings, or if small pockets of pine are scattered throughout the stand, carrying out shelterwood or selection in those areas. Competition is fierce in these stands from resprouting of intolerant hardwood species and without significant financial investment, it is unlikely that pine will dominate the future stand. The goal of managing this forest unit is to maintain or increase the current red and white pine composition and opportunities for artificial regeneration will be evaluated where lower levels of competition exist.

White Spruce (SW)

Made up mainly of planted white spruce, this forest unit makes up only 2% of the RCF. It is separated out to remain visible on the treatment schedule for commercial thinning. Selective harvesting may also be considered in older plantations to remove poorer quality stems and leave the best for further growth and development. Regeneration plans for these areas will encourage the natural regeneration of white spruce in later thinnings if the site is well-suited to spruce. In areas where spruce are struggling (e.g., root rot), diverse natural regeneration from adjacent stands will be encouraged. The vast majority of RCF plantation white spruce is overdue for thinning, as markets for this product have been poor historically. Other options will be evaluated for treatment of these areas during the course of this plan, including clearcutting older plantations (50-60 years), shelterwood harvesting to encourage transition to natural forest condition, or evaluating thinning as a non-commercial option to improve quality of remaining stems. Research on the success of these options in other forests will occur.

Table 4. Description of Renfrew County Forest Units

Forest Unit		Forest Type	Silvicultural System	General Parameters
Code	Name			
PR	Red Pine	Stands with a major component of red pine	Row and/or selective thinning, clearcut with seed trees, shelterwood	$Pr \geq 60$
PW1	White Pine	Stands that are dominated by white pine or mixed white and red pine	Shelterwood	$Pw+Pr \geq 40$ and $Pw > Pr$ and $Pw+Pr \text{ stk} \geq 30$
PW2	White Pine Mixed Wood	Upland intolerant hardwood stands with a significant component of pine and potential to be pine-dominated in future (PW1)	Shelterwood or clearcut with seed trees, commercial thinning	$Pw+Pr \geq 30$ and $Pw > Pr$ and $Pw \text{ stk} < 30$
CM	Upland Conifer	Stands with a major component of shade-intolerant conifer species	Clearcut	$Pw+Pr+Pj+Sw+Ce+He+Bf \geq 70$
OR	Red Oak	Dominated by red oak	Shelterwood	$Or > (Mh+Be)$ and $Or \geq 40$
HD	Tolerant Hardwood Hemlock Lowland Hardwood	Stands with a major component of tolerant hardwood species or hemlock	Selection, group selection, shelterwood	$Mh+Aw+Be+Bd+Cb+Ew+By+Or+He \geq 50$ and $Po+Bw+Bf \leq 30$ or $He \geq 40$ or $Ce+Ab+La+Sb \geq 30$ and $Ab \geq 20$
CE	Lowland Cedar	Lowland – dominated by cedar and other conifers	Group selection, shelterwood, strip cut or patch clearcut	$Ce \geq 40$ and $Ce \geq Sb+La+Bf$
OC	Lowland Conifer	Lowland – dominated by Sb, La	Patch or strip clearcut	$Sb+La+Bf > Ce$ and $Sb+Ce+La+Bf+Ab+Ew > 40\%$
INT	Intolerant Hardwoods	Upland shade intolerant hardwoods, dominated by Po/Bw	Clearcut	$Po+Bw \geq 50$; all B-S (potential exists for timber production)
SW	White Spruce	Upland – planted or natural Sw	Row and/or selective thinning, shelterwood, clearcut	$Sw \geq 60$
MW	Mixed Wood	Upland – dominated by Mr, Po, Bw and mixed hardwoods and conifers	Clearcut or selection	Stands which do not fit any other parameter

Source - County of Renfrew Forestry Division

Table 5. Area of Renfrew County Forest Units

Forest Unit	Description	Hectares	Acres	%
CE	Lowland Cedar	378	934	7
CM	Upland Conifer	208	514	4
HD	Tolerant Hardwood – Hemlock	746	1,843	13
INT	Intolerant Hardwoods	1,191	2,943	21
MW	Mixed Wood	759	1,875	14
OC	Lowland Conifer	75	186	1
OR	Red Oak	304	752	6
PR	Red Pine (dominated by plantations)	918	2,269	17
PW1	White Pine	686	1,694	12
PW2	White Pine Mixed Wood	191	471	3
SW	White Spruce	99	245	2
Total		5,555	13,726	100

Source - County of Renfrew Forestry & GIS Division

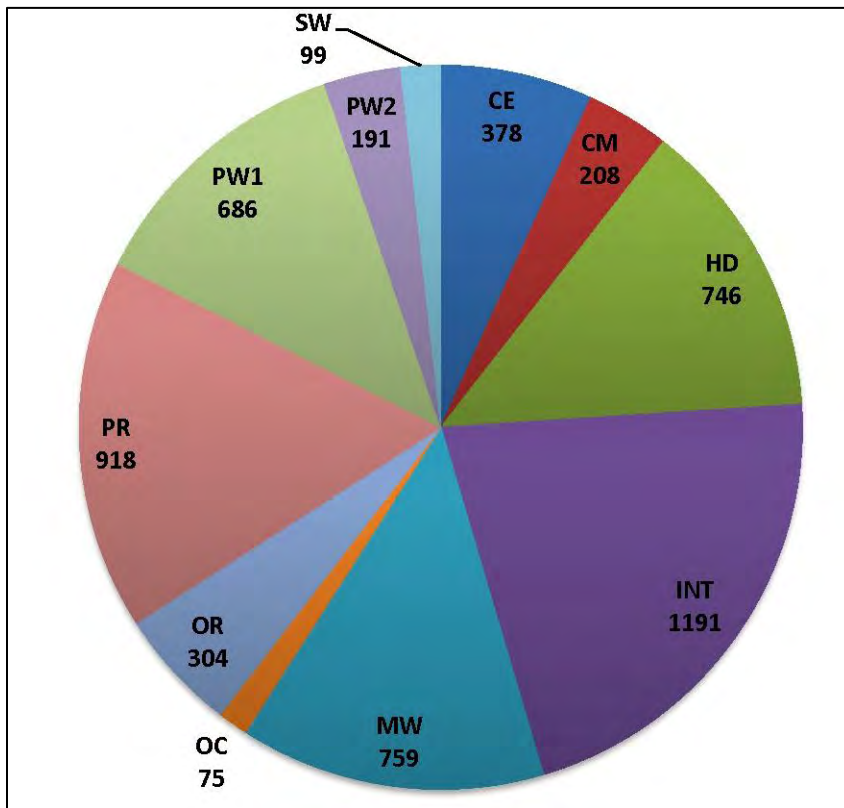


Figure 6. Area of Renfrew County Forest Units³² (ha)

³² See Table 4 for Forest Unit Descriptions. Source: County of Renfrew Forestry & GIS Division.

3.5 Forest Health

Forests are constantly changing. Many biotic and abiotic factors influence this change, while affecting the growth and survival of trees and forests. Abiotic factors are those that impact forests through natural events, including fire, wind events and drought. Biotic factors, such as insects and disease, also occur naturally. The risk and occurrence frequency of many non-native, introduced forest pests are on the rise, perhaps due to increased human-related vectors on the landscape. Low levels of disturbance are natural and healthy in a forest, and the general health condition of the RCF is good. Higher impact events are generally infrequent and infestations of natural pests are usually cyclical and eventually balanced out by natural predator processes.

3.5.1 Forest Fire

Prior to European settlement, fire was a normal, cyclical part of the natural landscape and forests were shaped by its impact. In the natural pine forests of Renfrew County, continual regeneration occurred through low intensity ground fires that exposed mineral soils and killed competitive species such as red maple, ironwood and poplar. The best current pine stands in the Ottawa Valley are the result of fires around the turn of the century in areas where an adequate seed source was present. Settlement, logging and land clearing removed larger pine trees that were the seed source for future forests. Furthermore, subsequent high intensity fires occurring in logging debris depleted soil nutrients, impeded natural pine regeneration and promoted the development of more adaptable, pioneer species such as poplar and white birch. Many of Renfrew County's modern-day poplar and white birch stands are logged pine stands that subsequently burned and converted to shade intolerant species.

Fire numbers, sizes and intensities in Southern Ontario have steadily decreased throughout the 20th century (see Table 6, below).

Table 6. Fire Frequency and Size Since 1921

Period	Average no. of Fires/Year	Average Fire Size (ha)	Average Area Burned/Year (ha)
1921-31	135	80	10,675
1971-81	103	2	206
1990-94	51	1.3	67

Source – Ottawa Valley Forest 2006-11 FMP

Modern fire fighting techniques have virtually eliminated fire's role in the RCF, and have for some time. Shade tolerant species such as balsam fir, ironwood and sugar maple have thrived under pine overstories, preventing the regeneration of new pine. These species react aggressively to forest disturbances such as harvesting, taking advantage of stand openings to out-compete pine. It is an ongoing challenge to regenerate pine naturally in the RCF. In the same way that current mature forests (70-100 years) show evidence of fire origin, the forests of the future will show the impacts of fire suppression on forest composition and structure. The

use of prescribed fire in regenerating pine and oak was successful in the past; however, high costs, safety concerns and protection of other forest and property values have limited the use of this tool in all of Ontario. While it is unlikely that many areas in RCF would meet the criteria required to implement a successful prescribed burn, it is still considered an effective silvicultural tool that could benefit pine and oak forest types on the landbase. The County will consider the use of prescribed burning as a silvicultural method and examine opportunities that may arise to partner with OMNRF and municipal fire departments to carry out treatments.

3.5.2 Wind

While severe windstorms were undoubtedly an instrument of forest change in the pre-settlement era, they were not as dominant as fire events. However, with improved fire suppression, wind has become the main agent of stand-replacing natural disturbance in Ottawa Valley forests in recent years.



Figure 7. Aftermath of 2006 windstorm in the Ottawa Valley.

Violent windstorms, such as tornados and microbursts, appear to be more frequent than in the past. In 1984 and 1999, large windstorms damaged extensive areas in Algonquin Park and surrounding areas. More localized storms affected areas of Laurentian Valley Township (2005) and the Upper Ottawa Valley (2006). In 2006, a violent tornado (rated F2 on the Fujita Scale) caused severe damage to a portion of Madawaska Valley Township. In July 2012, a severe wind event affected about 1,765ha in the Calabogie area³³. The K&P trail and several RCF Tracts in that area were affected, the most serious being the Virgin Lake Tract. A salvage harvest occurred to pick up about six hectares of blown down poplar-dominated forest, as well as a significant number of trees along the K&P trail.

Less intense wind events constantly change the forest. Single or small groups of trees occasionally blow down in localized thunderstorms. These types of disturbances favour the development of shade-tolerant species and result in multi-aged forest conditions. This is the type of small-scale disturbance the single-tree and group selection silvicultural systems strive to emulate.

³³ Forest Health Conditions in Ontario. MNRF. 2012. Queen's Printer for Ontario. <https://www.ontario.ca/document/forest-health-conditions-ontario-2012>

3.5.3 Drought

Drought events in Renfrew County have not historically been severe enough to have an impact on well-established, healthy forests. Small areas of scattered drought damage were reported in 1997 in Algonquin Park, and 2006 in red pine stands near Black Donald Lake, although this dieback has been attributed to a number of factors³⁴. However, the summer and fall of 2012 saw over 18,400ha³⁵ of moderate to severe drought damage in Renfrew County and a number of red pine plantations are still showing side effects four years later. Following drought events, numerous secondary pests typically increase in abundance, and this has been the case for Armillaria root rot and Ips pine beetle in red pine stands. Patch mortality has been observed in red pine plantations since 2012, some including up to 200 trees. A monitoring schedule has been put into place to monitor and initiate salvage operations if necessary on high-risk sites (shallow soil, history of mortality, etc.), but some timber will inevitably be lost. Time constraints make the monitoring of all red pine plantations annually unlikely, and experience has shown that drought-impacted red pine can go from seemingly healthy to unmerchantable in less than six months.

3.5.4 Insects

3.5.4.1 Native Insects

Native insects have always had an impact on forest conditions and influenced forest development. The most visible native insects are defoliators, such as the forest tent caterpillar and the fall webworm. Infestations of these pests are cyclical and in the absence of other factors, these insects do not generally result in extensive mortality. Nevertheless, if the forest is undergoing stress from prolonged drought or other factors, local mortality may be high.

Conifer defoliators, such as spruce budworm and jack pine budworm, may cause significant mortality. Extensive infestations of these pests may alter the stand structure considerably, and as trees die, forest fire risk increases. Cyclical outbreaks of these native pests occur every 10-30 years in Ontario, generally at a smaller scale in Renfrew County than more northern areas of Ontario, due to wider diversity of tree species³⁶.

Insects specific to red pine can have a very adverse affect on RCF plantations, which make up 17% of the productive forest land base. Of particular concern are the redheaded pine sawfly (affecting juvenile red pine) and several types of bark beetle. Infestations of these insects, when coupled with other stress factors, can result in high mortality.

³⁴ Managing Your Forest in a Changing Climate: Practical Advice for Renfrew County Woodlot Owners. Renfrew County Chapter of the Ontario Woodlot Association. April 2015.

³⁵ Forest Health Conditions in Ontario. MNRF. 2012. Queen's Printer for Ontario.
<https://www.ontario.ca/document/forest-health-conditions-ontario-2012>

³⁶ Forest Health Conditions in Ontario. MNRF. 2012. Queen's Printer for Ontario.
<https://www.ontario.ca/document/forest-health-conditions-ontario-2012>

White pine weevil has the potential to impact young white pine in Renfrew County. The larva of this insect feeds on the main shoot of young white pine, resulting in multiple tops and severe crooks in the tree. An effective means of dealing with this insect is through proper forest management. Weevils tend to avoid covered trees because they have small leaders and the microclimate in dense shade is sub-optimal for the weevil. Thus, white pine is ideally grown in shaded conditions until it is beyond the height to which the weevil can fly (approximately five metres).

Climate change may affect the numbers and types of native insects that have an impact on the RCF. For example, the mountain pine beetle, a native defoliator of western pines, is rapidly spreading east as a result of warmer winters. Forest managers attend annual updates and stay up-to-date on the latest pest trends to be better equipped to continually monitor for insect infestations.

3.5.4.2 Non-native Insects

Renfrew County trees are well adapted to the native insects that attack them. Limiting agents, such as predatory birds, insects or diseases, invariably lead to the end of periodic infestations. However, these natural limits on population are not present when the insects are invaders from other continents. For this reason, introduced pests have much greater potential to affect our forests.



Figure 8. Emerald Ash Borer, an invasive insect, has been confirmed in Renfrew County.

Gypsy moth was first observed in the County in 1986. These insects have been present in Europe and Asia for tens of thousands of years where native enemies have effectively controlled them. Gypsy moths prefer oak. However, in times of high infestation, they will attack any broad-leafed tree. Initially, there was great concern that this pest would cause major destruction in Renfrew County. It now appears that gypsy moths are naturally cyclical and they may not be any worse than native defoliators, such as the tent caterpillars.

More recently, the Asian long-horned beetle (China), the emerald ash borer (EAB) (Asia), hemlock woolly adelgid (Asia) and the pine shoot beetle (Eurasia) have made inroads into Ontario. As they have the potential to cause widespread mortality in a number of species, these insects are of major concern to forest managers. The development of biological controls, such as importing predatory insects, may hold the best hope for limiting the damage these invaders may cause. The development of resilient tree strains and ensuring diverse stand conditions may also minimize damage to forests.

Emerald ash borer was confirmed in Arnprior in 2013, and Renfrew in 2015 (Figure 8). Because of the expansion of the Canadian Food Inspection Agency's (CFIA) regulated zone to include Renfrew County in 2013, monitoring for presence has been limited. It is likely that EAB is present in other areas of Renfrew County. There will no doubt be increasing amounts of ash

mortality in towns and properties across Renfrew County. Since ash seldom comprises a major portion of any of our forest stands, EAB's economic affect on RCF is expected to be negligible, but the ecological impact remains to be seen.

3.5.5 Diseases

3.5.5.1 Native Diseases

Tending to kill single trees, native diseases do not normally cause extensive mortality in healthy tree populations. However, diseases can flourish when trees are stressed by other factors, such as drought and/or insect infestation, or past management practices have resulted in species growing "off-site".



Figure 9. Evidence of Armillaria root rot on red pine.

The most important native disease in the RCF is Armillaria root rot (Figure 9). Present in virtually all stands, this pathogen does not normally become a problem unless the trees are badly stressed. Armillaria is of particular importance in red pine plantations, where it may cause considerable loss in high-value products. Red pine pocket decline, where all red pine dies in round patches of varying size, is believed to be closely connected to Armillaria. Pocket decline has caused some mortality in plantations found at Golden Lake, Round Lake Complex, Germanicus and Ruby Tracts of the RCF. Depending on the inoculum load when plantations are nearing the end of their rotation, other species should be selected for regeneration in areas where Armillaria has resulted in significant mortality.

3.5.5.2 Non-native Diseases

Diseases introduced from Europe and Asia have had serious repercussions in the RCF. The most important of these diseases is white pine blister rust.

White pine blister rust first appeared in Ontario at the turn of the 20th century. Affecting white pine of all ages, this disease is particularly deadly to young trees (i.e., seedling to sapling stage). In some plantations of central Ontario, white pine blister rust has killed up to 95% of the planted trees. This disease requires specific site conditions: high humidity, cool, low-lying areas that do not get early morning sun or wind, and the presence of an alternate host species (plants of the *Ribes* family). When considering regenerating white pine, forest managers are wise to avoid low-lying areas, and north or east facing slopes.

At one time, there were extensive stands of American elm in Renfrew County. Dutch elm disease has decimated the elm trees that were once widespread in Ontario. Although individual trees in urban settings may be protected, there is no practical means to combat this disease in the rural forest. Ongoing research and development of Dutch elm disease-resistant trees appears to be the only hope of re-establishing this tree to its once wide range.

Although butternut is relatively uncommon in the RCF, it is present in the more eastern tracts. Butternut in Renfrew County is on the “leading edge” of butternut canker, which has spread rapidly from Wisconsin, where it was first reported in the 1960s. Due to the deadliness of this canker, butternut is now listed as an endangered species. The survival of the species is dependent on the identification and propagation of naturally resistant trees. Any butternut trees identified in RCF harvest areas are assessed by a certified Butternut Health Assessor. Even those that are “non-retainable” are generally left standing as diversity trees.

Beech bark disease has also been confirmed in Renfrew County, and in one RCF Tract to date (Ireland North, 2015). The scale insect has been observed in several tracts and it is expected that the full impacts of this invasive disease will be felt in the area in the next decade. Beech, although generally a minor component of tolerant hardwood stands in RCF, is an important wildlife species. Neighbouring forests dealing with more advanced stages of this disease have reported concerns with beech root suckers impeding regeneration of other species when dieback has occurred, or post-harvest if the disease is present. County forestry staff will include management responses in FOPs in areas with a beech component. It is possible that harvest plans may be accelerated for areas with a high beech component if the disease is identified. Staff will stay informed about management strategies being trialed on other forest landbases in Central Ontario and implement best practices on RCF during the 2017-26 FMP.

3.5.6 *Invasive Plants*

Invasive plants are a growing problem in south and central Ontario forests. Although most invasive plants that pose a significant threat to forest health and regeneration have not yet reached Renfrew County Forests, the experiences of community forests neighbours has shown that early detection is key.

Wild parsnip is a human health concern that is prevalent along many roadsides in Renfrew County, and has appeared on a few RCF tract landings and road systems. The presence of this plant can pose hazards for County Forestry staff and operators working on active harvest blocks.

Purple loosestrife is often observed at low levels in wetlands or swamps. In the 1990s, this plant was a significant concern for wetland ecosystems. The release of two European beetle species in 1992 has acted as an effective biocontrol for purple loosestrife. Staff will map occurrences and pull isolated pockets when encountered, if possible and appropriately timed.

Phragmites, although not yet mapped in any RCF tracts, is becoming more widespread throughout Renfrew County. It poses significant risks for wetland vegetation and wildlife, as well as increased fire hazards. Monitoring is ongoing for this species; however, treatment options are limited.

Garlic mustard, dog-strangling vine and buckthorn are the most concerning invasive plants for forest health and regeneration. They have the ability to spread rapidly in a forest understory, shading out native plants and regenerating tree species, preventing forests from regenerating successfully. Garlic mustard is present in scattered, isolated locations in Renfrew County, and buckthorn is present in some areas but none of these species has yet been discovered in RCF. Any infestations discovered in future must be dealt with promptly.

3.5.7 Climate Change

Scientific evidence suggests that climate change could impact Ontario's forests, causing changes in forest growth due to climate warming and changes in precipitation, changes in where tree species can successfully grow, and extreme weather events, wildfires and other natural disturbances^{37 38}.

Impacts on the management of RCF from a changing climate are already becoming visible and many have been discussed in this section: drought conditions causing dieback, declining health of species at the edge of their range (e.g., jack pine) and frequent, extreme wind events. In recent years, damage has been done to foliage and early flowers by early spring conditions followed by a hard frost. Some abnormally warm winters have prevented harvest access into areas where frozen conditions are required to protect soils. While not unheard of in the past, these weather events seem to be becoming more frequent.

Trees play an important role in mitigating impacts associated with climate change, by absorbing and storing carbon, both while living in the forest and when stored into wood products after harvesting. Applying sustainable forest management practices and managing for a healthy, vigorous forest are good actions to take against reducing greenhouse gases and mitigating climate change^{39 40}. Adaptive management and flexibility are important tools in any managed forest, and even more so under changing variables. County Forestry staff will stay abreast of science and experiences related to mitigating climate change impacts to forests and implement strategies where appropriate on an operational level. This may include:

- Increasing genetic diversity at the local level by including a proportion of seedlings in tree plants from seed zones to the south, as recommended by the [Forest Gene Conservation Association](#) and nursery suppliers.
- Evaluating research and trial opportunities for including minor species or those at the northern edge of their range (e.g., hickories or white oak) to increase stand diversity with species that may be more successful in a warmer climate.

³⁷ OMNRF. 2016. <https://www.ontario.ca/page/managed-forests-and-climate-change>

³⁸ Williamson, T.B.; Colombo, S.J.; Duinker, P.N.; Gray, P.A.; Hennessey, R.J.; Houle, D.; Johnston, M.H.; Ogden, A.E.; Spittlehouse, D.L. 2009. [Climate change and Canada's forests: from impacts to adaptation](#). Sustain. For. Manag. Netw. And Nat. Resour. Can., Can. For. Serv., North. For. Cent., Edmonton, AB. 104 p.

³⁹ OMNRF. 2016. <https://www.ontario.ca/page/managed-forests-and-climate-change>

⁴⁰ Renfrew County Chapter of the Ontario Woodlot Association. 2015. [Managing Your Forest in a Changing Climate: Practical Advice for Renfrew County Woodlot Owners](#).

3.5.8 *Forest Health Strategies*

A number of actions are already taking place on the RCF to manage and stay informed about forest health concerns. That said, there is little that can be done to slow the spread or reduce mortality from non-native pests and diseases that have no natural control mechanism. The forest needs time, in the long run, to achieve equilibrium with a new pest or disease. The following strategies are best-bets in maintaining a healthy forest.

- 1. Manage for a healthy forest.** The most effective strategy to help guard against pests and disease is to manage for a healthy, diverse forest and retain seed-producing, potentially resistant trees to carry on the gene pool of targeted tree species.
- 2. Stay current and informed on current and upcoming forest health threats.** Staff vigilance, training and the ability to react quickly to native and non-native invaders will be vital to effective RCF management.
- 3. Monitor and maintain an inventory of invasive species occurrences on the RCF.** A draft County of Renfrew Invasive Species Plan exists as a working document that is updated annually with known status of invasive species in RCF tracts, potential impacts, control methods and control plans for each species. A digital database of known occurrences is kept up to date. Provincial tracking database EDDMaps⁴¹ is also used to report invasive species sightings. A local Renfrew County Forest Health Network has been initiated as a means to share sightings and information amongst various forest workers and land managers in the area.
- 4. Work with operators to reduce risk of invasive plant seed transfer to RCF tracts.** A voluntary and educational approach is taken to encourage equipment cleaning before moving to RCF. Equipment washing should occur if equipment is moving from known infested areas.
- 5. Know the RCF landbase.** Efforts are made to undertake more frequent visits and monitoring in high risk areas, such as declining or stressed red pine plantations. Surveying will take place after known wind events. Monitoring does not occur specifically for forest health issues, but County forestry staff make observations during inventory updates, forest operations monitoring and other regular field work.
- 6. Salvage merchantable timber where possible.** In the event of unexpected natural events, such as wind, fire or drought, efforts will be made to make use of merchantable material. Artificial regeneration efforts will be considered, where appropriate. An amendment to the Forest Management Plan will not be required.

⁴¹ Early Detection & Distribution Mapping System, <https://www.eddmaps.org/ontario/>

4. LONG-TERM MANAGEMENT AND STRATEGIC DIRECTION

The Renfrew County Forest Management Plan is in place to act as a guiding document to the implementation of sound forestry practices and to facilitate management and operations that lead to the production and harvest of high-value forest products. As discussed throughout this plan, Provincial legislation and the best available science are consulted to ensure that forestry practices carried out on County forests are sustainable and maintain forest cover over time.

Like all sustainable forest management activities, the management of RCF hinges on balancing ecological, economic and social values. Ecological values include wildlife, flora, water features, wetlands, soils, and watershed health. Economic value includes harvested wood that supplies local mills and employs local woods workers, as well as revenue generated that sustains the Renfrew County Forestry program. Aside from the management of Renfrew County Forests, forestry staff provide expertise, support and services to the public, elected, municipalities and local forest industry. Many social benefits are provided by the RCF as well, including hunting and recreational opportunities, nature appreciation, and education. Social values also include the preservation of many cultural heritage features that exist on RCF tracts, and the recreational opportunities that exist.

4.1 Guiding Principles

Management of Renfrew County Forests is guided by the following principles:

- RCF is managed according to the code of good forestry practices, as defined in the *Forestry Act* (R.S.O 1990, Chapter F.26):

“the proper implementation of harvest, renewal, and maintenance activities known to be appropriate for the forest and environmental conditions under which they are being applied and that minimize detriments to forest values including significant ecosystems, important fish and wildlife habitat, soil and water quality and quantity, forest productivity and health and the aesthetics and recreational opportunities of the landscape”

- The RCF is owned by the Corporation of the County of Renfrew, and managed according to County of Renfrew objectives
- The RCF is a working forest
- Forest management, forest health, protection of forest values and associated forest operations take precedence over recreational activities
- All activities within the RCF must meet the objectives addressed in Section 10.2 of the Renfrew County Official Plan (Appendix 1)

Overarching objectives are discussed below and context is provided throughout this Forest Management Plan.

4.2 Plan Objectives & Strategies

The following objectives expand upon those defined in the draft (as of the date this FMP was approved) Renfrew County Official Plan. A number of strategies are identified below that will help achieve objectives throughout the plan term, and in the longer term.

4.2.1 *Manage the Forest in a way that Maximizes the Economic Sustainability of Forest Products, and Plan for a Balanced Forest Structure*

Recognizing the current unbalanced age and species structure of the County Forest, management strives to maximize the economic sustainability of forest products, and plans for a healthier, more balanced future forest structure.

As most RCF stands originated at approximately the same time, they have similar settlement and timber harvest history. Many were settled in the early 1900s, remained homesteads with various levels of land clearing, and were often cut over before their sale to the County in the 1950's and 1960's. The age class structure of RCF is illustrated in Figure 10 (all forest area) and Figure 11 (by forest unit). As a result, much of the RCF (particularly even-aged forest units: CM, INT, MW and PR) will reach optimal harvest age (70-90) at the same time.

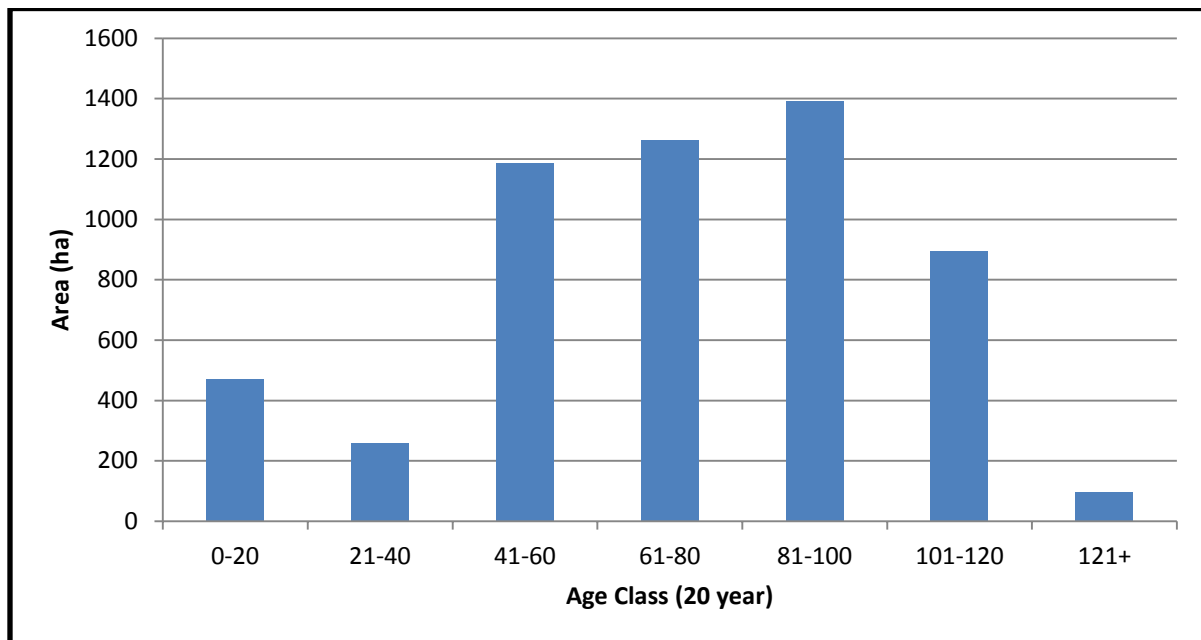


Figure 10. Age Class Structure of RCF (all forest units in hectares)

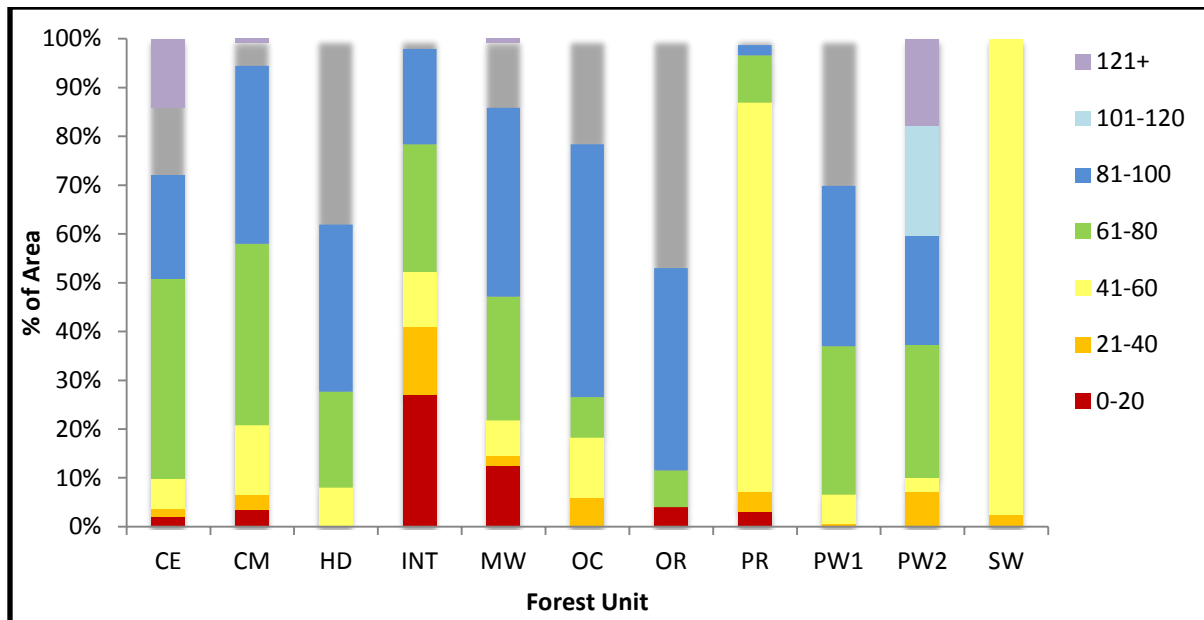


Figure 11. Age of RCF by Forest Unit (% of forest unit area)⁴²

The foresight of those responsible for acquiring RCF tracts, and planting what now makes up 17% of the landbase with red pine, combined with the current market value of red pine means that the RCF will see its most profitable years in the next two decades.

This age class structure, coupled with the transition of red pine plantations to natural forest in the next 30-40 years means long-term economic sustainability in the RCF will be challenging. Several strategies can improve the short, medium and long term economic sustainability of the RCF, and lead the forest to a more balanced future structure. More information on anticipated future harvest levels is provided in Section 4.3.1.

4.2.1.1 Economic Sustainability and Balancing the Future Forest Strategies

1. **Extend the rotation age of existing plantations and delay harvest of other forest area where possible.** Stands that exhibit characteristics of good health and vigour can be deferred from harvest for short periods of time to extend revenues. However, once peak yield has been reached in natural and planted forests or overall health is poor, harvest should occur as soon as possible to avoid losing value. This is especially critical in commercial thinning of red pine since delaying harvest can prevent high-value stands from achieving optimum growth and yield. It is more likely to find candidates for delayed harvest in stands dominated by long-lived species (e.g., white pine, hardwood, hemlock, red pine on optimal sites).
2. Where site conditions are appropriate (>5ha stand size, moderate-low levels of poplar/red maple competition, favourable soil conditions, no previous pine-specific pest/disease concerns), **use artificial regeneration methods** to ensure successful

⁴² Source: County of Renfrew Forest Resource Inventory. Some ages approximate.

renewal to pine forest types. This will help mitigate the anticipated decrease in pine forest in the future.

3. **Funding for regeneration on the RCF should be derived from harvest revenue.** It will be necessary to build up a renewal account over time to fund future regeneration efforts to maintain a pine component on the RCF landbase. More detail on the expected renewal costs are provided in Section 4.3.3.
4. **Complete a Forest Operation Prescription (FOP) and proper tree marking** for every stand where forest management activities are planned in the RCF, to improve the quality and health of the forest over time. The FOP is prepared and approved by County Forest staff, (who are members of the Ontario Professional Foresters Association) using field data to provide specific details for each stand to be harvested, including appropriate silvicultural practices, diversity and wildlife targets and any additional considerations that come up at the site level.
5. **Monitor operations** to ensure harvest is completed as planned, damage standards and standard operating procedures are abided by, and values are protected.
6. **Examine opportunities to improve quality of natural stands with a past management history.** Stands that were heavily harvested before acquisition were left with poor quality residuals that have stagnated over time and suppressed regeneration potential. Although there are currently limited or no markets for this material, conducting improvement harvests (potentially at a cost) of these areas would significantly improve forest health and vigour, encourage regeneration and decrease the time to next harvest.
7. **Review and update the Forest Management Plan every 10 years** to reflect the most current science and legislation, as well as plan forest management activities based on field observations and forest inventory.

4.2.2 *Protect and Enhance Wildlife and Fisheries Values*

This plan includes direction on the protection of wildlife and fisheries values (Section 5.6). Protection for fish and wildlife will be implemented based on current provincial and federal direction, experience of County Forest staff, and on-site conditions. The small scale and fragmented nature of the County Forest Tracts leads to unique situations where protection of a species is considered on a case-by-case level in most instances. County staff will continue to remain current on recommended direction and expand learning of flora and fauna identification and record-keeping to protect and improve the biodiversity of County forests. The preparation of an FOP for each planned harvest, along with tree marking and layout, lead to each stand being well-travelled before equipment arrives on site. Water features and wildlife features are mapped and protected as appropriate. County staff are on-site frequently during active operations, and operators are briefed to ensure that any values discovered during forest operations are protected.

4.2.2.2 Strategies for the protection and enhancement of wildlife and fisheries values:

1. **Observe, record and map water and wildlife features** encountered during prescription writing, tree marking and boundary layout. Values encountered at any time (including during active operations) require attention and protection if appropriate.
2. **Maintain unique forest types and tree species** through appropriate tree marking and silviculture practices.
3. **Forest operations will respect values protection measures** outlined in Section 5.6 and additional standards outlined in the FOP for each value present. Protection measures will be based on current provincial and federal direction, experience of County Forestry staff, and on-site conditions.
4. **Forest values will be recorded and added to the digital inventory of values**, to ensure knowledge of and protection in future.
5. **Forest areas containing or contributing to a range of significant features or functions may be defined as “High Conservation Values (HCV)”**. HCVs will be identified and mapped using available data and a report on these values will be updated on an ongoing basis, according to a framework and toolkit provided by the Eastern Ontario Model Forest. Management activities within HCVs will maintain or enhance the attributes of the forest. Further information is included in Section 5.6.10.
6. **County staff will remain current and informed** by reviewing new science and research pertaining to forestry and other forest values in the Great Lakes-St. Lawrence and attend related training as appropriate.

4.2.3 *Promote the RCF and Sustainable Forest Management*

Forest management on the RCF will strive to be an example of good forest stewardship in hopes of influencing responsible forestry practices on other forest lands within the County. An opportunity to encourage others to implement sustainable forest management practices should never be missed.

County Forestry staff provide information, presentations, tours and demonstrations when requested on a variety of forestry topics to a diverse range of audiences. Staff will continue to provide this support in an attempt to increase understanding, raise awareness and emphasize the value and importance of the forest on ecological, economic and social levels.

Opportunities to work cooperatively with various partners to effectively provide information and education to the public will continue to be evaluated and taken when appropriate. Examples of past and current partnerships include the Ontario Professional Foresters Association (OPFA), Forests Ontario, Shaw Woods Outdoor Education Centre (SWOEC), Canadian Institute of Forestry (CIF), Ontario Woodlot Association (OWA), and Eastern Ontario Model Forest (EOMF). Much valuable knowledge and experience has also been shared through a network of Community Forest Managers in Southern/Central Ontario and the Ontario Invasive Plants Council. Opportunities to participate in or contribute to research projects pertinent to forest management and the forest industry in Renfrew County will also be evaluated when they arise.



Figure 12. Forestry Connects brought urban students to RCF to learn forestry skills. Photo by Forests Ontario.

Promotion of sustainable forest management and the importance of the forest industry in Renfrew County is extremely important in increasing the public's understanding of how crucial the industry is to the area and how many benefits can be gained from the forest. In recent years, Renfrew County has facilitated the *Renfrew County Forestry Outreach & Education Group*, made up of local industry representatives and other interested forestry stakeholders and partners. This group has successfully reached thousands of people per year with positive forestry messaging and education, through career fairs, radio interviews, school group tours, classroom visits, planned activities during National Forest Week and more. This has undoubtedly had a positive impact on the perception of forestry in Renfrew County's youth, and the general public.

Renfrew County Council Resolution No. DP-CC-04-02-23 (February 26, 2004) approves County forestry staff to provide forest management consulting services to local municipalities, when requested, on municipally-owned properties. Forestry staff will continue to provide this service and will consider the provision of such services as being of high priority.

4.2.3.1 Strategies to promote the RCF and sustainable forestry

1. **Continue to provide outreach and information**, as requested, to municipalities, schools and other groups, in coordination with local industry and other partners.
2. Evaluate opportunities **for effective public outreach** with partners as they arise.
3. Evaluate opportunities **for partnership in the promotion of forestry or forest research** in Renfrew County as they arise.

4.2.4 Provide Recreational Opportunities

Although there are no official trails in County Forests that are managed by the County, the properties are available for recreation and enjoyment in many different ways. The many benefits of outdoor recreation are often understated; time in the woods provides health benefits, encourages physical and mental wellness, provides learning opportunities, and is a perfect place to spend time alone or together with loved ones. As a society, we are spending less time outdoors and more time sitting in cars and on couches. Access to local outdoor spaces and trails is found to be positively correlated with physical activity and lower rates of obesity⁴³. It is hoped that members of the public will use County Forests as an accessible and available opportunity to enjoy nature.

4.2.4.1 Strategies to provide recreational opportunities in RCF

1. Unless issues arise, such as damage to County Forests due to recreational use, **continue to permit recreational use of RCF by the public** according to the specifications in Section 4.4 and the County of Renfrew Trails Strategy⁴⁴.
2. During active forest operations, **take steps to avoid conflict between recreational users and operations**, including: post signage prior to the start-up of operations, identify trails that receive a high volume of usage (e.g., official snowmobile trails) and ensure that they are left clear of debris when operations are complete. If operations are anticipated to occur during hunting season, a notice sign with anticipated harvest dates and areas should be posted in advance of the opening of the season.

4.2.5 Rehabilitate Waste Lands and Lands Unsuitable for Agriculture

This objective was largely dealt with during the creation of the Agreement Forest in the 1950s and 60s, when land was acquired and planting occurred. In contrast to many Agreement Forest era landbases, only about 20% of the acquired land was unforested and subsequently planted at that time. However, the potential still exists for abandoned agricultural land to be purchased by the County and afforested. Any abandoned agricultural lands acquired will be managed in a way to bring them back to a forested condition, most often by tree planting. There were two such areas added to the RCF landbase during the 2011-2016 FMP term: the 150th Anniversary Tract and Sperberg Tract.

4.2.5.1 Strategies to rehabilitate waste lands and lands unsuitable for agriculture

1. **Examine opportunities for acquisition and reforestation** of marginal farmlands eligible for planting to red pine or forested land of species and age class that are underrepresented on the RCF landbase. Creating young forest conditions or acquiring

⁴³ Kline, J.D et al. 2011. A National Assessment of Physical Activity in US National Forests. Journal of Forestry.

⁴⁴ County of Renfrew Trails Strategy. May 25, 2016.

<http://www.countyofrenfrew.on.ca/documents/development-property/TrailsStrategy2016.pdf>

undermature forest would help lessen the age class gap that currently exists in the inventory.

4.2.6 *Protect and Conserve Water Resources by Preventing Erosion and Establishing Vegetative Cover*

This objective is largely related to the rehabilitation of lands discussed in Section 4.2.5. As previously discussed in Section 2.3, erosion and its effect on water resources were a major issue in the early 1900s. The reduction of forest cover by land clearing, burning and agriculture on sensitive soils had a major impact on the landscape of Southern Ontario. Although Renfrew County saw these impacts to a lesser degree, the lessons learned about the importance of forest cover and soil conservation are still important today. The benefits of the RCF tracts go far beyond economics and recreation – the ecological goods and services are impossible to measure.

In terms of operations on RCF tracts today, measures are put in place to mitigate impact on water resources. Equipment is not to damage soil adjacent to water courses in a way that could accelerate, direct or impede regular flow of water, cause sediment erosion into waterbodies or otherwise impact water quality. A strip of vegetative cover shall remain undisturbed directly adjacent to waterbodies to maintain a root mat that acts as a sediment filter. More details are provided in Section 5.6 on the protection of water features.

4.2.6.1 *Strategies to protect and conserve water resources in the RCF*

1. Roads, water crossings and access trails will be constructed, maintained and/or rehabilitated to **minimize adverse impacts** to water features and drainage patterns. Applicable approvals and permits will be obtained prior to construction.
2. **Water features will be protected** during forest management activities according to the direction in Section 5.6.

4.2.7 *Maintain Certification under an Internationally Recognized, 3rd Party Standard*

Forest certification is a process designed to encourage the sustainable management of forests throughout the world. Independent auditors evaluate forests to determine whether their owners are complying with sound forestry standards. This label provides assurance to both the woodlot owners and consumers of wood products that forests are being well managed⁴⁵. Wood harvested from the Renfrew County Forest purchased by mills with Chain of Custody certification can be marketed as FSC® Certified, and some mills report this as an advantage in securing sales, particularly for chips and dust that make their way to pulp and paper mills. The County did not have to make drastic changes to meet standards for FSC® certification since forest management plans had been in place for some time, directing activities on RCF according

⁴⁵ Eastern Ontario Model Forest. Context and History of Forest Certification in Canada, Ontario and the EOMF. http://www.eomf.on.ca/index.php?option=com_k2&view=item&layout=item&id=324&Itemid=360&lang=en

to sustainable forestry practices. As long as third-party certification remains applicable to sustainable forest management in GLSL forests, affordable and implementable on RCF, the County is committed to maintaining certification to provide extra public and market assurance that wood comes from sustainably managed forests.

If certification becomes uneconomical, administratively prohibitive or otherwise no longer appropriate, a system will be put in place for activities on RCF to be periodically audited by an impartial, 3rd party for sustainable forestry practices.

4.3 Long-term Management Direction

Several of the objectives and strategies above do not have short-term implications or results, and span far beyond the 10 year term of this Forest Management Plan. The intent of sustainable forest management is to make management decisions that will provide for future generations, ensuring that those that come after us will be able to derive the same economic, ecological and social benefits from the forest that we do today. This section provides additional information and context on the long-term management direction of the RCF, and rationale for action that must be taken for the good of the future forest.

4.3.1 Long-term Harvest Cycles and Economic Implications

Due to the age and species structure of the RCF, a long-term, constant revenue stream is not achievable. A change in operational planning methods since the 2011 FMP aims to prolong the revenue generated from the RCF by pushing non-mandatory (e.g., maintaining or limited loss of total stand volume) harvest areas forward into future terms. As is always the case, markets ultimately determine harvest levels on RCF, since the implementation of activities depends on the receipt of acceptable bids.

There is still a high level of harvest that must occur in the two 5-year terms of this plan (2017-26) to ensure value is not lost to natural mortality, and that growth conditions are improved, especially in red pine plantations. Figure 13 shows that the average five year harvest level that has been achieved from 2006-2015 (approximately 117 hectares per year) can be met over the next 30 years, if market conditions exist for all forest types/species. Although it appears that significant area will be available for harvest in 2027-31, it is worth noting that over 500 hectares of the 2027-31 harvest are in the mixedwood (MW) and intolerant mixedwood (INT) forest units, which as discussed in Section 3.4.1, have traditionally had a high proportion of low quality and poor stocking. Inventory updates and operational planning that will occur during the preparation of the 2027-2036 FMP will likely see more area pushed forward to future terms. This will help reduce the shortfall set to occur starting in 2047 when most mature or over-mature areas have been harvested, and an age gap exists from what is now the 0-40 year old forest.

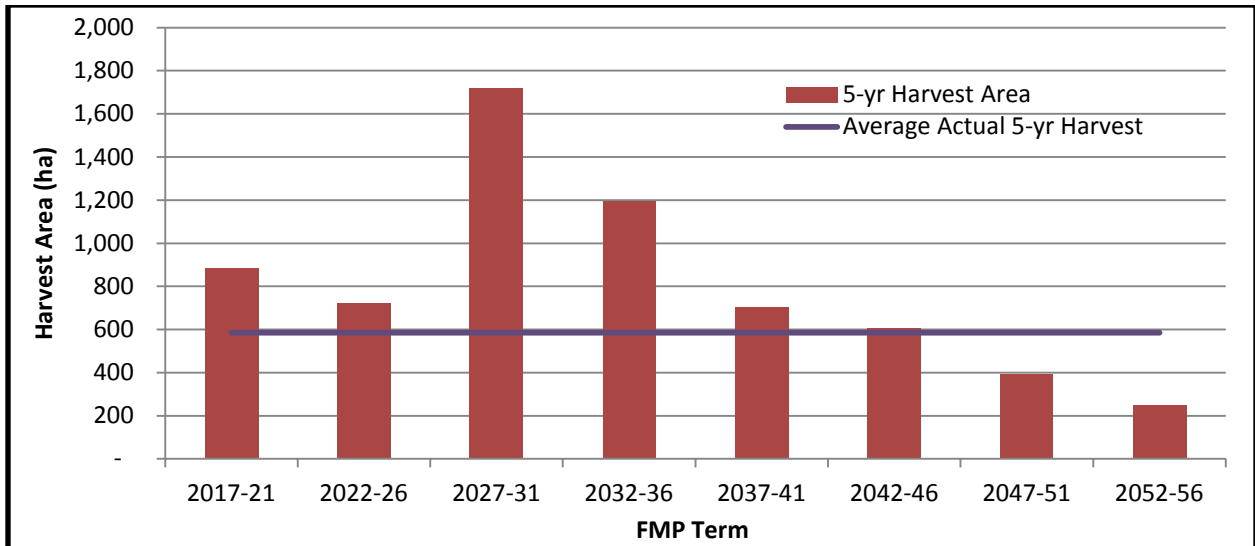


Figure 13. Total Projected Harvest Area (ha) from 2017 - 2056⁴⁶

Also worth recognizing is the age distribution and regeneration of RCF’s highest value stands, red pine plantations. The vast majority of these stands were planted in the early 1960s, have similar thinning schedules, and most will reach final removal conditions at the same time. Furthermore, as these stands become depleted, they will not all regenerate to species that are of equal economic value⁴⁷. Similar to the previous FMP term, second and third thinnings of many red pine plantations will yield very high volumes and high revenues (see Table 11) during the 2017-26 plan term. Most plantations will yield 2-3 subsequent thinnings that will also be high value. However, without new plantings, timber recovery of red pine after 2040 will fall.

⁴⁶ Based on current CoR Forest Resource Inventory. Projections into the future involve assumptions based on rotation age, return harvest cycles and current stage of management.

⁴⁷ This assumes the red pine will continue to be a high value product in future. This is impossible to predict, and future markets are unknown.

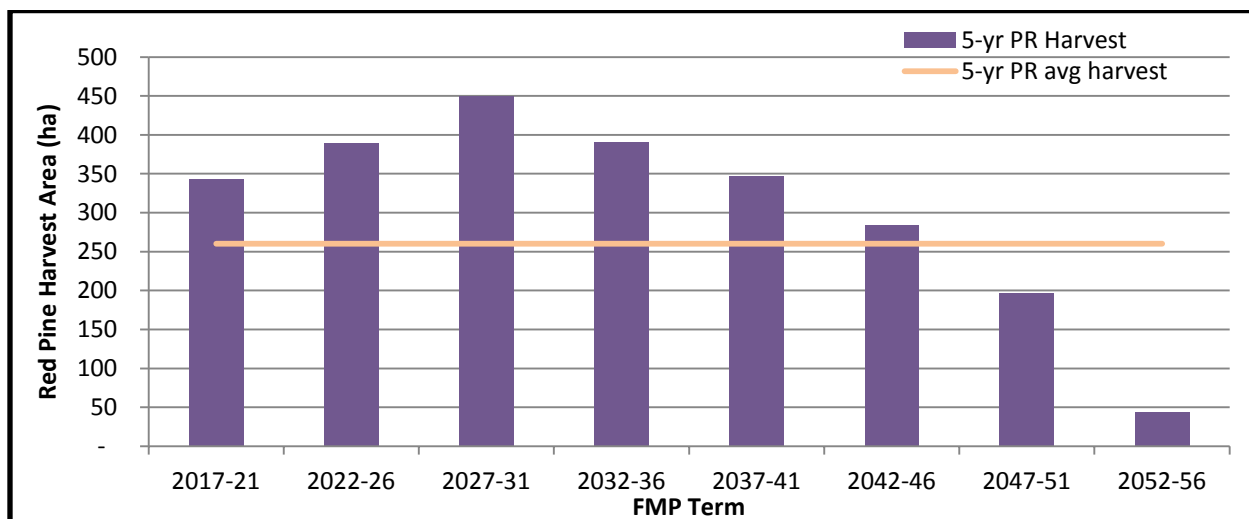


Figure 14. Projected Red Pine Harvest Area (ha) from 2017-2055⁴⁸

It cannot be overstated that, although it has been occurring at levels appropriate to the condition of the forest, the past and current harvest levels are not cannot be sustained in the long term on the RCF. There will be a period of 20-30 years, starting in the 2046 FMP term, when planned harvest levels will be significantly lower (50-70% less) than current actual harvest levels. Strategies have been outlined in Section 4.2.1.1 to mitigate this age class imbalance throughout the course of the plan.

Although economic sustainability is not achievable in the longer term, the forest will be continually improving in health, quality and value through good forest management practices. Age class and species diversity will improve if artificial regeneration activities are undertaken to ensure a pine component remains on the RCF. Ecological sustainability will be achieved through the protection of values, and increased with attention paid to providing more habitat types on the landbase.

4.3.2 *Maintaining or Increasing the Diversity of RCF*

As discussed in Section 2.3.1, the current forest condition has an overrepresentation of intolerant hardwoods and underrepresentation of pine forests, compared to what is expected to be present in the absence of human intervention. This plan has discussed at length that deliberate action will be necessary as a part of the management of RCF to maintain or increase the pine component of the future forest.

There are a number of reasons it is important to maintain or increase the diversity of forest types on the RCF. It cannot be predicted what the most desirable forest products of the future

⁴⁸ Based on current CoR FRI and includes projected return harvests. Assumes all plantations in their current stage of development will receive at least 1 additional thinning, 70% will receive 2, and 30% will receive 3 more thinnings. Assumptions based on current forest conditions and field observations of CoR forestry staff.

will be, making it advantageous to have a wide variety of tree species on the landbase. It is also unwise to manage for a limited number of species because new forest health concerns are continually arising, and tend to target specific species, sometimes with the potential to wipe out all trees of that species on the landscape.

Even though RCF tracts are spread out over the greater landbase of Renfrew County and are often small in nature, they provide important ecological value and refuge for wildlife. Sometimes surrounded by private land, RCF's objectives provide assured, continual habitat for a wide range of species. Every species of wildlife has specific criteria that it requires to be successful. It is desirable to have representative amounts of ecosystems and forest ages, so that all species of flora and fauna have an opportunity to meet their habitat needs. Managing the forest landbase for different species and ages encourages diversity on a larger scale, while values protection and planning on an operational level helps meet smaller scale requirements (e.g., protecting water features and retaining cavity and wildlife trees during tree marking).



Figure 15. Some red pine plantations are already naturally succeeding to other forest types.

Strategies for maintaining or increasing the diversity of RCF are discussed in Section 5.6.

4.3.3 Allocation of Forestry Revenue

As the preceding section illustrates, the structure of the RCF is not conducive to providing a steady and regular flow of income for a regimented and fixed annual budgeting system. Revenues generated from RCF will fluctuate over time according to markets and forest types available for harvest, but this plan aims to provide sustained revenue annually over the ten year term.

When harvests occur in natural areas with a significant pine component, reinvestment in the forest is necessary to ensure that these areas continue to be pine-dominated in future. Because these forest types naturally rely on fire to regenerate, it has been long proven to be difficult to renew them after forest management, without using fire or other substituting means as a tool. In the absence of fire, it will be necessary to carry out artificial regeneration activities: typically mechanical site preparation, chemical site preparation, tree planting and often one or two follow-up tending treatments. Preliminary assessments of harvest areas scheduled for 2017-2026 show that approximately 130 hectares of area will be cut in white and red pine areas which will require silviculture treatments to successfully regenerate to pine. The anticipated cost from 2017-2026 for this to occur is approximately \$260,000. Since this represents

approximately 15% of the forecasted revenue for 2017-2026 (further discussed in Section 7.2), it is recommended that:

15% of revenue derived from forest harvesting activities in the RCF be placed in a dedicated forest renewal account.

Longer term analysis shows that regeneration costs can be expected to increase in future terms, as red pine plantations approach final removals. FOPs in red pine plantation thinnings prescribe conditions to encourage natural seeding of white pine and protection of already established natural regeneration when present. In some cases, tolerant hardwood stands or natural white pine will establish in the understory, diversifying the County landbase. Depending on site conditions and naturally occurring regeneration, it may be necessary to underplant red pine plantations with white pine soon after second-to-last thinnings, or in situations where disease and forest pests are not a concern, to re-plant the site with red pine after the final removal. This comes at a cost: at current prices, from \$2,000-2,200/ha. The alternative is to do nothing and take what comes. Science and experience show that the passive management approach will lead to majority of the area naturally succeeding to intolerant hardwoods, balsam fir and other mixedwoods, which already make up a significant proportion of the RCF (almost 40%). Natural regeneration is preferred but success of desirable species can be very difficult due to limited seed sources and competition from faster-growing species. The same level of effort and investment will be necessary after white pine seeding cuts to ensure successful regeneration back to white pine, and also in other natural forest harvest areas identified as suitable for growing red pine. In anticipation of these future costs that will likely exceed 15% of revenue in future years, it is recommended that:

In years where revenues are in excess of budgeted, the excess should be committed to forestry reserves in order to finance future regeneration opportunities that arise for challenging, but high-value, species such as red and white pine.

The need for artificial regeneration treatments is identified at the site level during the development of the FOP or post-harvest and associated costs will be projected at that time. It is difficult to precisely project costs of renewal activities at the time of FMP preparation since FOPs are usually prepared a year or less prior to tendering, to ensure values are current and to use market conditions to plan harvests and optimize return.

Table 7 shows a very simplified overview of pine value and regeneration costs. The potential current value is calculated based on recent tender values of pine (from 2009-15), and assumes that all standing wood would be cut at once. It is important to note that while markets have recently been depressed, red pine has yielded the best price of all products during the past few years – more than six times the price per cubic metre as poplar. While it is likely that prices for wood will increase over time, it is less certain what products will be most desirable in the future. This is yet another reason it is important to have a diverse landbase to work with. It can be certain that the costs for renewal activities will also increase in the future. The future value of these current pine stands if no regeneration activities are undertaken and the area is allowed

to succeed to intolerant hardwoods and/or mixedwoods is also shown and is based on current average tender prices. It is clear that in today’s market, pine is a much more valuable species than intolerant hardwood and although regeneration costs are considerable, the investment is worthwhile when the stand reaches maturity. Today’s value of a hectare of mature red pine plantation is currently worth more than 10 times as much as a hectare of poplar. Again, markets are sure to change over the next 100 years but if the pine component is lost from the Renfrew County Forest, so will be the opportunity to capitalize on the value of different products and species. Not all area in red pine plantations will be suitable for regeneration of pine, and some areas will have regenerated naturally to desirable or less desirable species before the final removal, lessening the future renewal cost. However, to avoid losing the red pine component of the RCF completely, natural areas on good red pine sites should also receive treatment. White pine mixedwood (PW2) sites should also be targeted for renewal work to maintain or increase the future pine component.

There is an obligation as landowners of a sustainably managed forest to ensure regeneration occurs to appropriate forest types (as per Silvicultural Ground Rules and Regeneration Standards in Section 5.1), and to reinvest in the land that provides so many ecological, social and economic benefits to the County and the people who live here. Not only has a level of revenue from RCF become normal and expected, but several local mills depend on pine volume derived from harvests on the landbase.

Table 7. The Value of Red and White Pine and Associated Regeneration Costs

High-Value Forest Unit	Area Currently in RCF (ha)	Potential Current Value		Regeneration Cost to renew to pine		Future Value of Stand if Regenerated to Intol/mixedwood	
		\$/ha	\$	\$/ha	\$	\$/ha	\$
Red Pine (PR)	918	11,273	10,348,614	2,025	1,858,950	961	882,198
White Pine (PW1)	686	6,469	4,437,734	2,250	1,543,500	961	659,246

4.4 Additional Information on Recreational Use of RCF

Recreational use of the RCF is identified as an objective in the County Official Plan (Section 10.2 (3)). Sharing the benefits of access to County forested properties relies on the user's respect of the forest environment, the rights of other users and the recognition that forest management activities take priority over other uses. To formalize expectations and responsibilities of certain users, Land Use Permission Agreements will be required for certain activities.

4.4.1 Trails on Renfrew County Forest

The County of Renfrew does not presently construct or maintain any trails on the RCF and does not actively invite public use of existing trails. However, all RCF tracts have existing networks of

logging roads and skid trails, both old and new. To various extents, the public has used these corridors for recreational pursuits. For harvest operations and property access, logging companies and local residents have used existing roads under the auspices of an Access Agreement. In addition, without knowledge of or approval from the County of Renfrew, hunters, trappers, hikers and others have cleared many trails for ATVs, walking, skiing or other activities.

Notably, when County forests were managed by the OMNRF, there was an interpretive trail complex built and maintained by the OMNRF at the Beachburg Tract. Presently, the County of Renfrew does not maintain or support the use of these trails. Despite the lack of maintenance in the past, the trails continue to be used by members of the public and the trails are now kept in good repair by the Beachburg Off Road Cycling Association (BORCA)⁴⁹. The County of Renfrew has a Land Use Agreement with BORCA for trail development, enhancement and holding an annual event in the Little Lakes and Beachburg Tracts that is renewed annually. All new trail locations must be approved by County staff to ensure forest values and regeneration are protected. Efforts are made during operations to keep main trails free of debris, but no “buffers” will be left surrounding trails, and trails must be closed during active operations.

4.4.1.1 Minimal impact activities

Recreational users of the RCF enjoy a host of benefits such as healthy outdoor activities, nature appreciation and peace of mind. Minimal impact activities leave only footprints behind and participants in these activities can contribute to the knowledge and stewardship of the natural resources present within County forests.

Provided recreational users have consideration for forest management objectives and the needs of other forest users, the **following activities are examples of permitted** recreation within the RCF:

- Cross-country skiing
- Geocaching
- Hiking
- Nature study and appreciation
- Orienteering
- Snowshoeing

4.4.1.2 Pets and domestic animals in the RCF

Many County residents, particularly those living near County tracts, use the RCF to exercise their pets, as well as themselves.

Dog walking is a permitted activity within the RCF providing that dogs are kept under control or on-leash at all times. Pet owners are asked to consider other users and pick up pet waste when in frequently used areas.

⁴⁹ <http://www.borcatrails.com/>

Horseback riders must also consider other trail users and be mindful of the impact horses can have on soft trails, and that horse manure can be a vector for introduction of invasive plants and may lessen the enjoyment of those using trails on foot.

Grazing or pasturing of livestock in RCF is not permitted.

4.4.1.3 Snowmobiling

Snowmobiling is a well-organized and regulated sport in the Province of Ontario. Within the RCF, the Ontario Federation of Snowmobile Clubs (OFSC) maintains several trails over two OFSC Districts.

Club members ensure that trails are well kept and maintain signage. Trail permits are required by the OFSC. Furthermore, snowmobile clubs and the Ontario Provincial Police patrol the trails. County of Renfrew staff has good communication with the clubs and can easily address concerns, such as rerouting trails, when winter harvesting activities are planned.

Provided that Land Use Permission Agreements are in effect between the County and the snowmobile club, snowmobiling will be permitted on designated OFSC trails within the RCF.

The snowmobile club is responsible for ensuring that machines stay on trails and do not cause any damage to RCF values or regenerating trees. With the consent of County of Renfrew Forestry staff, trails may be expanded or re-routed, provided they do not negatively affect forest management goals or other forest values. The County reserves the right to restrict access if damage is occurring, especially where silvicultural investments have been made.

4.4.1.4 Mountain biking

Mountain biking, a fast-growing sport throughout Ontario, is a healthy, relatively low-impact use of the RCF. It is increasing in popularity, particularly in County forests that are close to developed areas. Generally, mountain biking has minimal impact on soils and vegetation. However, the potential for site degradation and conflict with other users exists.

Mountain biking is a permitted activity within the RCF; however, construction of new trails is prohibited unless authorized through a Land Use Permission Agreement. Organized groups require Land Use Permission Agreements when conducting activities within the RCF.

4.4.1.5 Off-road motorized vehicles (ORMVs)

For the purpose of this plan, an ORMV is defined as any motorized vehicle except snowmobiles designed for off-road use that has a maximum gross vehicle weight of 400kg. This includes all-terrain vehicles (ATVs) and motorcycles.

ORMV numbers are increasing dramatically province-wide and more ORMVs are frequently using Renfrew County properties for recreational use. However, unregulated and unrestricted use of ORMVs has resulted in problems in many jurisdictions. Trespassing, conflicts with other forest users and damage to the environment have resulted in complaints to County of Renfrew staff. Nevertheless, most ORMV users are respectful of the forest and other users. Greater

ORMV usage can be linked to expanded tourism opportunities, such as ORMV tours. ORMV restriction would have a negative impact on hunters, trappers, tourism operators and occasional recreational users.

ORMV use is permitted within the RCF. However, construction of new trails, installation of water crossings or upgrading of existing trails is prohibited unless authorized through a Land Use Permission Agreement. Furthermore, organized groups require Land Use Permission Agreements when conducting activities within the RCF. At the discretion of County of Renfrew Forestry staff, ORMVs may be prohibited in some areas if:

- Environmental damage is occurring;
- Conflict with other forest users is occurring; or
- Trespassing onto adjacent private land is occurring.

4.4.2 *Public Use of Renfrew County Forest Roads*

Historically, neighbouring landowners, logging companies, timber licensees and other members of the public have requested permission to cross RCF properties or use roads located on RCF lands to access adjacent properties. Most of these requests have been granted, as the County of Renfrew does not wish to interfere with the normal conduct of business. However, certain conditions, including environmental and liability considerations, must be met.

A frequent and undesired impact of roads in County forests is dumping of large amounts of garbage. **Dumping is strictly prohibited on RCF and charges may be laid if the perpetrator is identified.** Restriction or decommission of access may occur if risks of ecological impacts exist from dumping or activities that have a potential to negatively affect forest values.

Requests for permission to use roads located on RCF property will be considered on a case-by-case basis. Providing conditions described in the agreed upon Renfrew County Access Agreement are met, the County of Renfrew will continue to allow the use, upgrade or construction of roads within RCF tracts. An on-site meeting between the proponent and County staff must take place before any work occurs, to clarify terms and finalize details in the Access Agreement. Access agreements will be terminated if conditions are not adhered to, and penalties as outlined in Appendix 4 may apply if damage occurs. At the discretion of County of Renfrew staff, County of Renfrew may deny permission if the reason for the request does not satisfy environmental and liability considerations.

4.4.3 *Hunting*

Hunting is a traditional institution in the Ottawa Valley, with respect for and sustainable harvest of wildlife passed on from generation to generation. Many County businesses and schools make allowances for their employees and students to hunt during the November deer season.

Non-resident hunters support local tourist operators and businesses. In 2005, about 12,500 deer hunters generated approximately \$5.7 million for the local economy⁵⁰.

Hunting is permitted within the RCF, both under Ontario Hunting Regulations and Algonquin Harvest Management Plan except in active forest harvest operation areas, or in any manner which places the operator at risk. These areas will be posted as off-limits for hunting in as far in advance of opening day by County Staff as possible. Hunters are required to obey all regulations governing their activities, including, seasons, tags, bag limits, safety, etc. Only portable or temporary tree stands are permitted.

Bear baiting is also permitted within the RCF. **However, a Land Use Permission Agreement will be required.** This is to ensure the safety of Forestry Staff who may be working in the area, to avoid overlap in Tract use and mitigate conflict with other forest users. All regulations that apply on Crown lands also apply on County property, including those particularly critical to public safety: no hunting black bears within 400m of a waste disposal site, no baiting within 500m of a dwelling or public building, or within 200m of a public right of way. Hunters are required to be licensed and obey all regulations governing their activities, including seasons, bag limits, safety, etc. All bait containers (buckets, barrels, etc.) must be removed from RCF at the end of each hunting season.

4.4.4 *Fishing and Bait-Fishing*

There is limited suitable habitat for most fish species within the RCF. Although creek fishing for brook trout is possible on a number of tracts, only two County Forest tracts (Lorwall Lake Tract and Centennial Lake Tract) abut large lakes that provide greater angling opportunities.

There are many water bodies on RCF that are suitable for bait fishing (i.e., the capture of fish, frogs, leeches and crayfish). The Ontario Fishing Regulations define acceptable baitfish species and capture practices. In the commercial baitfish industry, both dealers and trappers require Provincial licenses.

Fishing and collection of baitfish for personal use is permitted within the RCF, provided that all Provincial regulations are obeyed. Commercial bait-fishing is permitted only when authorized under a Land Use Permission Agreement and under the provisions of the appropriate Provincial regulations.

4.4.5 *Trapping*

Although beaver damming and flooding are a natural process by which wetland and pond areas are expanded or created, there are negative impacts associated with high levels of beaver activity in a managed forest, as well as liability concerns for impacts on adjacent lands. For example, valuable stands have been partially or wholly destroyed as a result of beaver flooding,

⁵⁰ 2011-21 Ottawa Valley Forest Management Plan. Supplementary Document D: Social and Economic Description.

and existing or historical access has become impassible. Trapping is the chief means of keeping furbearer populations at healthy levels, including beaver.

OMNRF regulates provincial trapping to ensure the continued sustainability of the furbearer resource. In addition to limiting their harvests according to OMNRF regulations, trappers require licenses and written permission to trap on private property. There are 21 individuals holding OMNRF-administered trapping agreements with the County of Renfrew.

Trapping is a permitted activity within the RCF, provided an OMNRF-administered Landowner-Trapper Agreement has been authorized. These must be renewed every 5 years.

4.4.6 *Non-Timber Forest Products*

Increased awareness of the value of many non-timber forest products, such as mushrooms, fiddleheads and medicinal plants, has increased the harvesting of these products throughout Ontario. Less common or vulnerable species, such as wild leeks, are particularly susceptible to over-harvesting. Although responsible collection for personal use has a negligible effect on the sustainability of any species, commercial harvesting can have negative impacts. Harvesting of endangered species, such as ginseng, is illegal.

The collection of maple sap for maple syrup production is not permitted on the Renfrew County Forest.

With the exception of gathering sap for syrup production and species protected under the *Endangered Species Act*, responsible and sustainable harvesting of non-timber forest products for personal use is a permitted activity within the RCF. However, if warranted, County staff may restrict any harvesting.

4.4.7 *Special Use*

Historically many agreements have been approved between the County of Renfrew and organized groups using the RCF for special activities such a military training, scientific research, education, etc.

Special uses of the Renfrew County Forest will be considered on an individual basis. A Land Use Permission Agreement must authorize any special use activities. Evaluation for suitability will occur and, if appropriate to occur in the RCF, the resulting agreement will:

- Ensure that potential environmental impacts are mitigated;
- Ensure that activities do not conflict with forestry operations;
- Minimize impacts on other forest users;
- Ensure that liability issues are addressed;
- Reduce County supervisory or policing interventions.

4.5 Prohibited Activities

Renfrew County By-law 92-09, adopted on August 26, 2009, specifically prohibits a number of activities within the RCF. The By-law states that no person shall:

- a. remove, damage or deface County property;
- b. remove, damage or deface a relic, an artifact or natural object;
- c. damage, deface or disturb an archaeological or historical site;
- d. unlawfully disturb, cut, kill, remove or harm a plant or tree;
- e. unlawfully disturb, remove or harm a natural object;
- f. unlawfully conduct research;
- g. litter or cause litter;
- h. start a fire;
- i. permit domestic animal to disturb people, damage County property or vegetation, chase or harass wildlife or cause injury;
- j. introduce or possess a plant, animal or thing that may carry non-native or invasive species;
- k. unlawfully occupy land in County property; or
- l. unlawfully camp.

Upon conviction, any person who contravenes this By-law is subject to any penalty as provided in the *Provincial Offences Act*, and fines as outlined in Schedule A of By-law 92-09. A copy of By-law 92-09 is included in Appendix 4. The By-law may be periodically updated to deal with issues as they arise.

5. FOREST MANAGEMENT ACTIVITIES

5.1 Silvicultural Ground Rules

5.1.1 Introduction

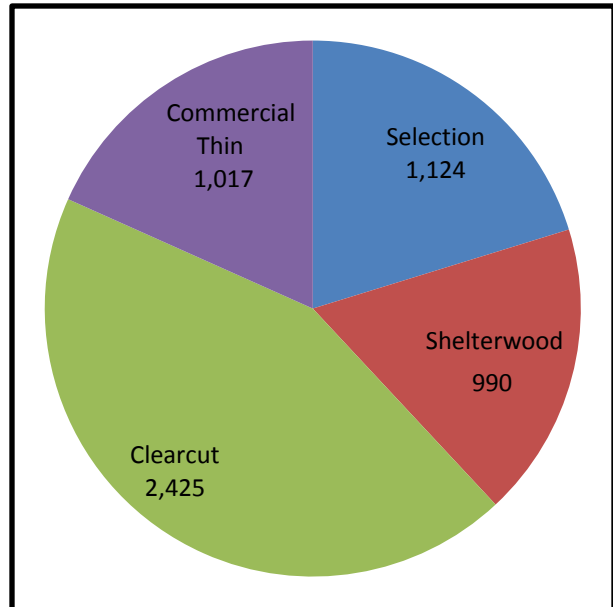
Extensive research, science and experience have shown that silvicultural treatments for specific forest types produce consistent, sustainable results. Silvicultural Ground Rules attempt to emulate natural processes. As a result of stand-replacing natural disturbance (e.g., fire), some forest types requiring high levels of light to regenerate as even-aged stands. Conversely, in areas where fire is unlikely to occur (e.g., a tolerant hardwood stand), forests develop differently, depending on singular tree death or small-scale windthrow for opportunities to regenerate.

RCF harvest and forest management activities will optimize economic efficiency. All forest management activities within natural stands will be designed to emulate natural disturbances and processes.

In Ontario, silvicultural guidelines developed for the Great Lakes-St. Lawrence Forest Region recommend best practices for specific forest units⁵¹. In the RCF, the following systems will apply:

- Single Tree Selection
- Group Selection
- Uniform Shelterwood
- Clearcut
- Thinning

High level details on the Silvicultural Ground Rules used in the RCF and applicable forest units can be viewed in Table 8. More detailed direction (target crown closure, basal area, species for removal, etc.) is included in each FOP, depending on stand conditions. The



Forest Management Guide to Silviculture in the Great Lakes-St. Lawrence and Boreal Forests of Ontario (2015) is consulted for direction.

Figure 16. Total Area (ha) of Renfrew County Forest by Silvicultural System.

Figure 16 shows the total area of the RCF according to which silvicultural system would be most commonly chosen to manage the forest type. Additional, more specific information is prescribed on a case-by-case basis in the Forest Operation Prescription, prepared by County staff.

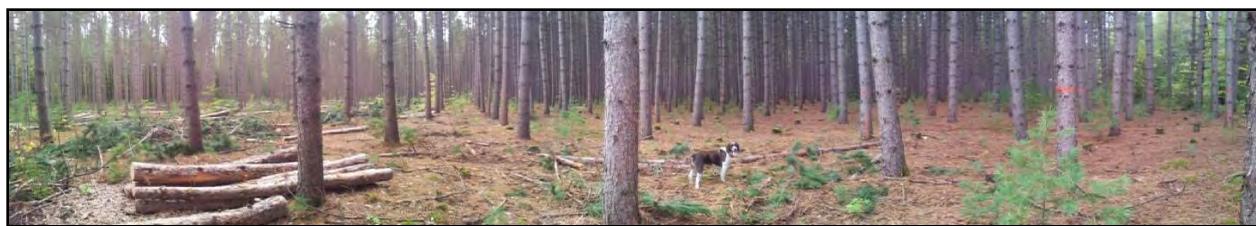


Figure 17. Red pine thinning operation in Beachburg Tract. Illustration of post-harvest (left) and pre-harvest (right) conditions in a third entry.

⁵¹ OMNRF. 2015. Ontario Forest Management Guide to Silviculture in the Great Lakes-St. Lawrence and Boreal Forests of Ontario. Toronto: Queens Printer for Ontario. 394pp.

Table 8. Silvicultural Ground Rules

Silvicultural System	SGR Code	Details	Retention and Regeneration Details	Return Cycle	Forest Units Where Applicable
Single Tree Selection	SEL	An uneven-aged silvicultural system that emulates single-tree disturbance in a stand. This system is appropriate for shade-tolerant forest types that can regenerate under a partial (50-60%) crown closure.	High quality trees that will survive until the next harvest rotation are retained and lower quality or diseased trees are removed to improve the overall quality and vigor of the stand. Regeneration occurs by natural seed from residual trees.	Harvesting occurs more frequently (~30 years) since partial cutting leaves approximately 2/3 of the trees standing to further develop.	Tolerant Hardwood (HD), Mixedwood (MW)
Group Selection	GSEL	A modification of the selection system where trees are removed in small groups to create larger openings in the canopy for the regeneration of mid-tolerant tree species. Uneven-aged conditions are created or maintained. This emulates natural disturbance that would be caused by small-scale windthrow or die-back. The level of shade created by the edge of the openings reduces competition by shade-intolerant species. Opening size varies by desired regeneration species and site characteristics. Single-tree selection may occur between openings when appropriate.	High quality seed trees of species desired for natural regeneration in group openings will be retained surrounding the opening. Site disturbance is desirable in the opening to improve seedbed conditions. Single-tree selection between openings follows the direction above.	~30 years for area between openings, ~70-80 years in openings.	Tolerant Hardwood (HD) with a high component of mid-tolerant species such as Yellow Birch, White Ash or Black Cherry. Sometimes appropriate in Cedar (CE), Hemlock and Red Oak (OR).

Silvicultural System	SGR Code	Details	Retention and Regeneration Details	Return Cycle	Forest Units Where Applicable
Uniform Shelterwood	US	An even-aged silviculture system that occurs through a sequence of management stages. The stage of management depends on the current stand conditions and may include commercial thinning, preparatory cut, seeding or regeneration cut and removal harvests. This system is intended to emulate low-intensity fire, leaving a varying level of canopy to aid in the natural regeneration of mid-tolerant tree species.	At the prep cut stage, future crop/seed trees should be identified and focus should be on developing the seed-producing potential of the crowns. At the regeneration stage, the best trees should be retained and spaced appropriately to allow sufficient sunlight to penetrate to the forest floor and start the regeneration process of the future stand. Once regeneration is fully established and past the risk of pest damage (e.g., weevil in white pine), the removal harvest will release the new stand. Harvest and site disturbance should be timed with good seed years if possible to increase success rate of natural regeneration.	Timing between stages of management depends on species and site conditions. The stand will be monitored and intervention will occur at the appropriate times. From final removal to next harvest is ~50-70 years.	Red Oak (OR) and stands with a high component of White Pine (PW1, PW2), Tolerant Hardwood (HD) stands on poor sites or in a two-aged condition.
Clearcut	CC	This even-aged silviculture system emulates stand-replacing disturbances (e.g., larger-scale blowdown or high-intensity fire) that are necessary to regenerate shade-intolerant species. Variations include strip, patch and seed-tree cuts.	Natural regeneration is highly successful in intolerant hardwoods and mixedwoods. In most cases, trees of desired species (Pw, Pr) that have a minor component in the stand are retained as seed sources. Another common scenario, due to past management practices, is an already established understory (e.g., tolerant hardwood) that would be retained as the future stand after the overstory is removed.	When an understory is present, return harvest can be within 40-60 years. Otherwise, 70-80 years is typical.	Lowland Cedar (CE), Upland Conifer (CM), Intolerant Hardwoods (INT), Mixedwoods (MW), Lowland Conifer (OC), White Pine Mixedwood (PW2)

Silvicultural System	SGR Code	Details	Retention and Regeneration Details	Return Cycle	Forest Units Where Applicable
Commercial Thinning	CT	Appropriate in high-density even-aged stands where residual trees would benefit from increased space and resources, most often plantations in the RCF. Properly timed thinnings maximize the growth and quality of remaining stems while maintaining general stand health and providing a regular supply of forest products.	The desired outcome is for an understory to become established in later thinnings that allow increased light to penetrate to the forest floor. The original intent of many red pine plantations was to stabilize the site for the future natural establishment of other forest types (e.g., tolerant hardwood). If white pine is present, they are preferentially retained as a seed source. When regeneration is established, the remaining overstory will be removed to facilitate development of the future stand.	Timing between thinnings will vary based on a number of factors. These stands are continually monitored and thinnings are planned at the appropriate times (generally 7-15 years).	Red Pine (PR), White Spruce (SW), White Pine (PW1)

5.2 Forest Operations Prescriptions

5.2.1 Introduction

Forest Operations Prescriptions (FOPs) are site and stand specific operational plans that describe the forest management activities and objectives for a particular area. FOPs prescribe the silvicultural treatments (as described in the silvicultural ground rules) that will be completed to achieve forest sustainability. An FOP is mandatory for any forest management activity within the RCF.

An example of an FOP template is attached in Appendix 5. The template is continually improved for clarity and efficiency purposes, and to ensure all regulatory requirements are being met.

5.2.2 Data Collection and Stand Analysis

Prior to developing the FOP, stand level data sufficient for the complexity of the stand must be collected. Data collection methods include: intensive timber cruising, scouting “walk-through”, air photo interpretation, historical research, or any combination of these techniques. Data gathered will include:

- Tree species, size category and quality class;
- Site features (topography, soils, landforms);
- Regeneration (species, stocking, stage of development);
- Access (existing and proposed);
- Values observed (stick nests, specific wildlife habitat, wetlands, etc.);
- Other observations that will assist in the development of the FOP (recommended season of operation, projected harvest volumes, boundary issues, etc.).



Figure 18. Data collection is an important component of preparing an FOP.

5.2.3 FOP Development

FOPs are best estimates based on the information available. They are intended to be flexible and should be able to adjust to varying stand conditions.

Following data analysis, FOPs state long and short-term objectives. These objectives include: future desired forest unit, planned tending and renewal operations, monitoring, etc. Prescribed treatments must match those allowed by the silvicultural ground rules.

Forest Operations Prescriptions for RCF must be certified by a member of the Ontario Professional Foresters Association in good standing.

5.2.4 *Implementing Forest Operations Prescriptions*

FOPs identify the proposed forest management activity and the tasks required to achieve it. These tasks may include: tree marking by certified tree markers, boundary location, identifying and laying out area of concern prescriptions, etc. Through effective auditing practices, Forestry staff will ensure that the provisions of the FOP are properly implemented.

5.3 Harvesting

There are a large variety of harvesting systems available for timber harvesting operations within the RCF. Conventional cut and skid, using chain saws and skidders, as well as mechanized harvesting (using feller-bunchers and grapple or cable skidders) are the most common systems in the County. In red pine plantations, mechanical harvesters and forwarders are commonly used. Generally, the contractor decides the harvest equipment system. If any system of harvesting equipment is not acceptable on a specific site, it will be indicated in the tender notice.



Figure 19. Conventional harvesting on the RCF.

Each timber sale's Terms of Reference includes Careful Logging Standards, which outline thresholds for logging damage to residuals, regeneration and damage to the physical environment (e.g., rutting standards). County staff will monitor operations to ensure adherence to the specified standards. Penalties are associated with non-compliance to the standards and are also outlined in the Terms of Reference.

5.3.1 *Criteria and Guidelines for the Sale of Timber*

5.3.1.1 *Overall Strategy*

- Provide a fair and transparent opportunity for all prospective buyers
- Utilize criteria that will aid in selecting capable prospective buyers
- Where all other factors are equal, preference will be given to prospective buyers who employ workers residing in Renfrew County and/or deliver timber products to Renfrew County forest industry establishments

5.3.1.2 Sale Terms

- Per unit sales (i.e., contractor pays for forest products actually harvested) will be the preferred methods in most areas. Special circumstances may warrant a lump sum sale (e.g., small wood volume, specialty product).
- In areas where economic, silvicultural or access factors may affect the ability of the County of Renfrew to market timber, direct hiring of a contractor, without a tendering process, may be used.
- Salvage operations, such as recovering wind-thrown, burned, flooded, diseased or insect-damaged timber may be made at the discretion of County staff without a public tender process.
- All sales will be subject to a comprehensive sales agreement, including Terms of Reference that will include the FOP for the tendered area. Terms of Reference have been developed by County staff and will be reviewed with prospective contractors prior to the commencement of operations.

5.3.1.3 Tender Information

Tender packages will include:

- Contract Terms of Reference
- Clear identification of sale area
- Approximate volumes (by species) available for harvest
- Comprehensive map package
- Forest Operations Prescription

5.3.1.4 Awarding of Tenders

- Tenders will be opened according to County of Renfrew standard operating procedures.
- Any member of the public may attend tender openings.
- Tenders will not necessarily be awarded. If, in the opinion of County of Renfrew staff, the County does not receive good value, the tender will not be awarded. Past experience with prospective bidders may also influence whether or not a tender is awarded.

5.4 Renewal and Tending

Renewal and tending refers to the regeneration of the forest and the tending treatments required to achieve silvicultural goals. Natural regeneration is encouraged in most forest units, but artificial means will likely be necessary in difficult-to-regenerate forest units (pine) in order to maintain them on the RCF landbase.

In some cases, natural conditions have aligned to regenerate areas with red and white pine (Figure 20), and advanced regeneration is always protected during operations. In other cases, less desirable competing species have made desired regeneration efforts a failure. As discussed in Section 4.3.3, investment in artificial regeneration treatments will be necessary during this plan term in natural pine areas, in order to maintain the pine component in the future forest. Proper timing and commitment to follow up is critical for regeneration since competition increases dramatically with each growing season post-harvest.



Figure 20. Some red pine plantations have natural white pine regenerating in the understory. This is not the norm.

When available, opportunities will be taken to align regeneration programs with those of adjacent landowners and those with larger

silvicultural programs, and to learn from the expertise and experience of others. Treatments may be deferred for one to three years if more area is expected to require treatment nearby, in an attempt to lower costs. It is expected that most stands that would benefit from artificial renewal treatment will be less than 15 hectares in size (the average size of a pine stand in the RCF is 8 hectares), but treatment should not be carried out in isolated stands less than 3 hectares except in extraordinary circumstances or where work can be carried out in-house. Historically, small plantations have become lost investments because they cannot be accessed economically for follow-up treatments.

As previously discussed in Section 3.5.1, prescribed burning will be evaluated as a silvicultural tool in regenerating challenging species such as pine and oak. Site conditions, public safety, protection of property and cost are determining factors for suitability of prescribed burning.

Some silviculture treatments are appropriate at a later stage in stand development. Pre-commercial thinning is often necessary in young (<30 year old) plantations to maximize future value by speeding up the natural thinning process in overstocked stands. Pre-commercial tending can also be a valuable tool in natural stands that are overstocked, to increase quality

and vigour of remaining stems. There is a cost associated with this treatment, unless speciality markets for undersized material exist. Similarly, conducting stand improvement treatments which remove poor quality stems, usually at a cost, can lead to a greater return on investment in the future forest. Stand improvement increases the health and vigour of remaining stems by making more resources (sunlight, water and nutrients) available through the removal of unhealthy, diseased or poor quality stems. There are a number of stands in RCF which would benefit from stand improvement, even if in the form of an incentive paid or discount given during harvest to facilitate the removal of unmerchantable stems. This will be evaluated by Forestry Staff during the course of this plan term.

Tending (e.g., control of competing vegetation, insecticide use, pruning, etc.) is usually limited to areas where a silvicultural investment has been made, or when natural pine regeneration has established but is overtopped by competition. Methods of tending generally include manual (brushsaw), manual-chemical (brushsaw with chemical applicator) or chemical (air-blast spray). Guidelines for pesticide use are detailed in Section 5.4.1.

5.4.1 Pesticide Use

In some situations, the judicious application of pesticides or herbicides may be the only economical option to effectively tend forest stands, or prevent significant loss to forest pests or invasive species. Herbicides are an effective means to prepare a competitive site for planting of pine, and reduce the reliance on post-plant tending which can sometimes result in damage to planted trees. If herbicide or insecticide use is prescribed, it will be conducted according to the following guidelines.

- Application must be supervised by a licensed applicator.
- Application must meet Ministry of Environment regulations as per the *Pesticides Act* (R.S.O. 1990).
- Buffers must be applied to areas of concern such as water bodies, wetlands, and streams⁵².
 - Aerial spraying must apply buffers as prescribed in the *Ontario Ministry of Environment/Ontario Ministry of Natural Resources Buffer Zone Guidelines for Aerial Application of Pesticides in Crown Forests of Ontario* (1992)
 - Machine based ground application of herbicides (e.g., air-blast sprayers mounted on skidders) must leave a 30m buffer for significant areas⁵³ and 60m for sensitive areas⁵⁴.
 - Hand-based ground application of herbicides (e.g., Back-pack sprayers) must leave a 3m setback⁵⁵.

⁵² Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. 2010. OMNRF. And Ontario Ministry of Environment/Ontario Ministry of Natural Resources Buffer Zone Guidelines for Aerial Application of Pesticides in Crown Forests of Ontario. February 1992.

⁵³ Significant areas include lakes, rivers, ponds and streams.

⁵⁴ Sensitive areas include PSWs, critical fish habitat, fish sanctuaries and hatcheries, stocked lakes and rivers, threatened and endangered aquatic species habitat and patented land. Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. 2010. OMNRF.

- Herbicides or pesticides used on the RCF must be in accordance with FSC® Pest Management Objectives⁵⁵. The list of “highly hazardous” pesticides changes frequently and should be checked if specific treatments are being considered.
- Buffers may be required adjacent to private property, if dwellings are within 120m of spray boundary.
- Traffic control will be required on public roads directly adjacent to treatment area during application of aerial or machine-based ground treatment.
- Sites treated must be indicated with appropriate signage at all access points of the treated area (roads, trails).

5.5 Inspection and Monitoring

All forest management activities must be monitored to ensure compliance with the FOP. The terms and conditions of all timber sales agreements will stipulate penalties, in the form of liquidated damages, for non-compliance.

Harvesting operations will be inspected on a weekly basis at a minimum, with proper documentation of start-up, observations and communication throughout. A report will be completed at the end of each operation, and filed appropriately. All other forest management activities will be monitored and inspected as required and documented accordingly.

Values are monitored as appropriate, before, during and after operations to ensure that forest management activities are in accordance with prescriptions and have effectively protected values.

All harvest areas will be monitored by County forest staff for regeneration success and the inventory will be updated accordingly when areas have reached “free-to-grow” status. Survey methods will vary depending on circumstances but staff will remain mindful and informed about techniques used by other forest managers in the GLSL. Regeneration standards for RCF can be viewed in Appendix 7. The FOP details specific regeneration considerations and plans for each stand prior to harvest.

⁵⁵ Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. 2010. OMNRF.

⁵⁶ <https://ic.fsc.org/en/our-impact/program-areas/forest-program/pesticides>

5.6 Values Protection in the RCF

RCF has a variety of forest values, habitats and historic remnants. Some of these values are fairly static and identified in the inventory (e.g., lakes, rivers, wetlands). Other values change locations over time and are identified when encountered, such as stick nests. Cultural values, such as homestead remnants, are often encountered during field work and are protected during operations. All identified values are given consideration during the planning of forest operations with details described in the FOP.

An area of concern is a defined geographic zone that contains a specific non-timber value within a block selected for forest management activities. Forest management activities may require modification to prevent, mitigate or minimize adverse effects arising from planned operations. Table 10 contains general information about protection of values commonly encountered in the RCF. Additional detail is provided in the Forest Operation Prescription which is determined to be appropriate based on the actual ground conditions of the value, and the scope and intensity of the operation. The Stand and Site Guide is consulted for values protection guidance, as well as any more recent habitat descriptions or peer-reviewed science. The CoR reserves the right to alter values protection from listed above if the situation warrants, based on science, field experience and professional judgement, to balance forest values, as long as the ecological value is not negatively impacted. Values less frequently encountered that are not listed in this table will still receive appropriate protection, based on the best available science.

The most commonly encountered values in RCF, as well as species at risk that have potential to be encountered, are discussed in the following sections.

5.6.1 Wetlands

Wetlands are lands that are either seasonally or permanently covered by shallow water. They also include areas where the water table is close to, or at, the surface. Wetlands are an essential component of County forest ecosystems. They provide environmental, economic and social benefits that are not easily measured.

Wetlands:

- Provide important wildlife, fisheries and vegetation habitat;
- Control and store surface water;
- Improve water quality by trapping and/or filtering sediments and contaminants;



Figure 21. Example of a marsh, emphasized or created by beaver. The standing dead trees make ideal nesting perches for heron rookeries.

- Provide recreational and educational opportunities.

The “Evaluation System for Wetlands of Ontario” (OMNRF 1984) was developed in response to an increasing concern for the need to conserve wetland habitats in Ontario. The principal evaluation components include biological, hydrological, social, and special features. The evaluation system describes four types of wetlands: bogs⁵⁷, fens⁵⁸, swamps⁵⁹ and marshes⁶⁰, all of which occur within the RCF. These have been identified using the MNR inventory and values layers and are refined and updated based on field data. To minimize impacts on the broader ecosystem, forestry operations in and around wetlands must be carefully considered.

Five RCF tracts have been identified as having “Provincially Significant Wetlands” within their boundaries: Budd Mills, Little Lakes, Afleskie, Killaloe and Sherwood River. Forestry operations will be planned in a manner which will not adversely impact these identified values. General protection measures are outlined in Table 10.

5.6.1.1 Beaver Management

The beaver is a very important species in wetland areas of the RCF. They create habitat for many species that contribute to the rich biodiversity of the Forest, including other furbearers, waterfowl and moose. Common practice of leaving unharvested reserves adjacent to waterbodies over the last 30+ years has created unnaturally mature forest surrounding most water features in the forest. In the absence of fire suppression, this area would be burned right to the shoreline, creating a flush of new growth that is favoured by the beaver. Lack of young forest surrounding water bodies has led to previously inhabited area being abandoned by beavers⁶¹.

Where high-value stands (e.g., red pine plantations) are not adjacent to wetlands, it may be desirable to re-establish beaver populations. Where slopes are stable and not erosion prone, this will be achieved by clearcutting to a portion of the water’s edge. The proportion of the water body that is eligible will depend on the forest type (e.g., preferred species for beaver use), the size of the water body and the potential for fish habitat. The Stand and Site Guide will be used as a reference to guide operations⁶². These clearcut areas will regenerate intolerant hardwoods, such as poplar, which will encourage beaver repopulation.

⁵⁷ Bogs are peat-filled depressions or peat-filled areas with a high water table and surface carpeted with moss.

Highly acidic and can be treed (<25% cover) or treeless. Typically dominated by black spruce if trees are present.

⁵⁸ Fens are peatlands typically consisting of mosses and sedges. More plant diversity than bogs. Groundwater fed.

⁵⁹ Swamps are wooded wetlands with 25% cover or more trees or tall shrubs.

⁶⁰ Marshes are periodically or permanently flooded with standing or slow-moving water.

⁶¹ OMNR. 2010. Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. Toronto: Queen’s Printer for Ontario. 211 pp.

⁶² OMNR. 2010. Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. Toronto: Queen’s Printer for Ontario. 211 pp.

5.6.2 *Lakes, Streams and Ponds*

The riparian areas located within RCF contain a surprisingly diverse and ecologically important fishery. Dominated by non-game species, these fish provide food for a wide variety of birds and animals. Brook trout (speckled trout) have historically been found in the creeks and streams of many RCF tracts. Although most of these creeks do not support the large trout required for a sport fishery, they may provide nursery areas where small trout are safe from larger predators. Two major lakes adjacent to County forest tracts, Lorwall Lake and Centennial Lake, do support important sport fisheries. Furthermore, many smaller ponds within County forests contain baitfish that could provide the local baitfish industry with saleable minnows. Water features that do not support fish habitat also serve important ecological functions.

To protect water quality and riparian habitat, areas adjacent to lakes, rivers, creeks and streams may require modified harvesting operations. Dimensions of modified areas will consider terrain, natural disturbance patterns of different forest types, thermal regime and sensitivity of the feature, and susceptibility to erosion. The Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (2010) provides good guidance to assist in the determination of necessary protection measures. General protection measures are outlined in Table 10, and more details are provided in each FOP.

When crossing a creek or stream, crossing locations are to be kept to a minimum. Crossing locations will be selected to minimize impacts on stream flow and water quality. Suitable structures (i.e., culverts, portable bridges, temporary log decks, etc.) will be utilized as required in accordance with legislated requirements. The operational Terms of Reference included with each timber sale further outline the requirements when a water crossing is required.

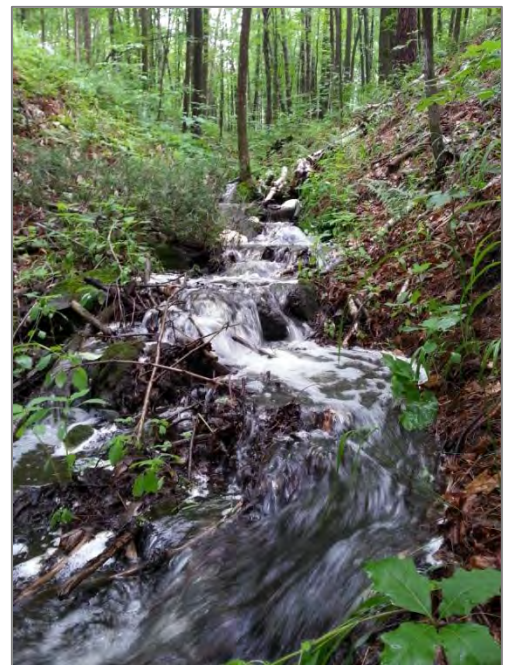


Figure 22. Some streams exist as a result of surrounding topography and are temporal in nature.

5.6.3 Species at Risk

A Species at Risk (SAR) is any naturally-occurring plant or animal that is in danger of extinction or extirpation from the Province of Ontario. Pembroke District OMNRF has compiled a list of species at risk that occur or have the potential to occur within Renfrew County. Many of these species are located in areas where forest operations will not occur, including rock barrens, ponds, wetlands, waterbodies and shorelines. Table 9 lists potential and present species at risk in the RCF at this time.

There are several classes that rank the status of the species at risk, according to federal designation (COSEWIC) and Ontario Provincial designation (COSSARO). Endangered (END) means a species that is facing imminent extirpation or extinction. Threatened (THR) means a species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. A species of Special Concern (SC) is one that may become threatened or endangered because of a combination of biological characteristics and identified threats.

Species at risk presence confirmed within County forest tracts or within distance to be affected by forest operations will be dealt with on a case-by-case basis, with protection of habitat being afforded as required according to the most recent legislation, currently the *Endangered Species Act (2007)* and Habitat Regulations.



Figure 23. American Ginseng

5.6.3.1 American Ginseng

Ginseng is at risk mainly due to over-collection by illegal harvesters. The County will strive to preserve encountered patches by discretely maintaining adequate forest cover to preserve the habitat conditions required for continued presence and avoiding damage to the plants by harvesting and skidding equipment.

5.6.3.2 Turtles

A number of species of turtles at risk are prevalent in Renfrew County. Wood turtle, Blanding's turtle, eastern musk turtle, spiny softshell turtle, northern map turtle and snapping turtle all have populations in the area, some of which are among the largest concentrations in Ontario. Road mortality and collection for illegal pet trade are the main threats to turtles. Impacts to turtles are mitigated on County forests through modified operations around water features confirmed as habitat and timing restrictions during the active season on harvest, renewal and tending operations. Habitat Regulations⁶³ and the Stand and Site Guide⁶⁴ will be consulted when operating in turtle habitat to ensure adequate protection is prescribed.

⁶³ <http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/268554.html>

⁶⁴ OMNR. 2010. Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. Toronto: Queen's Printer for Ontario. 211 pp.

5.6.3.3 Butternut

Butternut trees are currently dying en masse due to an introduced pathogen known as butternut canker. It is believed that some specimens of the tree may have natural resistance to the pathogen; therefore it is desirable to retain healthy butternut in hopes of providing seed for the future. All encountered butternut trees in County forest operating areas are assessed by a County staff member who is a certified Butternut Health Assessor. If identified as not retainable, the tree may be marked and is eligible for harvest. If the tree is healthy and identified as retainable, the tree will be protected during operations. Group selection or shelterwood harvest surrounding healthy butternut trees is encouraged to facilitate natural regeneration of this shade-intolerant species.



Figure 24. Butternut canker on a butternut tree in the RCF.

Table 9. Potential and Present Species at Risk within the Renfrew County Forest

Group	Common Name	Ontario Status (SARO)	National Status (COSEWIC)	ESA Habitat (Regulated or General)	Confirmed in County	Confirmed in County Forest
Plant	American Ginseng	END	END	General	Y	Y
	Butternut	END	END	General	Y	Y
	Kentucky Coffee Tree	THR	THR	General	Y	
	Pale-bellied frost lichen	END	END	Regulated	Y	
	Flooded jellyskin	NAR	SC	n/a	Y	
	Blunt-lobed Woodsia	END	THR	General		
	Ogden's Pondweed	END	END	General		
	Black-foam Lichen	DD	THR			
Birds	Barn Owl	END	END	Regulated	Y	
	Golden Eagle	END	NAR	General	Y	Y
	Kirtland's Warbler	END	END	General	Y	
	Loggerhead Shrike	END	END	General	Y	
	American White Pelican	THR	NAR	Regulated	Y	
	Bank Swallow	THR	THR	General	Y	
	Barn Swallow	THR	THR	General	Y	
	Bobolink	THR	THR	General	Y	Y
	Cerulean Warbler	THR	END	General	Y	
	Chimney Swift	THR	THR	General	Y	
	Eastern Meadowlark	THR	THR	General	Y	
	Whip-poor-will	THR	THR	General	Y	Y
	Least Bittern	THR	THR	General	Y	
	Bald Eagle	SC	NAR	n/a	Y	Y
	Black Tern	SC	NAR	n/a	Y	
	Canada Warbler	SC	THR	n/a	Y	
	Common Nighthawk	SC	THR	n/a	Y	Y
	Golden-winged Warbler	SC	THR	n/a	Y	
	Olive-sided Flycatcher	SC	THR	n/a	Y	
	Peregrine Falcon	SC	SC	n/a	Y	
	Red-headed Woodpecker	SC	THR	n/a	Y	
	Rusty Blackbird	SC	SC	n/a	Y	
	Short-eared Owl	SC	SC	n/a	Y	
	Eastern Wood Pewee	SC	SC	n/a	Y	
	Grasshopper Sparrow	SC	SC	n/a	Y	
	Wood Thrush	SC	THR	n/a	Y	
Henslow's Sparrow	END	END	General			

Group	Common Name	Ontario Status (SARO)	National Status (COSEWIC)	ESA Habitat (Regulated or General)	Confirmed in County	Confirmed in County Forest
	Piping Plover	END	END	General		
	Red Knot	END	END	General		
	Red-necked Phalarope	SC	SC	n/a		
	Louisiana Waterthrush	SC	THR	n/a		
	Whooping Crane	NAR	END	n/a		
	Yellow Rail	SC	SC	n/a		
Reptiles	Wood Turtle	END	THR	Regulated	Y	Y
	Blanding's Turtle	THR	THR	General	Y	Y
	Eastern Musk Turtle	SC	SC	n/a	Y	
	Spiny Softshell	THR	END	General	Y	
	Northern Map Turtle	SC	SC	n/a	Y	
	Snapping Turtle	SC	SC	n/a	Y	Y
	Spotted Turtle	END	END	by 2013		
	Eastern ribbonsnake	SC	SC	n/a	Y	
	Milksnake	NAR	SC	n/a	Y	Y
	Eastern Hog-nosed Snake	THR	THR	General		
	Gray Ratsnake	THR	THR (GLSL pop)	Regulated		
Amphibians	Western Chorus Frog	NAR	THR	n/a	Y	
	Common Five-lined Skink	SC (GLSL pop)	SC (GLSL pop)	n/a		
Mammals	Eastern Cougar	END	DD	General	Y	
	Algonquin (Eastern) Wolf	THR	SC	General	Y	Y
	Eastern small-footed Myotis (bat)	END		General	Y	
	Little Brown Myotis (bat)	END	END	General	Y	
	Northern Myotis (bat)	END	END	General	Y	
	Tri-coloured Bat	END	END	General	Y	
	Grey fox	THR	THR	by 2013		
Aquatics	American Eel	END	END	General	Y	
	Lake Sturgeon	THR (GLSL pop)	THR (GLSL pop)	General	Y	
	River Redhorse	SC	SC	n/a	Y	
	Hickorynut	END	END	General	Y	
	Eastern Sand Darter	END	THR	General		
	Shortjaw Cisco	THR	THR	General		

Group	Common Name	Ontario Status (SARO)	National Status (COSEWIC)	ESA Habitat (Regulated or General)	Confirmed in County	Confirmed in County Forest
	Northern Brook Lamprey	SC	SC	n/a		
	Deepwater Sculpin	NAR	SC	n/a		
Insects	Bogbean Buckmoth	END	END	Regulated	Y	
	Monarch Butterfly	SC	SC	n/a	Y	Y
	Rusty-patched Bumble Bee	END	END	Regulated		
	Riverine Clubtail	END	END	General		
	Gypsy Cuckoo Bumble Bee	END	NAR	General		
	Yellow-banded Bumble Bee	END	NAR	General		
	Northern Barrens Tiger Beetle	END	END	Regulated		
	Rapids Clubtail	END	END	Regulated		
	West Virginia White	SC	n/a	n/a		

Source – OMNRF Pembroke District and County of Renfrew Staff. As of June 2016. Subject to change.

END – Endangered

THR – Threatened

SC – Special Concern

NAR – Not at Risk

DD – Data Deficient

SARO – Species at Risk in Ontario List

GLSL pop – Great Lakes-St. Lawrence Population

ESA – Endangered Species Act

COSEWIC – Committee on the Status of Endangered Wildlife in Canada

SARA – Species at Risk Act

5.6.4 Other Wildlife

The RCF contains a rich variety of habitats and an equally rich diversity of wildlife. Big-game species include moose, white-tailed deer and black bear. With the reintroduction of elk in the last 10 years to Central Ontario, this species is becoming more visible in Renfrew County and has been observed in some RCF tracts. Virtually all fur-bearers, small mammals and birds present in Renfrew County can be encountered in County forests.



Figure 25. Deer benefit from tops left behind during winter harvests. Photo by A.Hobbs.

The deer population is generally increasing throughout southeastern Ontario, including Renfrew County. In the agricultural regions of the County, farmers experience extensive crop damage due to deer browsing and rural deer-vehicle collisions is common. Given the fragmented nature of the County Forest and the healthy deer population, no formal measures are put into place on County property to specifically manage for deer on the landscape level. Harvesting generally creates browse for ungulate species and

often low, dense areas used by deer for cover in winter are inoperable and left unharvested. Depending on the silvicultural system and the time of year harvesting occurs, stand-level considerations for browse creation or winter cover protection may be written into forest operation prescriptions, as described in Table 10.

Wild turkeys were re-introduced to eastern Ontario in the late 1980s. The population has succeeded to the point where a regulated hunting season now exists. Wild turkeys are present in the County forest, but no specific management considerations are in place except to leave any nests encountered undisturbed.

5.6.5 *Stick Nests*

Forest nesting raptors, including goshawks as well as broad-winged, Cooper's, red-shouldered, red-tailed and sharp-shinned hawks, are present in the RCF. Although varied somewhat to apply to private lands, forest operations will follow provincial guidelines and will adhere to all applicable legislation concerning forest raptors (i.e., *Migratory Birds Convention Act* and *Fish and Wildlife Conservation Act*).



Figure 26. Active broad-winged hawk nest.

To ensure the protection of stick nests and the birds that use them, variable width reserves and timing restrictions (for occupied nests) dependant on bird species will be used, using the *Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales* (Stand and Site Guide)⁶⁵. No bird nest will be intentionally destroyed and any active nest will be protected from disturbance, including those of songbirds. General information about the protection of bird nests is described in Table 10.

⁶⁵ OMNR. 2010. *Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales*. Toronto: Queen's Printer for Ontario. 211 pp.

5.6.6 *Special Habitat Features*

Following a fire or other natural disturbance (e.g., windstorm), or as a result of natural forest succession, a combination of live, dead, and dying trees provide structure and special habitat features for wildlife. The structures and special habitat features preferred by wildlife varies widely. Trees retained during forest operations, with the intent to provide structure and features beneficial to wildlife in general, and for specific species, groups or communities, are collectively referred to as wildlife trees.

Cavity trees are dead, dying or live trees with a cavity or cavities, or have the potential to develop cavities. They provide birds and mammals with sites for nesting, feeding, evading predators, hibernating or denning. Mast trees produce a variety of edible fruits food (e.g., acorns, cherries) for numerous animal species. Scattered conifer trees in a deciduous-dominated stand provide important cover and foraging for bird, small mammals and deer. Supercanopy trees are large trees that emerge above the main canopy of a stand and are commonly used by black bears for refuge, as well as large birds and hawks for nest, roost or perch sites.

General guidelines are as follows:

- Minimum overall retention should be ≥ 25 stems/ha
- Wildlife trees should be generally well dispersed; at least 15/ha should occur as individual stems. The rest may occur in clumps.
- Retain an average of ≥ 10 large (>38 cm DBH where available) cavity trees or large stubs per hectare. At least 5/ha of these should be living.
- Retain an average of ≥ 10 mast trees/ha
- Retain an average of ≥ 10 scattered coniferous trees/ha
- Retain an average of ≥ 1 supercanopy tree/4 ha (>60 cm DBH preferred)

Wildlife trees should be greater than 25 cm DBH and windfirm. The above targets will have varying levels of applicability depending on silviculture system. In addition, long-lived veteran



Figure 27. Wildlife trees are marked for retention.

trees (healthy, large specimens of cedar, white pine, red pine, and hemlock,) should be targeted as wildlife trees in all phases of operations to develop into supercanopy trees and maintain desirable genetic diversity. Anomalies within the forest composition (e.g., individual or rare specimens) should also be retained as diversity trees. Single wildlife trees with more than one wildlife attribute can be double-counted to meet several of the targets above. The FOP will provide specific direction on special habitat features for each harvest and wildlife trees will either be marked in blue by County Forest staff or identified for retention by trained operators.

5.6.7 Old Growth Forest

Old growth forests typically are a result of lack of or low levels of human intervention or natural disturbance for a long period of time, resulting in complex stand structure and ecosystem function. Due to the relatively recent (1920-1960) disturbance history of virtually all of RCF, there is currently no old growth component. At first glance, it would appear that there are stands in the FRI that are “old” - greater than 120 years is generally considered overmature for most tree species.



Figure 28. Stand exhibiting potential for future old growth.

However, stands in the FRI with a year of origin prior to 1910 do not reflect old growth conditions since they were heavily disturbed prior to acquisition. Species that were desirable at the time were removed and poor quality or undesirable species (usually short-lived) were left.

For the purposes of this Forest Management Plan, old growth forests are defined as:

A condition of dynamic forest ecosystems that tends to include complex forest stand structure, relatively large dead standing trees (snags), accumulations of downed woody material, up-turned stumps, root and soil mounds, accelerating tree mortality, and ecosystem functions that may operate at different rates or intensities compared with earlier stages of forest development⁶⁶.

A large proportion of RCF is currently mature and some will likely age into old growth naturally. RCF staff will identify candidate areas that exhibit characteristics of old growth and have the potential to continue to develop further.

⁶⁶ OMNR. March 2010. Forest Management Guide for Great Lakes-St. Lawrence Forests. Toronto: Queen’s Printer for Ontario. 57 pp.

These characteristics include⁶⁷:

- Forest dominated by late-successional tree species (sugar maple, beech, hemlock, white pine, white cedar)
- High levels of structural diversity including snags, downed woody material and pit and mound topography
- High basal area
- Significant representation of trees greater than 50cm DBH
- Multi-layered canopy

Future old growth areas will still be eligible for forest management but operations may be modified to retain old-growth characteristics⁶⁸ in representative areas. Managing some area for old growth will increase the age class and ecological diversity of the County forest but contribution to the landscape for wildlife value will be limited due to the fragmented nature of the forest. Specifically managing to increase old growth is not an objective of this plan given that the RCF is a small, geographically scattered forest with relatively limited contribution potential to the larger landbase, therefore no area targets are set. One stand with old growth potential was identified during the course of the 2011 FMP, and classified as an HCV.

5.6.8 Cultural Values

Cultural values include man-made or natural features associated with historic use by Algonquins or European settlers as well as features associated with current uses of the forest.

A large portion of the RCF tracts were previously settled and evidence of original homesteads and stone fences remain. Most RCF properties were originally agricultural lands that were granted to the original settlers as early as the mid-1800s. Evidence of these early settlers abounds on many tracts, including original stone or stump fences, building foundations and remnants, and stone wells. Periodically, new values, such as grave sites, are discovered.



Figure 29. Stone fences are plentiful and impressive in the RCF.

Efforts continue to document these in a database as encountered, as well as adding those discovered before a digital database was in place. Forestry staff will work with appropriate groups and authorities to develop strategies to assess cultural heritage values on the RCF.

⁶⁷ OMNR. 2003. Old Growth Policy for Ontario's Crown Forests. Toronto: Queen's Printer for Ontario; and *Forest Management Plan for the Bancroft Minden Forest*. 2011.

⁶⁸ OMNR. 2004. Ontario Tree Marking Guide. Version 1.1. Toronto: Queen's Printer for Ontario. 252p.

These groups and authorities may include government agencies, local historical societies, and First Nations communities. Protection of these cultural heritage features is described in Table 10.

Current uses of the RCF are described in Section 4.4. While these are not activities that warrant alterations to forest management, efforts are made to reduce conflict between other forest users and forest operations, such as keeping heavily used trails clear of debris and posting signage to alert users of pending operations.

5.6.9 First Nations Values

County of Renfrew's Forestry Division strives to have a strong working relationship with the Renfrew County Algonquin communities. The Algonquins of Ontario and the County of Renfrew share many similar goals and objectives in regard to local socio-economic conditions. The harvest of non-timber products (such as birch bark for canoes and other traditional Algonquin products) from the RCF has been with the active participation of County forestry staff. RCF staff will continue to inform local Algonquins of the location of plants, such as bloodroot, and timber products, such as black ash for basket production, when requested.

RCF staff will continue to pursue training activities and other learning opportunities to expand their understanding of traditional and non-traditional Algonquin values that may be present in the RCF.

5.6.10 High Conservation Values

Some of the values identified in RCF qualify as High Conservation Values (HCV) as defined in accordance with Principle 9 and Appendix E of the Forest Stewardship Council® (FSC®) certification document "FSC Forest Stewardship Standard: Great Lakes-St. Lawrence Region (Draft 3.0, 2010). All values encountered in the field are mapped and added to the RCF Values Database. Those that qualify as HCVs are identified as such and reported annually, in a separate process from this FMP. Many HCVs are confidential in nature, so are not identified on publically available maps. The public is invited to identify any values during the FMP development process, through a notice to review the draft FMP and provide input.

Six categories of High Conservation Values are identified from the FSC® Standards:

- Category 1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia);
- Category 2: Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;
- Category 3: Forest areas that are in or contain rare, threatened or endangered ecosystems;

- Category 4: Forest areas that provide basic services of nature in critical situations (e.g., watershed protection, erosion control);
- Category 5: Forest areas fundamental to meeting basic needs of local communities (e.g., subsistence, health); and,
- Category 6: Forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Currently, HCVs are identified in the RCF for Categories 1, 3 and 6. Management guidance and monitoring plans are in place as part of the frequently updated HCV report. Protection of values aligns with the direction included in this FMP.

Table 10. Area of Concern Direction for Renfrew County Forests

Value	Code	AOC Width (m)	Harvest Modification Guidelines	Roads, Landings, Pits, Extraction trails ⁶⁹
Water				
Provincially Significant Wetlands	PSW	120	<ul style="list-style-type: none"> Retain residual forest within 120m of delineated wetland. Small-scale clearcutting may be permitted to create early successional habitat or maintain forest types that are contributing to current ecological function of the PSW. All other protections measures as outlined in regular water AOC. 	No new roads, landings or pits within AOC, unless no feasible alternatives exist, with discussion with and approval by County staff.
Lakes, Ponds, Wetlands, Rivers and Streams	W	Variable	<p>Within 3m:</p> <ul style="list-style-type: none"> No excessive removal or damage of sapling-sized trees and shrubs. No machine travel. Trees should not be felled into the water feature. If trees are accidentally felled into a water feature, they should be left where they lie to avoid further damage to the waterbed unless they can be topped in a manner that merchantable material can be removed without further damaging the waterbed (must be authorized by County forestry staff). <p>Within 15m:</p> <ul style="list-style-type: none"> No rutting. Any ruts within 15m will be promptly rehabilitated to prevent erosion or sedimentation. <p>Within 30m:</p> <ul style="list-style-type: none"> No equipment maintenance. <p>Variable Width (defined in FOP with additional details):</p> <ul style="list-style-type: none"> Retain residual forest or a reserve around a 	<p>No landings or pits within the AOC.</p> <p>No new roads within the AOC unless no feasible alternatives exist. ROW width within AOC should be as narrow as possible (<10m, unless otherwise approved).</p> <p>New roads and use/maintenance of existing roads may not result in erosion or sedimentation into a watercourse.</p> <p>Extraction trails must only cross streams or other water features if solidly frozen or if temporary crossing structures are put in place that do not impede, accelerate or divert water movement.</p> <p>All crossing (extraction and road) locations and conditions must be discussed with and approved by COR staff.</p>

⁶⁹ “New” roads, landings or pits include those that have not previously existed. Roads and landings that were used in the past but have grown up with regenerating trees (and may not be currently drivable) are not considered new since the road/landing bed is already in place. If the reasoning behind road control is to control access to sensitive areas, access control measures will be put in place on re-opened roads after operations are complete.

Value	Code	AOC Width (m)	Harvest Modification Guidelines	Roads, Landings, Pits, Extraction trails ⁶⁹
			<p>portion/whole of the feature to the level necessary to protect the thermal regime of the feature.</p> <ul style="list-style-type: none"> Disturbance of the forest floor that disrupts hydrological function (ephemeral streams, seeps, springs, other groundwater discharge) is prohibited. 	
Woodland Pools/Seeps (temporary bodies of open water >25m diameter)	S	15	<p>Within 3m:</p> <ul style="list-style-type: none"> No harvest. No machine travel. Trees should not be felled into the water feature. If trees are accidentally felled into a water feature, they should be left where they lie to avoid further damage to the waterbed unless they can be topped in a manner that merchantable material can be removed without further damaging the waterbed (must be authorized by County forestry staff). <p>Within 15m:</p> <ul style="list-style-type: none"> No rutting. Any ruts within 15m will be promptly rehabilitated to reduce risk of erosion or sedimentation. No equipment maintenance. Retain residual forest conditions when adjacent harvest is clearcut. 	<p>No landings or pits within 15m of the high-water mark.</p> <p>No new roads, landings or pits within AOC, unless no feasible alternatives exist, with discussion with and approval by County staff.</p>
Birds				
Raptor and Colonial-nesting Bird Nests	N	Variable	Species specific direction will be defined in the FOP and based on SSG direction, appropriate to the scale of the operation.	Species specific direction will be defined in the FOP and based on SSG direction, appropriate to the scale of the operation.
Other forest-nesting birds (songbirds, ground-nesters, etc.)	N	3	Nests encountered during operations will not be destroyed. Trees will be retained within 3m of nests containing eggs or young. Trees will not be felled into this area, and machines will not travel through.	Avoid construction of new roads, landings and pits within 3m of known nests containing eggs or young.
Mammals				
Occupied Black Bear	BD	100	No operations involving heavy equipment from	No road construction or aggregate extraction from

Value	Code	AOC Width (m)	Harvest Modification Guidelines	Roads, Landings, Pits, Extraction trails ⁶⁹
Den			October 15-April 30, except in extraordinary circumstances as approved by CoR staff.	October 15-April 30, except in extraordinary circumstances as approved by CoR staff.
Active Wolf Den	WD	200	<p>Within 50m:</p> <ul style="list-style-type: none"> • Reserve. No harvest. <p>Within 51-100m:</p> <ul style="list-style-type: none"> • Retain >60% uniform canopy closure. • No harvest, renewal or tending between April 1- June 30, except in extraordinary circumstances as approved by CoR staff. <p>Within 101-200m:</p> <ul style="list-style-type: none"> • Retain residual forest structure. • No harvest, renewal or tending between April 1- June 30, except in extraordinary circumstances as approved by CoR staff. 	<p>Within 100m:</p> <ul style="list-style-type: none"> • No new roads, landings or pits.
Dens of other Furbearing Mammals	OD	20	<p>Within 20m of <i>enduring features</i> known to have been occupied at least once within the past 5 years:</p> <ul style="list-style-type: none"> • Reserve. No harvest. <p>Known, occupied dens in <i>transitory features</i> (hollow logs, tree cavities, etc.) will not be destroyed, and a 3m reserve will be applied.</p>	No new roads, landings or pits.
White Tailed Deer	WTD	n/a	<p>In areas mapped as Stratum 1 Deer Wintering Areas:</p> <ul style="list-style-type: none"> • Clearcuts should be <60ha continuous or conifer to conifer cover distances <200m. • Winter harvest is preferred when practical, feasible and in line with silvicultural objectives. • Consider retaining low conifer patches as critical thermal habitat. • Consider maintaining conifer canopy closure along known travel routes in or adjacent to bedding areas. <p>The reality of the scale and low intensity of harvest operations on RCF usually provides for these habitat preferences without additional planning.</p>	
Bat Hibernacula	BH	200	<p>Within 0-100m:</p> <ul style="list-style-type: none"> • Reserve. No harvest. 	<p>Within 100m:</p> <ul style="list-style-type: none"> • No new roads, landings or pits.

Value	Code	AOC Width (m)	Harvest Modification Guidelines	Roads, Landings, Pits, Extraction trails ⁶⁹
			Within 101-200m: <ul style="list-style-type: none"> Retain residual forest conditions. No harvest permitted between September 1-May 30. 	<ul style="list-style-type: none"> No hauling or road maintenance on existing roads from September 1-May 30, unless the road predates the hibernaculum. Within 101-200m: <ul style="list-style-type: none"> Reasonable efforts will be made to avoid new roads, landings or pits.
Species at Risk*				
Flooded Jellyskin	FJ	Delineated Habitat	Within 30m of woodland pools known to support flooded jellyskin: <ul style="list-style-type: none"> Reserve. No harvest. Do not fell trees into this area. Trees accidentally felled will be left where they fall. 	Within 30m of woodland pools known to support flooded jellyskin: <ul style="list-style-type: none"> No new roads, landings or pits.
American Ginseng	AG	120m 30m	<i>For colonies >=20 plants:</i> Within 20m of delineated patch: <ul style="list-style-type: none"> Reserve. No harvest. Within 21-120m of delineated patch: <ul style="list-style-type: none"> No rutting or significant exposed mineral soil. Single tree selection only. Winter harvest preferred. <i>For colonies <20 plants:</i> Within 30m of patch edge: <ul style="list-style-type: none"> Reserve. No harvest. Do not fell trees into AOC. In all cases, harvest should be laid out in a way that does not indicate that the value is present.	<i>For colonies >=20 plants:</i> Within 20m of delineated patch: <ul style="list-style-type: none"> No new roads. Within 21-120m of delineated patch: <ul style="list-style-type: none"> No new landings or aggregate pits. No new roads unless no feasible alternatives and approved with conditions by CoR. <i>For colonies <20 plants:</i> Within 30m of patch edge: <ul style="list-style-type: none"> No new roads, landings or pits.
Butternut	B		Healthy, naturally-occurring butternut will be retained and protected from damage during operations. Healthy can be defined as: <ul style="list-style-type: none"> >70% live crown and <20% of the bole and root flare affected by cankers <i>or</i> >50% live crown and no cankers Unhealthy butternut will be retained as diversity trees unless removal is necessary for safety or silvicultural purposes.	

Value	Code	AOC Width (m)	Harvest Modification Guidelines	Roads, Landings, Pits, Extraction trails ⁶⁹
			<p>Butternut must be assessed by a designated Butternut Health Assessor (BHA) to be eligible for removal.</p> <p>When healthy butternut is present in an area scheduled for harvest, FOP will evaluate opportunities to create conditions to encourage regeneration.</p>	
Blanding's Turtle	BT	300	<p><i>Nesting Sites:</i></p> <ul style="list-style-type: none"> No harvest, renewal or tending within 30m. <p><i>Summer Habitat:</i></p> <p>Within 3m:</p> <ul style="list-style-type: none"> No machine travel or falling trees within 3m. If trees are accidentally felled into the zone, they will be left where they fall. No excessive removal or damage to sapling-sized trees and shrubs. <p>Within 15m:</p> <ul style="list-style-type: none"> No rutting or significant mineral soil exposure. Any ruts or soil exposure must be promptly rehabilitated. <p>Within 30m:</p> <ul style="list-style-type: none"> No heavy equipment between April 15-October 15 (active season). <p>Within 150m:</p> <ul style="list-style-type: none"> No heavy equipment between May 1-September 30 (terrestrial period), except during the low activity period (July 15-August 31). <p>Within 300m:</p> <ul style="list-style-type: none"> No heavy equipment between June 1-30 (nesting period). Operators should be briefed on how to protect turtles from injury if encountered. 	<p>No water drawdowns permitted except in extraordinary circumstances with proper approvals.</p> <p>Within 30m:</p> <ul style="list-style-type: none"> No new landings or use of existing landings within 30m of active nesting sites. No new roads unless measures taken to avoid traffic mortality. No road construction or aggregate extraction between April 15-October 15 (active season). <p>Within 150m:</p> <ul style="list-style-type: none"> No new aggregate pits. No hauling between May 1-September 30, except in extraordinary circumstances. Avoid constructing new roads. No road construction or aggregate extraction between May 1- September 30 (terrestrial period), except during the low activity period (July 15-August 31). <p>Within 300m:</p> <ul style="list-style-type: none"> No road construction, hauling or aggregate extraction between June 1-30 (nesting period), except in extraordinary circumstances. Implement strategy to mitigate traffic-related mortality during active season. Consider access restrictions on any new all-weather roads. Winter roads and temporary water crossings are preferred.

Value	Code	AOC Width (m)	Harvest Modification Guidelines	Roads, Landings, Pits, Extraction trails ⁶⁹
Wood Turtle	WT	500	<p>Within 3m of known habitat feature:</p> <ul style="list-style-type: none"> No machine travel or falling trees within 3m. If trees are accidentally felled into the zone, they will be left where they fall. No excessive removal or damage to sapling-sized trees and shrubs. <p>Within 30m:</p> <ul style="list-style-type: none"> A reserve or modified harvest area may be applied, depending on situation and characteristics of habitat feature. No rutting or significant mineral soil exposure. Any ruts or soil exposure must be promptly rehabilitated. <p>Within 0-500m:</p> <ul style="list-style-type: none"> No heavy equipment between May 1-September 30 except in extraordinary circumstances with risk mitigation measures in place. 	<p>No water drawdowns permitted except in extraordinary circumstances with proper approvals.</p> <p>Within 30m of known habitat feature:</p> <ul style="list-style-type: none"> No new roads, landings or pits. <p>Within 31-500m:</p> <ul style="list-style-type: none"> New roads, landings and pits and use of existing roads, landings and pits are subject to restrictions, conditions and approvals determined by CoR.
Snapping Turtle	ST	Variable	Nest sites of snapping turtles will not be damaged during operations. No machine travel, harvest or felling of trees onto identified nest site between June 1 and September 30.	No new roads, landings or pits that will damage nest sites. Road maintenance that will disturb nesting areas should not occur between June 1 and September 30, except in extraordinary circumstances.
Other Forest Values*				
Cemetery	C	15	Reserve. No harvesting within 15m of the boundary of the cemetery. Notify Ministry of Tourism, Culture and Sport if discovered.	Reserve. No new roads, landings or pits within 15m of the cemetery.
Cultural Heritage/Ruins	CH	Variable	<p>Cultural heritage features are not to be disturbed. Trees are not to be felled onto features. A tree length reserve may be placed on some features.</p> <p>It may be necessary to create openings in stone fences. Stone fences must be crossed at right angles as minimally as possible, as approved by CoR staff.</p>	Roads, landings and pits will not disturb cultural heritage features.

*These values are confidential in nature and will not be identified on publically available maps.

5.7 Forest Protection

5.7.1 Fire Protection

For fire protection services, RCF lands are classified as private land. On private land, municipalities are responsible for fire protection. Several municipalities in County of Renfrew have entered into agreements with the OMNRF to coordinate fire protection. In these agreements, the municipality pays the OMNRF for fire protection on some private lands.

County of Renfrew Resolution No. DP-CC-01-04-60 states “that beginning in the year 2002, the County of Renfrew pay \$1.01 per hectare of County Forest property to municipalities for fire protection, providing the municipality contracts the fire protection services to the Ministry of Natural Resources”. All County of Renfrew municipalities have fire management agreements with the OMNRF, with the exception of Whitewater Region and Horton Township.

The fire management agreements with the OMNRF allow the municipalities to call on the OMNRF to assist them with forest fire control, should the need arise. As a result, RCF is protected from forest fire by both municipal and provincial fire services.

5.7.2 Insects and Diseases

Insects and diseases occurring on RCF are outlined in Section 3.5. Staff will continue to monitor for insects and diseases when conducting any field operations. Moreover, staff will continue to obtain training and utilize information as it becomes available.

When encountering damaging insects and diseases, forest management will include appropriate, scientific, evidence-based action on a case-by-case basis.

5.7.3 Invasive Plant Species

Invasive plant species are being discovered in Ontario at an alarming rate. The most concerning species on the horizon are highlighted in Section 3.5.6.

RCF staff will monitor for invasive plant species when conducting any field operations, as well during post-harvest follow-up. Any identified occurrences will be recorded in the RCF Invasives database. Staff will continue to obtain training and utilize information as it becomes available. When invasive plant species are encountered, management will include appropriate, scientific, evidence-based action on a case-by-case basis. Measures will be taken during tendering of harvest operations on RCF to reduce the risk of introduction of invasive plant species. Disclosure will be required if the operator’s equipment was previously in an infested area and actions must be taken to reduce the risk of seeds being unintentionally introduced into County forest (e.g., required to wash equipment prior to arrival on site)⁷⁰.

⁷⁰ The [Ontario Invasive Plant Council’s Clean Equipment Protocol](#) for Industry is a useful reference in this case.

5.7.4 Wildlife Damage

Wildlife feeding damage to forests is virtually impossible to prevent and must be accepted as part of the natural process. Where intervention is necessary (such as with beaver flooding in a high-value timber area), RCF staff will consider whatever means are available to ensure the long-term sustainability of the County forest.

6. PROPERTY AND ACCESS

6.1 Introduction

As discussed in Section 2.3.5, lands comprising the RCF were purchased as part of a provincial strategy to reforest lands that were not suitable for agriculture. Most of these lands were previously settled and farmed. However, there was no consistent approach to conditions included in the purchase agreement, and this is reflected in the individual deeds. Some properties have access deeded to adjoining landowners. Other properties are accessed via colonization roads. Moreover, some neighbouring landowners may have other rights (e.g., access to wells on County property) imbedded in their deeds. Whenever forest management activities are planned for any individual property, the property deed must be examined to determine any legal implications that may affect County of Renfrew operations.

One of the conditions in the Termination of the Forest Management Agreement with the Ministry of Natural Resources and Forestry states that the forests which comprise the historical Renfrew County Agreement Forest “...shall not, without the approval of the Minister, be sold, leased, or otherwise disposed of, and the proceeds from any sale, lease or other dispositions of any such lands shall be shared equally by the (County) and the Province of Ontario”. Thus, the land base of the RCF cannot be reduced without OMNRF approval. Furthermore, this land base will not be increased without regard to County of Renfrew criteria, which includes property sales or acquisitions at fair market value.

Additionally, when the Town of Pembroke became the City of Pembroke in 1970, an Agreement between the City and the County of Renfrew relevant to the adjustments of assets and liabilities (County of Renfrew By-law No. 2232) addressed the issue of the City receiving its share of RCF revenues. This Agreement was updated in 2000. Any sale of RCF lands must meet the terms of this Agreement.

6.2 Disposal of County Forest Lands

Given the conditions required for disposal of County forest land, the rationale must be very compelling to contemplate disposal. Any request for disposal of County forest will be evaluated on a case-by-case basis. Requests from municipalities for land that contributes to the greater

public good (e.g., landfill expansion) will be reviewed at committee level and appropriate recommendations taken forward to County Council. Sale to private landowners will not be considered.

6.3 Acquisition of County Forest Lands

The County forest landbase may be expanded when opportunities arise. Offers to purchase property will be evaluated on a case-by-case basis. Where opportunities arise to improve access, retain property in the public realm, improve recreational opportunities, etc., the County staff will bring a recommendation forward to Committee and subsequently County Council.

6.4 Property Boundaries

6.4.1 Background

Prior to their purchase, the majority of RCF lands were agricultural properties. Many of the boundaries were fenced and frequently described in the acquisition documents. Over time, many fences have fallen into disuse and can be quite difficult to relocate. In the past, some boundary lines were infrequently maintained with extremely variable accuracy. In many cases, individuals unknowingly positioned lines in the incorrect location, often missing existing fences or surveyed lines. Adjacent landownership changes have also contributed to lines being “lost” or misrepresented.

The County of Renfrew is committed to accurate property boundary location. Forestry staff will not “buffer” lines (i.e., intentionally locate a line inside County property to avoid any possibility of trespass onto adjoining property). Rather than being referred to as “forest management” lines, mutually agreeable, definitive property divisions will be called “boundary” lines. Over the term of this plan, a system will be developed to maintain an inventory of property line conditions, and a schedule implemented to refresh boundaries over time.

6.4.2 Re-establishing County Forest Boundaries

All available documentary evidence must be consulted prior to any fieldwork. County and Land Registry Office records (i.e., deeds, forest management records, reference plans completed by an Ontario Land Surveyor, etc.) will provide a basis for line reestablishment. Moreover, adjacent landowners may offer useful information.

When physically locating lines, the priority of boundary evidence is:

1. Evidence of survey by an Ontario Land Surveyor (with a corresponding plan of the survey)
2. Evidence of long occupancy (e.g., old fences) on, or close to, the expected line location
3. Existing, accepted lines, provided they approximate the expected line location
4. Field measurements

When line locations are suspect, acceptable line locations will be determined in consultation with adjoining landowners. When boundary agreements cannot be reached, the services of an Ontario Land Surveyor will be considered.

6.5 Access

6.5.1 Introduction

Complete, unencumbered access to County Forest tracts is essential to ensure long-term forest sustainability. However, the conditions of sales for RCF properties seldom addressed legal access. Hence, access to RCF properties is variable, including assorted combinations of County and Provincial Roads, municipal thoroughfares (both maintained and seasonal), private property agreements, colonization roads and deeded road corridors.

In cases where private property owners use roads through County properties to access their own properties, misunderstandings and jurisdictional difficulties can arise when access arrangements are not formally negotiated or documented.

6.5.2 Legal Access to Renfrew County Forest for County Purposes

Many long-term access arrangements through private properties have been very successful for the County of Renfrew. However, any forest management investments are at risk if these arrangements are changed. Ownership of adjacent private properties may change, and new owners may not be as receptive to allowing County and contractor staff access.

The County of Renfrew will obtain legal access to its forested properties by obtaining easements or purchasing property where feasible.

6.5.3 Public and Industry Access through Renfrew County Forest

6.5.3.1 General Public

County of Renfrew will continue to allow public access through its forested properties. However, the County reserves the right to close roads when necessary to prevent or reduce negative environmental impacts, damage to roads or minimize safety risks. The County also reserves the right to decommission roads where environmental risk exists.

6.5.3.2 Industrial Users

Many County Forest properties are adjacent to Crown lands that are harvested under the authority of Ottawa Valley Forest Inc., the holder of the Sustainable Forest License for Crown lands in Renfrew County. The County of Renfrew will continue to allow forest industry access through County properties, providing industrial users agree to the terms and conditions of an access agreement. Other industrial users will be evaluated on a case-by-case basis.

6.5.3.3 Access by Utility Companies and Local Municipalities

There are a number of easements for utility corporations (e.g., Hydro One) within RCF tracts. For their own purposes, including access to waste disposal sites, employees of County municipalities may also require access to County Forest land. Access will continue to be permitted for all these types of users.

6.5.3.4 Access by Adjacent Private Property Owners

A significant number of private property owners use roads through RCF tracts to access their properties. This group includes owners of residential and seasonal dwellings, recreational camps on Crown lands (by authority of Crown Land Use Permits and Leases), and rural acreages. County of Renfrew is not legally bound to maintain or improve any of these roads, and cannot be held liable for damages or injuries resulting from public use of these roads. Most of these roads exist due to previous forest management activities, and will continue to be used for forest management activities in the future. Anyone using these roads must respect use by operators and equipment, as well as any necessary upgrades or changes to roads required for forestry purposes.

Where landowners wish to improve roads for their personal use, they must obtain written permission from County forestry staff in the form of a Landowner Access Agreement, and resulting improvements do not convey any rights to the landowner. If the conditions of Landowner Access Agreement are not adhered to, future access may be restricted and penalties may apply as outlined in Appendix 4. The use of RCF by adjoining landowners to access their properties will continue to be catalogued and legal issues arising will be addressed.

6.6 Aggregate

Many RCF properties contain aggregate deposits of varying quality. Requests to utilize these deposits for logging roads during timber harvesting, or any other purpose, will be considered on a case-by-case basis. Generally, providing long-term forest management goals and forest values are not negatively affected, small-scale aggregate extraction will be permitted from County Forest property.

Aggregate extraction must meet the requirements of the *Aggregate Resources Act* (Revised Statutes of Ontario, 1990, Chapter A-8).

7. AREAS SELECTED FOR OPERATION

7.1 Review of Past Operations

Traditionally, forest management plans have revolved around matching harvest with growth. Although this method can be successful when applied to a large area (i.e., the landscape level), it can be very difficult to utilize on relatively small tracts (i.e., the stand level) found within the RCF. In the RCF, the nature of the access, distribution of age classes, marketability of specific products and diverse forest types within a limited area make large-scale landscape level planning unworkable. Consequently, the operational component of this Forest Management Plan is based on stand level parameters.

Previous FMPs for the RCF identified a large area of forest eligible for harvest during the plan term. For example, 1,427ha of area was identified as “mandatory” harvest area from 2011-16. A large amount of this (>600ha) was overmature, poor quality, intolerant mixedwood forest which has entered the declining stages of development. This area is difficult to market mainly because of the stand conditions (poor stocking, low value, poor quality), but in addition, many of these areas have poor access which has left them unharvested. During the plan term, the inventory was updated for many of these areas, and actual conditions were found to be unmerchantable at this time. The actual area harvested during the last 5-year plan term (calendar years 2012-2016) was 472ha. Tenders were issued for other areas (CE, INT and MW) and no bids were received. A similar situation occurred in the 2006-11 FMP, where 1,405ha were planned for harvest and 700ha were actually harvested.

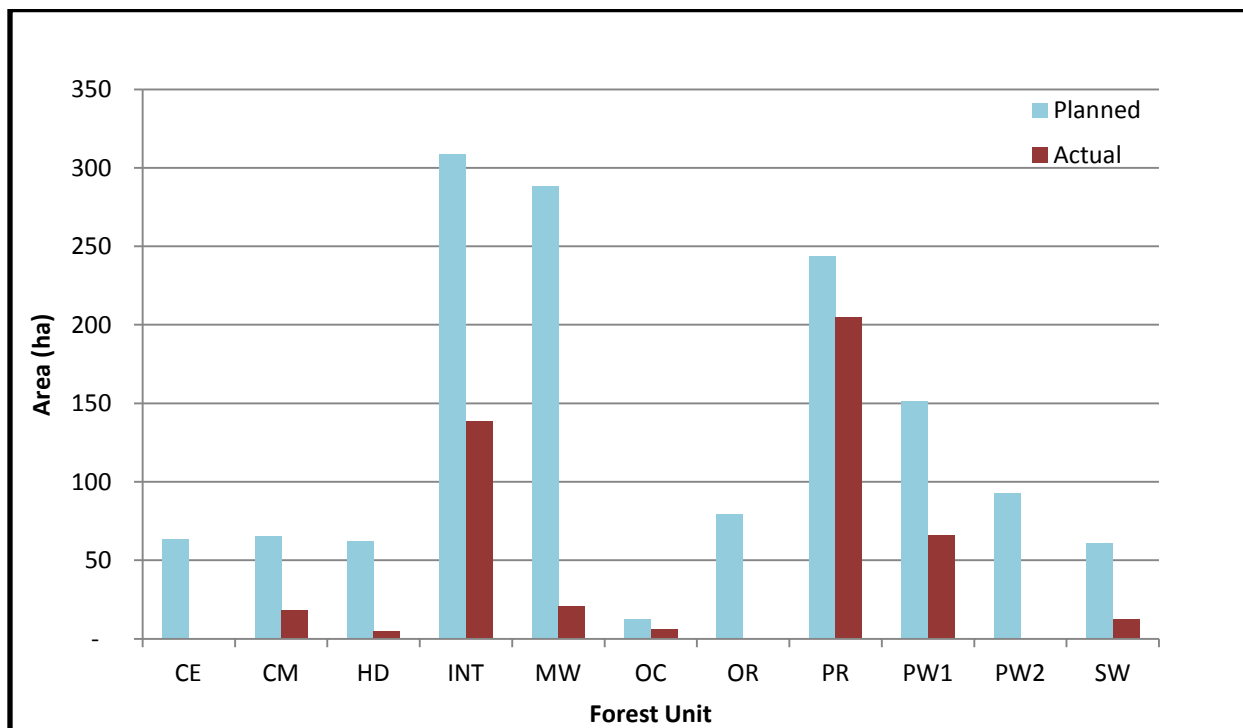


Figure 30. 2012-16 (5 year) Planned vs. Actual Harvest Area (ha).

Although operations have been planned for this 10 year term which should lead to an even revenue stream from the RCF, it is important to remember that the harvest of these blocks is completely dependent on market conditions. Looking back at operations over the past 11 years in Figure 30 shows a period of 4 years where the only salable species was red pine. Markets for poplar and other species have improved slightly over the past few years, and this is reflected in the harvest area for 2015-16. Annual timber tenders will continue to strive to take advantage of market conditions to ensure the best value for RCF wood, and planned harvest areas may change from year to year as a result.

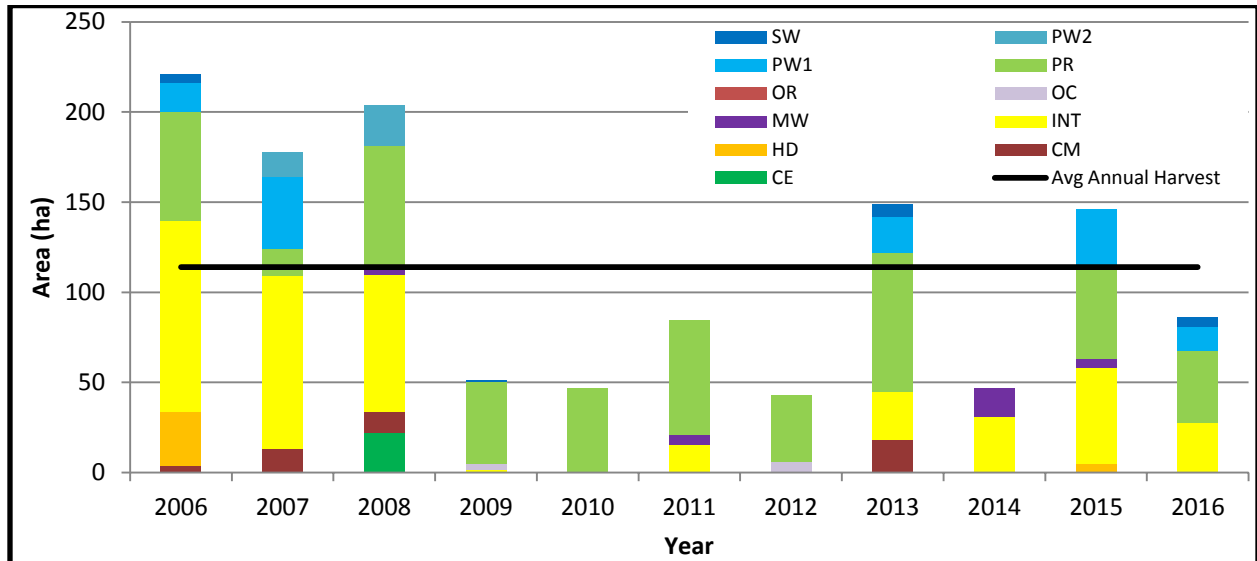


Figure 31. Actual Harvest Area (ha) by Year and Forest Unit from 2006-2016.

7.2 Operations in the 2017-2026 FMP Term

The operational planning strategy for the 2017-26 FMP was to identify areas through field examination, archival records, and other available information, followed by ground-truthing areas to be included for a realistic harvest level over the next 10 years. Recognizing the age class imbalance that exists and the economic impact this will have in future years, non-mandatory harvest areas were pushed forward to future terms. This exercise should be repeated during this plan term in preparation for the 2027-36 FMP to continue to prolong the economic viability of the RCF, a strategy outlined in Section 4.2.1.1.

It is certain that there are additional areas in the RCF that would benefit from a harvest at this time, although their merchantability is limited either by access, isolation, low stocking or poor quality. If opportunities arise to successfully market these areas so that they can be improved in health, quality and vigour, they will be tendered during the plan term. An amendment will not be required. If conditions are encountered on the ground that warrant immediate harvest to avoid a loss in potential future revenue (e.g., declining health or dieback in plantations), areas

that are not included in the planned harvest area for this plan can be harvested without amendment.

Table 11 shows the area planned for harvest in the 2017-2026 term. All stands selected for harvest are identified on maps in Appendix 9 by 5-year terms (2017-2021 and 2022-2026). The timing of harvest is subject to change, and areas may be added or withdrawn from the plan without amendment. Estimated volumes are also shown and are based on actual volume recovery by forest unit where available and historic volume recovery. The table also shows an “even-flow” 10-year harvest calculation that represents a mathematical calculation of what harvest area would give an even flow over time (Total FU Area/Rotation Length). This is a useful calculation for comparing planned harvest area to what level could be sustained over time. The total harvest area and associated projected volume in the two 5-year terms of the 2017-26 FMP are much less than the allocated harvest area in the 2006-11 FMP (1,405ha and 122,130m³) and 2011-16 (1,427ha and 125,195m³), although it is similar or more than the actual harvest areas for those two plan terms (700ha and 472ha respectively). As previously discussed, this is in an attempt to prolong the long-term economic sustainability of the RCF, and present a more realistic operational plan based on actual forest conditions. As shown in Table 11, the planned harvest level by forest unit is quite similar to the harvest level that could be sustained in the long term⁷¹, with some exceptions:

- HD and OR: Hardwood areas were harvested quite aggressively in the past, are young and need more time to grow and develop before a selection or shelterwood harvest can be implemented.
- MW: Mixedwood stands have a high representation of older age classes, and poor quality. They are targeted to be harvested before further decline occurs.
- PR: The average thinning cycle for red pine plantations on the RCF is 7-15 years. The timing of thinnings depends on the growth of each stand – if stems still have room to experience optimum growth, thinning can be delayed. Within the plan term, most plantations on the landbase will have gone longer than 10 years since the last thinning. The rotation recurrence will be prolonged when possible, as discussed in Section 4.2.1.1. A rotation cycle of 15 years was used in the even-flow calculation.
- PW1: Many white pine areas were previously seed cut (1990s-2000s) with limited success of regenerating white pine in the understory. Lessons learned include the importance of adequate crown spacing, and the necessity of artificial regeneration. These historic seedcuts need more time to grow in order to make a re-cut economically viable. It is important to ensure adequate funds exist in the reserve when white pine stands are Seedcut, in order to carry out artificial regeneration that will be necessary in these areas to establish the next generation of pine.
- SW: Many plantations are overdue for a first thinning and have been planned for harvest for some time but attempts to tender sale have been unsuccessful. When market conditions allow, these areas require immediate thinning.

⁷¹ It is worth noting that this method of calculating a sustainable harvest level is very simplistic and does not take age or stage of development into consideration. It assumes a forest with even age class diversity, which is not the case for the RCF.

Table 11. Planned Harvest for 2017-2026 FMP compared to Even-Flow Harvest Levels

Forest Unit	Total Forest Area (ha)	10-year Even-flow harvest level (ha)	Planned Harvest Area 2017-2026 (ha)	2017-2026 Total Est. Volume (m ³)
CE	378	76	75	5,969
CM	208	30	41	4,135
HD	746	187	67	2,677
INT	1,191	170	182	22,657
MW	759	108	151	12,052
OC	75	9	6	330
OR	304	152	70	2,783
PR	918	612	733	60,519
PW1	686	343	178	13,380
PW2	191	48	28	1,103
SW	99	40	76	4,916
<i>Total</i>	<i>5,557</i>	<i>1,774</i>	<i>1,605</i>	<i>130,521</i>

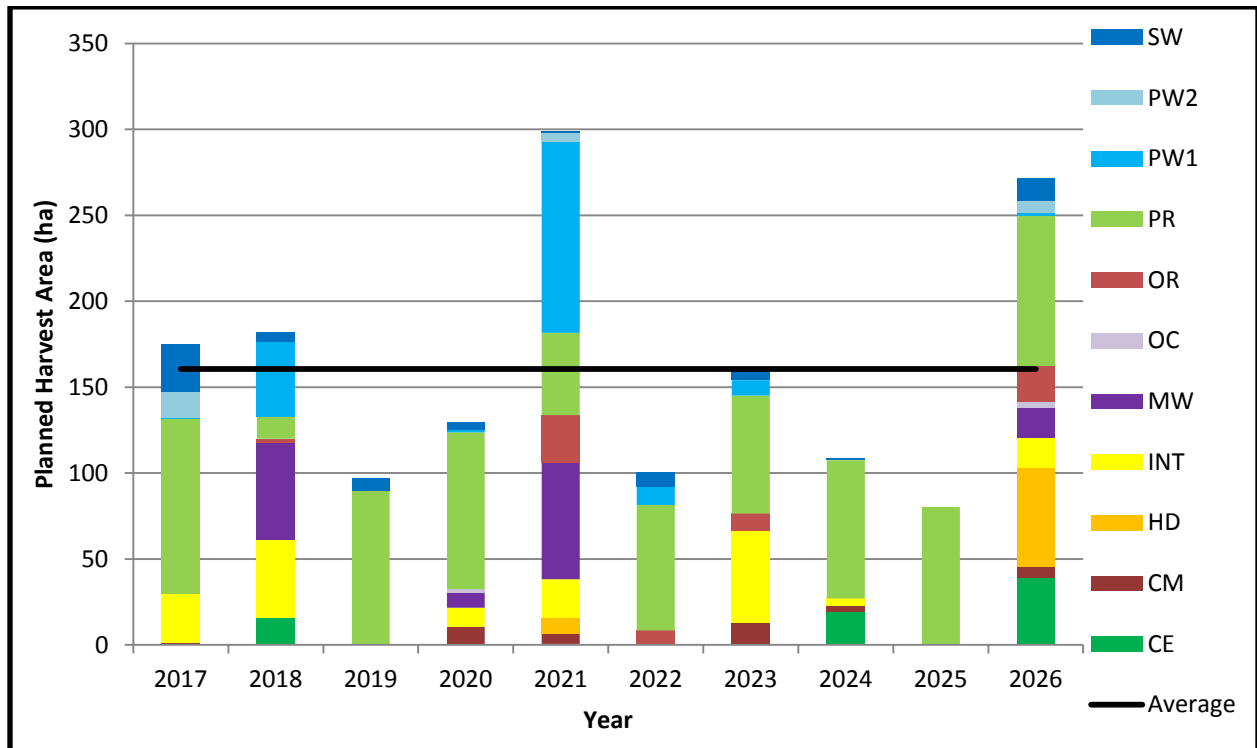


Figure 32. Planned Harvest Area by Year for the 2017-2022 FMP Term.

The planned harvest area by year in Figure 32 is an informed estimate based on favourable market conditions for all products. The operations as planned should deliver a fairly level revenue stream to the County of Renfrew if sales are successful and at similar rates as recent

years. If all tendered harvest areas are successfully sold at expected prices, projected total revenue from 2017-2026 is \$1.8 million.

The apparent spike in harvest area in 2021 and 2026 is reflective of “contingency” area included that may be harvested in the event of unforeseen circumstances in planned harvest areas or unsuccessful tender sales due to market conditions. If contingency areas are not harvested, they will be pushed forward into the 2027 FMP.

7.3 Renewal in the 2017-2027 Term

If all planned operations occur, artificial regeneration will be necessary on approximately 130 hectares of RCF to maintain or increase the pine component from the pre-harvest condition. This 130 hectares represents about 60% of the white pine shelterwood (PW1) forest unit planned harvest area, which is anticipated to be at the proper stage of management to facilitate regeneration (regeneration cut), and almost all of the white pine mixedwood (PW2) forest unit planned harvest area. Actual suitability or necessity for artificial regeneration treatments is assessed during Forest Operation Prescription preparation and confirmed post-harvest, therefore actual necessary treatment area is not yet known and could be higher or lower than planned.

The total projected costs to see the anticipated renewal areas from harvest to successful, free-to-grow pine forest are estimated at approximately \$260,000, or \$2,000/ha, based on the average cost of treatments at the present time. This represents a need for about 15% of the projected income from RCF wood harvested to be reinvested in the forest during the plan term. Further detail on the importance of artificial regeneration in RCF is described in Section 4.3.3.

7.4 Plan Amendments, Reports and Updates

Formal plan amendments are not necessary to add or remove harvest area from this plan, as long as the long-term sustainability of the RCF will not be impacted. Amendments of a strategic or administrative means must be brought forward to and approved by the Development & Property Committee of the Renfrew County Council.

An informal Annual Report will be prepared in the first quarter of every year which will report on the previous year’s activities including area and volume harvested, revenue, silvicultural treatment areas and expenses and other major projects and activities undertaken by forestry staff.

The Forest Management Plan will be reviewed in five years (2021) to determine if an update is necessary. Minor changes to the operational component of this plan between the first and second five-year term are expected and would not warrant a complete update of the plan.

Major updates to the inventories and harvest projections, natural disturbances, land acquisition and disposal, a change in strategic direction or major influencing policies may be cause for a plan update after five years. If no major changes to policy, landbase or other factors that may influence the management of the RCF, this plan will be in place until December 31, 2026. An updated plan will be prepared prior to the commencement of 2027 operations.

7.5 Consultation, Review and Approval

The first draft of this FMP was reviewed internally and by several qualified peer reviewers. The second draft was presented to the Development & Property Committee on November 15, 2016. The Committee accepted the draft Forest Management Plan and recommended it be presented to County Council and circulated to local municipalities and the public for consultation. County Council was presented with the second draft on November 30, 2016, and the draft plan was approved for circulation and consultation with local municipalities and the public (Resolution no. DP-CC-16-11-79).

A public consultation period took place between December 1, 2016 and January 6, 2017. Notification of the draft plan being available for review and comment went out directly to each municipality via email, and to the public via a media release placed on the County website and sent to all local papers, as well as an ad placed in 3 local newspapers (Figure 33). A notification email was sent to addresses on file for those who have an interest in Renfrew County Forests.

A total of seven comments were received regarding the draft FMP during the consultation period. A summary of public and municipal comments and any resulting changes is included in Appendix 10.

The final draft of the FMP will be presented to Development & Property Committee, and then to Renfrew County Council for approval and signature of the final document.



Figure 33. Consultation ad placed in local newspapers.

Appendix 1: Renfrew County Official Plan, Section 10

County Official Plan

Section 10 – County Forest

Currently in Draft Form.

To view the current version please visit the County of Renfrew website:

<http://www.countyofrenfrew.on.ca/departments/development-and-property/planning-and-land-division/>

Appendix 2: Reference and Source Materials

1. A National Assessment of Physical Activity in US National Forests. Journal of Forestry. Kline, J.D et al. 2011.
2. A Silvicultural Guide for the Great Lakes – St. Lawrence Conifer Forest in Ontario. Ontario Ministry of Natural Resources. Queen’s Printer for Ontario, 1998.
3. A Silvicultural Guide for the Tolerant Hardwood Forest in Ontario. Ontario Ministry of Natural Resources. Queen’s Printer for Ontario, 1998.
4. Ecological Land Classification Primer: Central and Southern Ontario. OMNRF, 2007. ISBN 978-4249-4066-0 PDF
5. Evergreen Challenge – The Agreement Forest Story. E.L. Borczon. Queen’s Printer for Ontario, 1982.
6. Field Guide to Forest Ecosystems of Central Ontario. B.A. Chambers, B.J. Naylor et al. Queen’s Printer for Ontario, 1997.
7. Forest Health Conditions in Ontario. MNRF. 2012. Queen’s Printer for Ontario. <https://www.ontario.ca/document/forest-health-conditions-ontario-2012>
8. Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales. OMNRF. 2010. Toronto: Queen’s Printer for Ontario. 211 pp.
9. Forest Management Plan for the Bancroft Minden Forest. April 1, 2011 to March 31, 2021. Lacey Rose, RPF. 2011. Bancroft Minden Forest Company.
10. Forest Management Plan for the Ottawa Valley Forest, 2006-2010 and 2011-21. Alf Van Dyke RPF. Ottawa Valley Forest Inc. Unpublished.
11. Forest Management Planning Manual for Ontario’s Crown Forests. Ontario Ministry of Natural Resources. Queen’s Printer for Ontario, 2010.
12. Forest Raptors and Their Nests in Central Ontario. K. Szuba, B. Naylor. Queen’s Printer for Ontario, 1998.
13. Improving the Endangered Species Act: Impacts on Renfrew County. February 2014, County of Renfrew.
14. Ontario Forest Management Guide to Silviculture in the Great Lakes-St. Lawrence and Boreal Forests of Ontario. OMNRF. 2015. Toronto: Queens Printer for Ontario. 394pp.

15. Ontario Ministry of Environment/Ontario Ministry of Natural Resources Buffer Zone Guidelines for Aerial Application of Pesticides in Crown Forests of Ontario. February 1992.
16. Ontario Tree Marking Guide Ontario Ministry of Natural Resources. Queen's Printer for Ontario, 2004.
17. [Proposed Agreement-in-Principle among the Algonquins of Ontario and Ontario and Canada](#). June 2015.
18. Renfrew County Forest Operating Plan April 1, 2000 to March 31, 2005. Larry Powell, RPF. Madawaska Forestry Inc. Unpublished.
19. Renfrew County Agreement Forest Management Plan April 1, 1993 to March 31, 2013. Earl Berry, RPF. Ministry of Natural Resources. Unpublished.
20. Renfrew County Forest Management Plan 2006-2040. Jeff Muzzi, ARPF. County of Renfrew.
21. Renfrew County Forest Management Plan 2011-2016. J. Muzzi and L. Rose. County of Renfrew.
22. Science and Information in Support of Ontario's Forest Management Guides for Landscapes. Science Package A. Elkie, P. Et al. 2013. OMNRF. Electronic. <http://www.olt.tbaytelirectit.com/Science%20and%20Information%20-%20Package%20A.pdf>
23. Silvicultural Guide to Managing Southern Ontario Forests. OMNRF. 2000.
24. Simcoe County Forests 2011-2030. Graeme Davis, RPF.
25. Soil Survey of Renfrew County. J.E. Gillespie, R.E. Wicklund. Report No. 37 of the Ontario Soil Survey, 1964.
26. Species at Risk Recovery Strategies. Government of Canada. www.sararegistry.gc.ca
27. The Field Guide to Forest Ecosystems of Central Ontario. Chambers, B. et al. 1997. Queen's Printer for Ontario.
28. The Ecosystems of Ontario, Part I: Ecozones and Ecoregions. Crins, William J., Paul A. Gray, Peter W.C. Uhlig, and Monique C. Wester. 2009. Ontario Ministry of Natural Resources, Peterborough Ontario, Inventory, Monitoring and Assessment, SIB TER IMA TR- 01, 71pp.
29. The Physiography of Southern Ontario. Chapman, L.J & Putnam, D.F. 1966. 2nd ed. University of Toronto Press, Canada. Ontario Research Foundation.

Appendix 3. Glossary

Ecozones: The largest scale of classification, and are characterized by a distinctive bedrock and physiographic domain that differs in origin and chemistry from the bedrock domain directly adjacent to it. The bedrock, in concert with long-term climatic patterns, has a major influence of the ecosystem processes and biota that occur there. Ecozones are resistant to short and medium-term change.

Ecoregions: Contained within ecozones, and are defined by a characteristic range and pattern in climatic variables, including temperature, precipitation and humidity. This has a major influence of the vegetation types, substrate formation and other ecosystem processes.

Ecodistricts: Further sub-divisions within ecoregions, based on more finely resolved abiotic data, including patterns of relief, geology and substrate parent material.

Residual Forest: A forest patch that generally functions more as habitat for wildlife that inhabit older forests than as habitat for wildlife that inhabit younger forest. Generally this includes forest that is ≥ 35 years old or ≥ 10 m in height, of a patch size >0.1 ha, with canopy closure $\geq 50\%$ based on dominant/co-dominant trees. Ideally trees will be uniformly spaced and the harvested residual forest will normally have similar stand characteristics to the pre-harvest forest.

Appendix 4: County Forest By-law

COUNTY OF RENFREW

BY-LAW NUMBER 92-09

A BY-LAW TO PROHIBIT CERTAIN ACTIVITIES ON COUNTY OF RENFREW-OWNED FORESTS AND TRAILS

WHEREAS by subsection 11(2) of the *Municipal Act*, 2001, S.O. 2001, Chapter 25, as amended, the Council of the Corporation of the County of Renfrew is authorized to pass a by-law providing for the use by the public of lands of which the Corporation is the owner and for the regulation of such use and the protection of such lands;

AND WHEREAS by sections 2, 3, 5, and 6 of the *Trespass to Property Act*, Chapter T.21 of the Revised Statutes of Ontario, 1990, the Council of the Corporation of the County of Renfrew is authorized to prohibit entry to land occupied by the Corporation of the County of Renfrew and to regulate the carrying on of certain activities on such land and for these purposes give notice thereof;

AND WHEREAS the Council of the Corporation of the County of Renfrew approved the document entitled "Renfrew County Forest Management Plan 2006-2040" which outlines the County's policies with regard to the resource management of the lands occupied by the Corporation and generally known as the Renfrew County Forest, and the "K&P Trail Management Plan" which outlines the County's policies with regard to the management of the lands occupied by the Corporation and generally known as the K&P Trail;

NOW THEREFORE the Council of the Corporation of the County of Renfrew hereby enacts as follows:

1. That By-law 34-09 is hereby repealed.
2. That the document marked Schedule "A" attached to and made a part of this by-law is hereby approved.
3. No person shall:
 - a) remove, damage or deface County property;
 - b) remove, damage or deface a relic, an artifact or natural object;
 - c) damage, deface or disturb an archaeological or historical site;
 - d) unlawfully disturb, cut, kill, remove or harm a plant or tree;

- e) unlawfully disturb, remove or harm a natural object;
 - f) unlawfully conduct research;
 - g) litter or cause litter;
 - h) start a fire;
 - i) permit domestic animal to disturb people, damage County property or vegetation, chase or harass wildlife or cause injury;
 - j) introduce or possess a plant, animal or thing that may carry non-native or invasive species;
 - k) unlawfully occupy land in County property; or
 - l) unlawfully camp.
4. This by-law shall not apply to an employee of the Corporation of the County of Renfrew while acting in the course of his or her employment in managing the Renfrew County Forest or any part thereof, or any person authorized by an employee of the Corporation of the County of Renfrew to carry out any duty relating to the resource management of the Renfrew County Forest or any part thereof.
5. Officers to enforce the provisions of this by-law may be appointed by by-law of Council and an Officer so appointed shall:
- (a) not be a member of the Council; and
 - (b) shall hold office for such term and on such conditions as may be specified by by-law of the County.
6. Any person who contravenes any provision of this by-law is, upon conviction, guilty of an offence and is liable to any penalty as provided in the *Provincial Offences Act*.
7. That this by-law shall come into force and take effect upon the passing thereof.

READ a first time this 26th day of August, 2009.

READ a second time this 26th day of August, 2009.

READ a third time and finally passed this 26th day of August, 2009.

Original signed by
DONALD RATHWELL, WARDEN

Original signed by
NORM LEMKE, CLERK

Schedule "A"
THE CORPORATION OF THE COUNTY OF RENFREW
PART 1 PROVINCIAL OFFENCES ACT
BY-LAW NO. 92-09
BY-LAW TO PROHIBIT CERTAIN ACTIVITIES ON COUNTY OF
RENFREW-OWNED FORESTS AND TRAILS

Item	Column 1 Short Form Wording	Column 2 Provision creating or defining offence	Column 3 Set Fine
1	Remove County property	s. 3(a)	\$125.00
2	Damage County property	s. 3(a)	\$125.00
3	Deface County property	s. 3(a)	\$125.00
4	Damage relic, artifact or natural object	s. 3(b)	\$125.00
5	Deface relic, artifact or natural object	s. 3(b)	\$125.00
6	Remove relic, artifact or natural object	s. 3(b)	\$125.00
7	Damage archaeological or historical site	s. 3(c)	\$125.00
8	Deface archaeological or historical site	s. 3(c)	\$125.00
9	Unlawfully disturb archaeological or historical site	s. 3(c)	\$125.00
10	Unlawfully disturb plant or tree	s. 3(d)	\$125.00
11	Unlawfully cut plant or tree	s. 3(d)	\$125.00
12	Unlawfully kill plant or tree	s. 3(d)	\$150.00
13	Unlawfully remove plant or tree	s. 3(d)	\$125.00
14	Unlawfully harm plant or tree	s. 3(d)	\$125.00
15	Unlawfully disturb natural object	s. 3(e)	\$125.00
16	Unlawfully remove natural object	s. 3(e)	\$125.00
17	Unlawfully harm natural object	s. 3(e)	\$125.00
18	Unlawfully conduct research	s. 3(f)	\$125.00
19	Litter	s. 3(g)	\$125.00
20	Cause litter	s. 3(g)	\$125.00
21	Start fire	s. 3(h)	\$150.00
22	Permit domestic animal to disturb people	s. 3(i)	\$ 75.00
23	Permit domestic animal to damage County property or vegetation	s. 3(i)	\$ 75.00
24	Permit domestic animal to chase wildlife	s. 3(i)	\$ 75.00
25	Permit domestic animal to harass wildlife	s. 3(i)	\$ 75.00
26	Permit domestic animal to cause injury	s. 3(i)	\$100.00
27	Introduce plant, animal or thing that may carry non-native or invasive species	s. 3(j)	\$150.00
28	Possess plant, animal or thing that may carry non-native or invasive species	s. 3(j)	\$150.00
29	Unlawfully occupy land in County property	s. 3(k)	\$125.00
30	Unlawfully camp	s. 3(l)	\$ 75.00

Note: The general penalty provision for the offences listed above is Section 6 of By-law 92-09, a certified copy of which has been filed.

Appendix 5

Example of a Forest Operations Prescription



Forest Operations Prescription

County of Renfrew

Prepared under the provisions of Renfrew County Forest Management Plan 2017-2026

Tract Name: _____

Municipality: _____

Tract Number: _____

Prepared by: _____

Date: _____

Signature: _____

Total Prescribed Area (ha): _____

I certify that the forest operations prescribed in this forest operations prescription are appropriate for the conditions existing.

RPF Seal

Comments/Issues:

Tract Overview

Current Conditions		
Natural and Harvest History		
Access		
Areas of Concern (AOC)		
AOC ID	Description	Prescription
Boundary Layout		
Harvest Conditions		
Habitat and Biodiversity Considerations		
Recreation Considerations		
Cultural/Historic Considerations		

Area A

Area (ha):

Forest Unit			Desired Future Forest Unit:	
Silvicultural System				
Stage of Management:				

Overview	
General Forest Management Objective:	
Tree Marking Direction:	
<i>Target Residual or % Removal:</i>	
<i>Marking Priorities (in order of importance):</i>	
<i>Wildlife Considerations:</i>	
Stand Variables:	
Harvest Instructions:	
On-the-house Species	
Other Species	
Other Direction	
Regeneration and Future Harvests:	

Stand Data - Treatment Area		A	Total Area:	
Forest Unit		SGR		
Desired Future Forest Unit		Silv System		
Data Collected by:		Date Collected		
Stand Number				
Species Composition				
Prepared under the provisions of Renfrew County Forest				
Height (m) 201 2026				
Basal Area (m2/ha)				
Stocking				
Average Site Class				
Area (ha)				
Ecosite				
Advanced Regeneration	Species			
	Height			
	Stocking			
Restrictions	Competition			
	Site Limitations			
Stand Data - Treatment Area		A	Total Area:	
Forest Unit		SGR		
Desired Future Forest Unit		Silv System		
Data Collected by:		Date Collected		
Stand Number				
Species Composition				
Age				
Height (m)				
Basal Area (m2/ha)				
Stocking				
Average Site Class				
Area (ha)				
Ecosite				
Advanced Regeneration	Species			
	Height			
	Stocking			
Restrictions	Competition			
	Site Limitations			

Appendix 6: Tract Legal Description

Tract	Township	Municipality	Legal Text	Assessed Area (ac)	Assessed Area (ha)	GIS Area (ac)	GIS Area (ha)	PIN
150 th ANNIVERSARY	Stafford	Whitewater Region	STAF CON 1 PT LOT 19	n/a*	n/a	27.9	11.3	476606601501050
AFELSKIE	Hagarty	Killaloe, Hagarty & Richards	HAG CON 8 PT LOTS 7 & 8	171.00	69.20	170.74	69.1	473103101517500
BAGOT CREEK	Bagot	Greater Madawaska	BAG CON 1 W PT LOT 8	100.00	40.47	86.98	35.2	470600601501700
BARRY'S BAY	Sherwood	Madawaska Valley	SHER CON 7 LOT 20	100.00	40.47			472602601023400
BARRY'S BAY	Sherwood	Madawaska Valley	SHER CON 8 E PT LOT 20	50.00	20.24			472602601026100
				150.00	60.71	149.49	60.5	
BEACHBURG	Westmeath	Whitewater Region	CON 4 EML W PT LOT 1	50.00	20.24			475805801011700
BEACHBURG	Westmeath	Whitewater Region	CON 4 EML N PT LOT 1	100.00	40.47			475805801011900
BEACHBURG	Westmeath	Whitewater Region	CON 5 EML LOT 1	200.00	80.94			475805801015300
BEACHBURG	Westmeath	Whitewater Region	CON 5 EML PT LOT 2	120.00	48.56			475805801015600
BEACHBURG	Westmeath	Whitewater Region	CON 6 EML PT LOT 1	21.00	8.50			475805801018100
BEACHBURG	Westmeath	Whitewater Region	CON 6 EML W PT LOT 2	17.00	6.88			475805801018400
BEACHBURG	Westmeath	Whitewater Region	CON 6 EML PT LOT 2;RP49R 931 PART 1	72.00	29.14			475805801018410
				580.00	234.73	625.40	253.1	
BIELASKIE	Hagarty	Killaloe, Hagarty & Richards	HAG CON 9 LOT 11 PT LOT 12	197.00	79.73	202.87	82.1	473103102504300
BLACK DONALD	Brougham	Greater Madawaska	BROUG CON 8 LOT 10	107.00	43.30	106.00	42.9	470600903001100
BRUDENELL	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 12 LOT 8 N PT LOT 7	208.00	84.18			471901901015000
BRUDENELL	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 13 LOTS 7 8	200.00	80.94			471901901017800
				408.00	165.12	418.83	169.5	
BUCK HILL	Hagarty	Killaloe, Hagarty & Richards	HAG CON 13 LOT 33	99.00	40.07			473103103012400
BUCK HILL	Hagarty	Killaloe, Hagarty & Richards	HAG CON 14 PT LOT 33	96.00	38.85			473103103019200
				195.00	78.92	201.63	81.6	
BUDD MILLS	North Algona	North Algona Wilberforce	N ALG CON 6 LOT 2	98.00	39.66			476907201030300
BUDD MILLS	North Algona	North Algona Wilberforce	N ALG CON 7 LOTS 2 3	196.00	79.32			476907201031500
BUDD MILLS	North Algona	North Algona Wilberforce	N ALG CON 8 LOT 1 S PT LOT 2	148.00	59.90			476907201031700
				442.00	178.88	438.35	177.4	

Tract	Township	Municipality	Legal Text	Assessed Area (ac)	Assessed Area (ha)	GIS Area (ac)	GIS Area (ha)	PIN
BYERS CREEK	Hagarty	Killaloe, Hagarty & Richards	HAG CON 6 LOTS 29 30	199.00	80.54	201.88	81.7	473103101012800
CARSWELL'S MTN	Matawatchan	Greater Madawaska	MAT CON 2 LOT 5 PT LOT 6	190.00	76.89			470601205001500
CARSWELL'S MTN	Matawatchan	Greater Madawaska	MAT CON 3 W PT LOT 2;W PT LOT 3	98.00	39.66			470601205003500
CARSWELL'S MTN	Matawatchan	Greater Madawaska	MAT CON 3 LOT 4 LOT 5	196.00	79.32			470601205003700
				484.00	195.87	498.15	201.6	
CENTENNIAL LK	Matawatchan	Greater Madawaska	MAT CON 5 LOT 10	98.00	39.66			470601205016500
CENTENNIAL LK	Matawatchan	Greater Madawaska	MAT CON 5 PT LOT 13 PT LOT;14	152.00	61.51			470601205016700
CENTENNIAL LK	Matawatchan	Greater Madawaska	MAT CON 6 PT LOTS 8,9,10	153.00	61.92			470601205019800
CENTENNIAL LK	Matawatchan	Greater Madawaska	MAT CON 6 LOT 11 LOT 12	194.00	78.51			470601205020200
				597.00	241.61	624.91	252.9	
CHIPPIOR'S CRN	Bromley	Admaston/Bromley	BROM CON 2 LOT 10	198.00	80.13	197.18	79.8	474205401004200
CONNAUGHT	Bromley	Admaston/Bromley	BROM CON 5 W PT LOT 29	100.00	40.47	99.09	40.1	474205401023100
CROOKED FENCE	Hagarty	Killaloe, Hagarty & Richards	HAG CON 7 LOT 26	100.00	40.47			473103101013290
CROOKED FENCE	Hagarty	Killaloe, Hagarty & Richards	HAG CON 7 LOT 25	100.00	40.47			473103102503050
				200.00	80.94	204.35	82.7	
CROW'S NEST	Alice	Laurentian Valley	ALICE CON 5 LOT 8	100.00	40.47			476607405010800
CROW'S NEST	Alice	Laurentian Valley	ALICE CON 6 LOT 8	100.00	40.47			476607406000700
CROW'S NEST	Alice	Laurentian Valley	ALICE CON 7 LOTS 9 10	200.00	80.94			476607406002000
				400.00	161.88	404.99	163.9	
DEACON	North Algona	North Algona Wilberforce	N ALG CON 5 PT LOTS 19 20	121.00	48.97			476907201503000
DEACON	North Algona	North Algona Wilberforce	N ALG CON 6 LOTS 19 20	200.00	80.94			476907201505400
				321.00	129.91	331.36	134.1	
DOUGLAS	Bromley	Admaston/Bromley	BROM CON 10 LOT 9	54.00	21.85			474205401515500
DOUGLAS	Wilberforce	North Algona Wilberforce	WILB CON 2 LOT 1	179.00	72.44			476906902503800
				233.00	94.30	238.45	96.5	
ELLIOT	Horton	Horton	CON 2 E PT LOT 25	100.00	40.47	102.05	41.3	474600001035700
GERMANICUS	Wilberforce	North Algona Wilberforce	WILB CON 20 PT LOT 26	79.00	31.97	89.20	36.1	476906902014200

Tract	Township	Municipality	Legal Text	Assessed Area (ac)	Assessed Area (ha)	GIS Area (ac)	GIS Area (ha)	PIN
GOLDEN LAKE	South Algona	Bonnechere Valley	CON 8 LOT 8 TO 12	446.00	180.50			473803603500100
GOLDEN LAKE	South Algona	Bonnechere Valley	CON 9 LOT 11	100.00	40.47			473803603502400
GOLDEN LAKE	South Algona	Bonnechere Valley	CON 9 LOT 12	97.00	39.26			473803603502500
GOLDEN LAKE	South Algona	Bonnechere Valley	CON 7 LOT 10 W PT LOT 9;E PT LOT 11	182.00	73.66			473803604511600
				825.00	333.88	824.31	333.6	
GREEN LAKE	Wilberforce	North Algona Wilberforce	WILB CON 22 LOT 17 S PT;LOT 18	150.00	60.71	153.45	62.1	476906901010000
HARRINGTON	Hagarty	Killaloe, Hagarty & Richards	HAG CON 1 LOTS 21 22	200.00	80.94	202.37	81.9	473103101001000
INDIAN RIVER	Fraser	Laurentian Valley	FRAS CON 9 PT LOT 5	50.00	20.24			476607406020850
INDIAN RIVER	Fraser	Laurentian Valley	FRAS CON 10 LOT 6	97.00	39.26			476607406021000
				147.00	59.49	160.12	64.8	
IRELAND NORTH	Raglan	Brudenell Lyndoch & Raglan	RAG CON 5 LOT 4 TO 7	399.00	161.48	393.87	159.4	471902201503600
IRELAND SOUTH	Raglan	Brudenell Lyndoch & Raglan	RAG CON 3 PT LOTS 3 & 4	133.00	53.83	130.47	52.8	471902201502100
KENNELLY	Brougham	Greater Madawaska	BROUG CON 8 LOT 6	100.00	40.47			470600903000500
KENNELLY	Brougham	Greater Madawaska	BROUG CON 9 S PT LOT 6	50.00	20.24			470600903003200
				150.00	60.71	159.87	64.7	
KILLALOE	Hagarty	Killaloe, Hagarty & Richards	HAG CON 7 LOTS 14 15	200.00	80.94	204.60	82.8	473103102502100
LECLAIRE	Matawatchan	Greater Madawaska	MAT CON 2 LOT 15 TO 18	400.00	161.88	393.38	159.2	470601205002400
LITTLE LAKES	Westmeath	Whitewater Region	CON 4 EML S PT LOT 4	150.00	60.71			475805801012400
LITTLE LAKES	Westmeath	Whitewater Region	CON 4 EML PT LOT 5	50.00	20.24			475805801012900
				200.00	80.94	209.04	84.6	
LORWALL LAKE	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 7 LOTS 6 TO 9;PT LOT 10	461.00	186.57			471901901005700
LORWALL LAKE	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 8 LOT 6	100.00	40.47			471901901006700
LORWALL LAKE	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 9 LOT 6	30.00	12.14			471901901008200
				591.00	239.18	608.85	246.4	
MARSH ROAD	Wilberforce	North Algona Wilberforce	WILB CON 24 LOT 22	100.00	40.47			476906901020100
MARSH ROAD	Wilberforce	North Algona Wilberforce	WILB CON 24 LOT 23	100.00	40.47			476906901020200
MARSH ROAD	Wilberforce	North Algona Wilberforce	WILB CON 24 LOT 24	100.00	40.47			476906901020300
MARSH ROAD	Wilberforce	North Algona Wilberforce	WILB CON 24 LOT 25 26	200.00	80.94			476906901020400
MARSH ROAD	Wilberforce	North Algona Wilberforce	WILB CON 25 LOT 22 PT	199.00	80.54			476906901023700

Tract	Township	Municipality	Legal Text	Assessed Area (ac)	Assessed Area (ha)	GIS Area (ac)	GIS Area (ha)	PIN
			LOT 23					
				699.00	282.89	712.13	288.2	
MASK	Hagarty	Killaloe, Hagarty & Richards	HAG CON 11 LOTS 27 28	200.00	80.94	207.31	83.9	473103103001600
MAVES	Fraser	Laurentian Valley	FRAS CON 7 LOT 4 CON 8 LOT 4	211.00	85.39	222.39	90.0	476607406019300
McGRATH ROAD	Grattan	Bonnechere Valley	CON 13 LOT 32 LOT 33	198.00	80.13			473803801000500
McGRATH ROAD	Grattan	Bonnechere Valley	CON 12 PT LOT 32;RP49R 10632 PART 1	3.00	1.21			473803801024955
				201.00	81.34	205.58	83.2	
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD RBS LOT 261	55.00	22.26			471901901017250
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD RBS LOT 256	57.00	23.07			471901901019000
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD RBS LOTS 257 TO 260	223.00	90.25			471901901019100
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD RBN LOT 260	54.00	21.85			471901901020900
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD RBN LOTS 261 262	110.00	44.52			471901901021000
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 12 LOT 27	100.00	40.47			471901901512800
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 12 LOT 28	100.00	40.47			471901901512900
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 13 LOTS 26 27	25.00	10.12			471901901513600
OPEONGO LINE	Brudenell	Brudenell Lyndoch & Raglan	BRUD CON 13 LOTS 29 30	144.00	58.28			471901901513700
				868.00	351.28	919.94	372.3	
PERSHICK	Admaston	Admaston/Bromley	ADM CON 11 W PT LOT 1	148.00	59.90			474204202009400
PERSHICK	Admaston	Admaston/Bromley	ADM CON 11 LOT 2	198.00	80.13			474204202009500
PERSHICK	Admaston	Admaston/Bromley	ADM CON 12 LOT 1	200.00	80.94			474204202011600
PERSHICK	Admaston	Admaston/Bromley	ADM CON 12 W PT LOT 2	100.00	40.47			474204202011700
PERSHICK	Admaston	Admaston/Bromley	ADM CON 13 LOT 1	200.00	80.94			474204202014500
PERSHICK	Admaston	Admaston/Bromley	ADM CON 13 LOT 2	200.00	80.94			474204202014600
PERSHICK	Admaston	Admaston/Bromley	ADM CON 13 E PT LOT 3	100.00	40.47			474204202014700
PERSHICK	Blythfield	Greater Madawaska	BLY CON 1 LOT 30	200.00	80.94			470600601029800
				1346.00	544.73	1431.68	579.4	
PETZNICK LAKE	Alice	Laurentian Valley	ALICE CON 3 LOT 14	100.00	40.47	102.79	41.6	476607405006200

Tract	Township	Municipality	Legal Text	Assessed Area (ac)	Assessed Area (ha)	GIS Area (ac)	GIS Area (ha)	PIN
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 10 LOT 9	100.00	40.47			473103101519000
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 11 LOT 9	100.00	40.47			473103101519700
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 12 LOT 11	100.00	40.47			473103102001400
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 10 N PT LOT 15	50.00	20.24			473103102506300
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 11 S PT LOT 11	50.00	20.24			473103102507000
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 11 LOT 10	100.00	40.47			473103102507010
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 11 LOTS 13 TO 16	400.00	161.88			473103102507300
ROUND LAKE COMPLEX	Hagarty	Killaloe, Hagarty & Richards	HAG CON 12 LOT 13	100.00	40.47			473103102508000
				1000.00	404.70	1030.39	417.0	
RUBY	South Algona	Bonnechere Valley	CON 10 PT LOT 27 S PT LOT;28 PT LOT 29	304.00	123.03	315.79	127.8	473803603516500
SCHROEDER	Hagarty	Killaloe, Hagarty & Richards	HAG CON 9 LOT 26	100.00	40.47	102.30	41.4	473103103000100
SERNOSKIE	Hagarty	Killaloe, Hagarty & Richards	HAG CON 9 LOT 18	100.00	40.47			473103102504900
SERNOSKIE	Hagarty	Killaloe, Hagarty & Richards	HAG CON 10 LOT 18	100.00	40.47			473103102506500
				200.00	80.94	196.94	79.7	
SHERWOOD RIVER	Sherwood	Madawaska Valley	SHER CON 11 LOT 9 LOT 10	201.00	81.34	200.89	81.3	472602602015300
SHRINE HILL	Hagarty	Killaloe, Hagarty & Richards	HAG CON 4 S PT LOT 30	50.00	20.24			473103101005650
SHRINE HILL	Hagarty	Killaloe, Hagarty & Richards	HAG CON 4 S PT LOT 31	50.00	20.24			473103101006600
				100.00	40.47	104.27	42.2	
SIMPSON'S PIT	Hagarty	Killaloe, Hagarty & Richards	HAG CON 11 PT LOTS 19 20	161.00	65.16			473103102507550
SIMPSON'S PIT	Hagarty	Killaloe, Hagarty & Richards	HAG CON 12 LOTS 17 18	200.00	80.94			473103102508600
				361.00	146.10	372.13	150.6	
SPERBERG	North Algona	North Algona Wilberforce	N ALG CON 3 LOTS 2 & 3	200.00	80.94	188.5	76.3	474205401023100
SPRINGTOWN	Bagot	Greater Madawaska	BAG CON 3 E PT LOT 21	100.00	40.47	113.66	46.0	470600601509500

Tract	Township	Municipality	Legal Text	Assessed Area (ac)	Assessed Area (ha)	GIS Area (ac)	GIS Area (ha)	PIN
STEPS	Hagarty	Killaloe, Hagarty & Richards	HAG CON 1 LOTS 12 13;PT LOTS 14 15	270.00	109.27	271.81	110.0	473103101502800
TINY	Hagarty	Killaloe, Hagarty & Richards	HAG CON 9 PT LOT 16	25.00	10.12	23.72	9.6	473103102504705
TROUTLING LAKE	Sebastopol	Bonnechere Valley	CON 2 LOT 16 PT LOT 15	175.00	70.82	181.12	73.3	473801605002900
VIRGIN LAKE	Bagot	Greater Madawaska	BAG CON 9 N PT LOT 6;RP49R 6801 PART 1	97.00	39.26			470600601003000
VIRGIN LAKE	Bagot	Greater Madawaska	BAG CON 9 PT LOT 7;RP49R 5863 PARTS 7, 9 & 11	144.00	58.28			470600601003200
				241.00	97.53	232.77	94.2	
YANTHA	Hagarty	Killaloe, Hagarty & Richards	HAG CON 2 LOT 29	100.00	40.47	102.30	41.4	473103101002800
TOTALS				15458.71	6256.14	15882.13	6427.5	

Note: Differences between assessed and GIS areas are the result of digitizing assessment map data.

* Only 11.3ha of this County property is designated as RCF.

Appendix 7. Regeneration Standards for Forest Management in the Renfrew County Forest

Forest Unit	Silviculture System	Management/ Regeneration Standards	FTG Age (years)	FTG Height	Target Species	Min stk of target species*	Acceptable Species	Target stk of acceptable species
CE	Group Selection	Average residual BA between openings is within +/- 10% as prescribed by the FOP. Composition and structure targets are achieved. Group openings are about the height of the stand, are less than 20% of the stand area and well-distributed.	15	1m	Ce	30	Ce, Sp, La, Pw, He, By	60
	Patch or strip cut	Cut 1 leave 1 or 2 patch pattern.	15	1m	Ce	30	Ce, Sp, La, Pw, He, By	60
HD	Single tree selection	AGS improvement by >=10%. Average residual BA should be within +/- 10% of target set in FOP. Ideal stand structure to manage towards is 6-6-5-3m ² /ha. Post-harvest species composition should maintain diversity of pre-harvest conditions.	n/a perpetual state of FTG. Assess 1-5 years post harvest.	n/a	Mh, He, By, Be, Or, Aw (dependent on original stand condition)	30	Mh, He, By, Be, Or, Aw, Mr (dependent on original stand condition)	60
	Group Selection	Average residual BA between openings is within +/- 10% as prescribed by the FOP. Composition and structure targets are achieved. Group openings are about the height of the stand, are less than 20% of the stand area and well-distributed.	10	1m	He, By, Bd, Cb, Or, Aw (dependent on original stand condition)	30	Mh, He, By, Be, Bd, Cb, Or, Aw, Pw, Pr (dependent on original stand condition)	60
PR	Commercial thin (eventual clearcut)	Desired succession of PR is to PR, PW or HD Forest Units. Other forest unit transitions may be acceptable depending on site. Will be defined in FOP. FTG age is measured after the final removal.	20	6m	Pr, Pw, tolerant hardwoods, other as defined in FOP.	30	Pw, Pr, Sp, Or, He, tolerant hardwoods, Po, Bw, Ms	60
INT	Clearcut	Acceptable species may be targeted based on stand conditions (e.g., likely regeneration success to hemlock, pine, etc. based on advanced regeneration) and will be specified in the FOP.	5	1m	Po, Bw	50	Po, Bw, Px**, He, Mh, Sx, By, Ms, La, Cb, Aw, Bd, Be, Or, By, Bf	60

Forest Unit	Silviculture System	Management/ Regeneration Standards	FTG Age (years)	FTG Height	Target Species	Min stk of target species*	Acceptable Species	Target stk of acceptable species
MW	Clearcut	Succession to other forest units and specific regeneration expectations will be described in FOP.	5	May be a combination of regen ≥1.0m ht and residuals ≥10cm dbh.	Po usually leading, any combination of Pw,Pr,Sw,Ce,He and tolerant hardwoods	50	All target species plus Mx, Bf, Bw	60
SW	Commercial thin (eventual clearcut)	Desired succession depends on site conditions. If Sw well-suited, regeneration to Sw is desired. If Sw struggling on site, regeneration to mixed conifer or pine (if appropriate) will be targeted.	10	1m	Sw if well-suited to site	30	Px, Ce, Sx, Bf, La, He	60
CM	Clearcut	Succession to other forest units and/or specific regeneration expectations will be described in FOP.	10	1m	Sx, Bf, Px, Ce, La	30	All target plus Po, Mr, He	60
OC	Patch or strip clearcut	Depending on stand details and site conditions, FOP will describe specific regen targets.	10	1m	La, Sb, Ce	30	La, Sb, Ce, Px, Sw, He,	60
PW1	Uniform Shelterwood	Regeneration efforts occur following the seeding cut stage of management.	20	6m	Pw	30	Pw, Pr, Or, Sw, He	60
PW2	Group Selection	Average residual BA between openings is within +/- 10% as prescribed by the FOP. Pine is targeted for retention, in addition to other species as required to maintain crown closure conducive to white pine regeneration.	20	6m	Pw	30	Pw, Pr, Sp, Or, He	50
	Seed Tree	Additional stems other than Pw may have to be retained to reduce risk of weevil damage. Goal is to regenerate component of white pine similar or higher than pre-harvest conditions.	20	6m	Pw	20	Pw, Pr, Sp, Or, He	40
OR	Uniform Shelterwood	Regeneration efforts occur following the seeding cut stage of management.	10	1m	Or	30	Or, Pw, Pr, Sw, He, By, Bd, Aw, Cb, Mh, Be	60

*Of available area

**"x" indicates all species acceptable. Example: Px = white pine, red pine, jack pine acceptable

Appendix 8. Additional Information on Landscape Guide Comparison

An attempt was made to run Ontario Landscape Tool (OLT) for the Renfrew County Forest, but data scales, data packages and inventories were not compatible. Instead, an attribute was created in the RCF inventory for “Landscape Class” in order to compare the median value for Ottawa Valley Forest’s Crown Land Landscape Class Simulated Range of Natural Variation (SRNV). Landscape classes are groupings of forest units by development stage. They were developed based on cluster analyses of used and preferred habitat types depicted in OMNRF’s habitat matrices⁷². Landscape classes express meaningful differences in wildlife use. Comparing the RCF landbase’s structure to modelled “natural condition” of the greater landscape proportions of the Ottawa Valley Forest in Figure 1. Comparison of Landscape Class Proportions of Ottawa Valley Forest 900-1000 year simulations and Current Renfrew County Forest Composition shows how the diversity of the RCF stands against a natural forest condition. The following assumptions were made to classify the RCF inventory into Landscape Classes.

A generalized relationship was drawn between RCF Forest Units and Landscape Guide Forest Units (LGFU) based on the Structured Query Language criteria of the LGFU identified in the Landscape Guide⁷³. This was then extended, based on Table 13, to create a Landscape Class attribute in the Renfrew County FRI. The T-Stage development stage was not factored into the RCF forest inventory.

Table 12. Relationship between Landscape Guide Forest Units and RCF Forest Units

Landscape Guide Forest Unit	RCF Forest Unit	Landscape Guide Forest Unit	RCF Forest Unit
HDSL1	HD	MWD	MW
HDSL2	HD	MWR	MW
HDUS	HD	MWUS	MW
BY	HD	PWUSC	PW2
OAK	OR	PR	PR
PO	INT	PJ1	CM
BW	INT	PJ2	CM
PWST	PW1	SP1	SW
PWUS4	PW1	SF	CM
PWOR	PW1	SB	CM
PWUSH	PW1	LC	CM
HE	HD	CE	CE
LWMW	HD		

⁷² Forest Management Guide for Great Lakes-St. Lawrence Landscapes. OMNRF. 2010.

⁷³ Syntax for LGFU can be viewed in [Science Package A](#) of the Landscape Guide.

Table 13. Forest Units, Development Stages and Landscape Classes used in the GLSL Landscape Guide. (Table 3 from Landscape Guide).

Forest Unit		Development Stage age of onset					
Name	Description	presapling	sapling	immature	mature	old growth	T-stage
HDSL1	Hardwood selection north	0	15	40	80	140	
HDSL2	Hardwood selection south	0	15	35	75	140	
HDUS	Hardwood shelterwood	0	15	35	75	130	
BY	Yellow birch	0	15	40	80	140	
OAK	Oak	0	15	35	70	120	
PO	Poplar	0	10	25	65	95	
BW	White birch	0	10	30	65	100	
PWST	White pine seed tree	0	15	35	75	120	
PWUS4	White pine 4 cut shelterwood	0	15	35	75	120	
PWOR	White pine red oak	0	15	35	80	140	
PWUSH	White pine hardwood shelterwood	0	15	35	75	120	
HE	Hemlock	0	15	45	85	155	
LWMW	Lowland mixedwood	0	15	35	75	120	
MWD	Mixedwood dry	0	10	30	65	105	
MWR	Mixedwood rich	0	10	30	65	105	
MWUS	Mixedwood shelterwood	0	15	35	75	120	
PWUSC	White pine conifer shelterwood	0	15	35	75	130	
PR	Red pine	0	15	40	80	140	
PJ1	Jack pine	0	10	25	60	100	
PJ2	Jack pine conifer	0	10	25	60	100	
SP1	Upland spruce	0	10	25	65	110	
SF	Spruce fir mixedwood	0	15	30	70	115	
SB	Black spruce	0	10	25	65	110	
LC	Lowland conifer	0	15	30	70	115	
CE	Cedar	0	15	35	75	125	

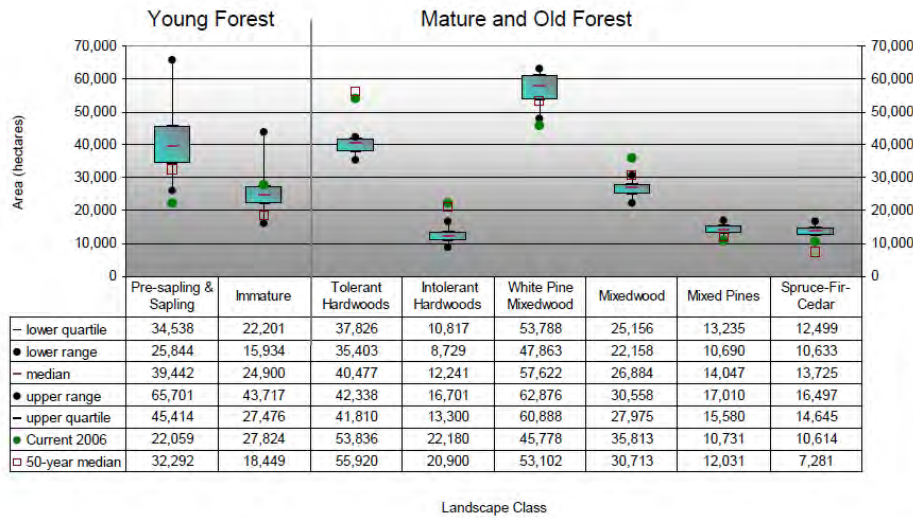
Landscape Class	Description
1 - Presapling & Sapling	presapling, sapling and T-stage development stages of all forest units
2 - Immature	immature development stage of all forest units
3 - Tolerant Hardwoods	mature and old growth development stages of HDSL1, HDSL2, HDUS, BY and Oak
4 - Intolerant Hardwoods	mature and old growth development stages of PO and BW
5 - White Pine Mixedwood	mature and old growth development stages of PWOR, PWUSH, PWUS4 and PWST
6 - Mixedwood	mature and old growth development stages of HE, LWMW, MWD, MWR and MWUS
7 - Mixed Pines	mature and old growth development stages of PR, PJ1, PJ2 and PWUSC
8 - Spruce-Fir-Cedar	mature and old growth development stages of SP1, SF, SB, LC and CE

Source: Forest Management Guide for Great Lakes-St. Lawrence Landscapes, Table 3, p. 24.

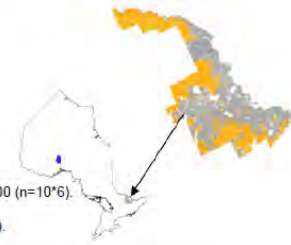
To compare the RCF area by Landscape Class to the Simulated Range of Natural Variation (SRNV) for Landscape Classes and Development Stages created in the Landscape Guide, the median value of the SRNV for Ottawa Valley Forest was used. These numbers represent the estimated natural ranges based on 1000 year simulations from the forest condition in 2006, growing the forest without human intervention. This presents a projection of natural forest conditions on the landbase. The simulation result for Ottawa Valley Forest (Crown land) is shown in Figure 32. Landscape Class SRNV for the Ottawa Valley Forest. The median values were made into a proportion of the total forest land base for projected forest conditions of the Ottawa Valley Forest, and compared to the proportion of landscape class area on the current RCF landbase in Figure 1. Comparison of Landscape Class Proportions of Ottawa Valley Forest 900-1000 year simulations and Current Renfrew County Forest Composition

Forest Management Guide for Landscapes - Landscape Class Information Sheet

900 - 1000 year simulation ranges*



Ottawa Valley
Area simulated – 524,907 ha
Crown area – 222,566 ha



*Estimated natural ranges based on 10 – 1000 year simulation replications with measurements taken at years 900, 920, 940, 960, 980 and 1000 (n=10*6).

** 2006 areas based on the 2006 inventory, 50 year simulation ranges based on 10 -1000 year runs with measurement taken at year 50 (n=10).
Tools used – Vegetation dynamics development tool (VDDT) and the Tool for exploratory landscape scenario analysis (TELSA).

Figure 34. Landscape Class SRNV for the Ottawa Valley Forest.

Appendix 9: Tract Maps and Planned Operations for 2017-2022

Interpreting the information attached to the maps

Stand Labels: Comp ID
 FU Year of Origin

Comp ID (Compartment ID)= Stand ID

All County forest compartments are described in a three-part code. The first two digits refer to the tract number (**37AN29**); the text refers to the stand type (**37AN29**); and the final digits refer to the stand number within the tract (**37AN29**). Hence, 37AN29 is the 29th natural forest stand in Pershick Tract.

Stand Types

Productive Forest	AN	Natural Forest Stand
"	AP	Plantation
Non-productive	B	Brush/Alders
"	G	Grass/Old Field
"	M	Muskeg
"	R	Rock
"	U	Unclassified (gravel pits, roads, etc.)
"	W	Wetland

FU (Forest Unit)

See Table 4, page 28.

Year of Origin

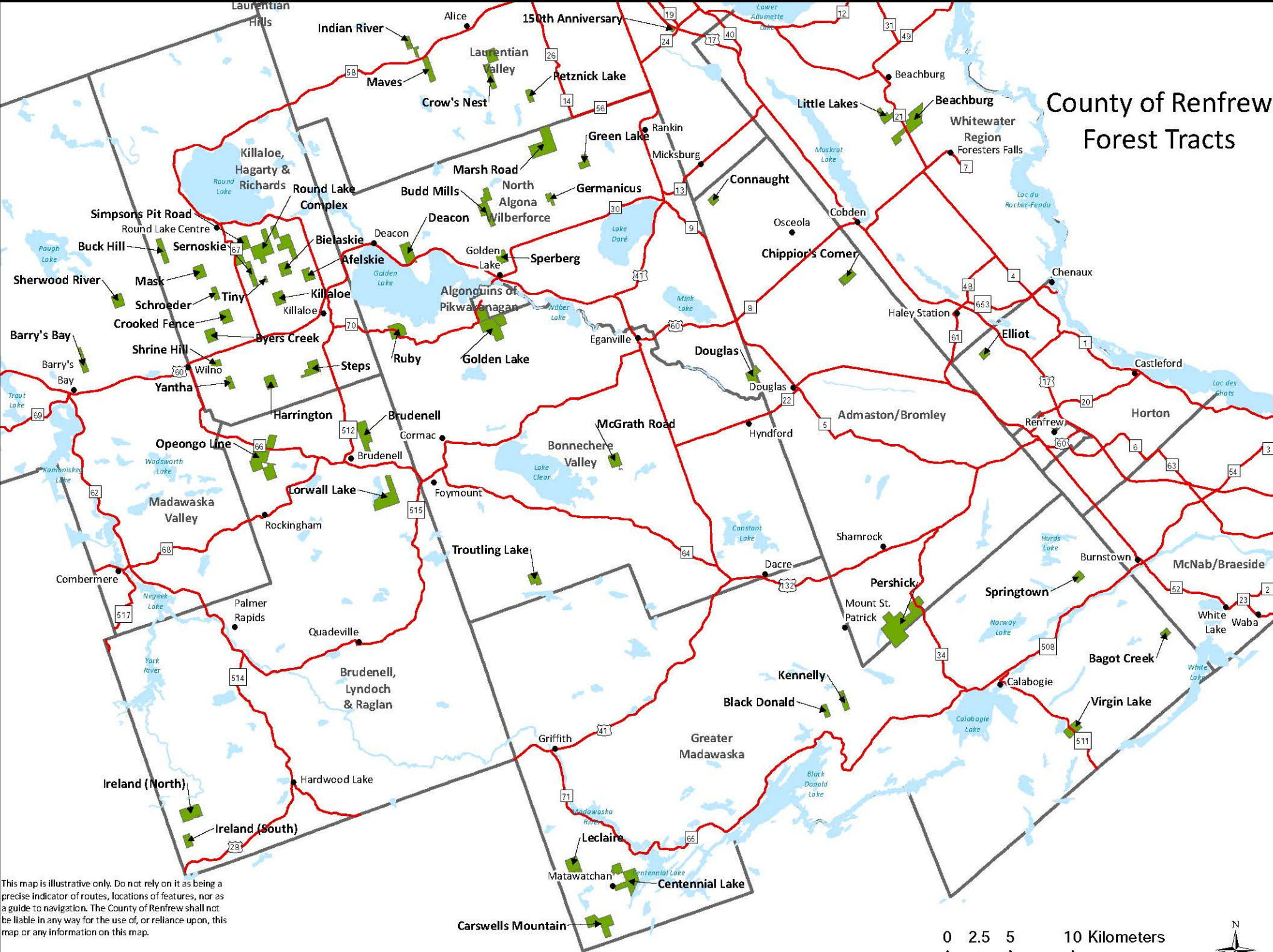
Year the overstory stand originated, based on best available records.

Appendix 10. Summary of Public and Municipal Comments Received

Comment #	Received from	Date/Venue	Comment/Question	Response
1	Mayor Mackay	Nov. 15, 2016 D&P Meeting	Will there be a system to notify municipalities of operations on County Forests that may impact municipal roads, so that they may use this information in their maintenance schedules?	The planned operations are mapped in the FMP by 5-year term, which will be available to municipalities. Staff will investigate a possible annual notification system to notify municipalities when operations will occur adjacent to municipally-owned roads.
2	Mayor Gibson	Nov. 29, 2016 Phone	Is there any research or monitoring being done of the affect of a warming climate on the growth rate of County Forests?	Not specifically, but there are others in the area who have research projects related to this. We will follow the results. We plan on investigating PSP data availability for RCF and re-implementing measurement of these plots in the next 5 years. We are always open to research partnerships. We use local yield curves, our own field measurements and compare the predictions to actual volume harvested. This data continually improves our estimates.
3	Steve D'Eon, RPF	Dec. 7, 2016 Email	1) There are achievable actions that can be taken now (before the next planning cycle) to increase the resilience of the RCF to a changing climate. One achievable item is increasing genetic diversity at the gene pool level which means planting from seed zones to the south (especially for Pw and Pr which are readily available). 2) Good to see increasing species diversity at the stand level. Diversifying to include some deep rooted or drought resistant species (such as hickories, maybe white oaks) should be considered as a minor component in selected	Testing and diversifying seed zones is already scheduled for the 2017 tree plant on RCF. Text was added to the plan to reflect that this will be a practice that will continue to be evaluated and used as recommended by experts (FGCA and other leaders on genetics) on the RCF. Text was added in the plan to reflect that other opportunities will be evaluated for increasing species diversity adding edge-of-range species. RCF is open to partnerships and research that would facilitate these

Comment #	Received from	Date/Venue	Comment/Question	Response
			stands. These species are also pretty good in ice storms and wind and provide mast but will cost you. 3) Any thoughts to RCF using some of the proven genetic winners that were developed at PNFI such as Beachburg white spruce or Spoor Lake jack pine? These seed sources have been proven to outperform other seed sources in trial after trial and would be available in partnership with the PRF (I would think). RCF could do some five acre plantings to create landraces for the future. A landrace is where a gene pool is allowed to adapt for 40 years then gets managed as a seed source.	opportunities, as well as those suggested in the third comment.
4	Robert Craftchick, RPF	Dec. 12, 2016 Email	AIP is still referred to in text as draft. Has now been signed, so "draft" can be removed.	Correction made.
5	Town of Deep River	December 16, 2016 Mail	Letter informing that the Council for the Town of Deep River received the information regarding the Forest Management Plan.	Information received.
6	Mayor Gruntz on behalf of the Township of Brudenell, Lyndoch, Raglan	Dec. 21, 2016 Email	A well written plan, the same as the provincial forest plan. Very detailed and well written on the state of our county forests with long term planning to ensure sustainability. The values follow the MNR guidelines with some flexibility. Concerns that the Endangered Species Act adds \$1.50 to \$2.00 per cubic meter to industry costs.	Concerns recognized. These impacts are recognized in the FMP (p.19) and the County will continue to work with local industry to provide feedback to MNRF in an effort to balance economic and ecological values.
7	Township of North Algona Wilberforce	December 21, 2016 Mail	Letter informing that the Council of the Township of NAW has reviewed the information provided and agreed to support the draft plan.	Information received.

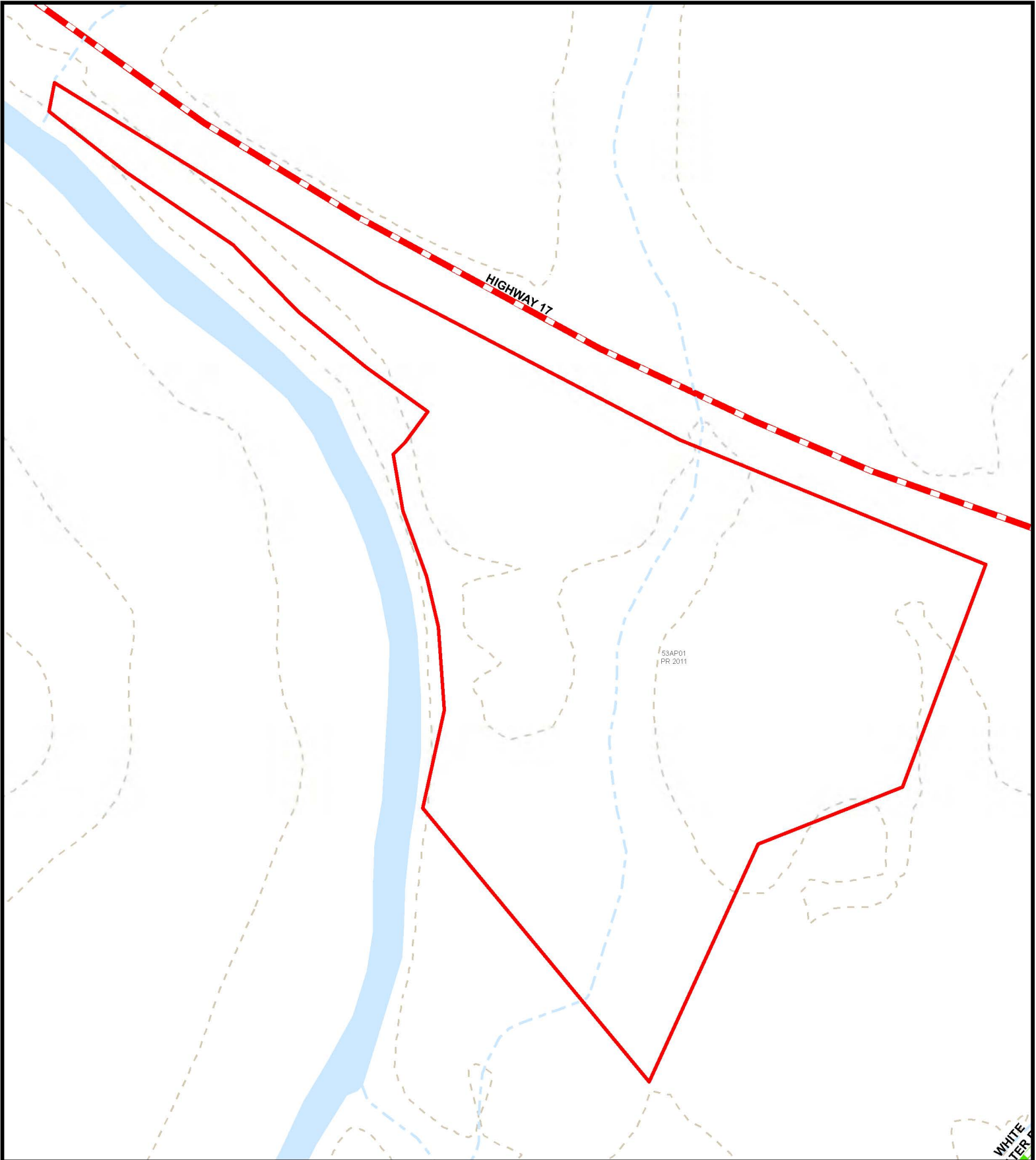
County of Renfrew Forest Tracts



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150th Anniversary Tract

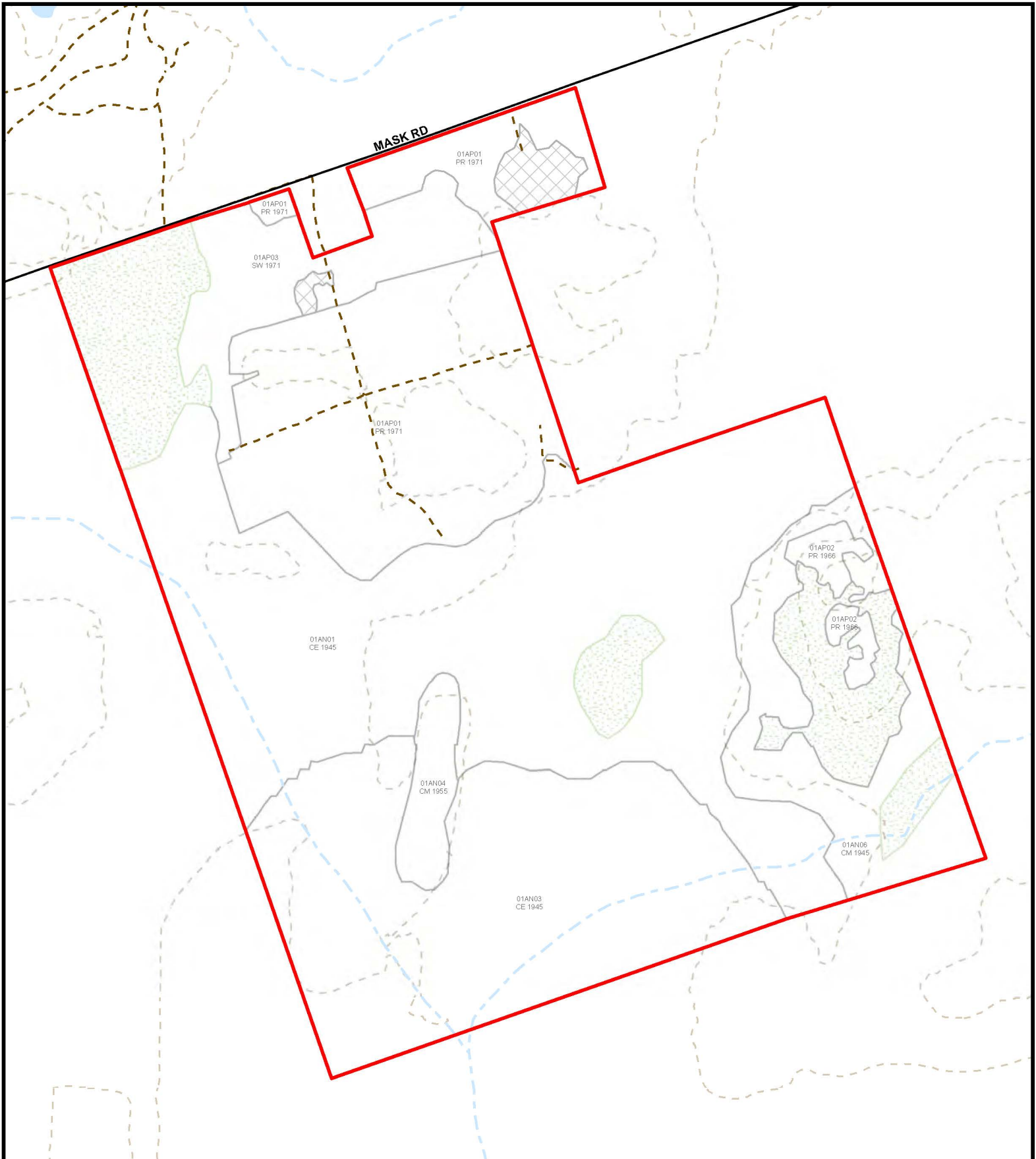
Township of Laurentian Valley



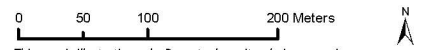
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|-------------------|--------------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| | Unclassified | | Interior Road | Water | |

Afelskie Tract

Township of Killaloe, Hagarty and Richards



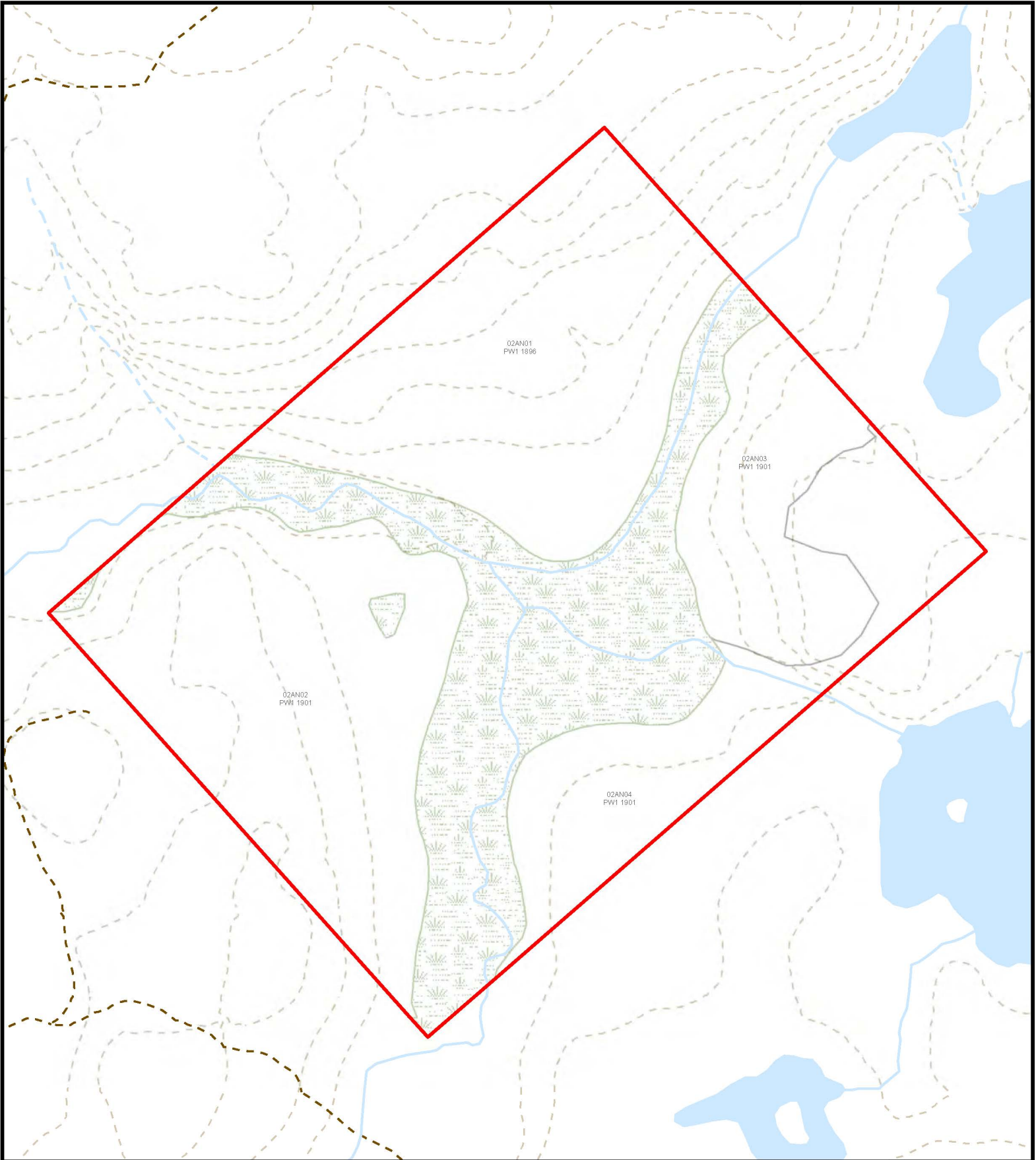
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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
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| Unclassified | | | Interior Road | Water | |



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Bagot Creek Tract

Township of Greater Madawaska



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|-------------------|--------------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| | Unclassified | | Interior Road | Water | |

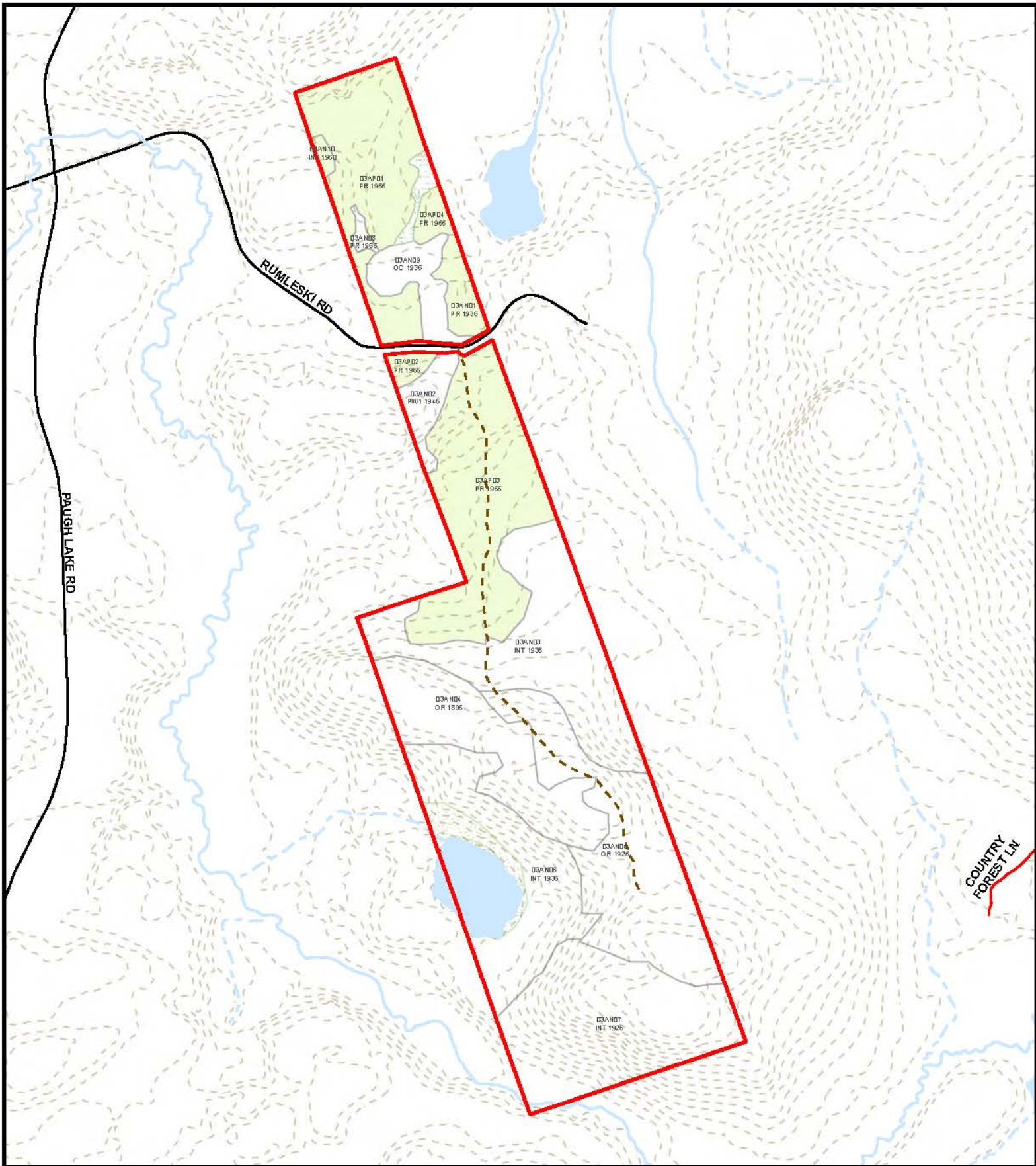
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Barry's Bay Tract

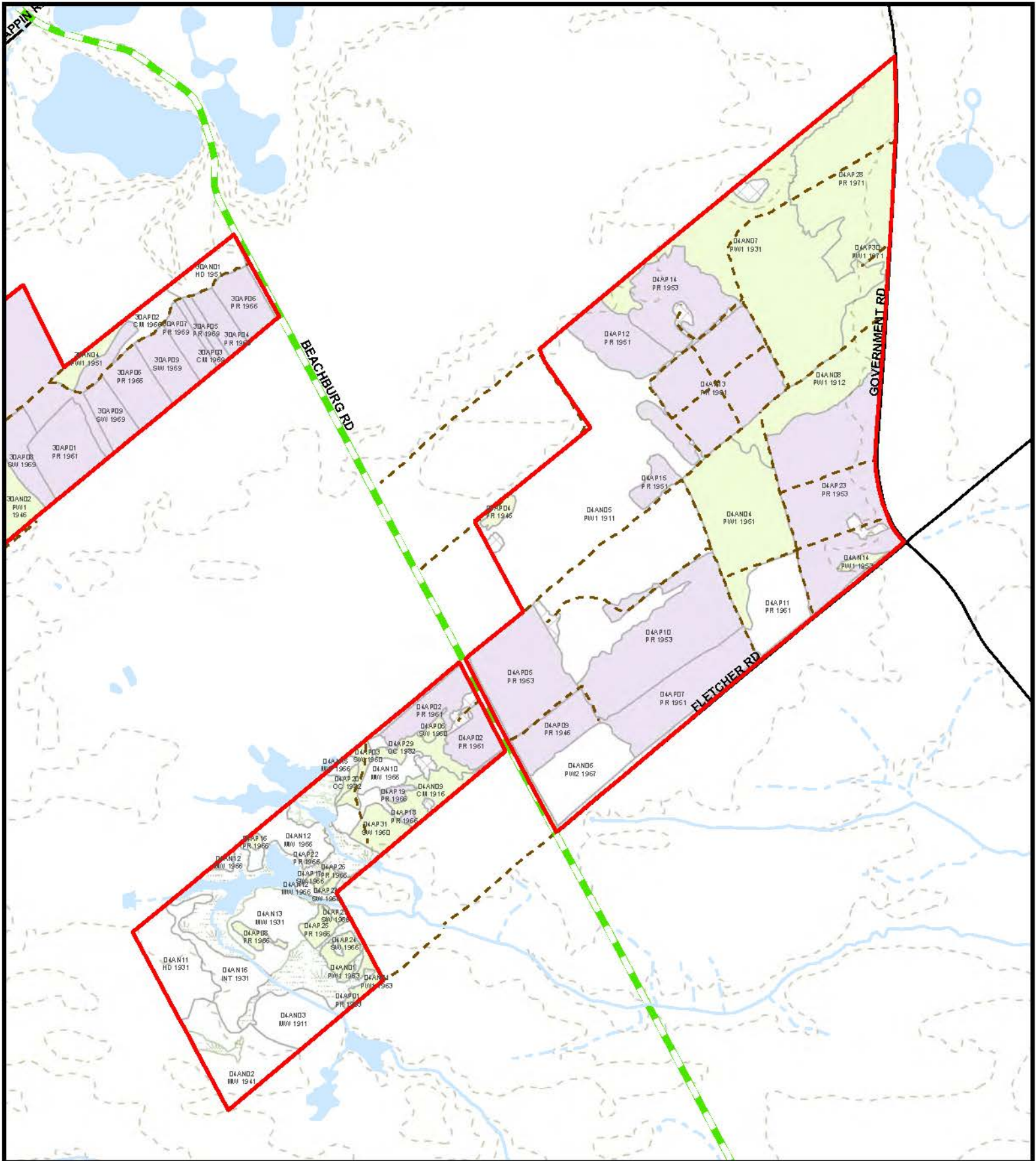
Township of Madawaska Valley



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours		 <small>This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.</small> <small>© 2016, Queen's Printer for Ontario</small>
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek	<small>0 50 100 200 300 Meters</small> <small>October, 2016</small>	
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
	Unclassified		Interior Road		Water		

Beachburg Tract

Township of Whitewater Region



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

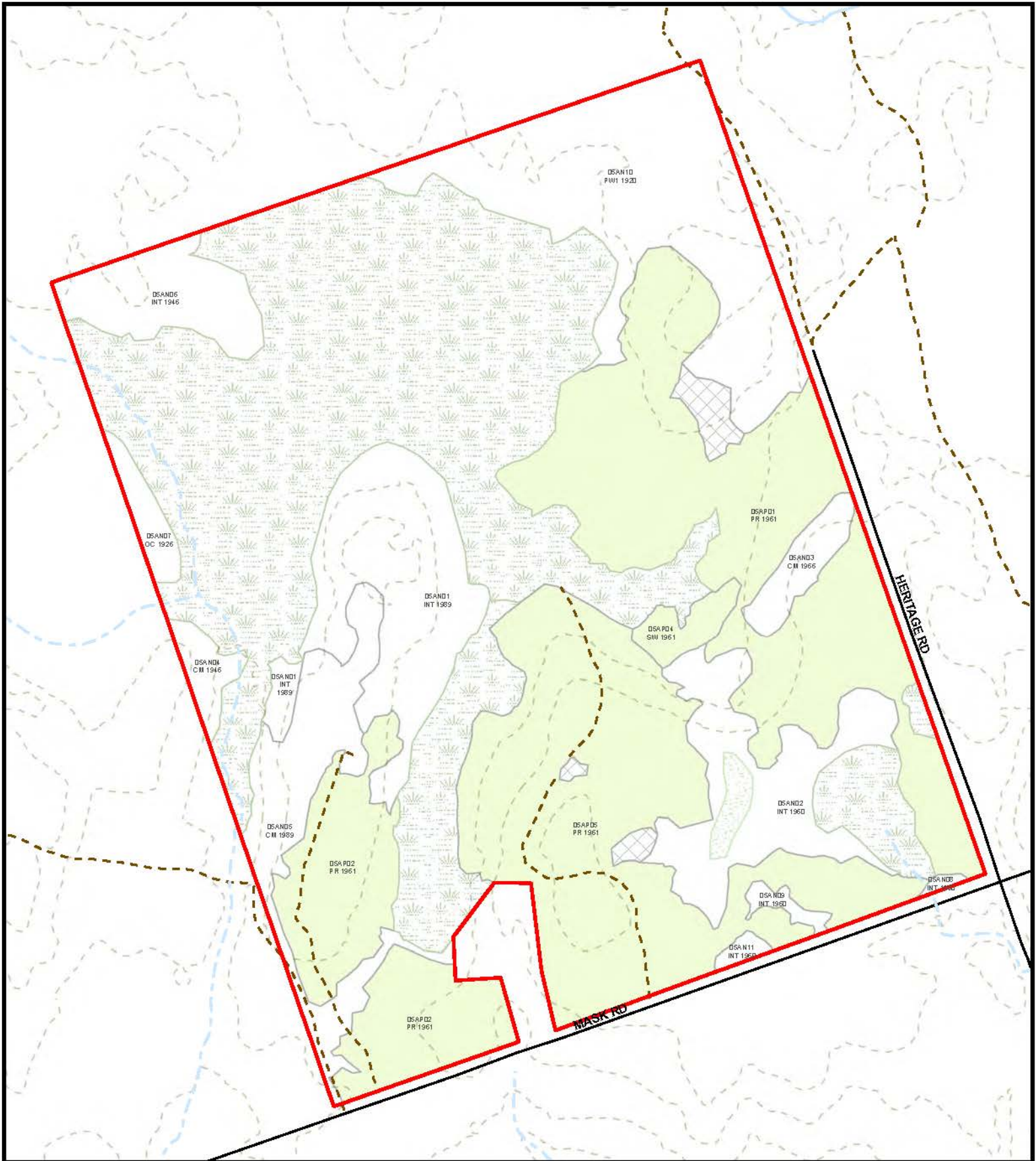
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Bielaskie Tract

Township of Killaloe, Hagarty and Richards



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

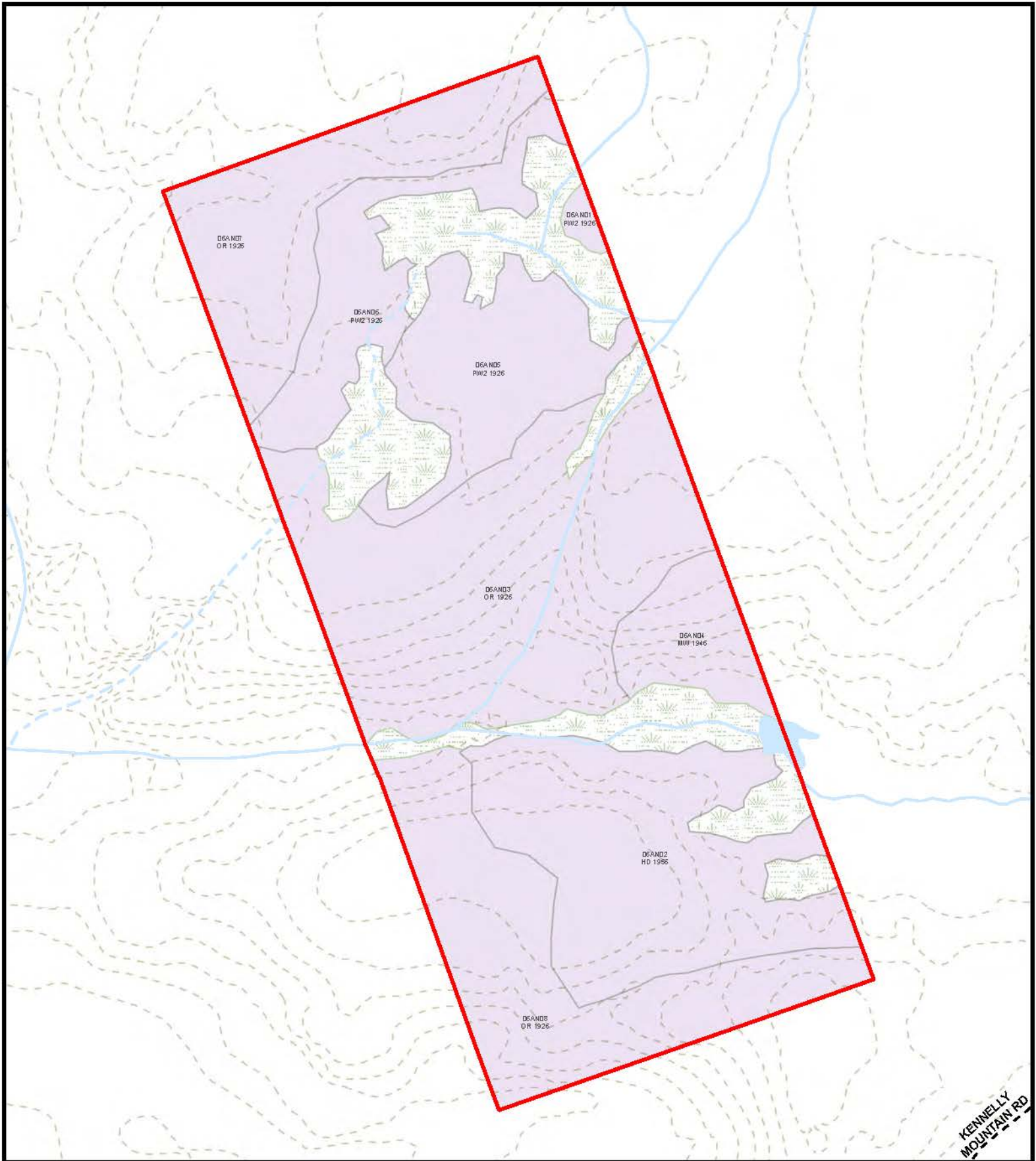
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Black Donald Tract

Township of Greater Madawaska



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

0 50 100 Meters

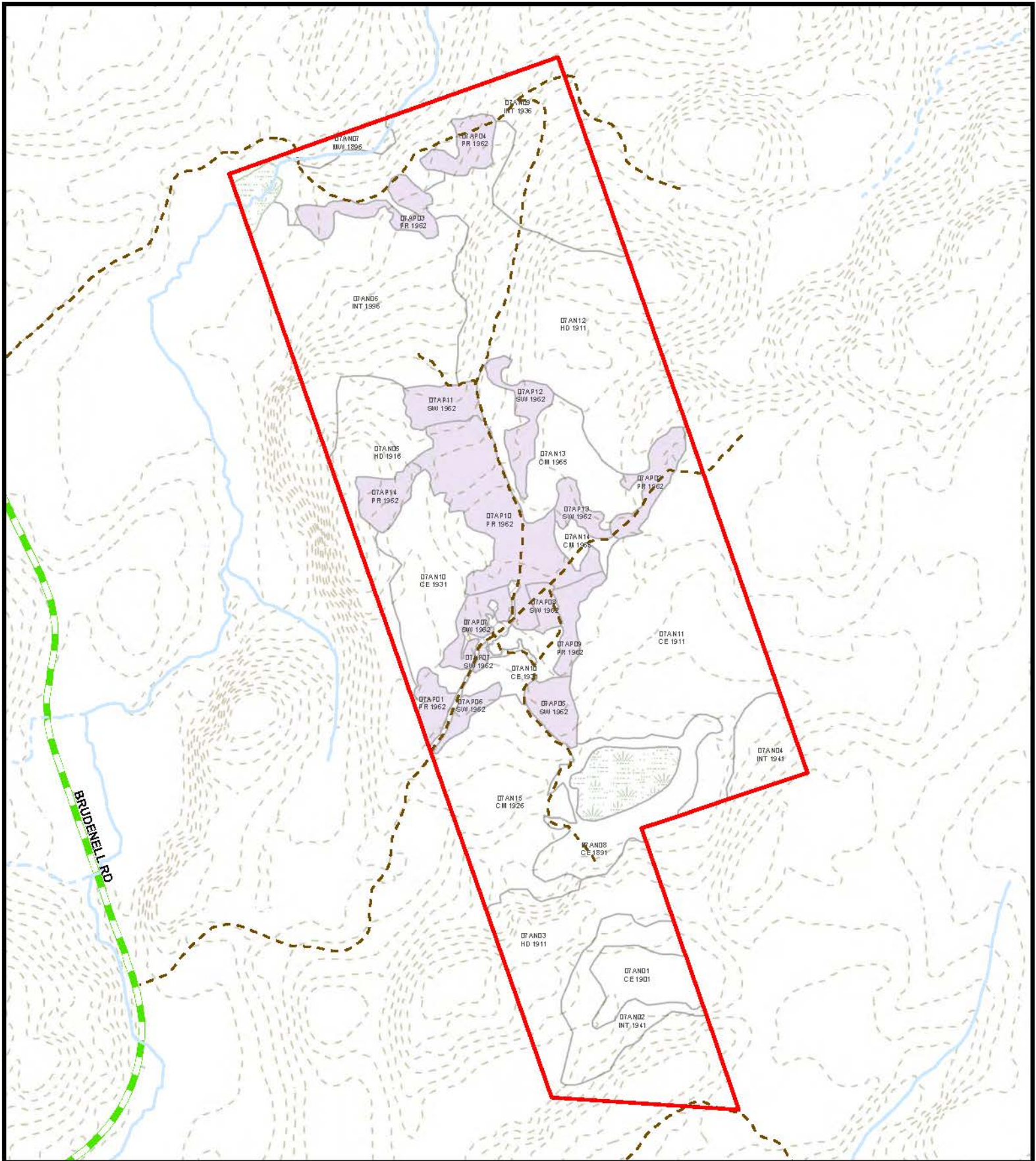
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KENNELLY MOUNTAIN RD

Brudenell Tract

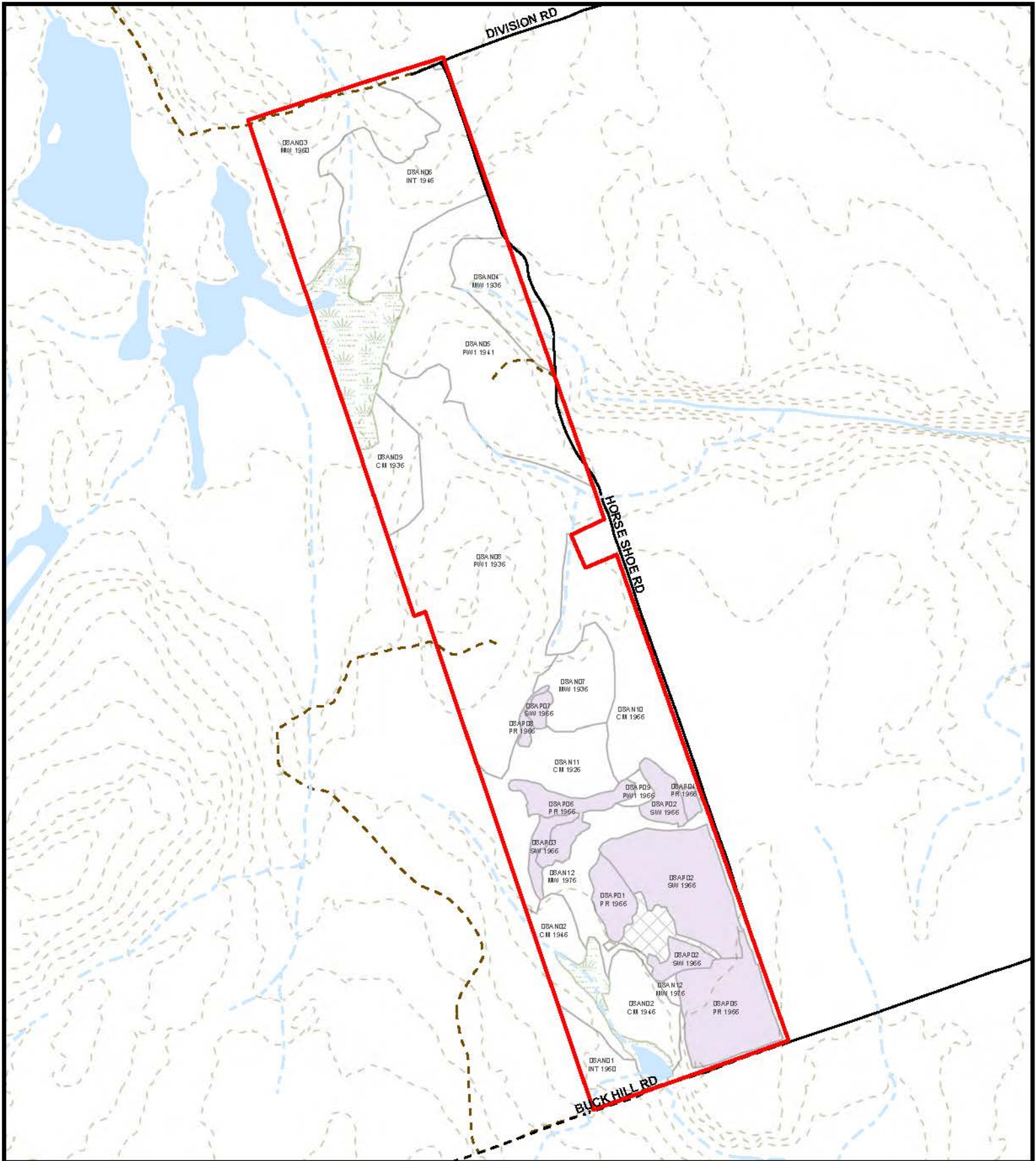
Township of Brudenell, Lyndoch and Raglan



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours		
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek	This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. © 2016, Queen's Printer for Ontario	131
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
Unclassified	Unclassified	Unclassified	Interior Road	Water			

Buck Hill Tract

Township of Killaloe, Hagarty and Richards



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek
Unclassified			Interior Road		Water

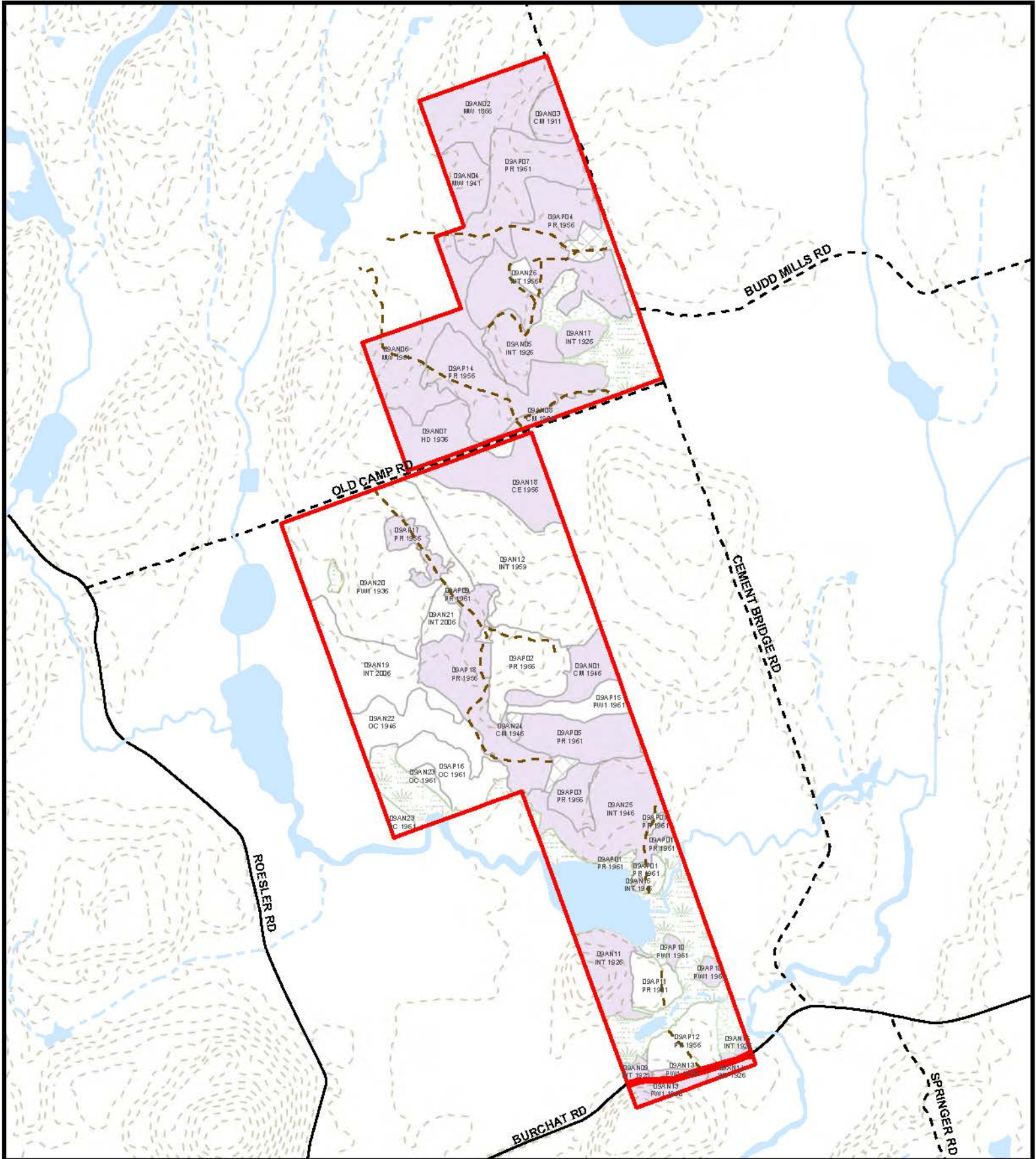
0 50 100 200 300 Meters

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Budd Mills Tract

Township of North Algona/Wilberforce



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|---|---|---|---|--|--|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

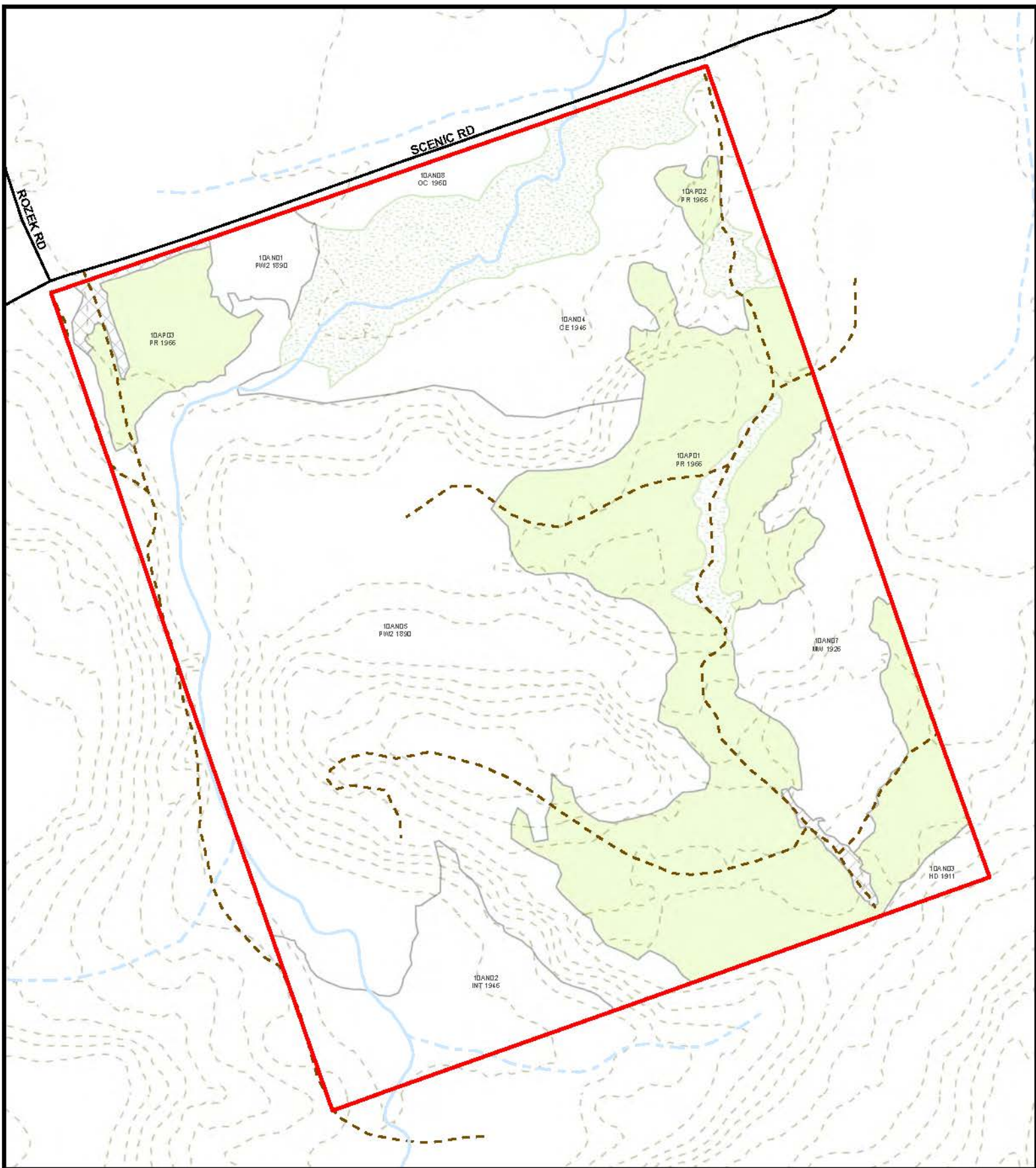
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Byers Creek Tract

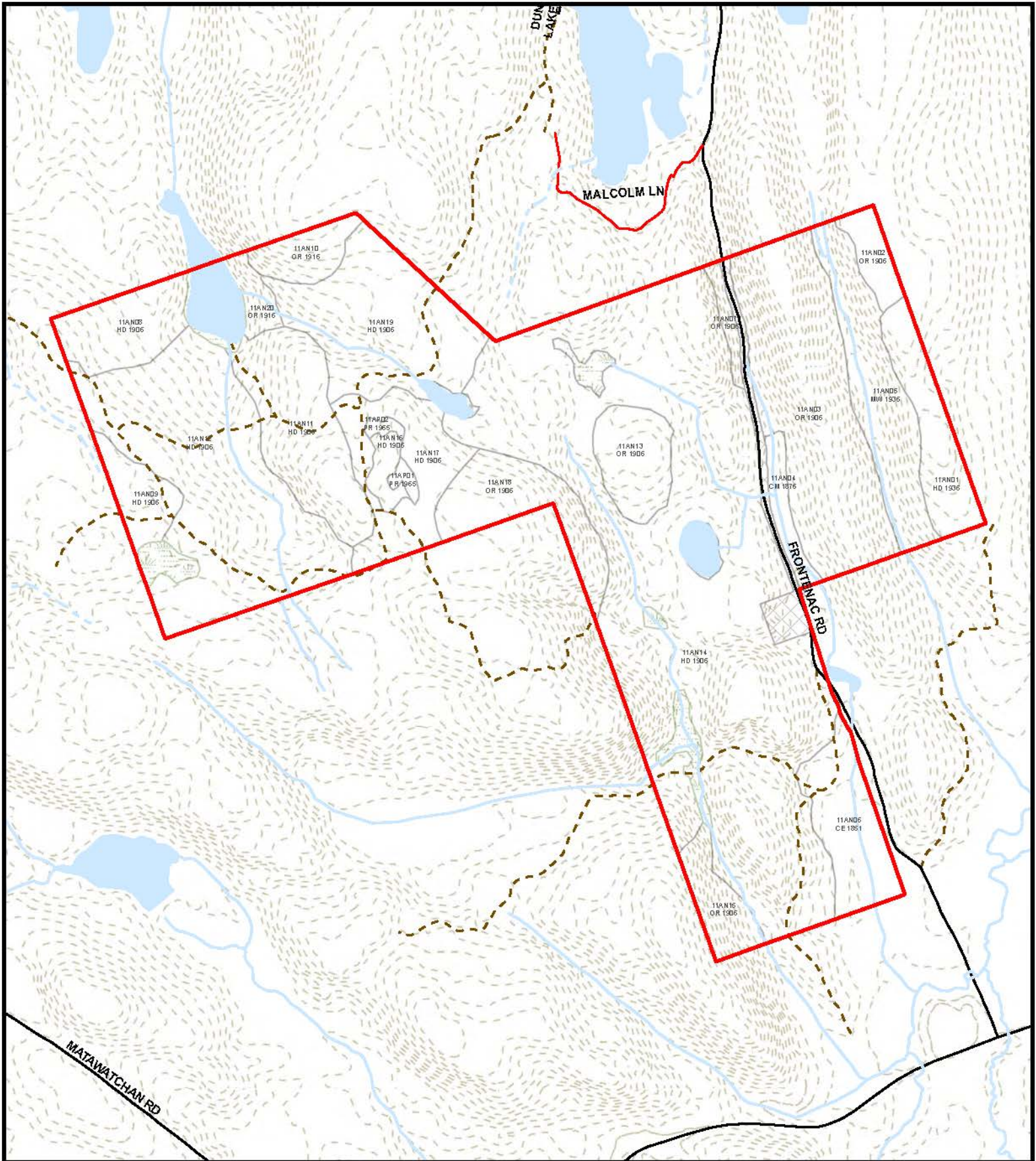
Township of Killaloe, Hagarty and Richards



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours	0 50 100 200 Meters	This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. © 2016, Queen's Printer for Ontario 134 October, 2016
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek		
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
Unclassified			Interior Road	Water			

Carswells Mountain Tract

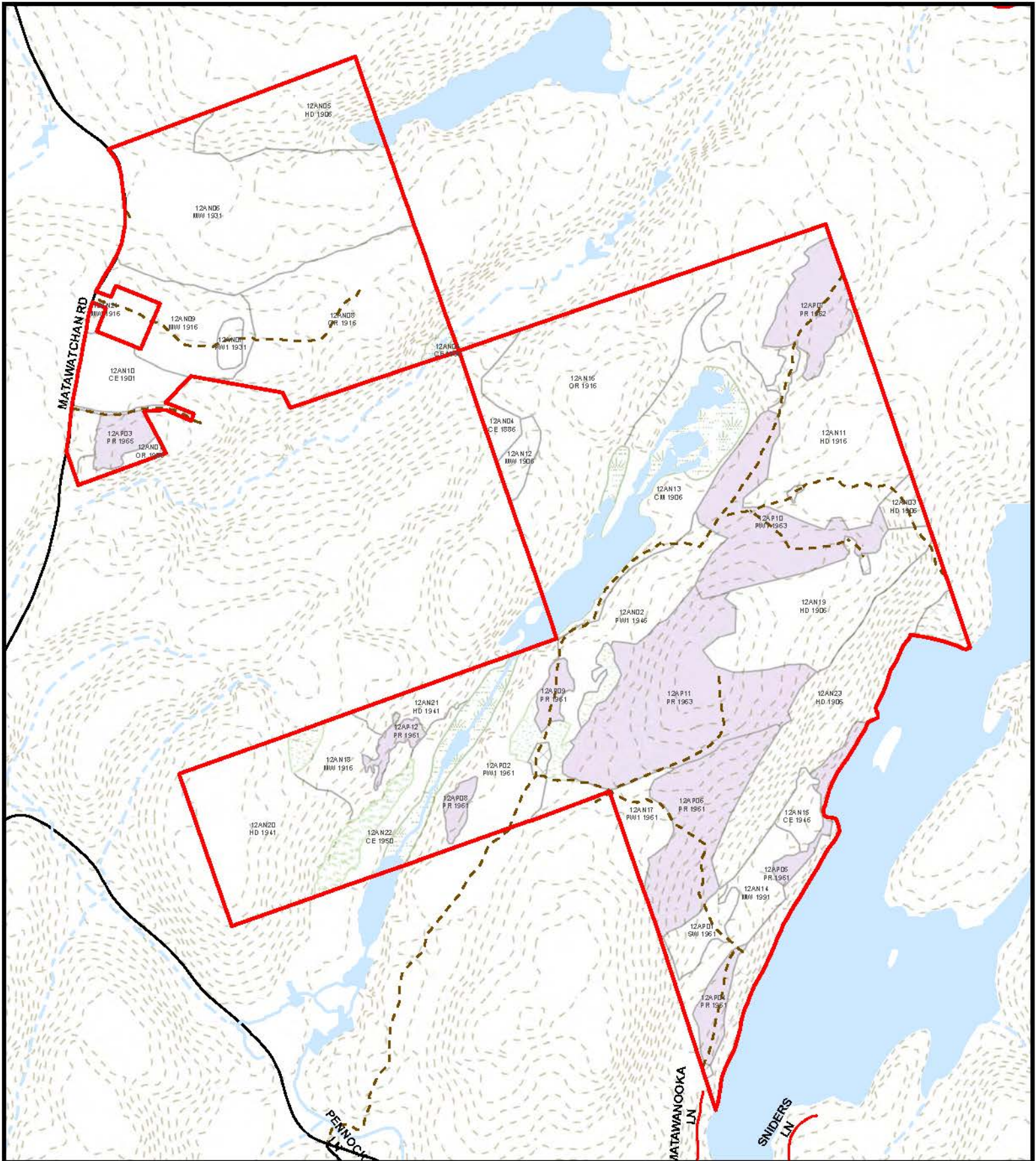
Township of Greater Madawaska



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours		
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek	This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.	
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
Unclassified			Interior Road		Water		

Centennial Lake Tract

Township of Greater Madawaska



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

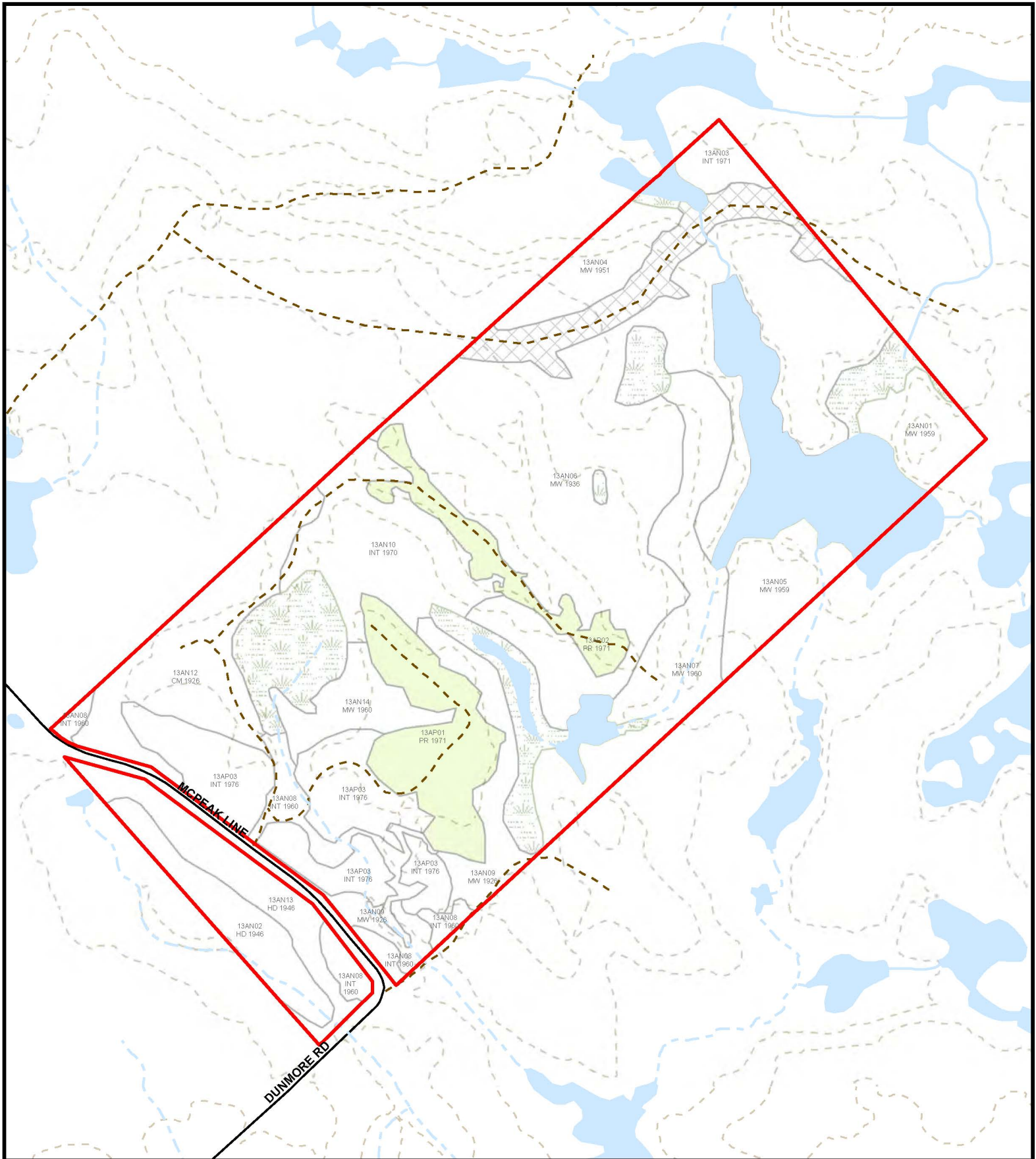
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Chippior's Corner Tract

Township of Admaston/Bromley



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

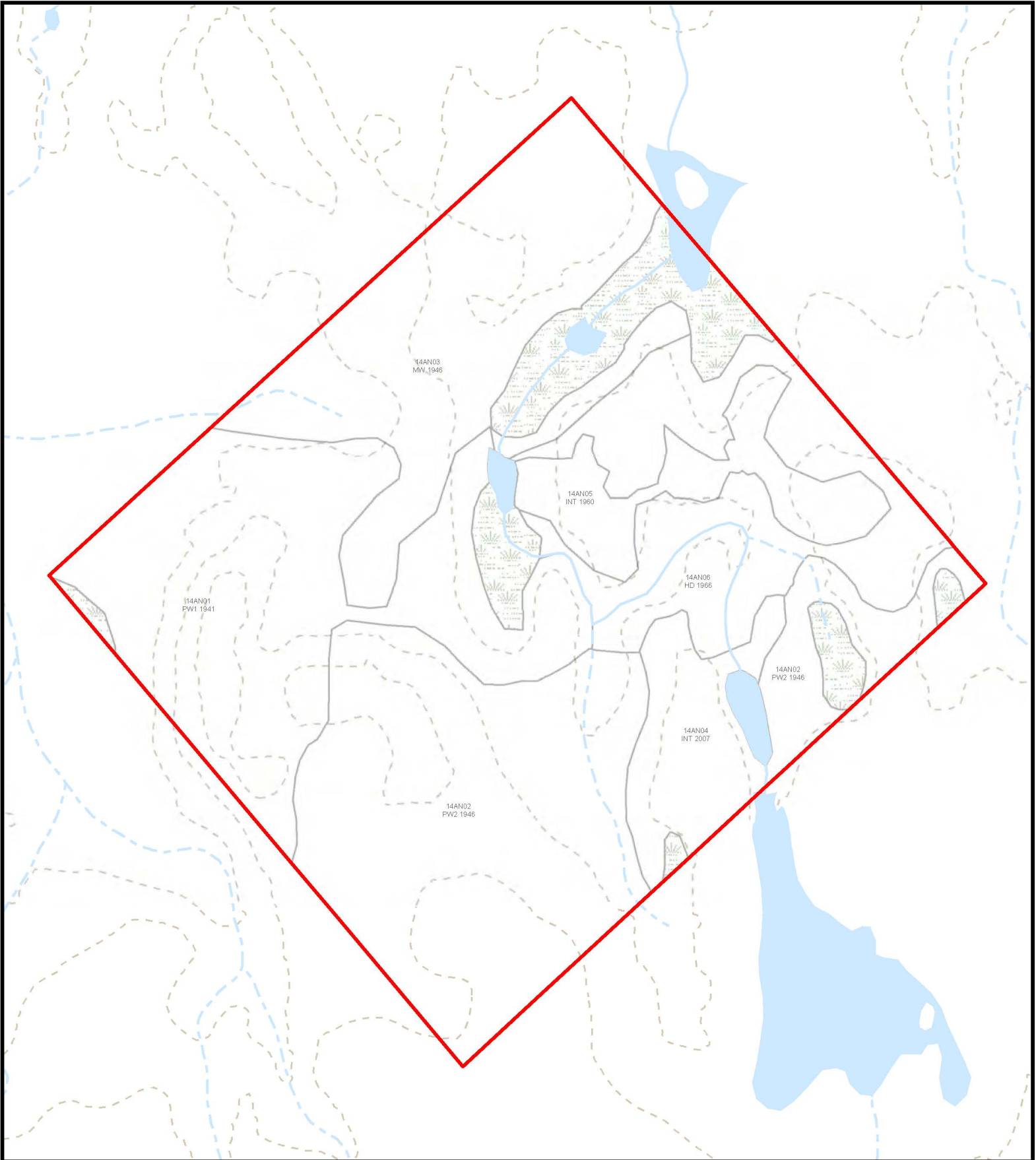
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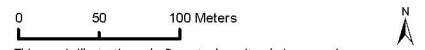
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Connaught Tract

Township of Admaston/Bromley



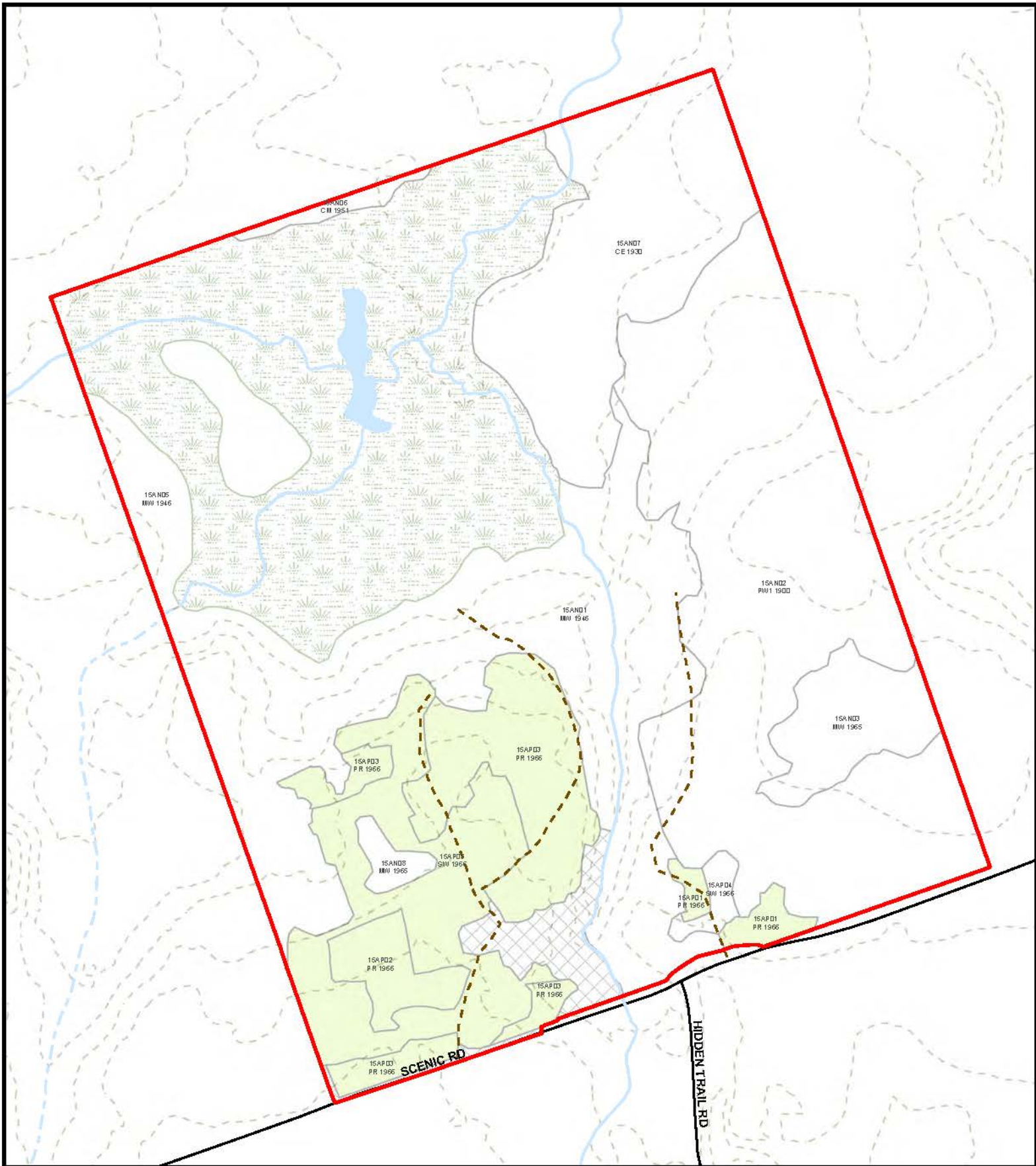
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| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| | Unclassified | | Interior Road | Water | |



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Crooked Fence Tract

Township of Killaloe, Hagarty and Richards



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

0 50 100 200 Meters

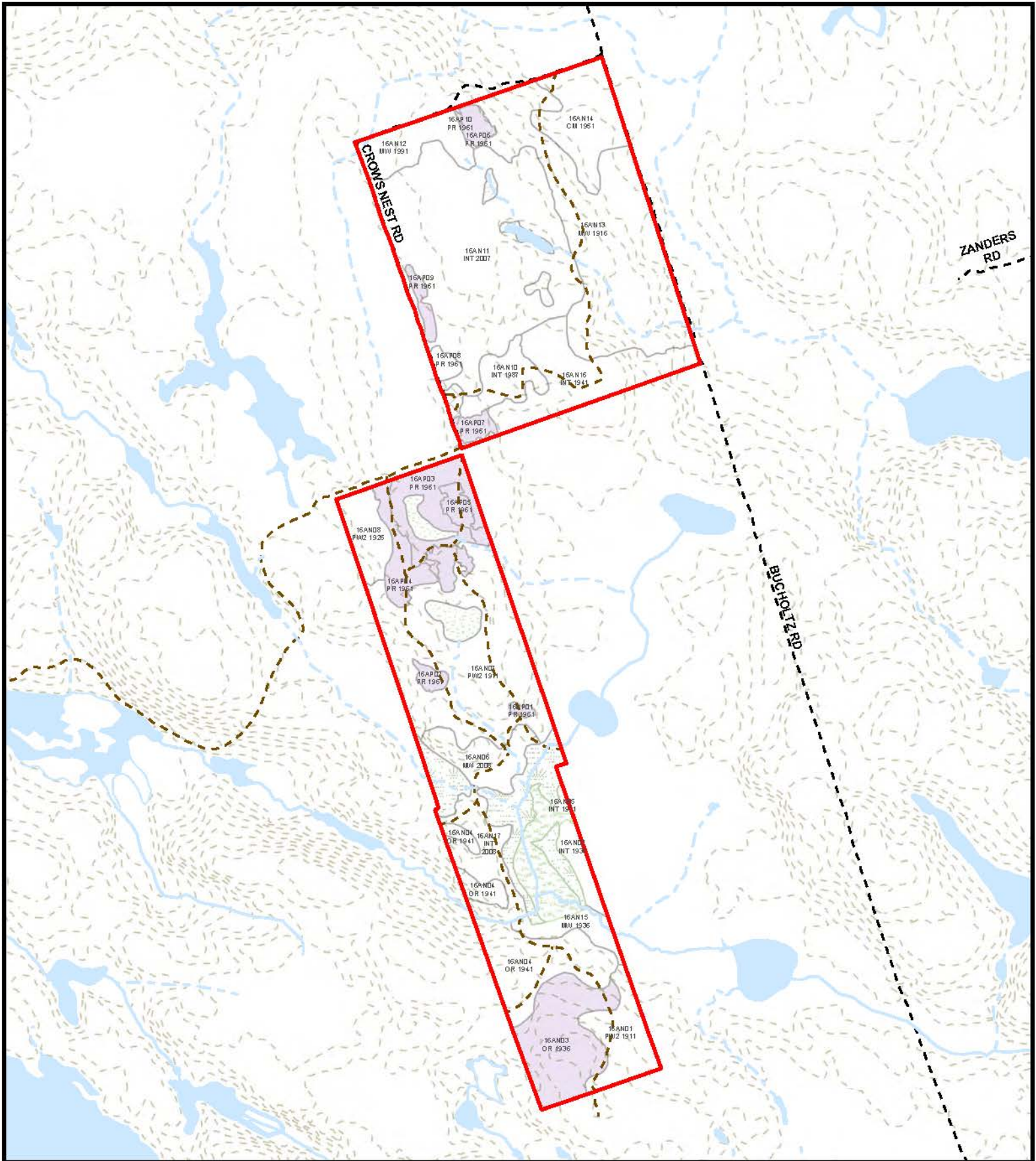
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Crow's Nest Tract

Township of Laurentian Valley



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

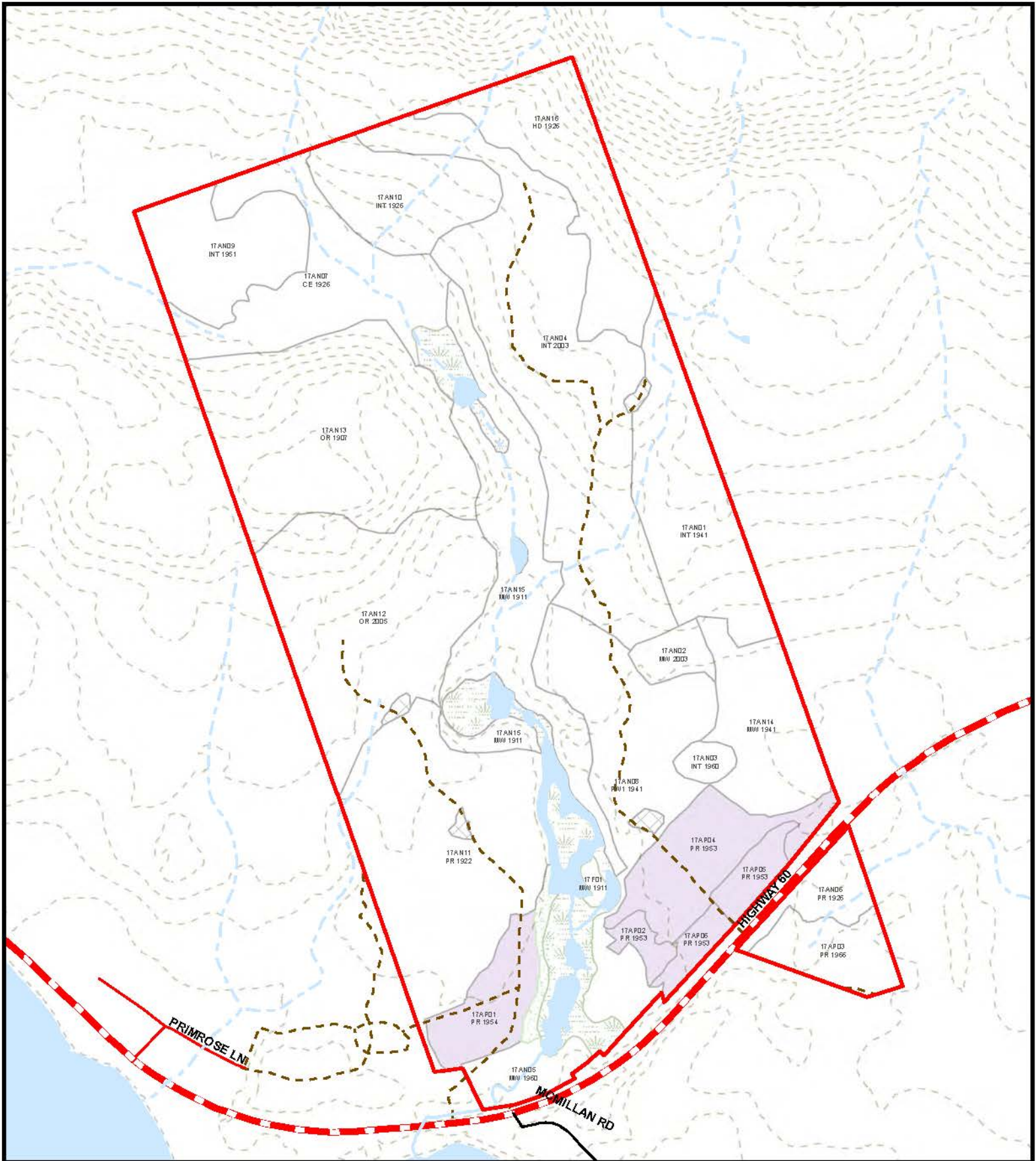
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Deacon Tract

Township of North Algona/Wilberforce



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
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| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

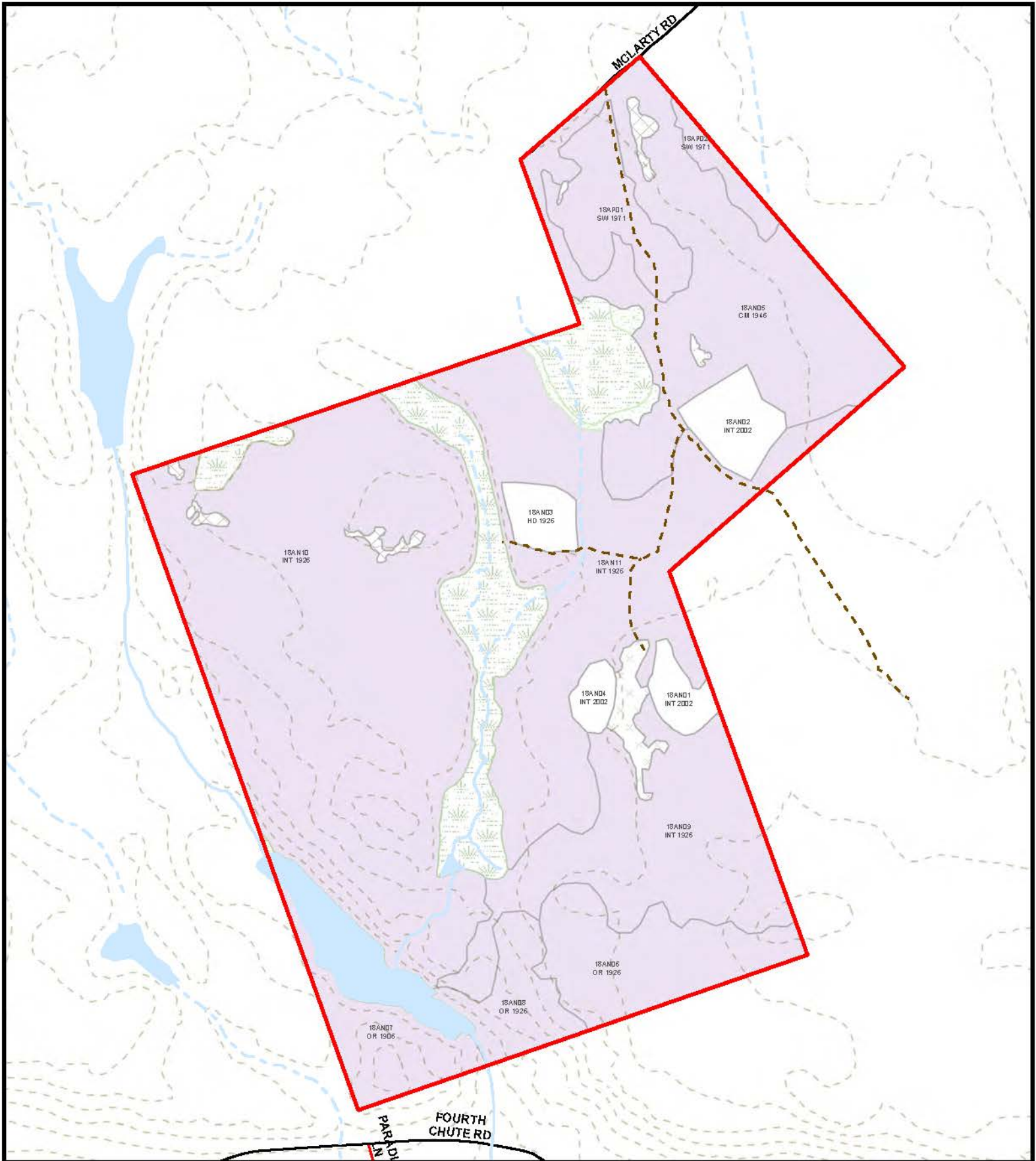
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Douglas Tract

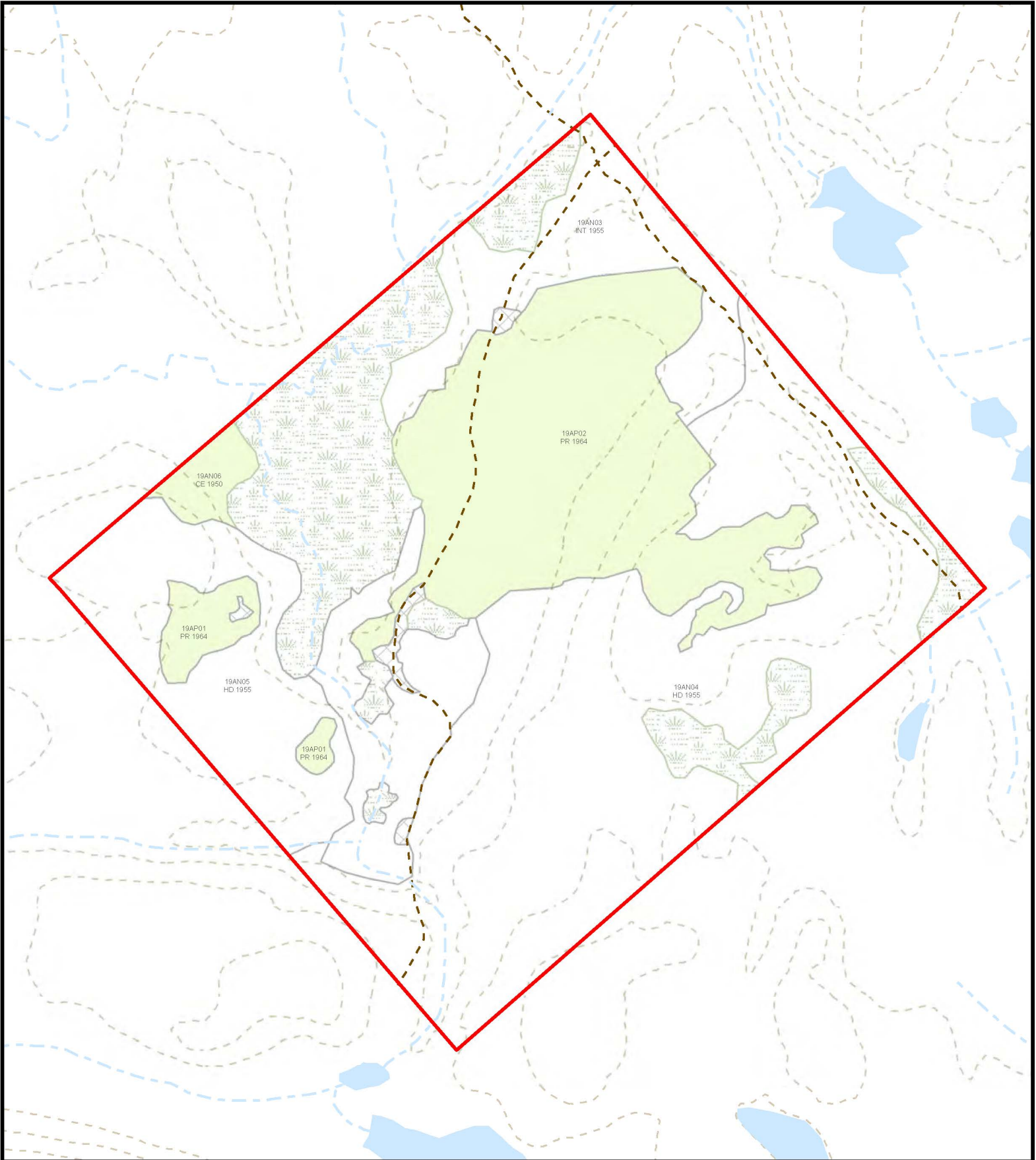
North Algona/Wilberforce and Admaston/Bromley



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours	0 50 100 200 Meters	This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. © 2016, Queen's Printer for Ontario
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek		
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
Unclassified	Water	Interior Road					

Elliot Tract

Township of Horton



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|-------------------|--------------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| | Unclassified | | Interior Road | Water | |

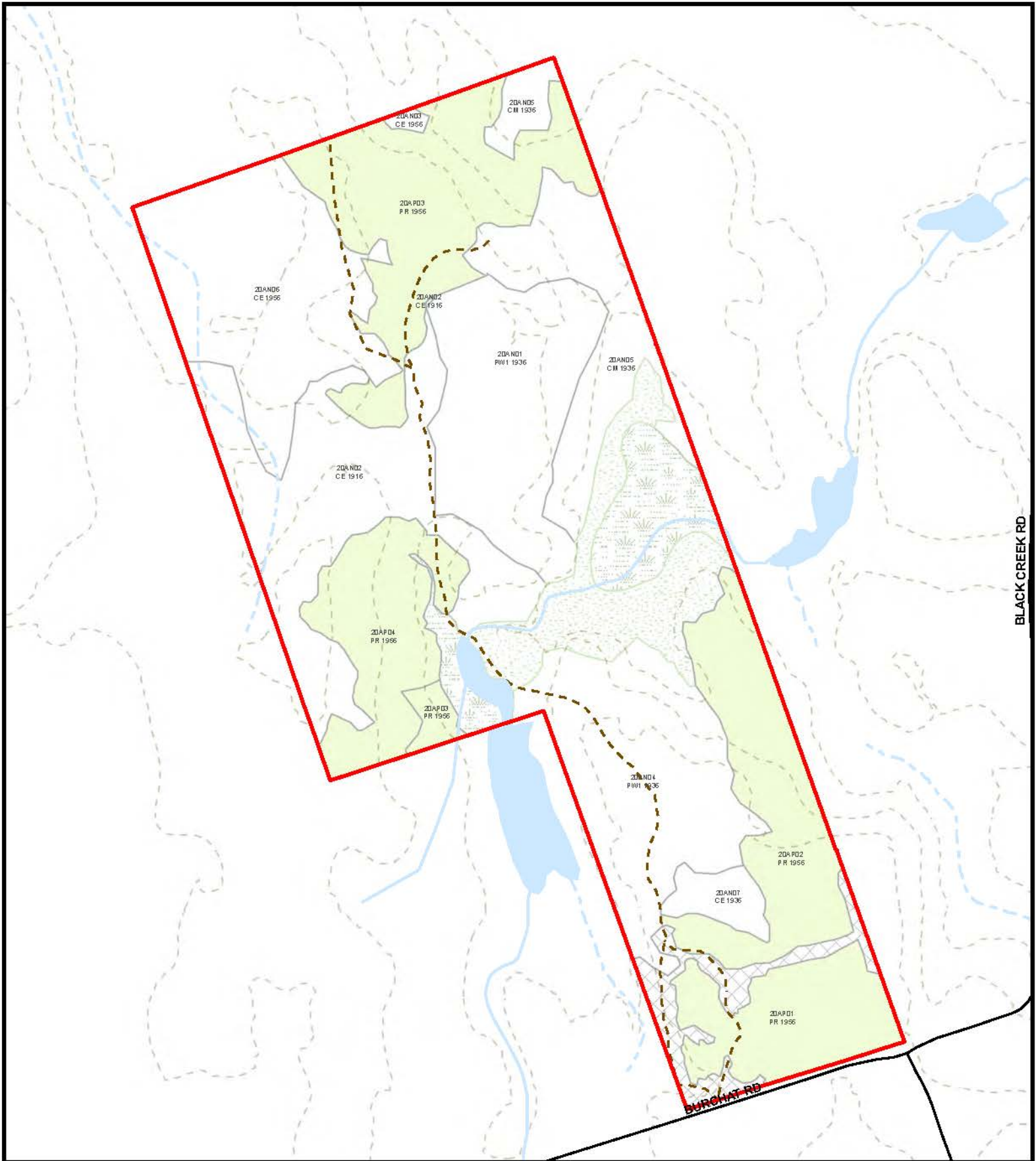
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Germanicus Tract

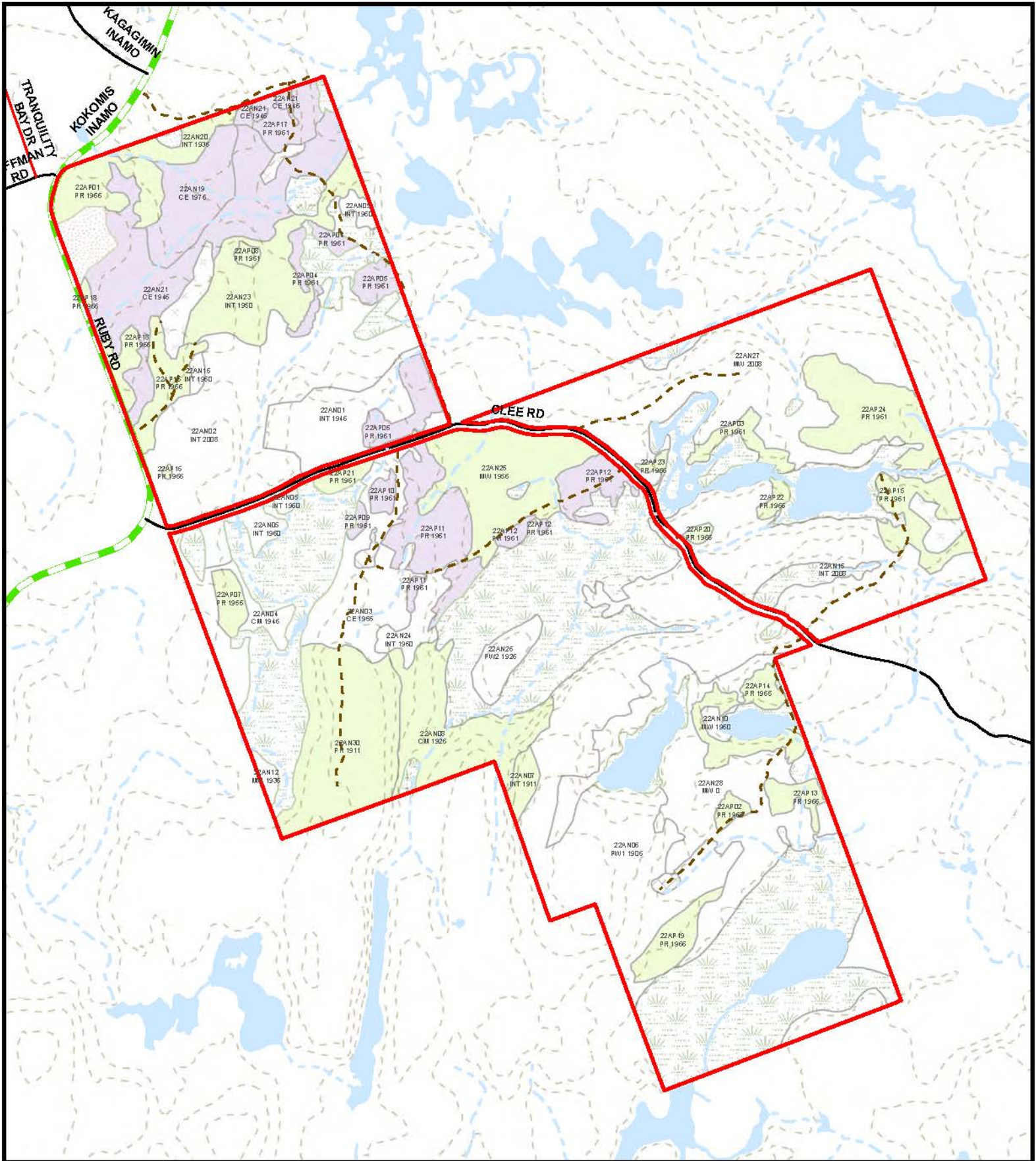
Township of North Algona/Wilberforce



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours	0 50 100 Meters	 <small>This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. © 2016, Queen's Printer for Ontario 144 October, 2016</small>
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek		
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
	Unclassified		Interior Road	Water			

Golden Lake Tract

Township of Bonnechere Valley



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

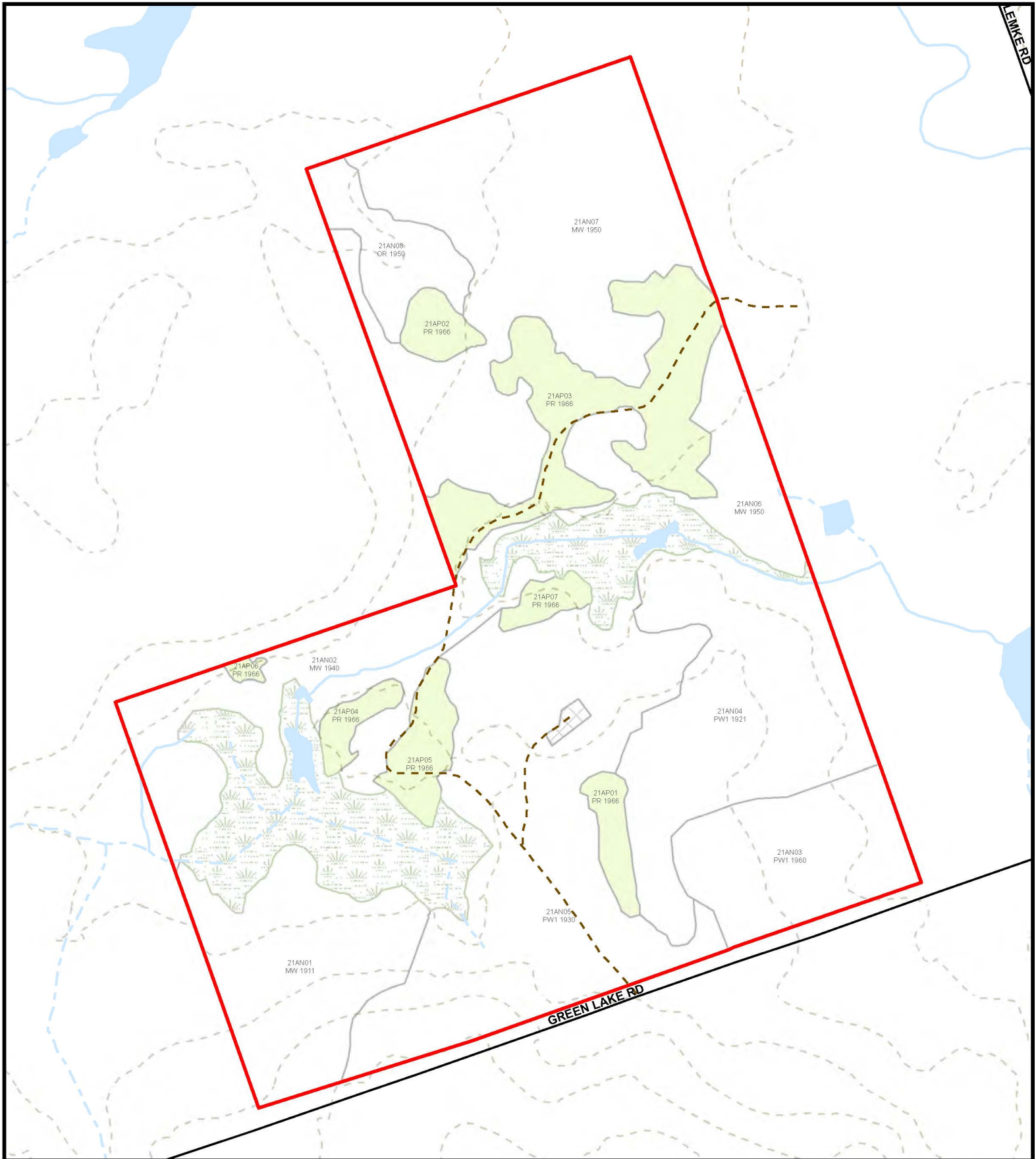
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Green Lake Tract

Township of North Algona/Wilberforce



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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

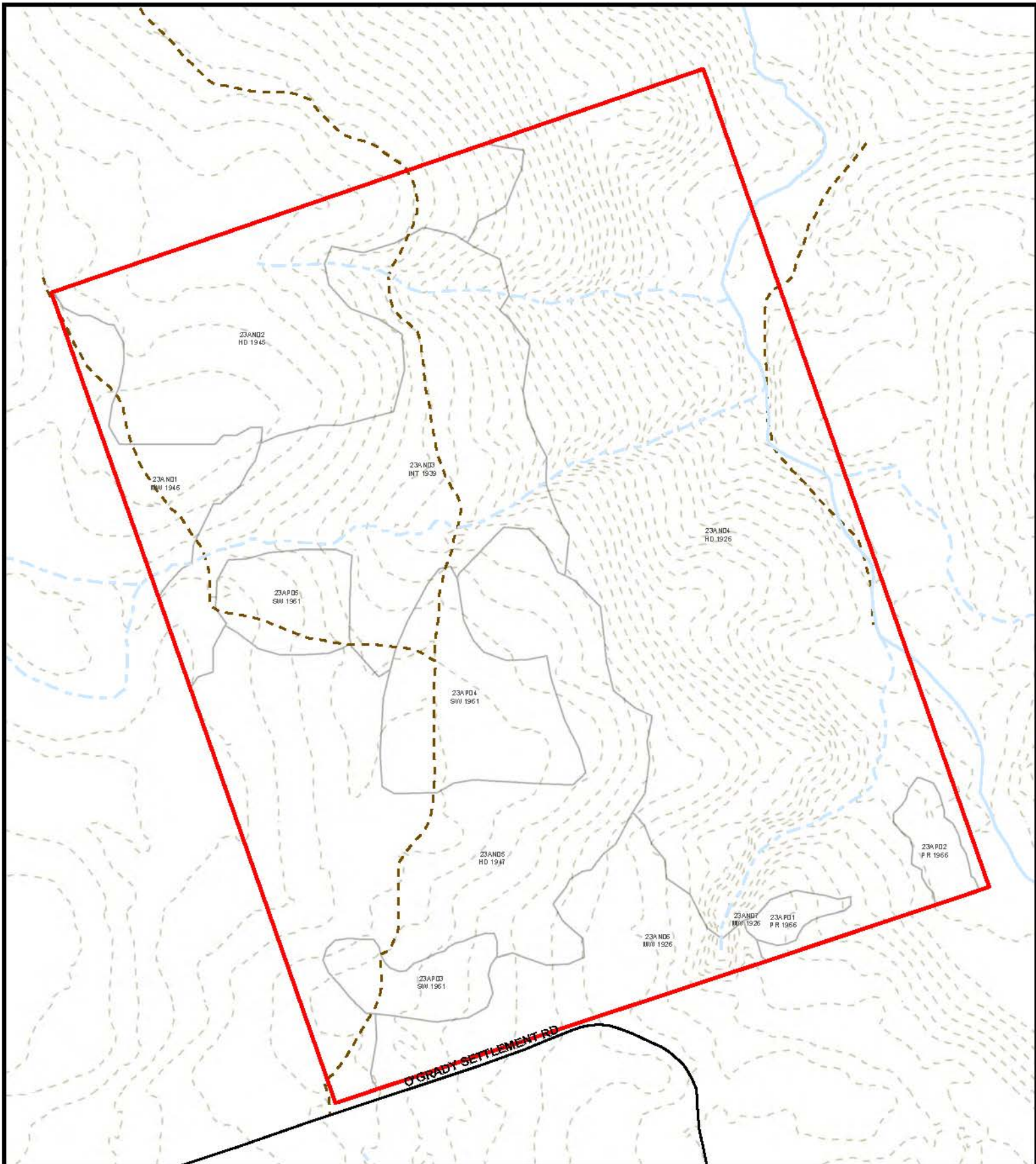
0 50 100 200 Meters

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Harrington Tract

Township of Killaloe, Hagarty and Richards



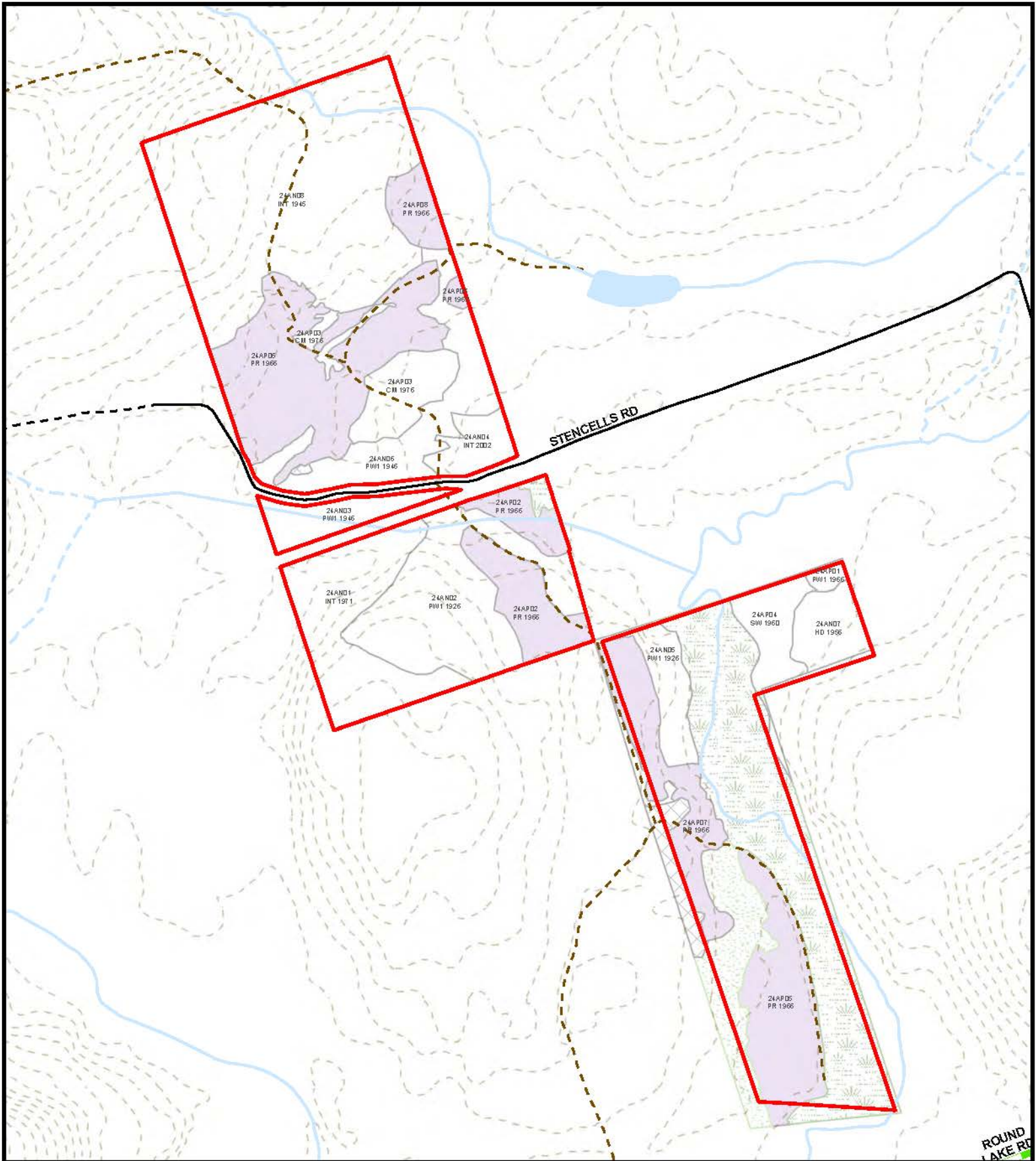
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|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |



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Indian River Tract

Township of Laurentian Valley



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

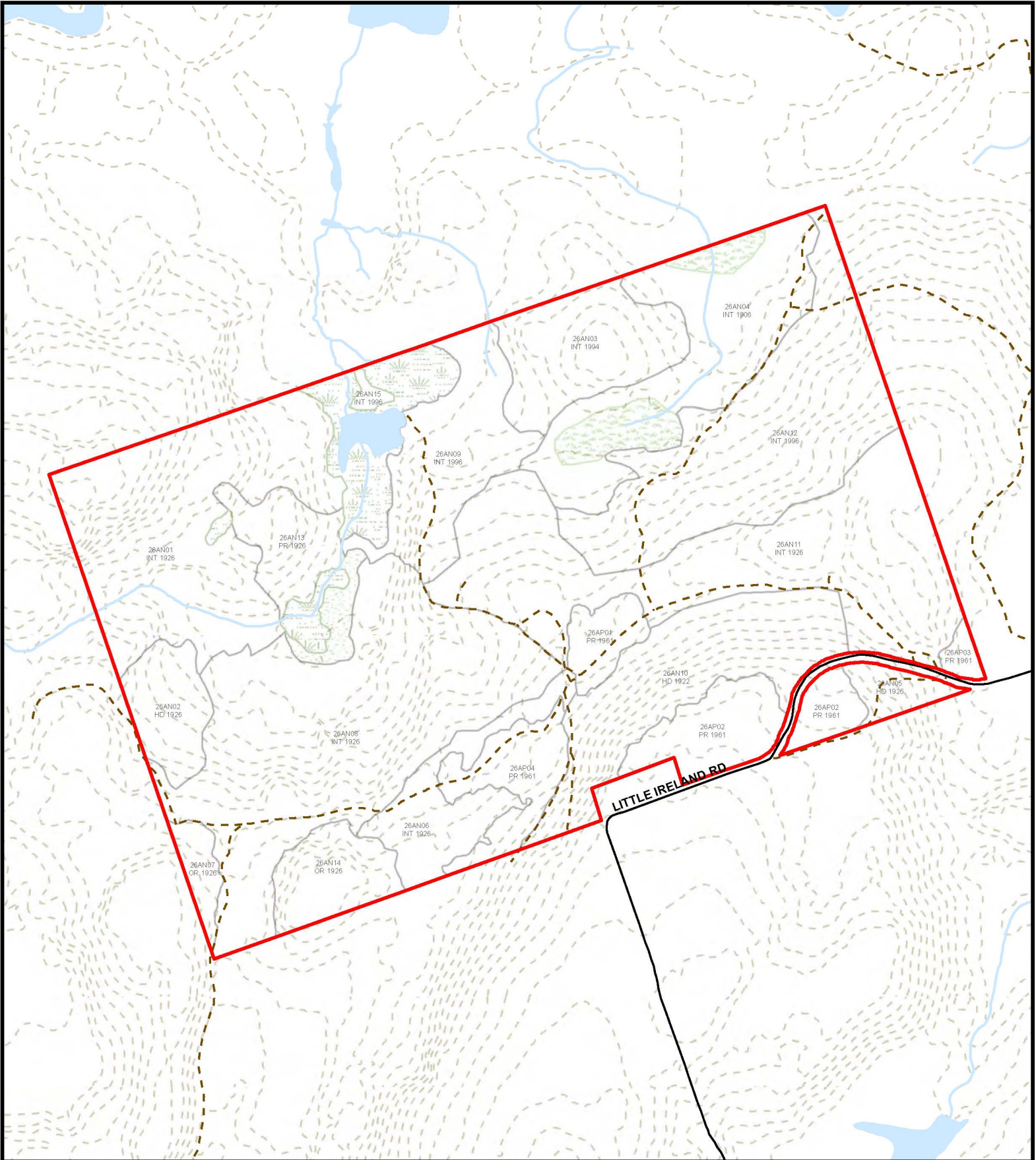
0 50 100 200 Meters

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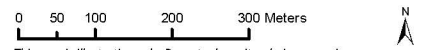
© 2016, Queen's Printer for Ontario

Ireland (North) Tract

Township of Brudenell, Lyndoch and Raglan



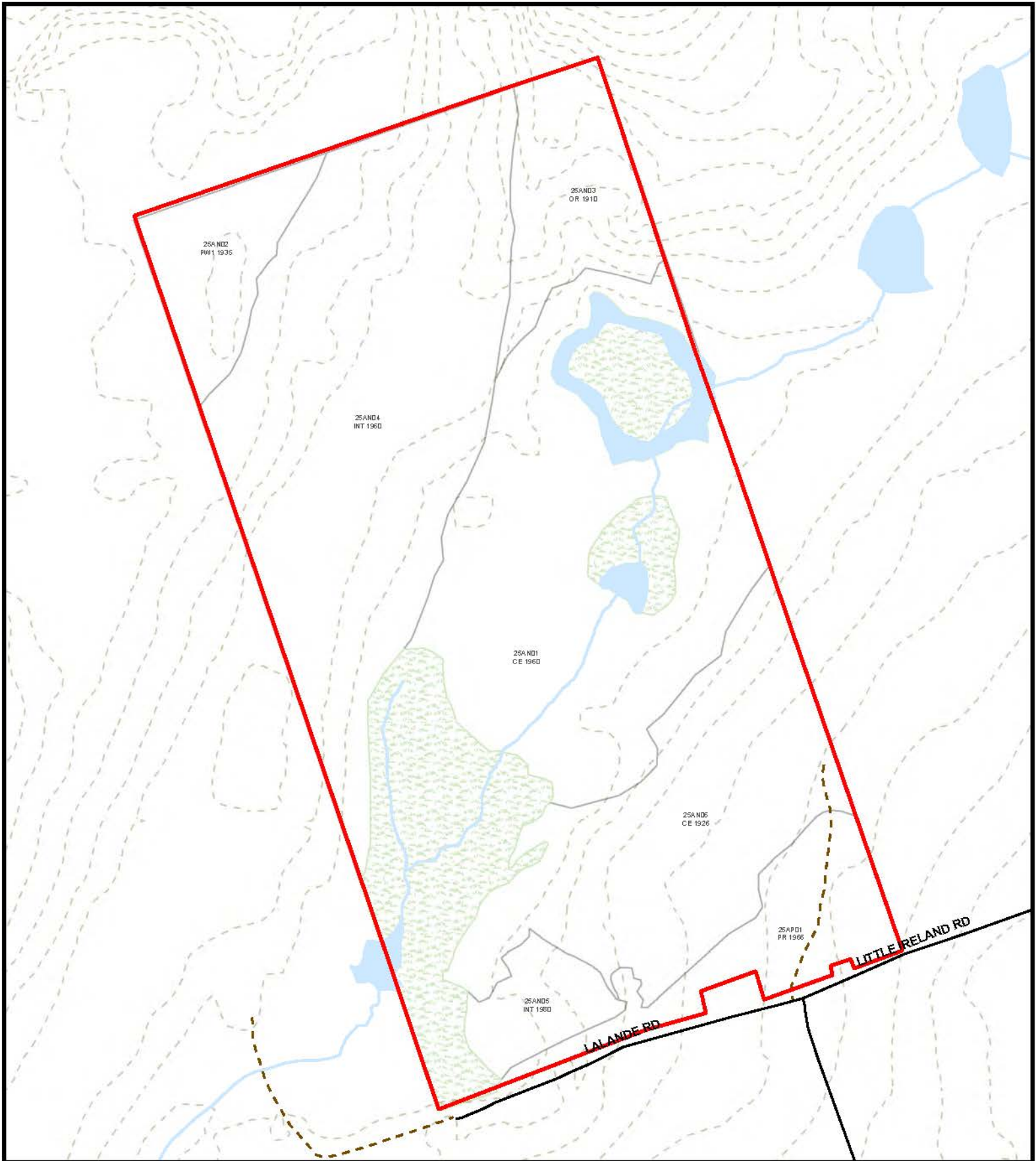
- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |



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Ireland (South) Tract

Township of Brudenell, Lyndoch and Raglan



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

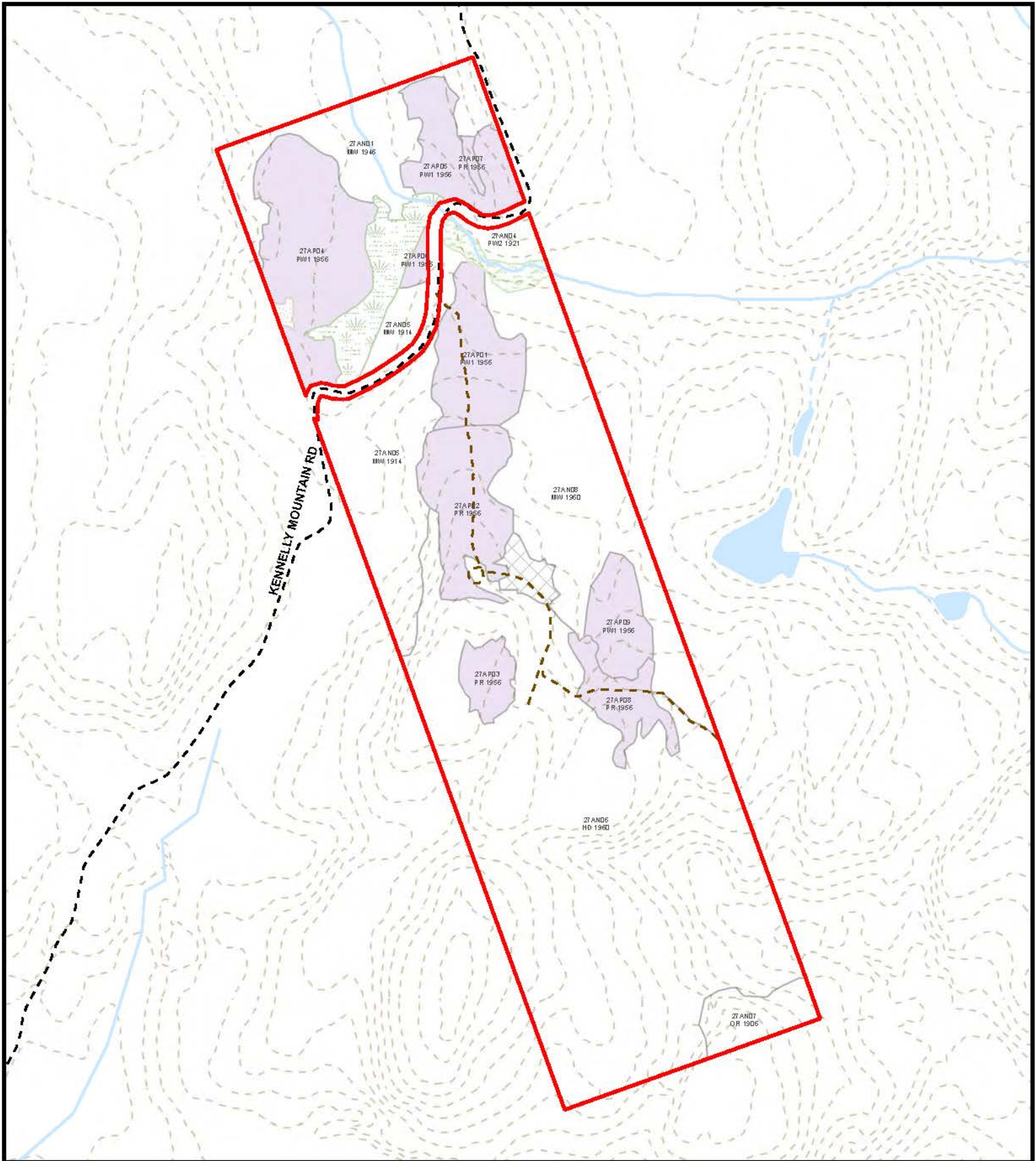
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Kennelly Tract

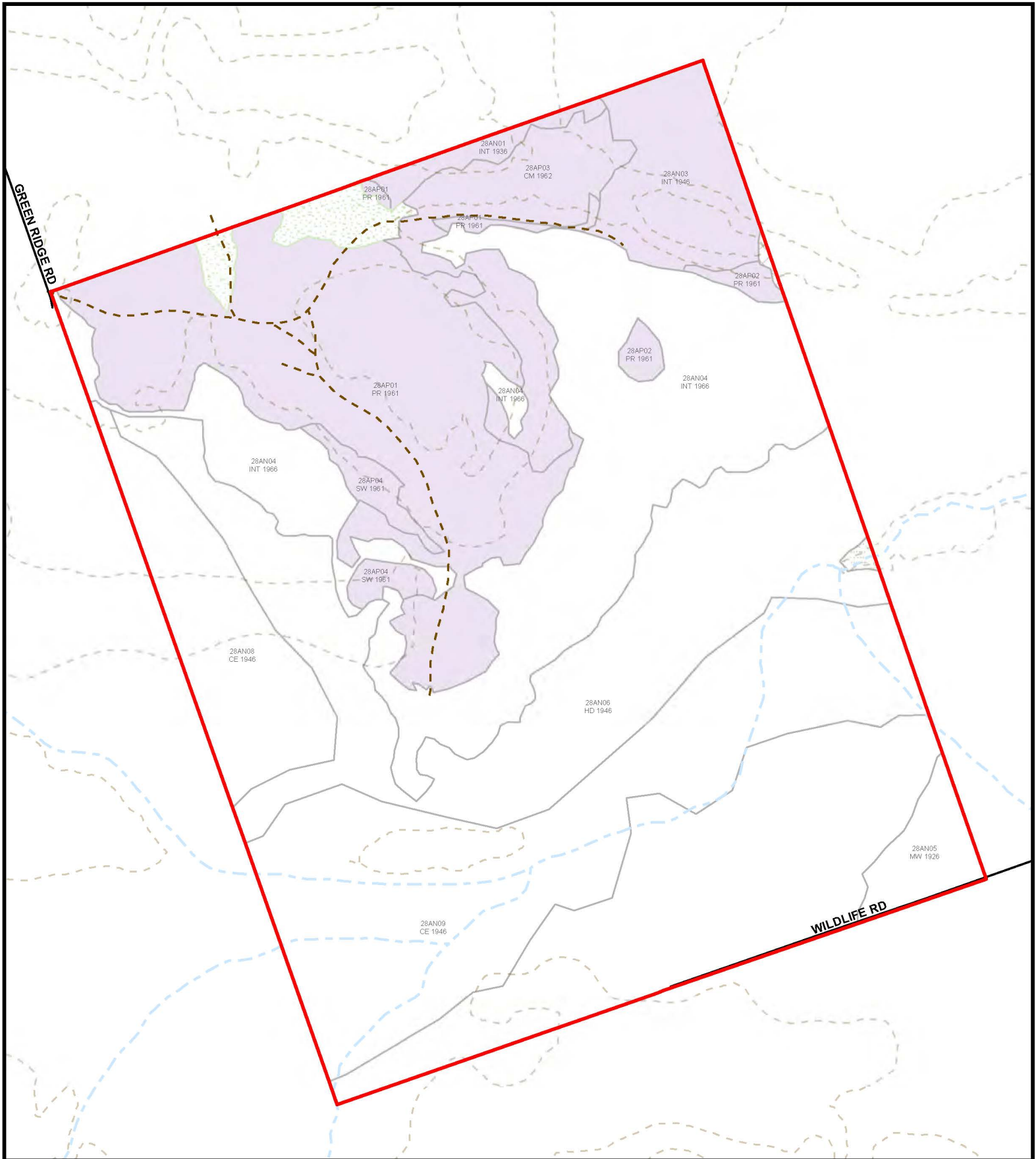
Township of Greater Madawaska



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours	0 50 100 200 Meters	 <small>This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. © 2016, Queen's Printer for Ontario October, 2016</small>
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek		
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
Unclassified			Interior Road	Water			

Killaloe Tract

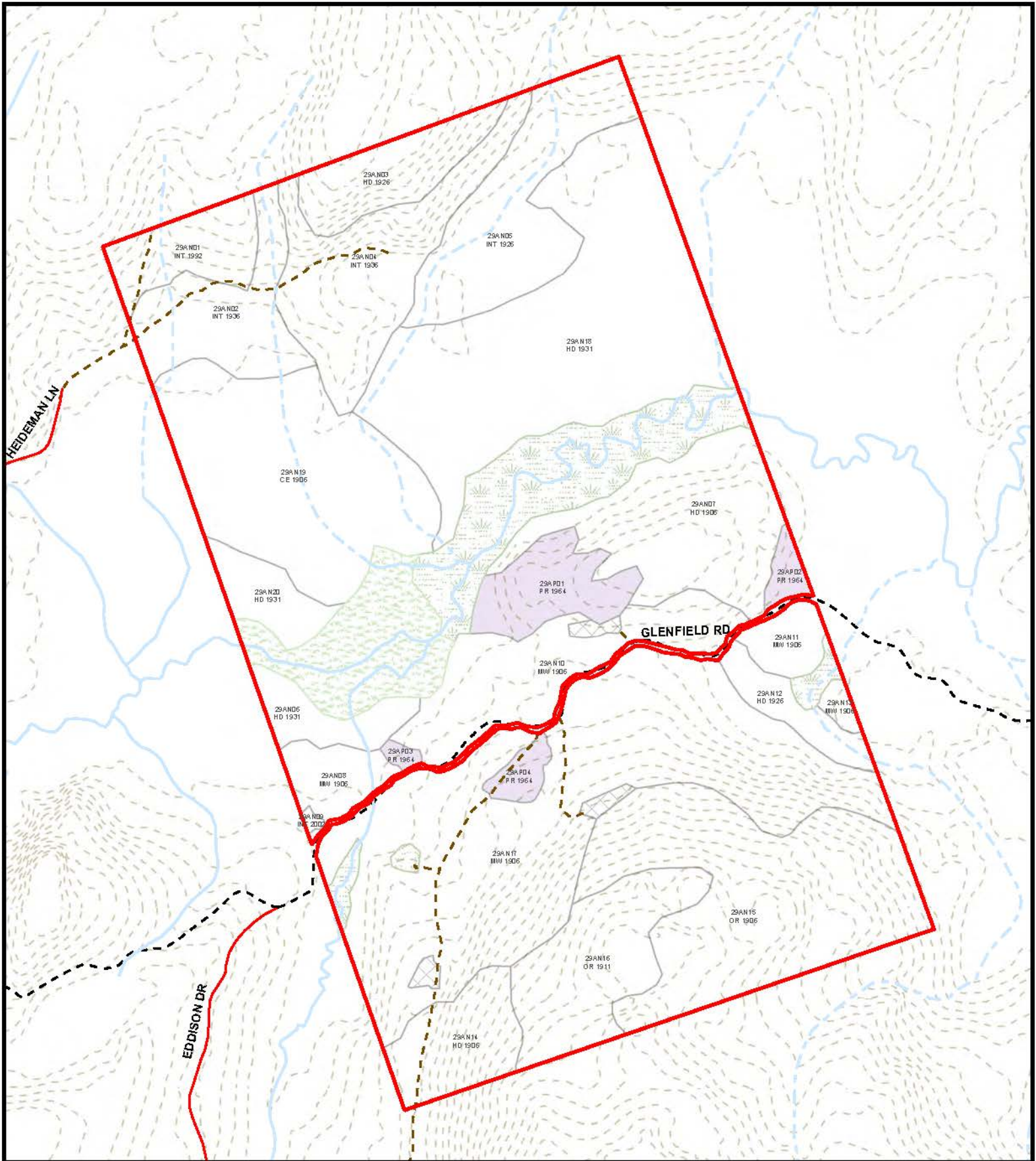
Township of Killaloe, Hagarty and Richards



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours	0 50 100 200 Meters	N
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek	<p style="font-size: small;">This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.</p> <p style="font-size: x-small;">© 2016, Queen's Printer for Ontario 152 October, 2016</p>	
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
Unclassified	Unclassified	Unclassified	Interior Road	Water			

Leclaire Tract

Township of Greater Madawaska



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

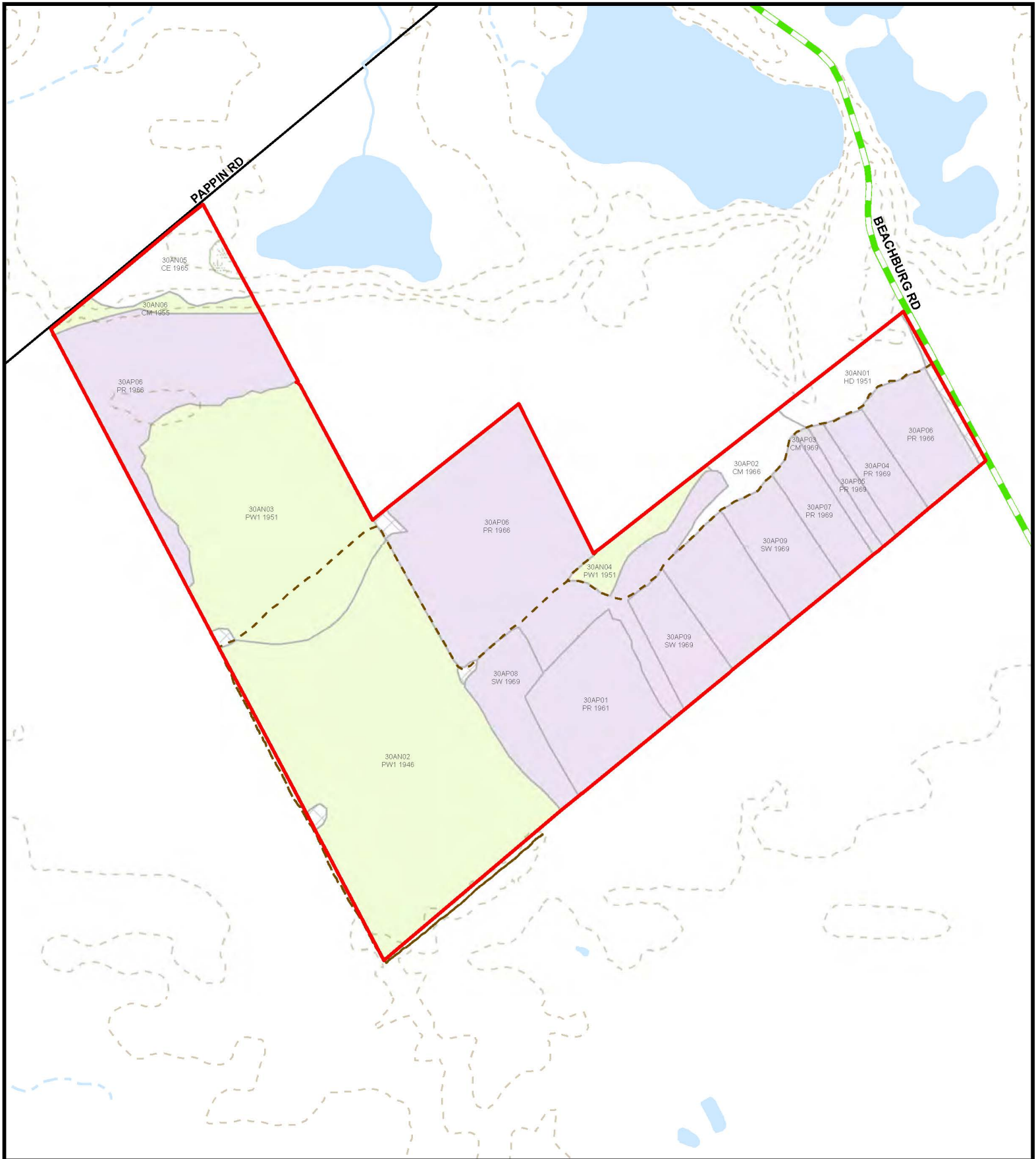
0 50 100 200 300 Meters

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Little Lakes Tract

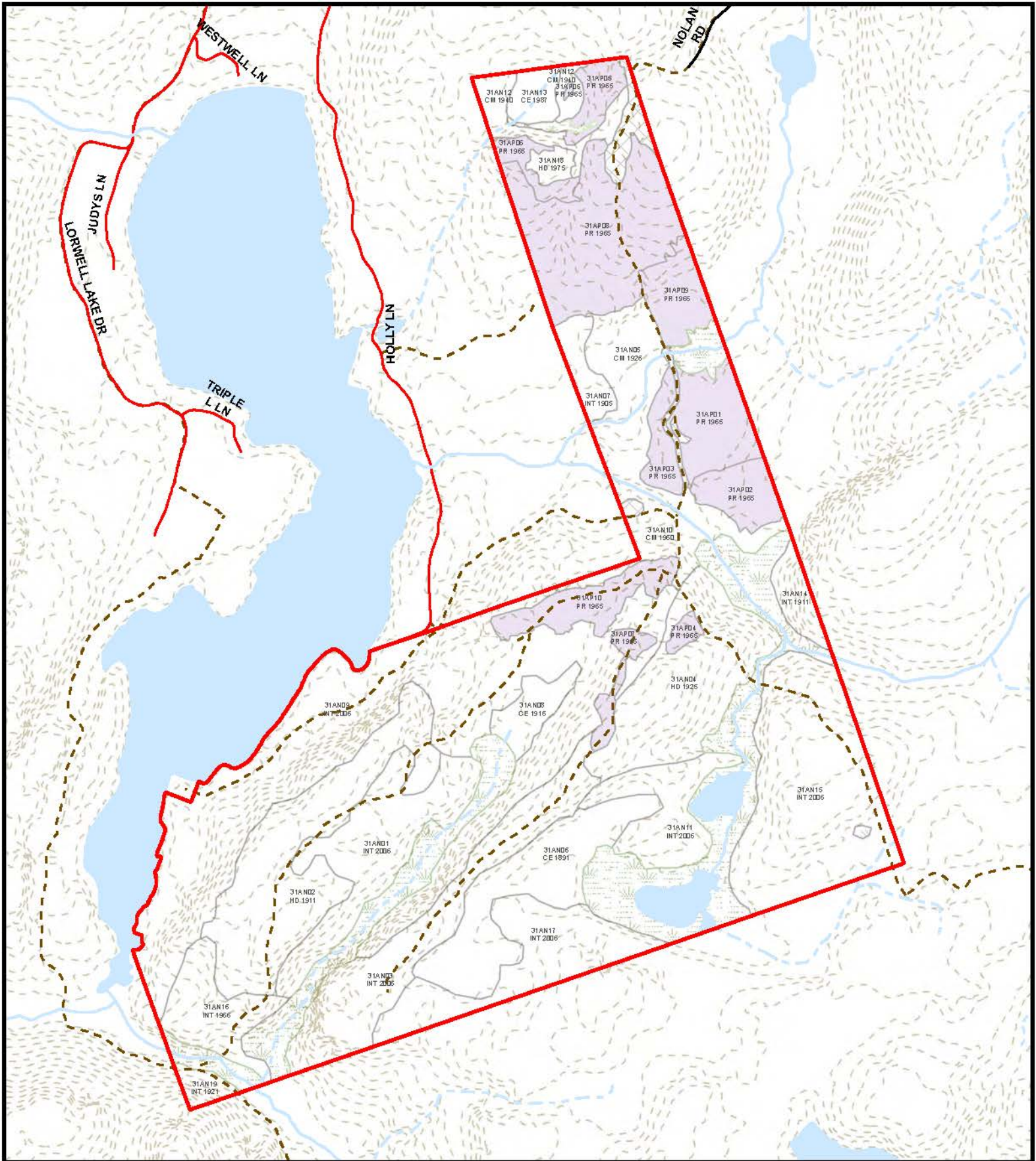
Township of Whitewater Region



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours	0 50 100 200 300 Meters	
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek	This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map. © 2016, Queen's Printer for Ontario	October, 2016
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		
Unclassified			Interior Road	Water			

Lorwall Lake Tract

Township of Brudenell, Lyndoch and Raglan



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

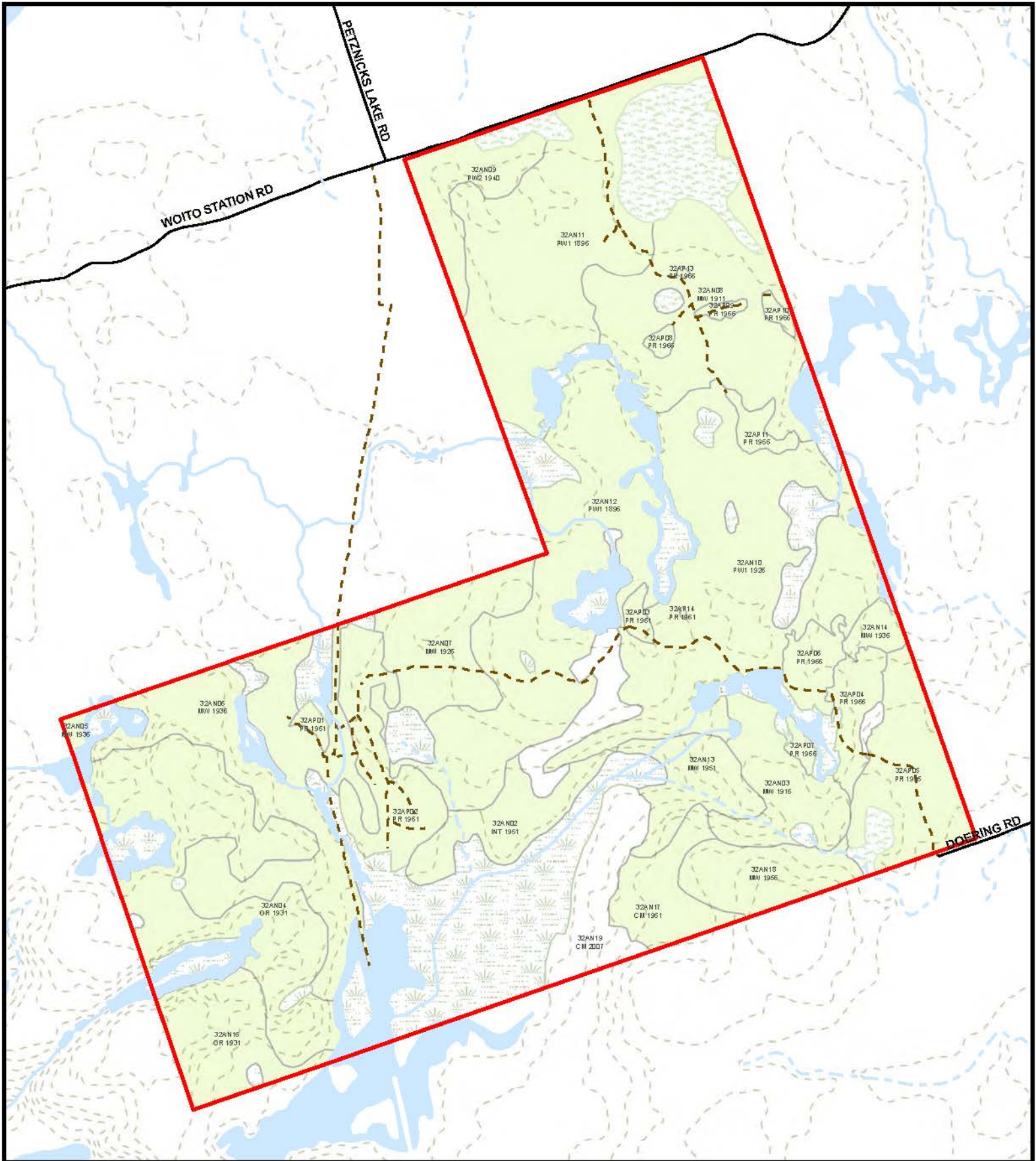
0 50 100 200 300 400 Meters

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Marsh Road Tract

Township of North Algona/Wilberforce



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

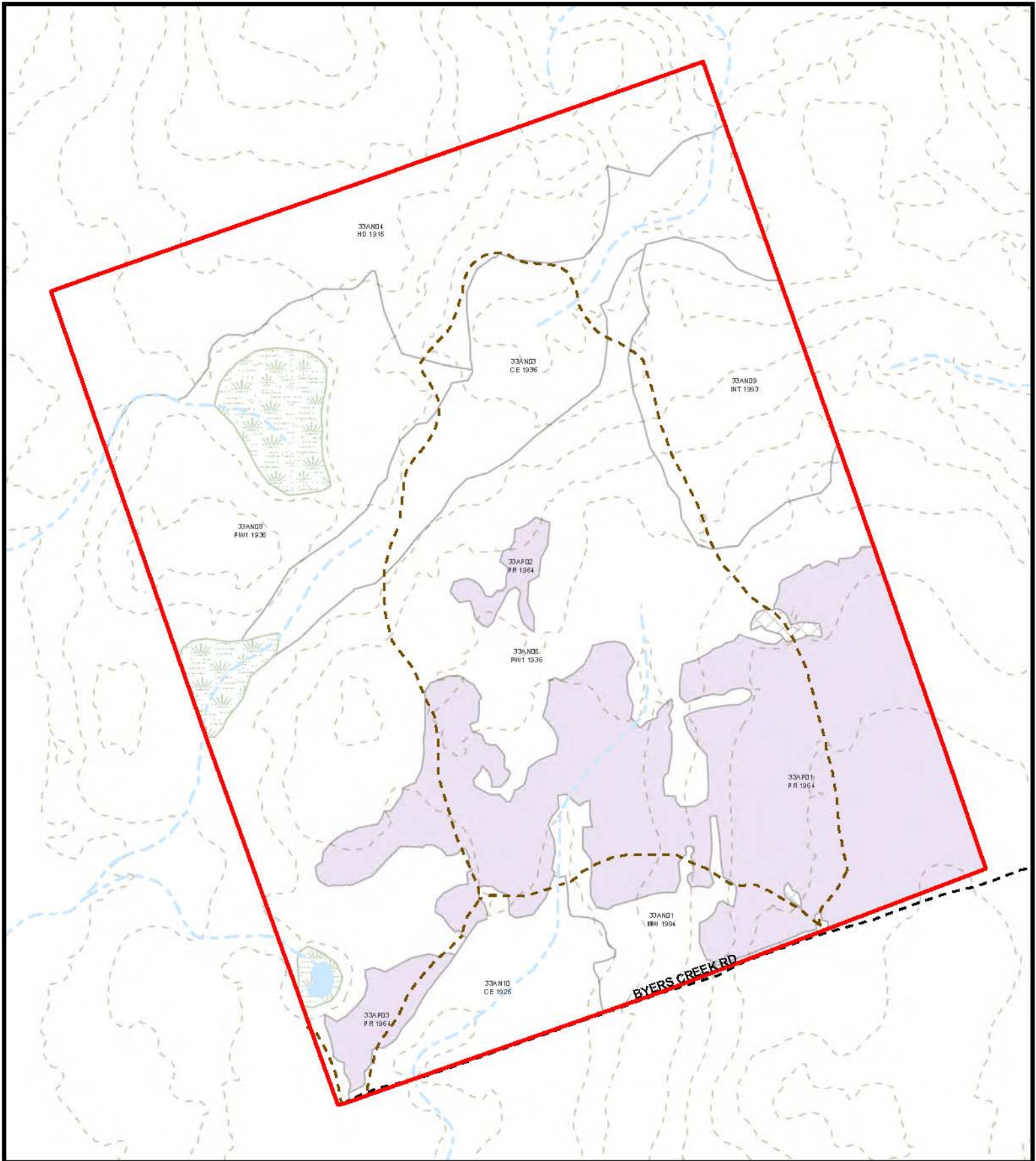
0 50 100 200 300 400 Meters

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Mask Tract

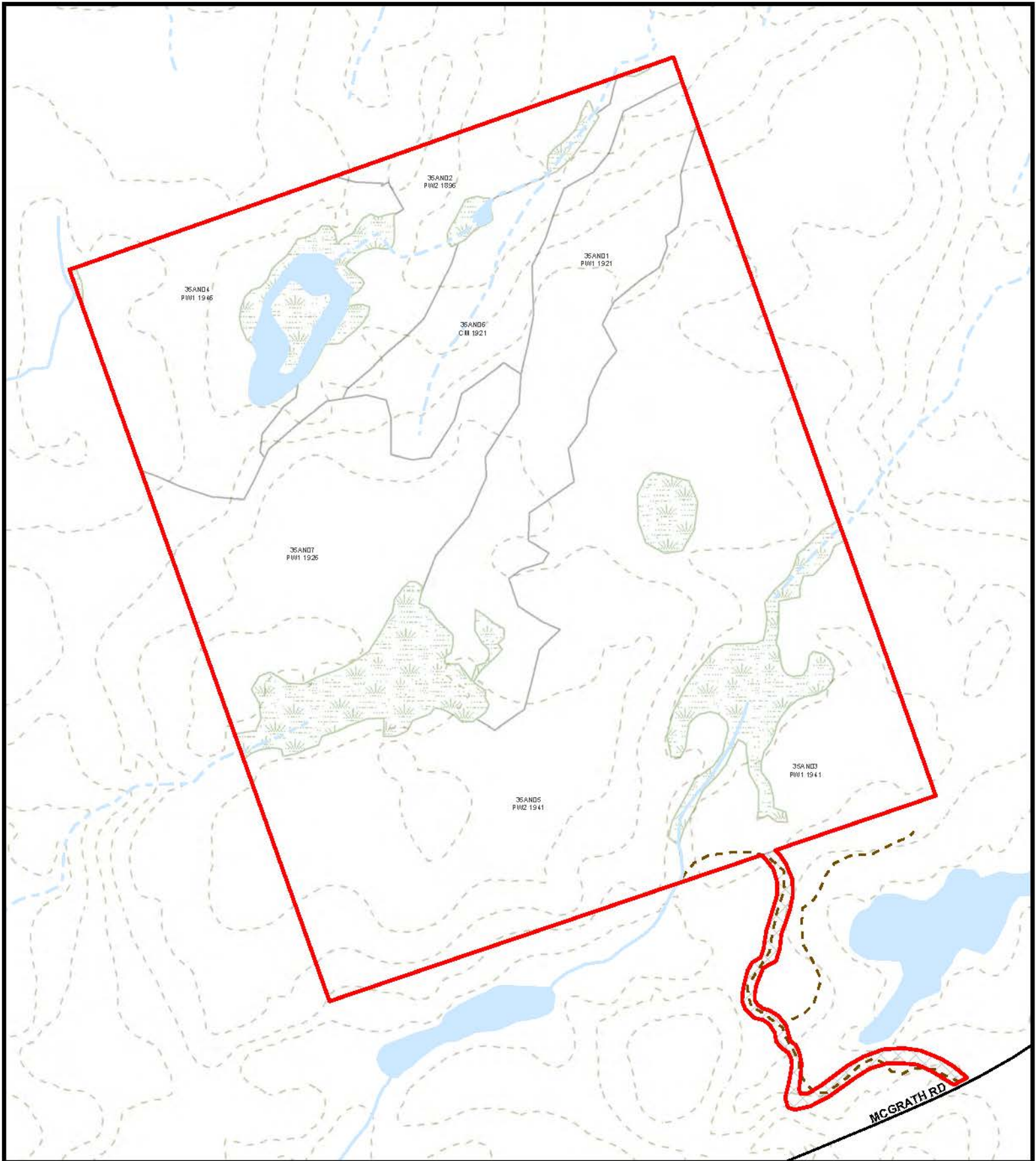
Township of Killaloe, Hagarty and Richards



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours	0 50 100 200 Meters	N
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek	This map is illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation. The County of Renfrew shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.	
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek		© 2016, Queen's Printer for Ontario 157 October, 2016
Unclassified			Interior Road	Water			

McGrath Road Tract

Township of Bonnechere Valley



- | | | | | | |
|-------------------|--------------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| | Unclassified | | | Interior Road | Water |

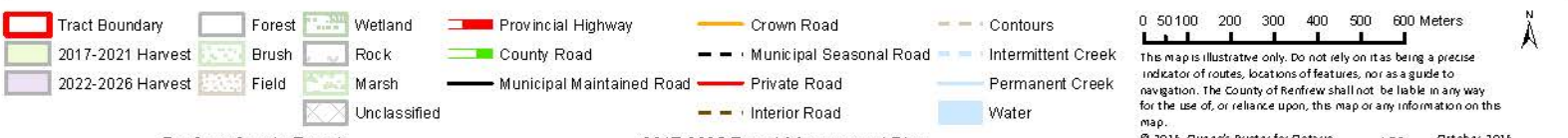
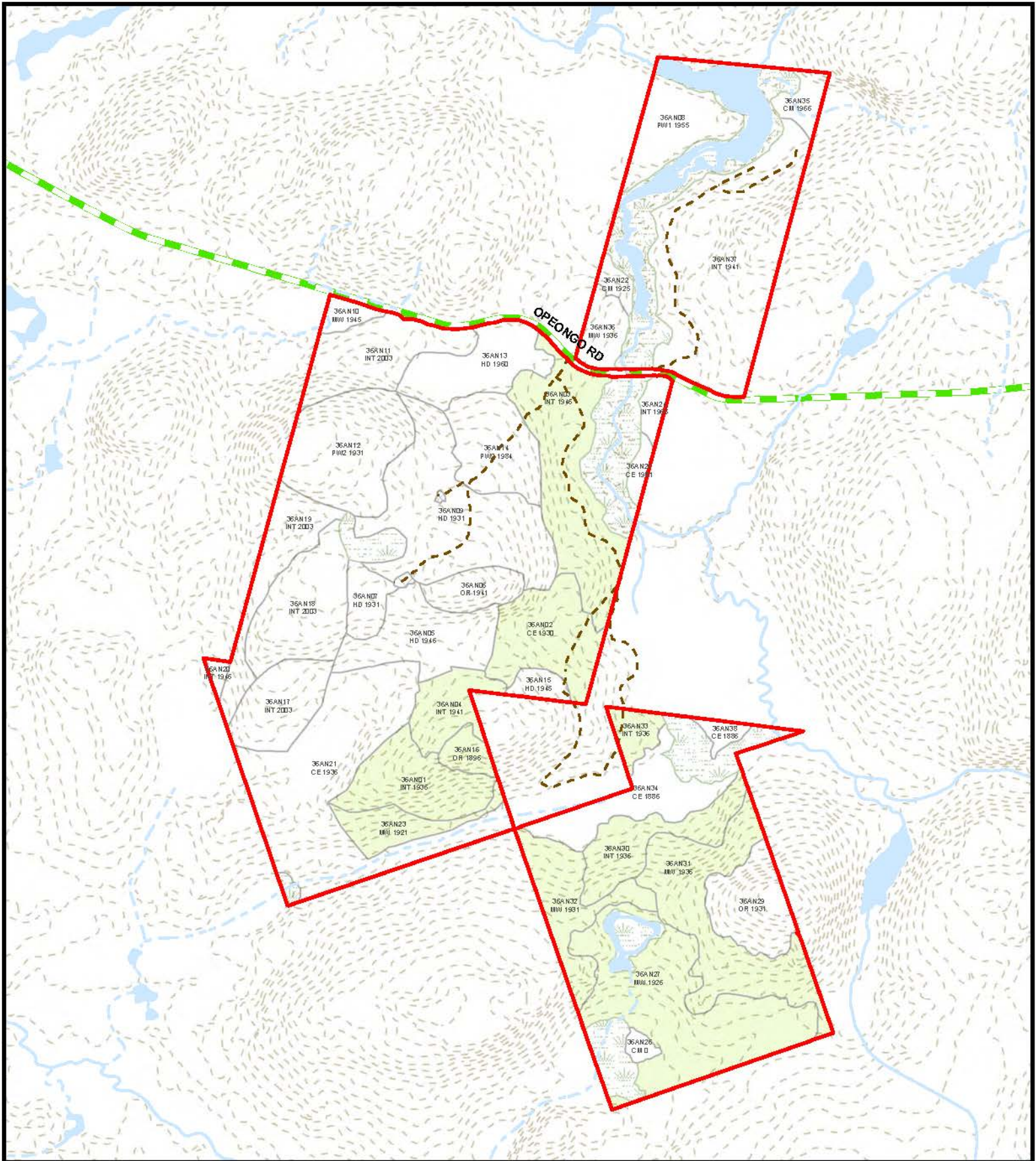
0 50 100 200 Meters

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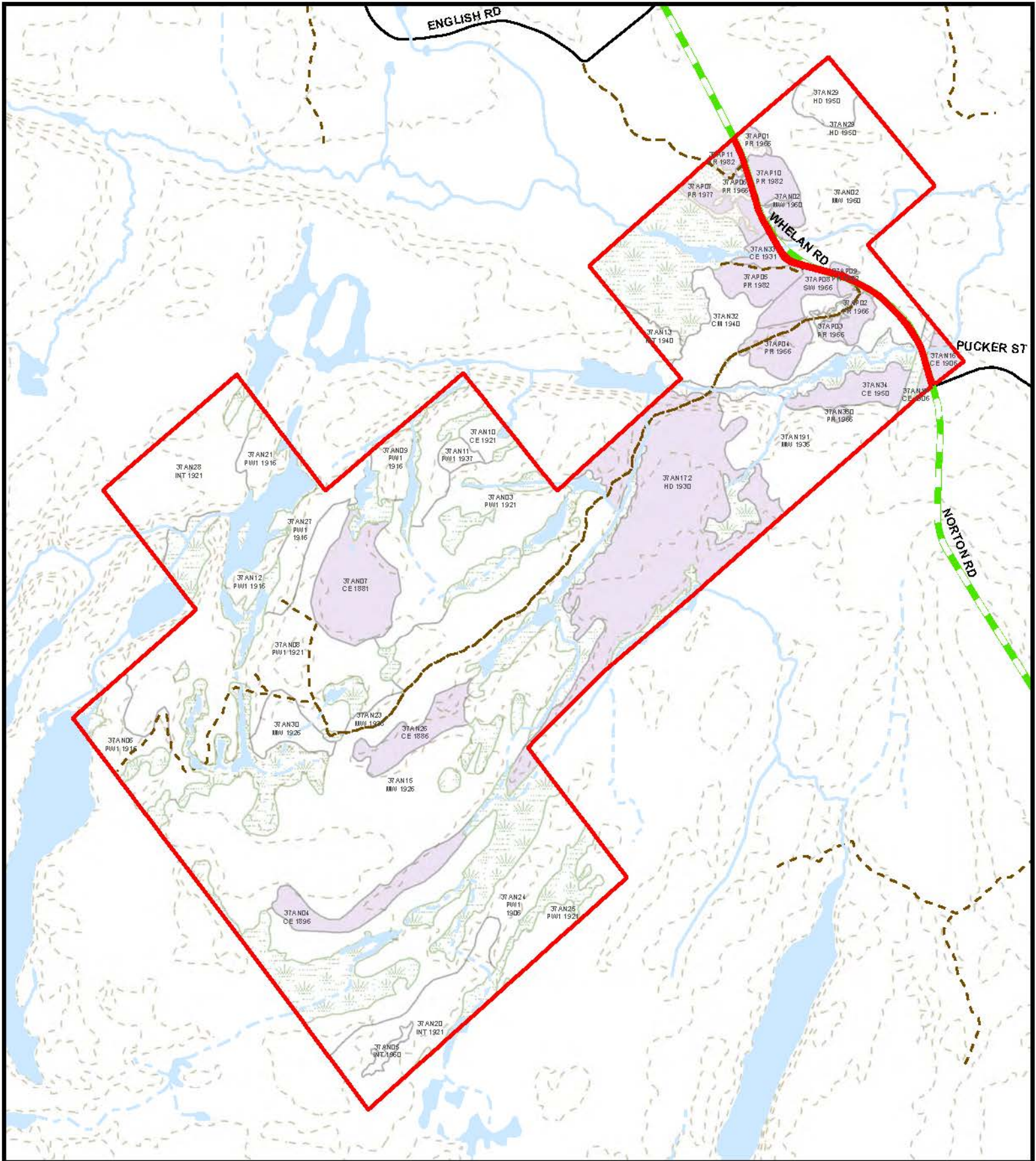
Opeongo Line Tract

Township of Brudenell, Lyndoch and Raglan



Pershick Tract

Township of Admaston/Bromley and Greater Madawaska



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

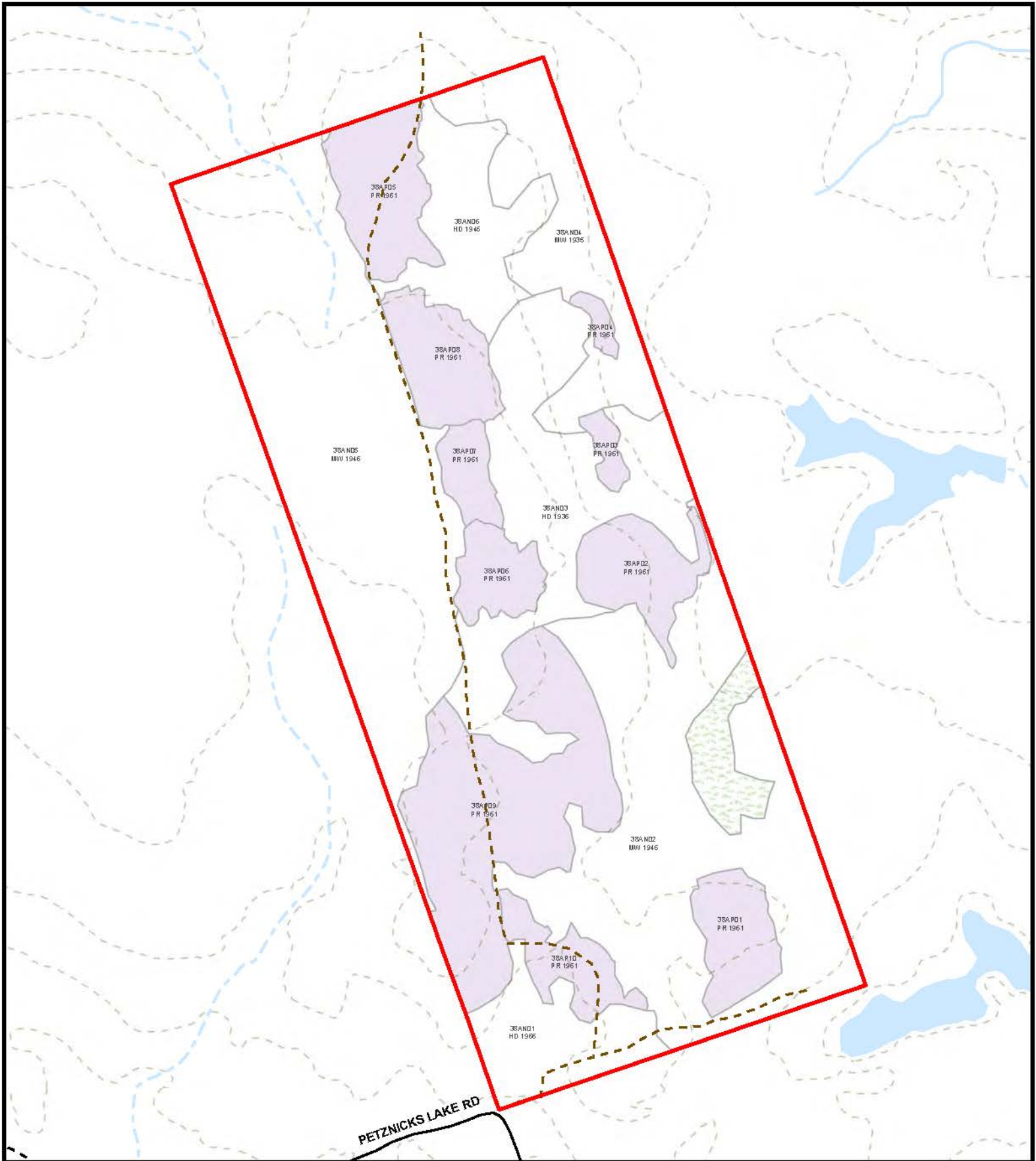
0 50 100 200 300 400 500 600 700 Meters

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Petznick Lake Tract

Township of Laurentian Valley



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

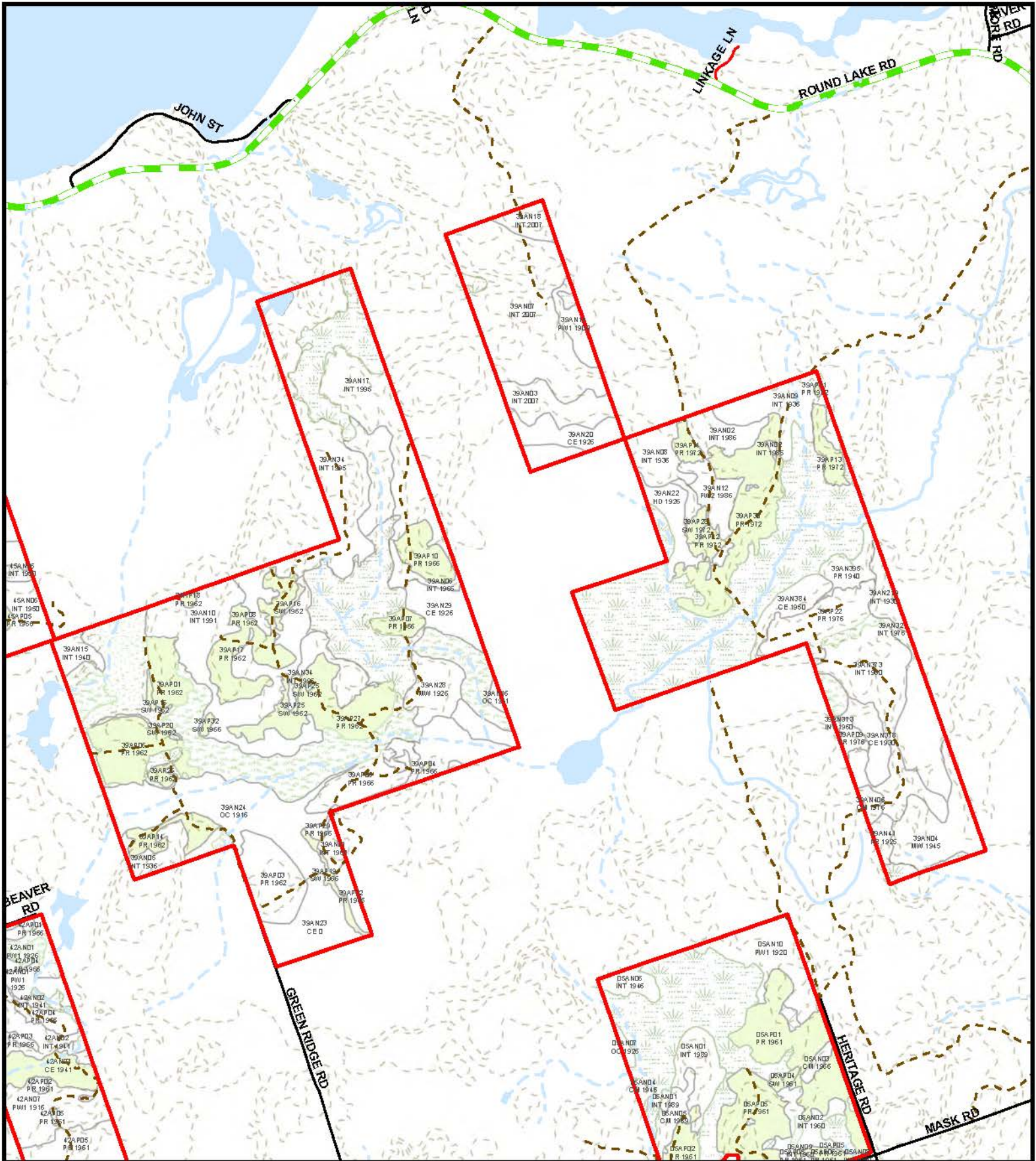
0 50 100 Meters

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Round Lake Complex Tract

Township of Killaloe, Hagarty and Richards



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

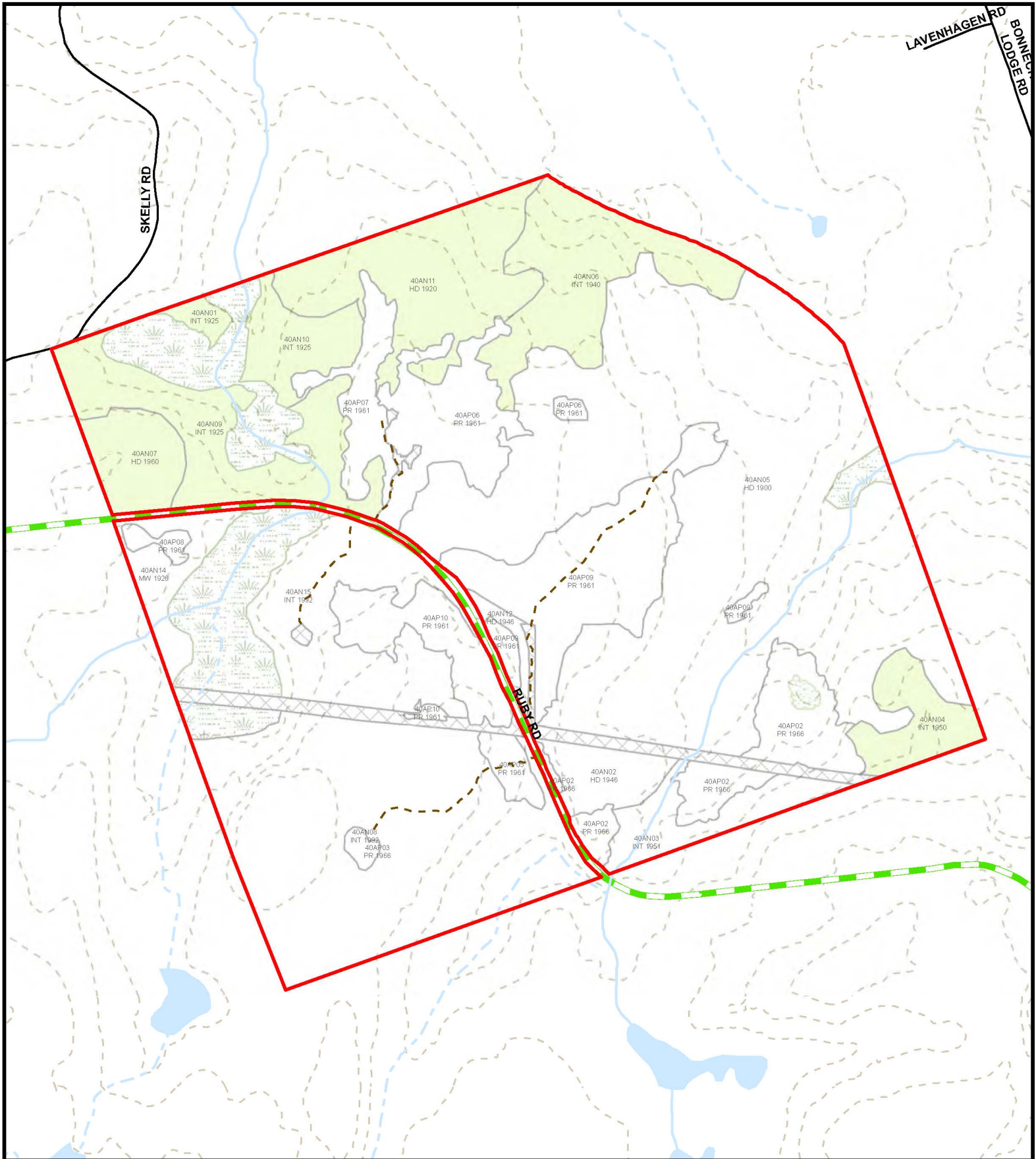
0 50 100 200 300 400 500 600 700 Meters

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Ruby Tract

Township of Bonnechere Valley



- | | | | | | |
|-------------------|--------------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| | Unclassified | | Interior Road | | Water |

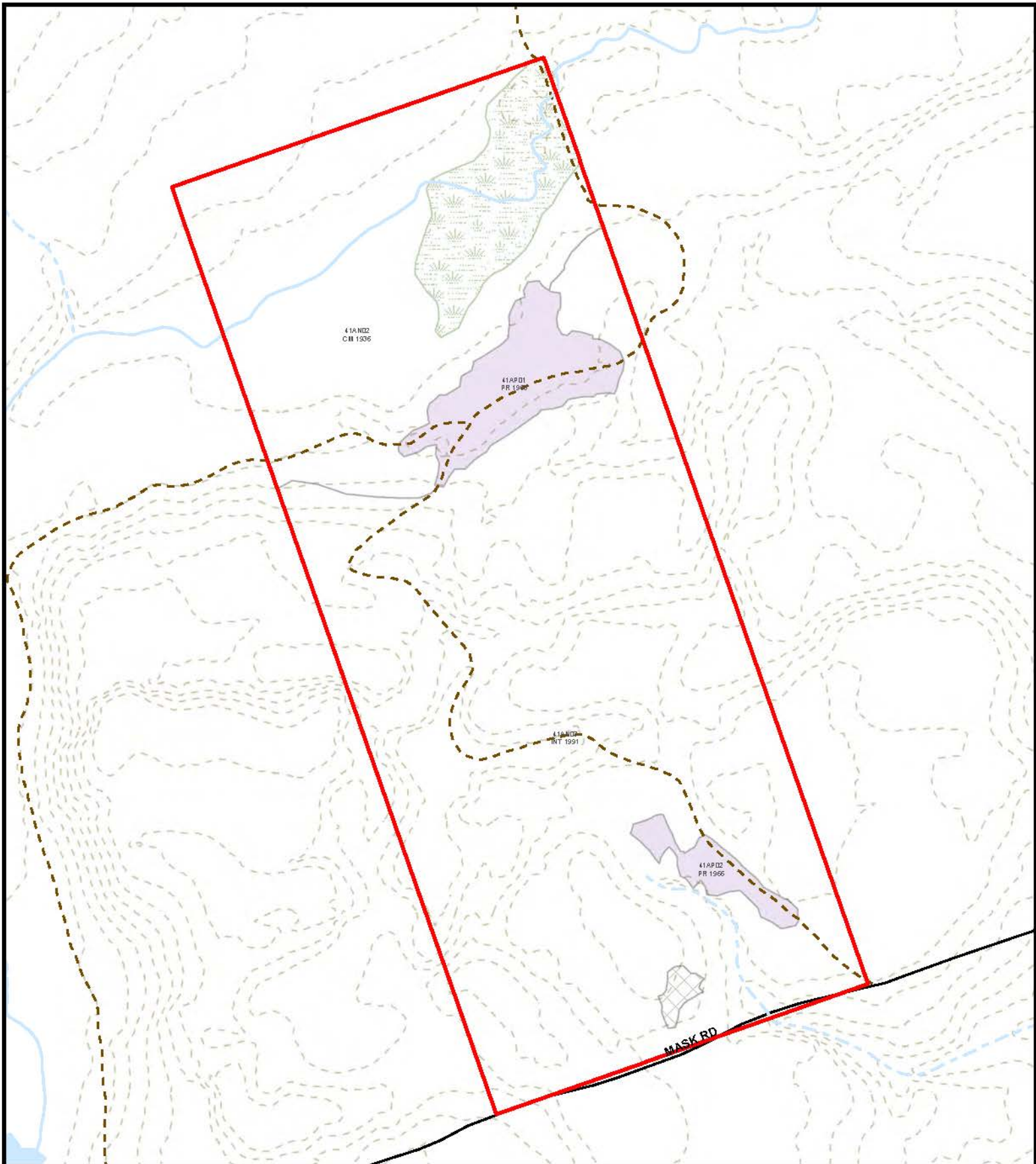
0 50 100 200 Meters

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N

Schroeder Tract

Township of Killaloe, Hagarty and Richards



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

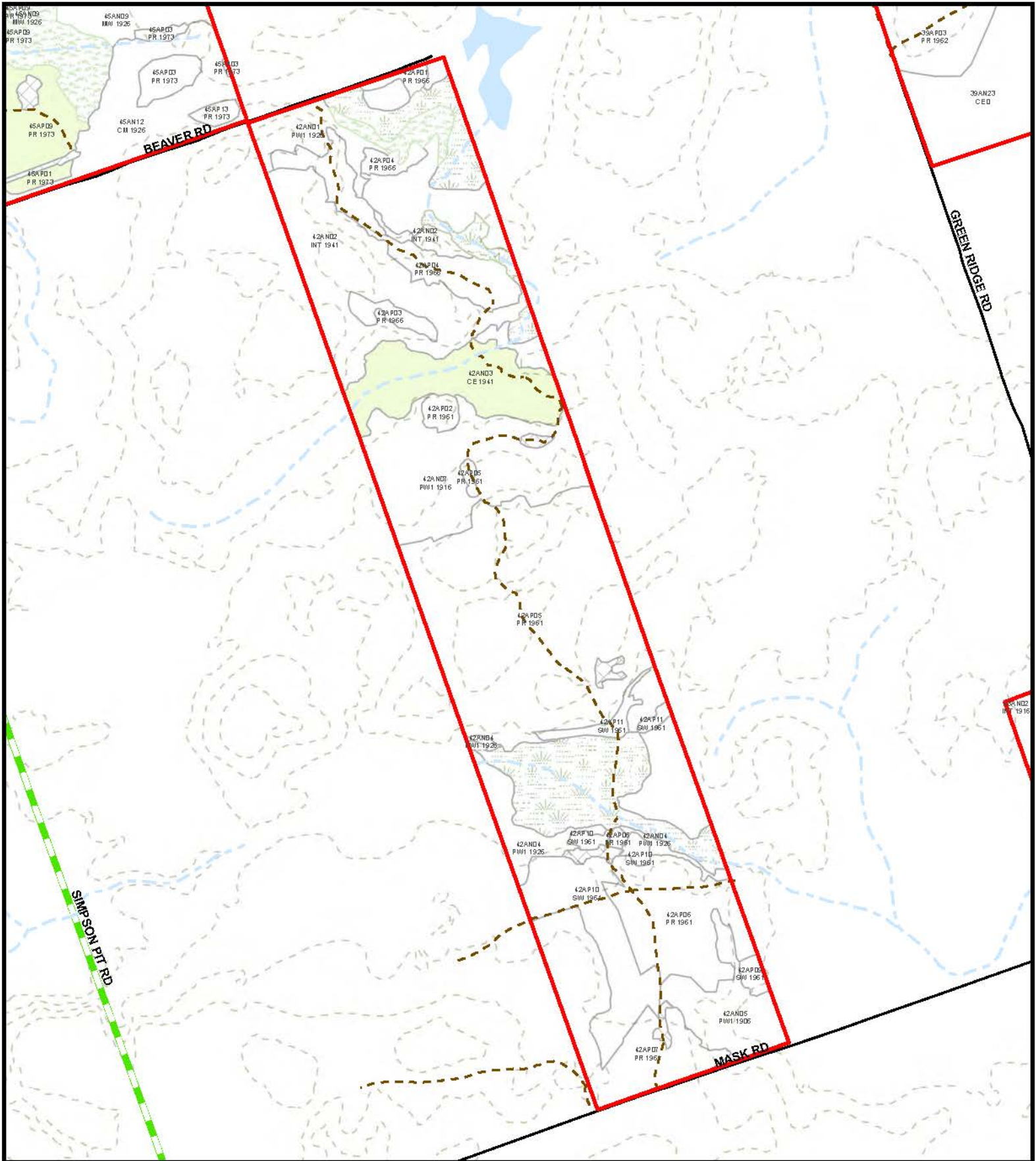
0 50 100 Meters

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Sernoskie Tract

Township of Killaloe, Hagarty and Richards



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

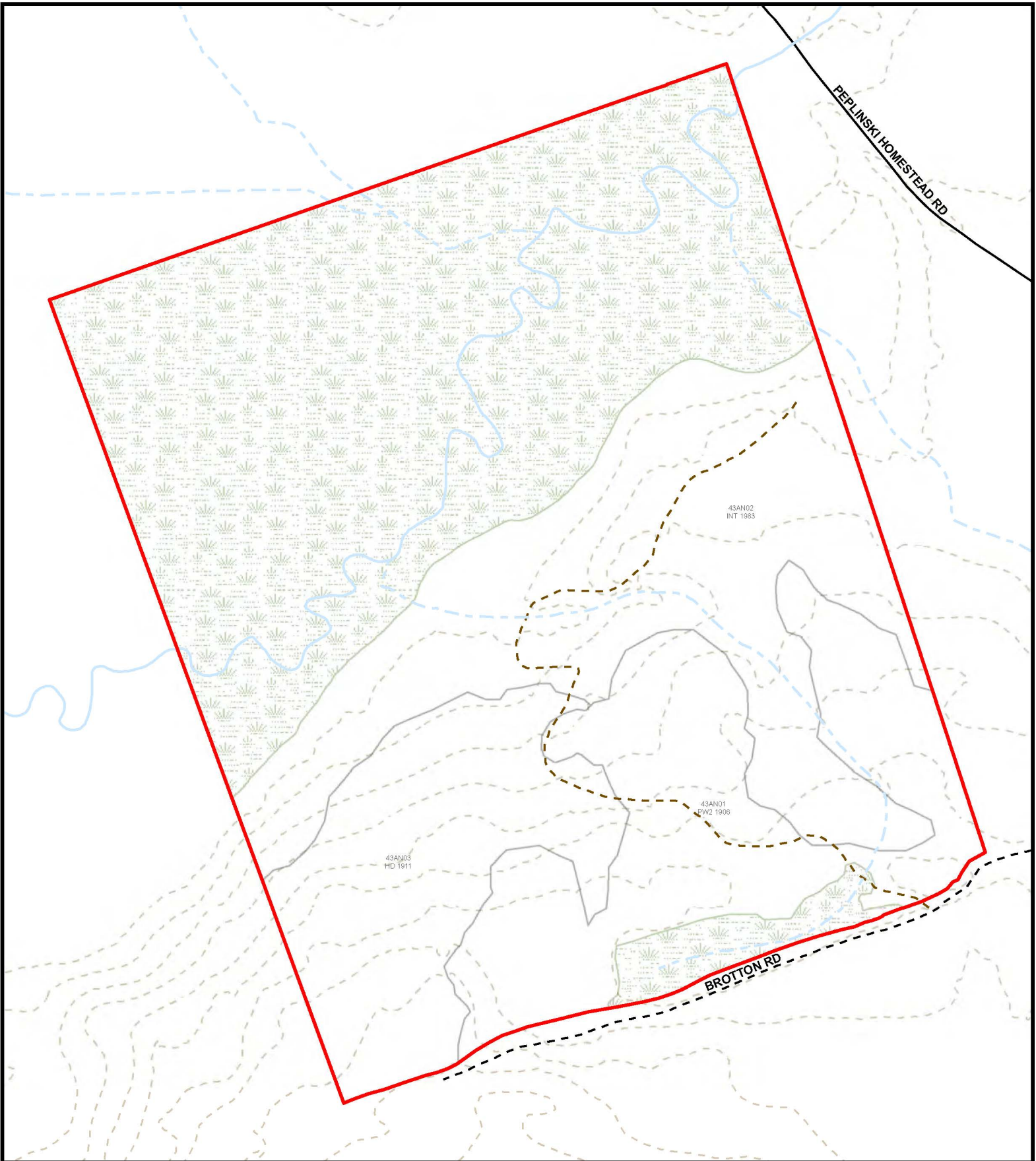
0 50 100 200 300 Meters

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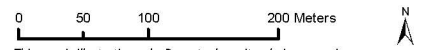
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Sherwood River Tract

Township of Madawaska Valley



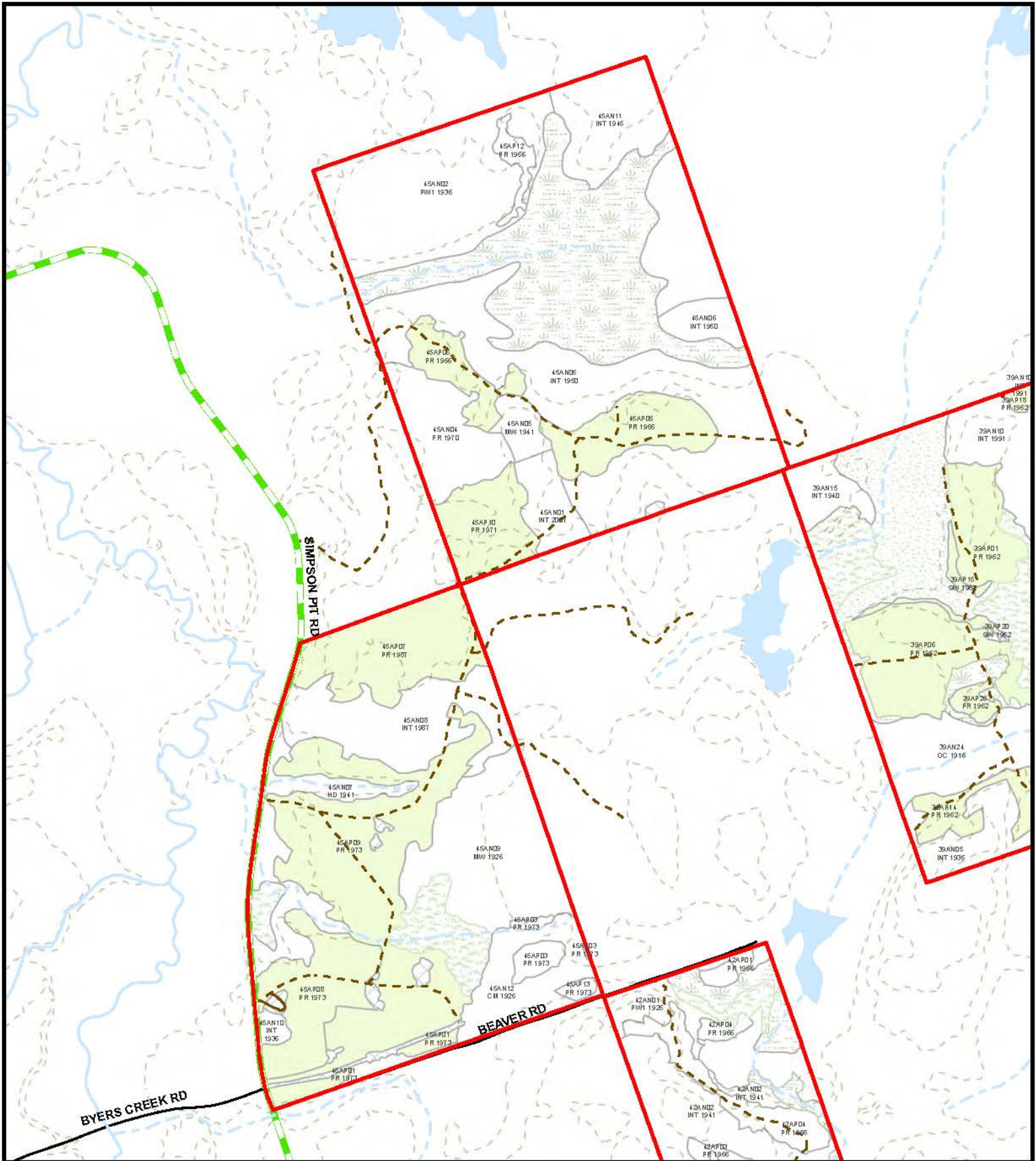
- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |



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Simpsons Pit Road Tract

Township of Killaloe, Hagarty and Richards



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |

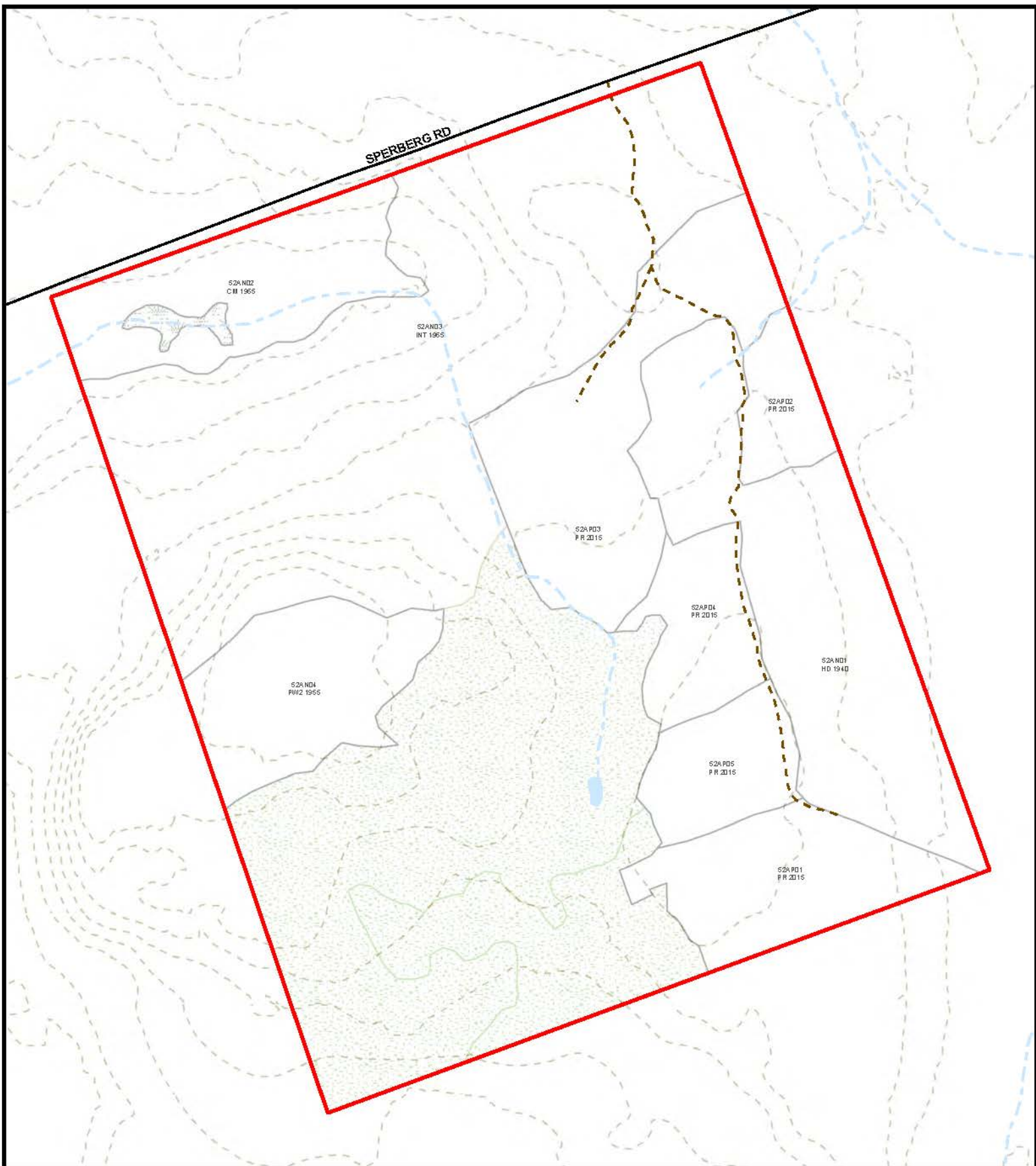
0 50 100 200 300 400 Meters

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Sperberg Tract

North Algona/Wilberforce



- | | | | | | |
|-------------------|--------------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| | Unclassified | | Interior Road | Water | |

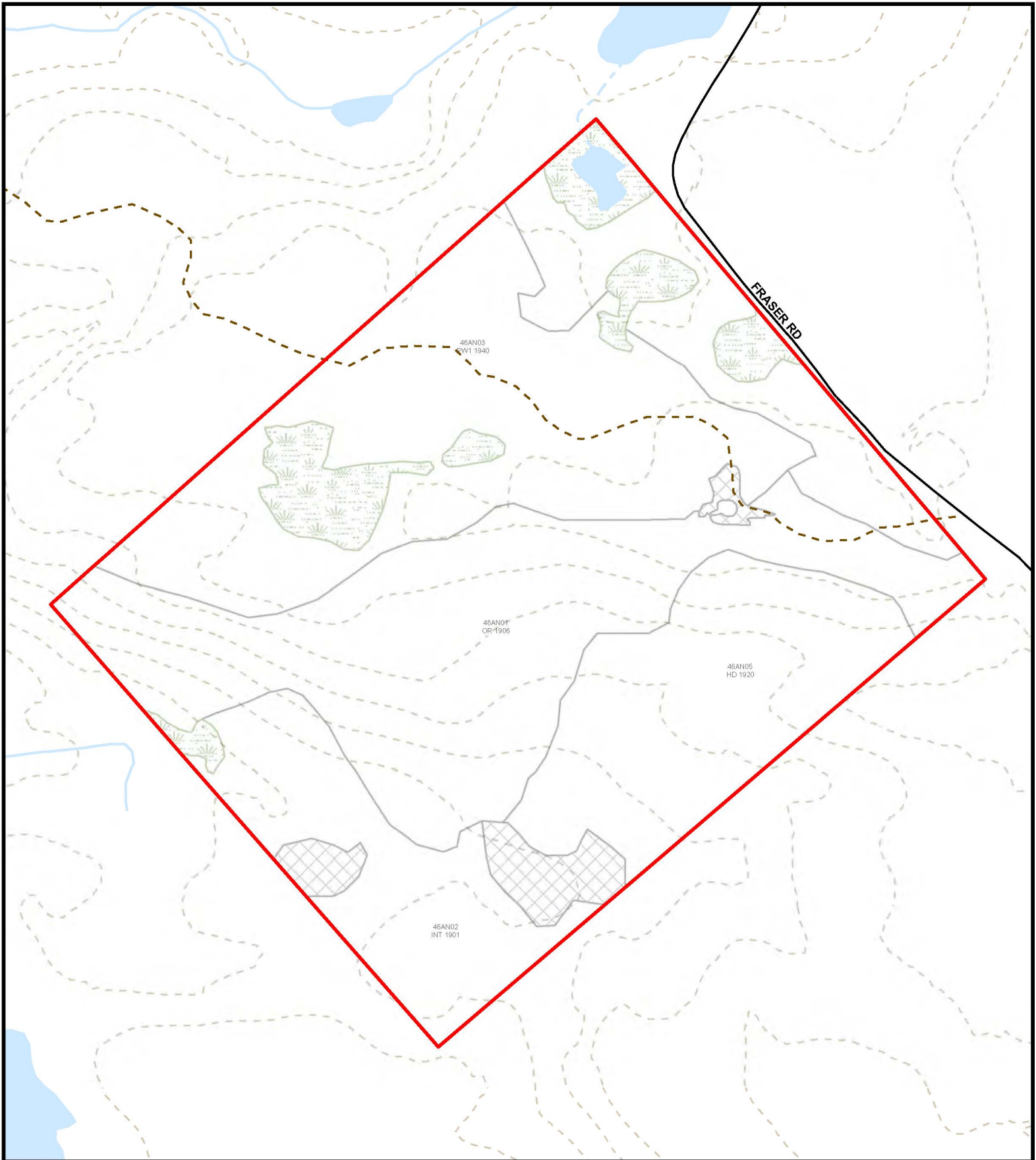
0 50 100 200 Meters

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Springtown Tract

Township of Greater Madawaska



Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek
Unclassified			Interior Road	Water	

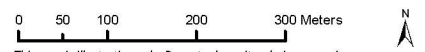
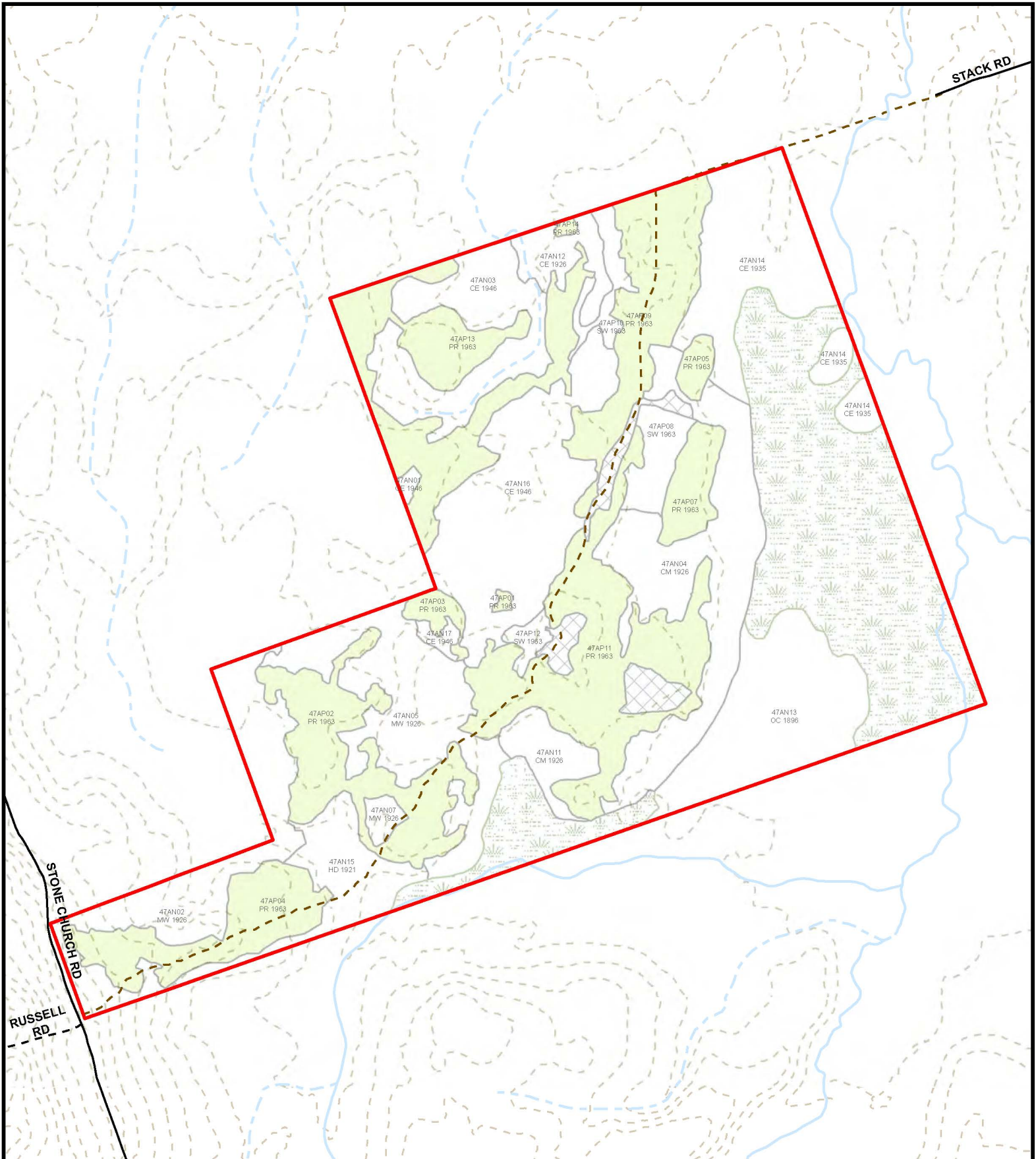
0 50 100 Meters

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Steps Tract

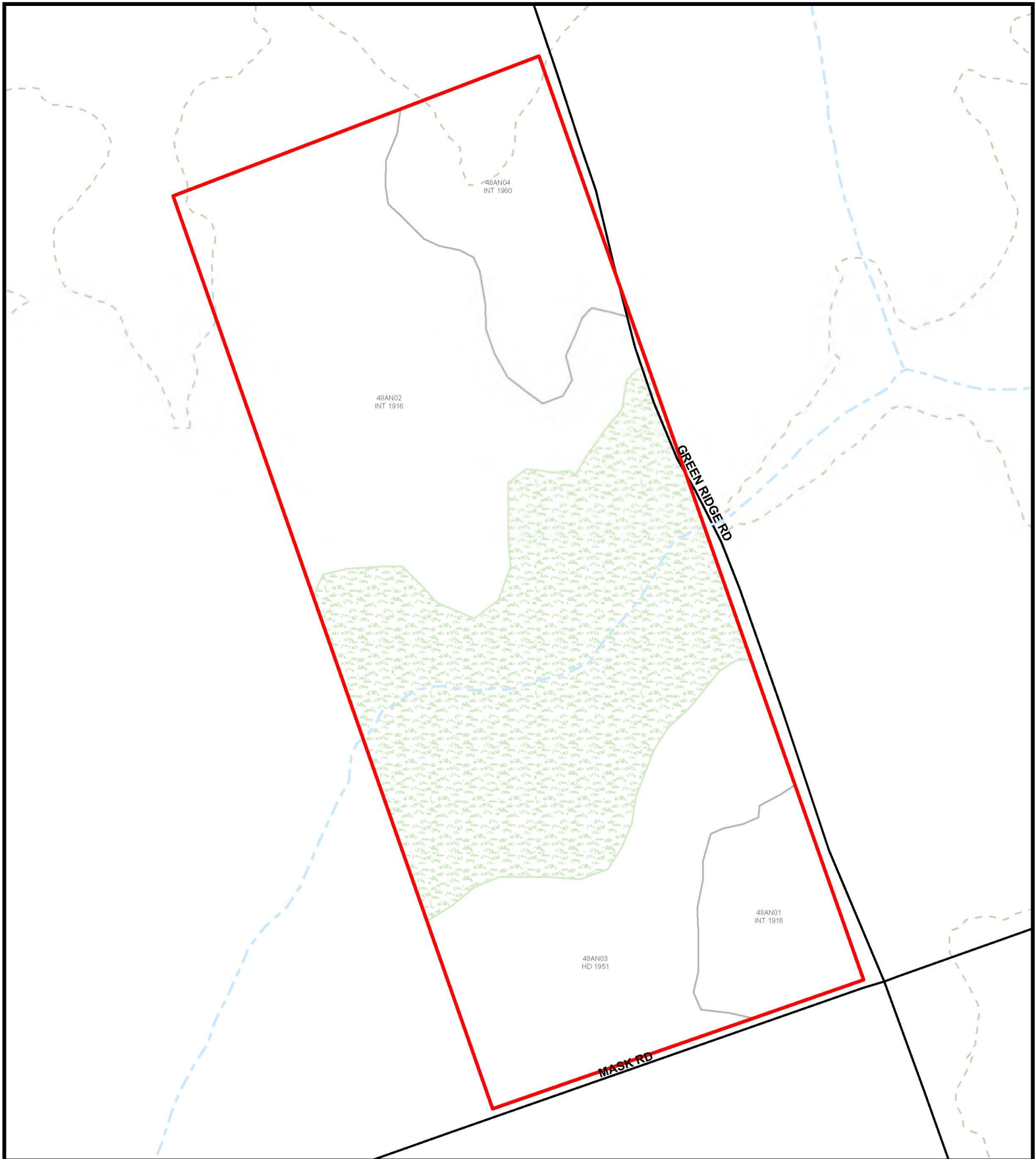
Township of Killaloe, Hagarty and Richards



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Tiny Tract

Township of Killaloe, Hagarty and Richards

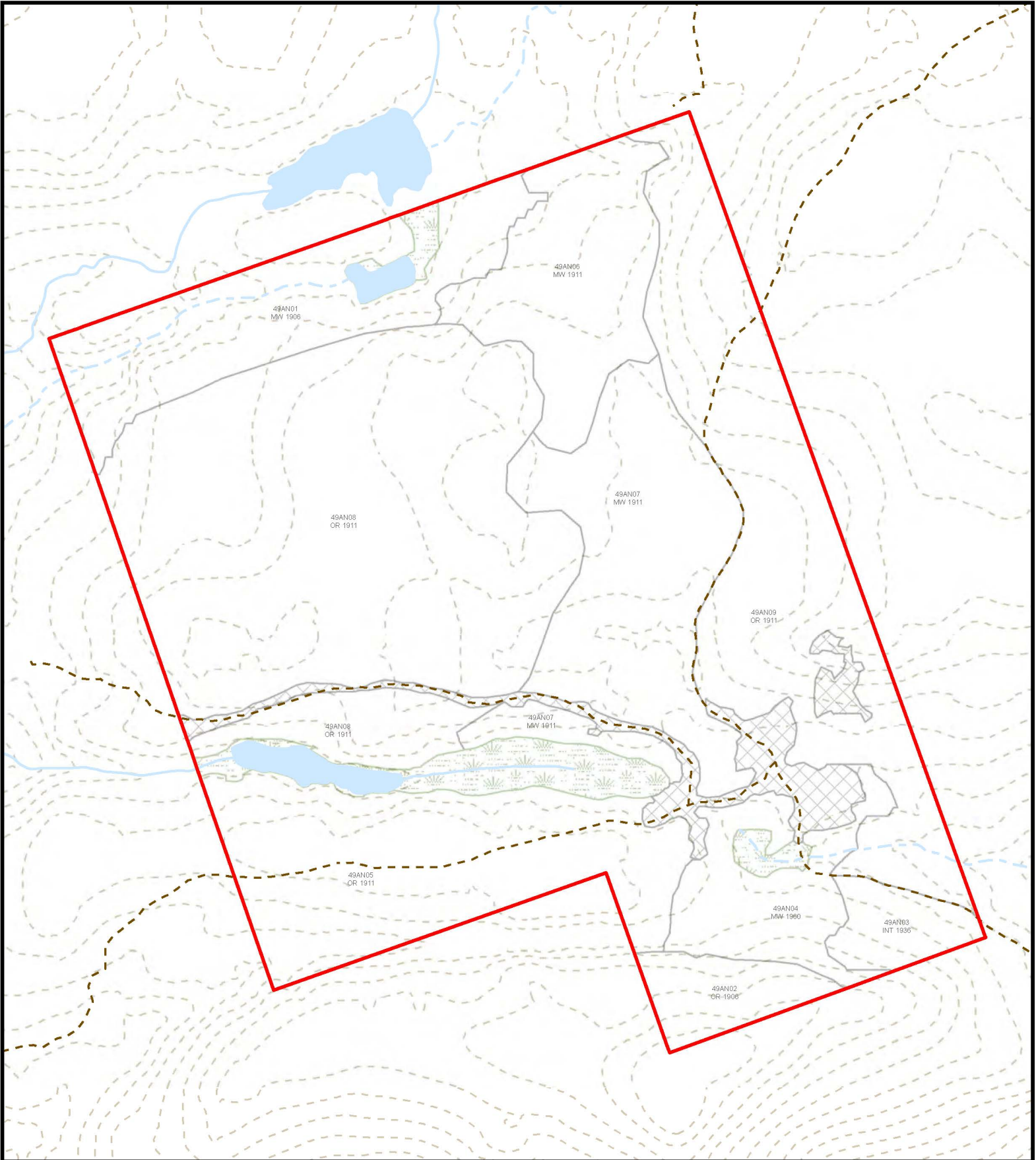


Tract Boundary	Forest	Wetland	Provincial Highway	Crown Road	Contours
2017-2021 Harvest	Brush	Rock	County Road	Municipal Seasonal Road	Intermittent Creek
2022-2026 Harvest	Field	Marsh	Municipal Maintained Road	Private Road	Permanent Creek
Unclassified			Interior Road	Water	

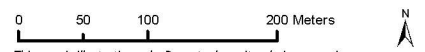
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Troutling Lake Tract

Township of Bonnechere Valley



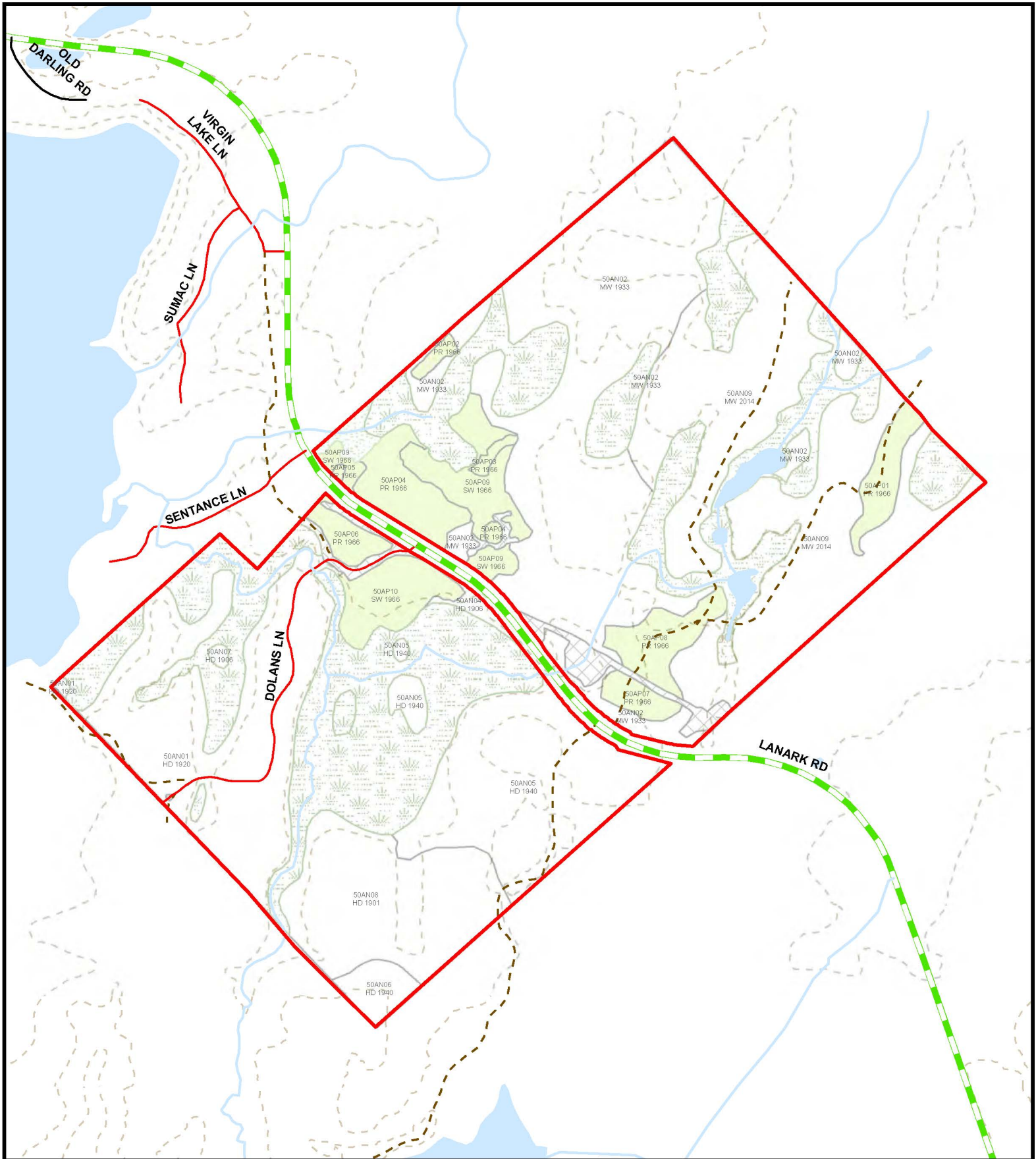
- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | Water | |



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Virgin Lake Tract

Township of Greater Madawaska



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

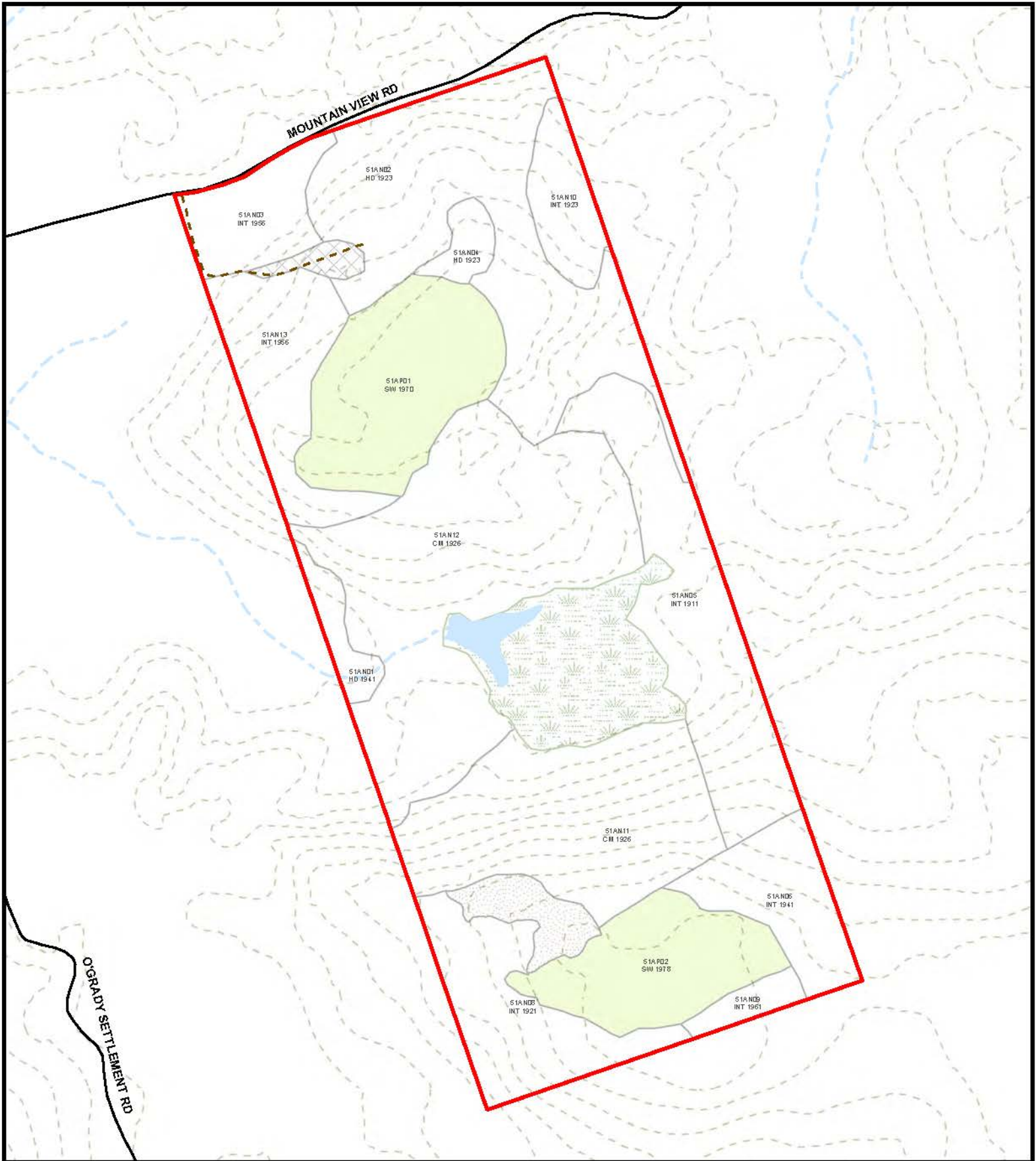
0 50 100 200 Meters

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Yantha Tract

Township of Killaloe, Hagarty and Richards



- | | | | | | |
|-------------------|--------|---------|---------------------------|-------------------------|--------------------|
| Tract Boundary | Forest | Wetland | Provincial Highway | Crown Road | Contours |
| 2017-2021 Harvest | Brush | Rock | County Road | Municipal Seasonal Road | Intermittent Creek |
| 2022-2026 Harvest | Field | Marsh | Municipal Maintained Road | Private Road | Permanent Creek |
| Unclassified | | | Interior Road | | Water |

0 50 100 Meters

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