



Property Management Plan for Warren Nature Reserve



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Preserving special places in our community

Acknowledgements and Disclaimers

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Disclaimer:

This document contains sensitive species at risk information and should be distributed on a “*need to know*” basis. Appendix A should not be shared with those who have not completed [data sensitivity training](#) delivered by the Ministry of Northern Development, Mines, Natural Resources and Forestry’s Natural Heritage Information Centre. The information provided in this document contains the best available knowledge and is subject to modification based on new information.

This document also contains personal information about partner organizations and individuals. Appendix C should not be shared with those who do not need to know the information contained within.

Scale bars in all figures are intended to provide context and should not be used to measure exact distances between locations.

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1 MISSION STATEMENT

1.1 VISION, MISSION, AND GUIDING PRINCIPLES

The Rideau Waterway Land Trust's (RWLT) vision is that "Nature has a future because our communities care." Our mission is "To preserve important natural lands and habitat in the Rideau Corridor and foster a healthy future for our communities."

RWLT uses the following guiding principles:

- We focus on the preservation of important land that supports plants, animals, and clean water.
- Our actions are inclusive and for the benefit of the community.
- We welcome the participation of those who appreciate the importance of nature.
- We strive for the right balance between access and the protection of conservation values.
- We partner with other organizations on mutually beneficial activities.

1.2 GENERAL GUIDELINES FOR MANAGEMENT PLAN

- The primary objective is the conservation of biodiversity.
- Use of properties owned and managed by RWLT will be restricted to activities that are consistent with its mission statement, guiding principles and property-specific guidelines.
- Signage will be carefully planned to encourage only compatible activities. Signs at suitable access points will indicate:
 - Property ownership
 - Emergency contact name and telephone number
 - Trespassing is prohibited and access is restricted.

1.3 SITE INFORMATION USED FOR THIS MANAGEMENT PLAN

This Management Plan is based on:

- Baseline report (Lougheed, et al., 2021)
- Site visits in 2022 by staff biologists

2 PROPERTY MANAGEMENT PLAN SUMMARY

2.1 PROPERTY INFORMATION

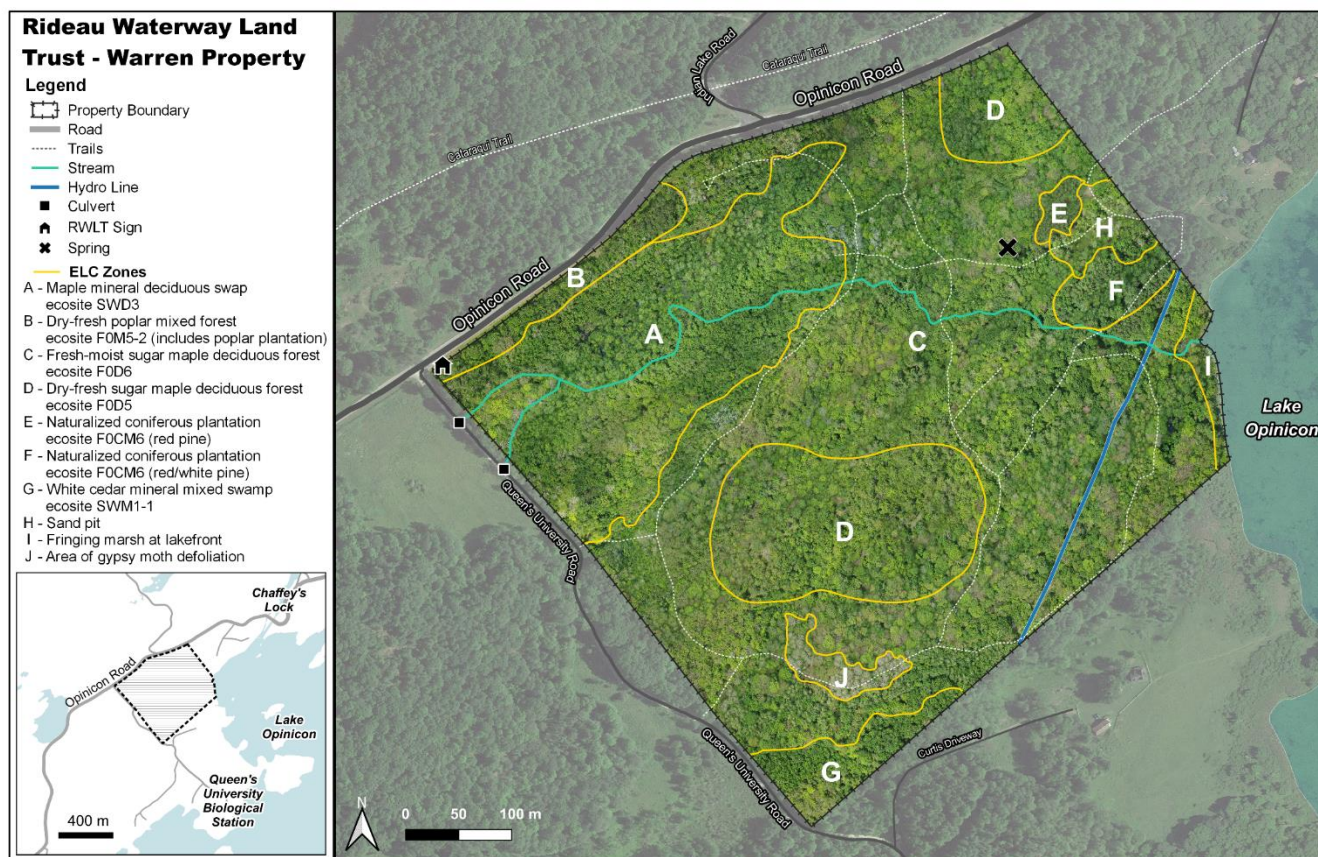


Figure 1: Warren NR (Lougheed, et al., 2021)

2.1.1 Location

The Warren Property, a 30 ha (74 ac) parcel is located just southwest of the village of Chaffey's Lock, with water frontage on Opinicon Lake (one in the chain of lakes of the Rideau Canal). The property has road frontage on Opinicon Road (South Crosby #9) on its northern side and Queen's University Road on its western edge (Lougheed, et al., 2021).

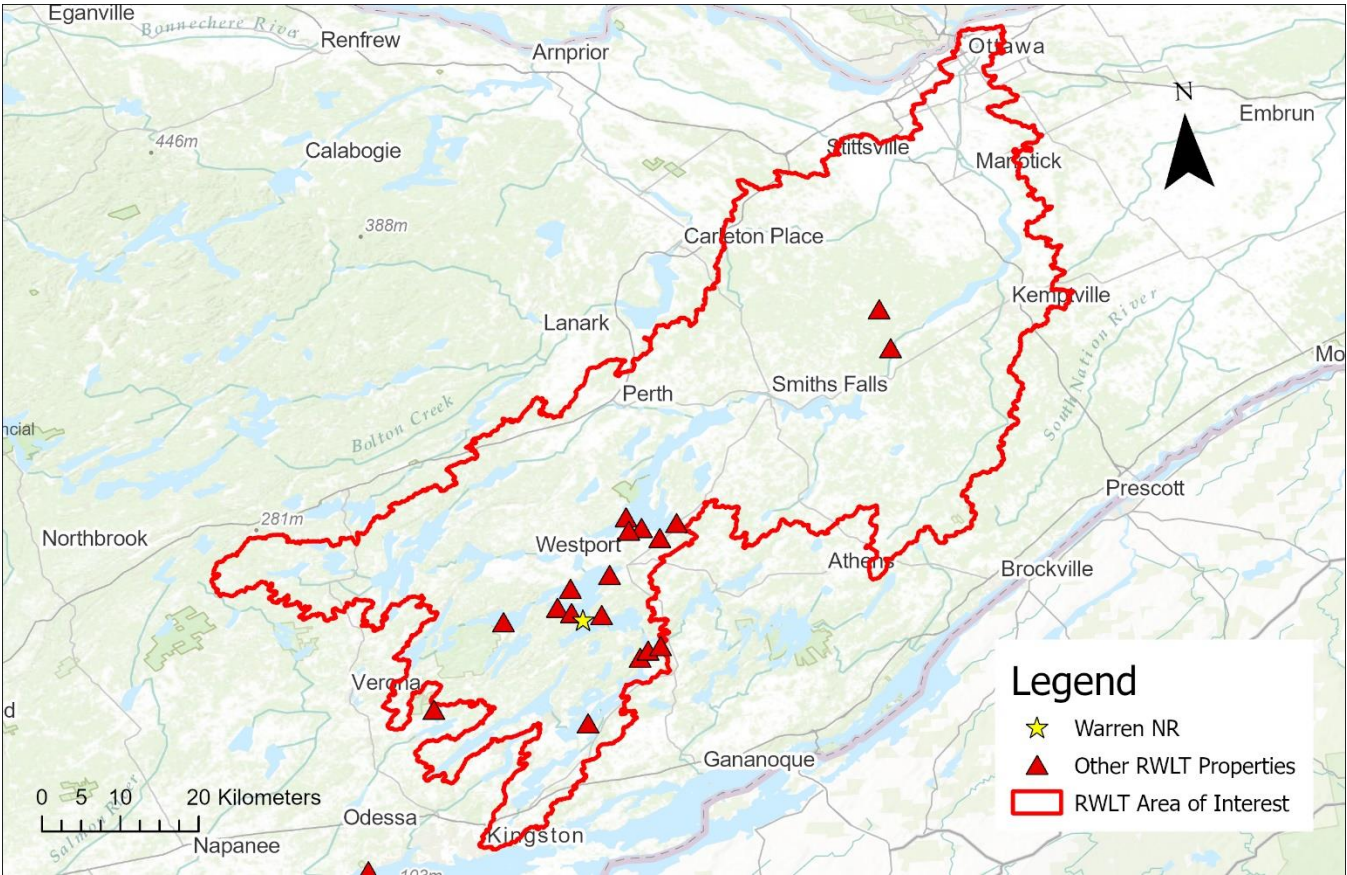


Figure 2: Regional Locator Map – Location of Warren relative to the RWLT Area of Interest

2.1.2 Property Area

The property consists of a single parcel with an area of approximately 30 hectares.

2.1.3 Securement Type/ Year

PROPERTY IDENTIFICATION NUMBER (PIN)	ASSESSMENT ROLL NUMBER	AREA (HECTARES)	YEAR ACQUIRED	ACQUISITION TYPE	PURCHASE PRICE
44107-0090	0831 836 046 51200	74.43 acres (30.1 ha)	2021	Purchase	\$372,000

2.1.4 Key Local Partners

- Queen’s University Biological Station staff, faculty, and students
- Warren family
- Cataraqui Region Conservation Authority

*Note: Contact information for key partners can be found in Appendix C: Contact Information for Key Local Partners

2.2 BIODIVERSITY VALUES

A brief summary can be found below, with further details in Section 5.2: Biological Features.

	<i>Number of Species</i>	<i>Notes</i>
<i>Amphibian</i>	10	7 frogs and 3 salamanders
<i>Bird</i>	58	Including 4 species at risk and one non-native
<i>Invertebrate</i>	2	1 invasive species and 1 species at risk
<i>Mammal</i>	9	Including beaver, fisher, muskrat, and several species of bat
<i>Plant</i>	137	Including 26 non-native species
<i>Reptile</i>	10	Including 6 species at risk
<i>Tree/Shrub</i>	54	Including 5 non-native species and 1 species at risk

2.3 CONSERVATION TARGETS AND THREATS

2.3.1 Conservation Targets/ Overall Viability Assessment

<i>Target</i>	<i>Overall Viability</i>	<i>Comments</i>
<i>Forests</i>	Good	Forests are generally healthy, supporting high levels of biodiversity and consisting of varied habitat types. Defoliation from spongy moth infestation, aging plantations, and lingering effects of past farming on the understory (or lack thereof) combine to negatively impact the health of the forest
<i>Wetlands and Streams</i>	Very Good	Varied types of wetlands are present on the property, supporting a healthy population of breeding amphibians and sustaining many other flora and fauna species. Connection to the provincially significant Murphy's Bay Wetland Complex makes it doubly important to sustain the health of the property's wetlands

2.3.2 Highest Threats

<i>Threat</i>	<i>Comments</i>
<i>Invasive Species</i>	33 non-native species have been identified on the property, including several that have the potential to cause substantial harm to ecosystem health, including dog-

Climate Change

strangling vine, phragmites, purple loosestrife, and spongy moth

Climate change has the potential to exacerbate existing threats such as providing additional routes of entry for invasive species, may possibly lead to increased physical damage due to increased extreme weather events, and will likely lead to species range shifts and changes in species assemblages

2.4 CONSERVATION MANAGEMENT GOAL AND OBJECTIVES

2.4.1 Goal

It is RWLT's goal to maintain the ecological integrity of the property with the following vision:

A vibrant forest alive with the sounds of birds singing from the trees, snakes slithering among the rocks, and frogs calling from the vernal pools and wetlands.

2.4.2 Objectives

RWLT will maintain the ecological integrity of the property with the following objectives:

1. Keep invasive species populations from spreading beyond 2022 limits and reduce coverage where possible.
2. Perform targeted monitoring for Species at Risk on the property, including bats, birds, and herptiles.
3. Remove solid waste dumped or abandoned in the past and prohibit future dumping on the property.
4. Explore opportunities for scientific research using non-destructive techniques and respecting ecologically sensitive areas.

2.5 FIVE-YEAR BUDGET SUMMARY

The total cost to implement this management plan is \$15,345 over five years or approximately \$3,070 per year. These are the bare minimum activities to achieve proper stewardship. They do not include costs associated with special projects such as invasive species removal or habitat enhancement. For information related to stewardship budgeting beyond the scope of the five years covered by this plan, including the plan update scheduled for 2026, please see Section 8.3. All cost calculations are based on rates from 2021-22 and are subject to change.

2.5.1 Universal Actions

Description		Cost	Frequency
Property Taxes and Insurance	<ul style="list-style-type: none"> • Register property under CLTIP CCL • Maintain insurance policy 	\$620	Annually

Description		Cost	Frequency
	<ul style="list-style-type: none"> • Liaise with municipalities/MNDMNRF/MPAC 		
Property Signage	Maintain and replace signage as needed, assuming 10 year replacement period	\$860	Every 10 years
Signpost Replacement	Maintain and replace signpost as needed, assuming a 20 year lifespan	\$680	Every 20 years
Property Maintenance	Perform tasks as needed to keep property in good condition ecologically and functionally <ul style="list-style-type: none"> • Remove invasive species • Remove unauthorized construction 	\$470	Annually
Annual Monitoring	<ul style="list-style-type: none"> • Conduct annual monitoring visit and complete form • Where appropriate, this visit can also include the following: <ul style="list-style-type: none"> ○ Invasive species inventory ○ Record incidental SAR • Record all species encountered 	\$640	Annually
Bi-Annual Monitoring	Bi-Annual Monitoring (in addition to annual monitoring) <ul style="list-style-type: none"> • Breeding Bird Surveys • Amphibian Surveys • Vernal Pool Surveys 	\$470	Every 2 years
Reports and Database	<ul style="list-style-type: none"> • Draft any invasive species or SAR reports • Update species database • Plan visits 	\$760	On-going
Partner Liaison	<ul style="list-style-type: none"> • Keep in contact with neighbours, QUBS, CRCA 	\$220	On-going
		Total Over 5 Years	\$15,345

3 BACKGROUND

3.1 PURPOSE OF THE MANAGEMENT PLAN

Rideau Waterway Land Trust acquired the 30.1-hectare Warren Nature Reserve in early 2021 after a targeted fundraising campaign generously funded by many of the Land Trust's supporters.

Ecological information on Warren Nature Reserve was provided in 2021 by Queen's University Biological Station researchers and staff, as well as consultants and retired researchers with ties to the university. Site visits by staff biologists in 2022 filled any gaps in information and allowed for the identification and evaluation of target health.

The scope of this management plan is place-based and focused on Warren NR. This management plan will describe how the organization will govern this ecologically significant property for the next five years.

3.2 RIDEAU WATERWAY LAND TRUST'S CONSERVATION EFFORTS

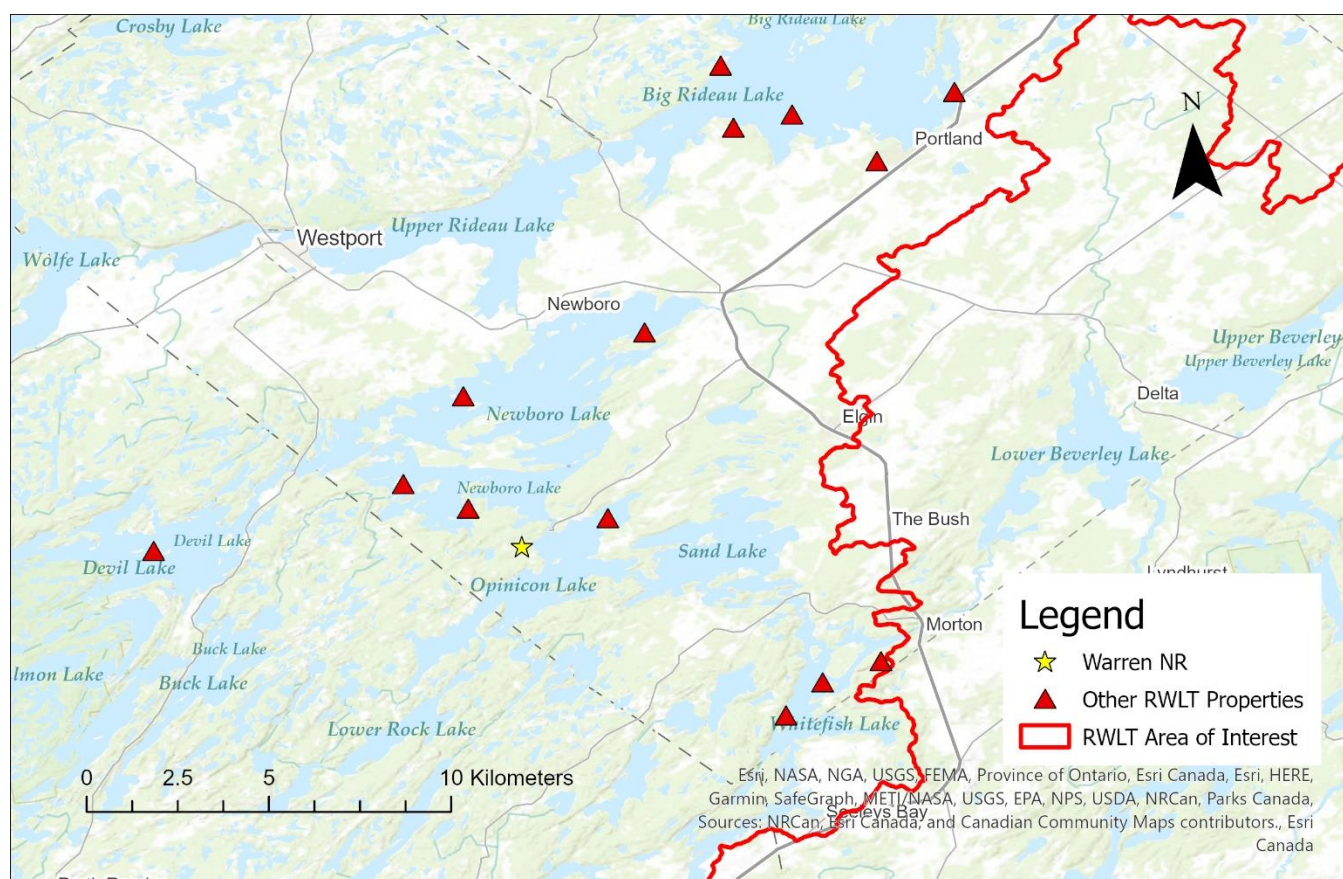


Figure 3: Close-up of RWLT area of operation w.r.t. Warren NR

3.3 WARREN NR MANAGEMENT GOALS

It is RWLT's goal to maintain the ecological integrity of the property with the following vision:

A vibrant forest alive with the sounds of birds singing from the trees, snakes slithering among the rocks, and frogs calling from the vernal pools and wetlands.

The long-term vision for the property is to steward and maintain the health of conservation targets, reduce or eliminate threats, and support species at risk.

3.4 PROPERTY DESCRIPTION

Table 1: Warren NR Property Summary

Property Owner	Rideau Waterway Land Trust
Nearest Town	Chaffey's Lock
Directions	From Chaffey's Lock, ON, take Opinicon Road southwest for ~1.4 km. Turn left onto Queen's University Rd and park. Alternatively, turn right onto Indian Lake Road 1 km out of Chaffey's Lock and park in the Cataraqui Trail parking lot (44.5769, -76.3315)
Coordinate Reference	44.574449, -76.334655 (NW corner, at the corner of Queen's University Rd and Opinicon Rd)
Elevation	Ranges from 119.6 m to 142.6 m ASL
Surface Area	74.43 acres (30.1 ha)
Conservation Authority	Cataraqui Region Conservation Authority
Watershed	Cataraqui River
EcoDistrict	6E-10 Charleston Lake
Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR) District	MNDMNR's Southern Region, Kemptville District. Address: Unit 1, 10 Campus Drive, Kemptville, ON K0G 1J0 Phone: 613-258-8204

3.4.1 Legal Description

Table 2: Legal Description of Parcels

Property Identification Number	Assessment Roll Number	Legal Description	Year Secured
44107-0090	0831 836 046 51200	PT LT 17 CON 9 SOUTH CROSBY AS IN SC7986 EXCEPT PT 17, 28R3897; S/TSC5531; RIDEAU LAKES	2021

3.4.2 Description of Property Perimeter Boundaries

The majority of the perimeter of the Warren NR is marked by rail fences. However, the rail fence that forms the western boundary is intermittent at best. As well, the rail fence on the eastern side meanders in the road allowance that abuts the property, and should not be used as a boundary marker.

Starting from the corner of Queen's University Road and Opinicon Road, the boundary of Warren NR follows the edge of Opinicon Road northeast for 640 m (Figure 4). It then turns about 90 degrees and heads southwest along the unopened road allowance between Concessions 8 & 9 towards the shore of Opinicon Lake. The boundary follows the shore for 176 m and then heads southwest for 518 m to meet Queen's University Road. The boundary then heads in a fairly straight line northwest back to the intersection of the roads.

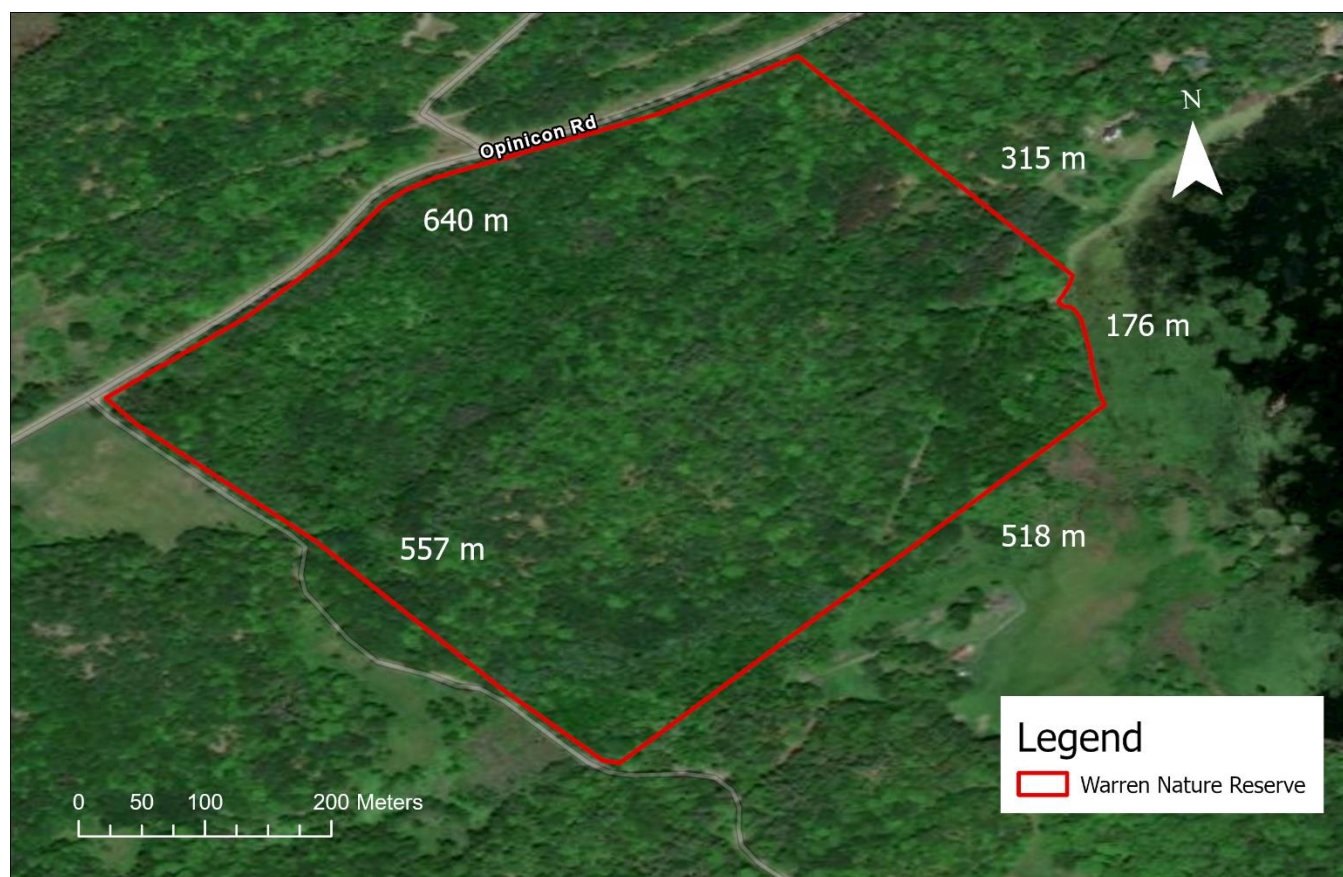


Figure 4: Satellite Imagery of Warren Nature Reserve (displayed by red polygon)

3.4.3 Site Designations

There are no Provincially Significant Wetlands (PSWs) or Areas of Natural and Scientific Interest (ANSIs) on the Warren NR. However, the shoreline does abut the provincially significant Murphy's Bay Wetland Complex and would be considered "adjacent land" with some associated protections from development.

3.4.4 Agreements (leases, encumbrances, etc.)

In 2021, an application was made to register the Warren NR under the Conservation Land Tax Incentive Program (CLTIP) as a Community Conservation Land (CCL). Approval was received via email on July 6, 2022. The CCL category broadens the range of properties owned by Conservation Authorities or like-minded organizations that are eligible for a property tax reduction. No use that would be detrimental to the natural heritage values of the property is permitted on a property registered under CLTIP (Ontario Ministry of Natural Resources, 2021). RWLT is required to reapply annually for properties registered in this program. To remain in the CLTIP program, RWLT is required to adhere to the rules regarding land use as outlined in Appendix E: Restrictions Upon Use or Disposition Of Warren NR.

As well, a license agreement was signed with Queen's University in May 2022 to classify Warren Nature Reserve and James H. Fullard Nature Reserve as agreement properties. As agreement properties, Warren and Fullard Nature Reserves will be listed on the QUBS website as properties available to researchers to request access to for their projects. Research on the Warren property is restricted in location and scope, to protect the sensitive wetland communities and prevent harm to the conservation values. Permitted research types include observational and non-invasive sampling.

Finally, a Hydro One "right-of-way exists and cuts diagonally across the southeastern quadrant of the property. Another short span of wires cuts across the northernmost part of the property at the curve of the Opinicon Road. A small old-field community exists underneath as a result of control of woody vegetation." (Lougheed, et al., 2021).

3.4.5 Adjacent Land Use and Cultural Elements

Properties surrounding the Warren Nature Reserve are primarily fairly undisturbed natural land. A large proportion of the surrounding area is owned by either the Queen's University Biological Station and used for scientific research, or the Nature Conservancy of Canada and protected as Wilderness Areas. Other key adjacent land uses include the nearby village of Chaffey's Lock (about 700 m NE), the Cataraqui Trail (passing a mere 45 m NE on the other side of Opinicon Road), and a closed waste disposal site about 150 m NW. This waste disposal site is situated between the Cataraqui Trail and Opinicon Road and was used by The Opinicon Resort to dispose of yard waste, brush, and clean construction materials. A proposal was received in 2001 by the Ministry of the Environment from The Opinicon Ltd. for approval to continue the use of this site for the disposal of these ecologically benign materials (Ministry of the Environment, 2001). No comments or objections to the proposal were made and approval was made on July 7, 2004. This waste site is marked as closed on the current Township of Rideau Lakes Official Plan, Schedule B, and no sign of dumping was seen during recent visits.

4 PROPERTY MANAGEMENT

4.1 HISTORICAL LAND USE

From the 1850s to the 1970s, the Warren NR property was mainly used for farming. The land was primarily used to raise livestock and for mixed farming. Much of the surrounding land was also used for dairy cattle and growing corn. In the 1950s, active farming ceased on the property, but land was rented out to neighbours as pasture. This continued into the 1970s. It was in the 1950s that gravel and aggregate were removed from the sand pit (Figure 1)

located near the eastern boundary. This area was originally a hill on which stood the original farm buildings (Lougheed, et al., 2021).

In 1965 Don Warren purchased the property. Areas continued to be used as pasture by local dairy farmers. Annual burns of reeds by the waterfront and fields kept these areas clear. In the mid-1970s, pasturing of cattle ceased and Don Warren partnered with the Ontario Ministry of Natural Resources to plant pine and hybrid poplar plantations to reforest the land. There used to be a barn in the eastern plantation site (ecosites E & F) but this was dismantled after a section collapsed in 1978. In the late 1980s, a walking trail was created in partnership with the municipality, the remains of which can still be seen today. Maintenance of this trail by the Township of Rideau Lakes ended in 1998 (Lougheed, et al., 2021).

Other uses of the property throughout the 1960s-2000s included research by Queen's University researchers, tapping of maple trees, firewood harvesting, hunting of deer and ducks by the Warren family, and illegal poaching. All of the buildings of the Warren family homestead are currently owned by the neighbouring Opinicon Resort. An old cabin was moved onto the property in 1971 for use as a cottage/playhouse by the Warrens. This was removed in the summer of 2021 as it was falling down.

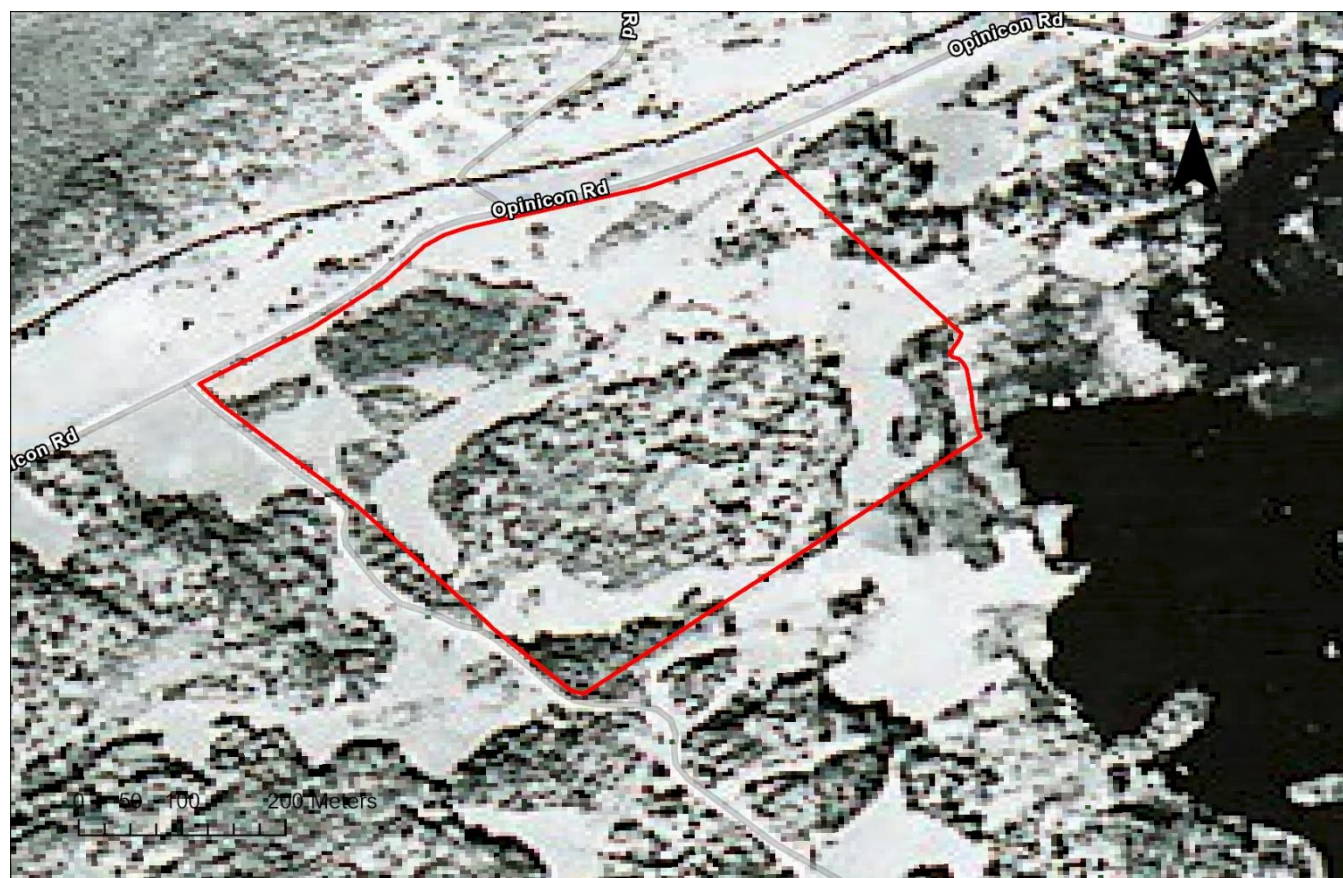


Figure 5: Warren NR (red outline) in 1954 (University of Toronto)

4.2 ACQUISITION HISTORY

In late 2020, RWLT staff reached out to Sonia Nobrega, the manager of the Queen's University Biological Station (QUBS), with a request for information on current landholding and priority areas for protection, to help inform RWLT's acquisition strategy. At the time, QUBS had a critical property on their "wish list" but facing fundraising constraints due to COVID, they were interested in learning of other potential sources of funds.

When the matter was raised with the Board of Directors, there was great interest in ensuring the protection of the property, due to the ecological significance of the property and a personal connection to the late Don Warren, a founding member of the Land Trust.

After exploring several possible methods of acquisition, it was decided by RWLT and QUBS that the Warren property would be acquired by RWLT, and QUBS would provide support in management, monitoring and development of the Baseline Report. Funds already secured by QUBS, including a grant from the Echo Foundation, would be transferred to RWLT to support the purchase.

A targeted fundraising campaign was quickly developed, framed as part of the 25th anniversary of the Land Trust. Support was quickly and broadly forthcoming from both large and small donors, with 175 donors contributing during a compressed 10-week campaign, as well as funding from the Ontario Greenlands Conservation Partnership.

Following the successful fundraising campaign, the property was purchased from the three Warren siblings, David, Melinda, and Susan for \$372,000, and the transfer was registered on April 27, 2021.

4.3 CURRENT MANAGEMENT

Since its acquisition in the spring of 2021, the Warren Nature Reserve has been managed as a conservation property with no public access. A decision about whether to allow some limited access to the property was deferred until after the Baseline Report and Management Plan could be developed, highlighting the sensitive areas and conservation targets on the property.

The Baseline Report was developed in the summer of 2021 by QUBS staff, students, and affiliated consultants. This report outlined the main Ecological Land Classification (ELC) communities, a history of the property, and included an extensive species list. This report was the main source of information on the property for this management plan.

Management in 2021 also included the dismantlement and removal of the collapsed cabin by the shore of Opinicon Lake and the installation of large property identification and donor recognition signs on Opinicon Road.

In 2022, eight triangular property boundary signs were placed in key locations along the western, northern, and eastern boundaries, typically in places where a trail enters the property. As well, the locations of several isolated populations of dog-strangling vine were mapped, and initial removal efforts were undertaken to prevent spread while a more comprehensive management plan could be prepared. Seven volunteers joined staff on Friday, August 12, 2022, to manually remove scattered dog-strangling vine plants in the area surrounding the old sand pit. A small grant of \$1,000 was secured from the Invasive Species Centre to support invasive species management efforts on the property.

4.4 FUTURE ACQUISITIONS

There are no current plans to acquire more property near Warren NR. However, as it is in the middle of one of RWLT's priority areas, RWLT would be open to further acquisitions in the area of the Warren Nature Reserve to further increase the connectivity of protected lands in the area. Properties protecting adjacent lands to the PSW or other undeveloped lake shorelines are of particular interest.

4.5 STEWARDSHIP

Warren NR is visited at least once a year for a full property monitoring visit, typically by RWLT biology staff. Each year, the visit is done during a different season to account for the full variation in flora, fauna, and habitat. Monitors complete the monitoring template attached as Appendix B, documenting any changes in the property and/or any disturbances that may have occurred, as well as updating the species database. If there are any unwanted or illegal activities, RWLT staff and board members decide upon the necessary actions needed to resolve the issue.

5 BASELINE INVENTORY SUMMARY

5.1 PHYSICAL FEATURES

5.1.1 Geology

The bedrock at Warren NR consists of carbonate metasedimentary rocks approximately 0.5-1.6 billion years old and is part of the Precambrian Canadian Shield, the oldest rock existing in Canada. The Precambrian Shield underlays most of the country but is covered by Canada's other geological regions as seen in Figure 6. Warren NR lies just within a narrow corridor of exposed Precambrian bedrock known as the Frontenac Arch, that extends to and ends in the United States. On either side of this hourglass-shaped corridor lies the Interior Platform where the bedrock consists of younger Paleozoic materials. The Precambrian bedrock underlying Warren NR is primarily composed of marble, metamorphic rocks derived from impure limestone, and fault breccia (a type of sedimentary rock with angular fragments that forms in localized fault zones). The surface geology is a mix of Precambrian bedrock, glaciofluvial deposits, glaciolacustrine deposits, and undifferentiated till, as well as organic deposits in poorly drained areas (Figure 7). The hard Precambrian bedrock resisted the abrasive action of the glaciers that formed most of the surface deposits in the area, resulting in much of the soil being thin and stony. Unsorted till deposits cover most of the county, however, there are areas of surface deposits that have been sorted by glacial streams and lakes.

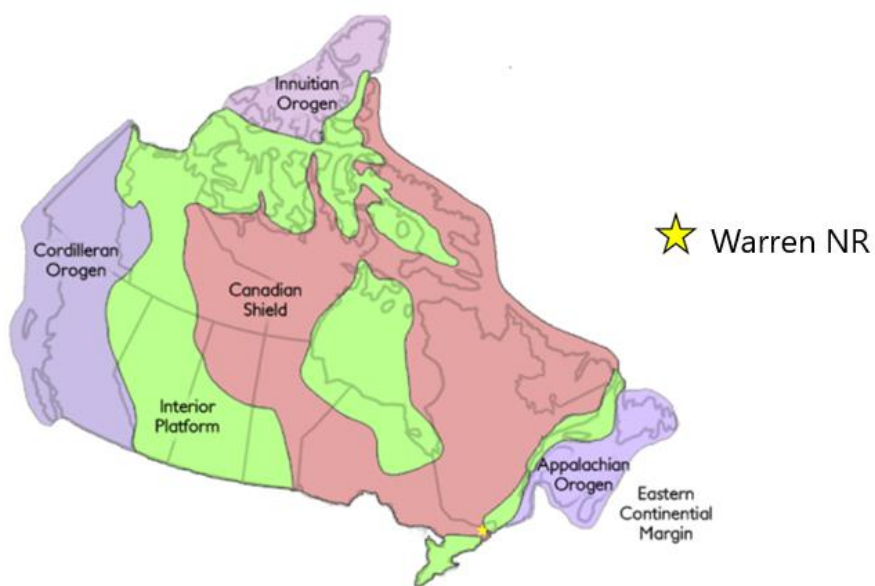


Figure 6: Geological regions of Canada

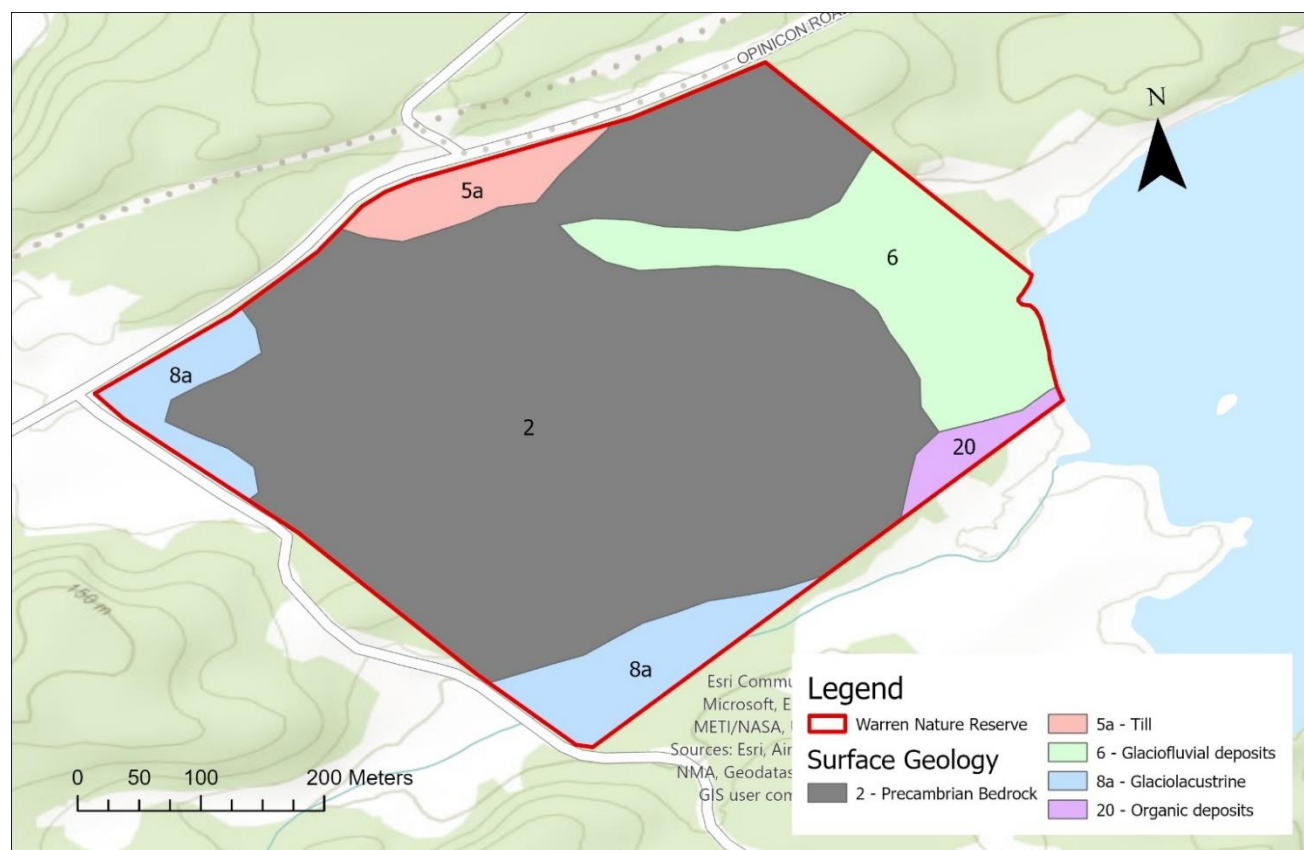


Figure 7: Surface geology of Warren NR (Ontario Geological Survey, 2010)

5.1.2 Soils

Overlaying the hard Precambrian bedrock there is a generally thin layer of soil. Approximately one-third of the property is covered with “Uplands” soil, developed from noncalcareous sand outwash deposited in slow-moving or still water, with a gentle slope of between 2-9%. The soil in these areas is generally stone-free sandy soils that drain rapidly and are thicker than 1m. However, they have low fertility and low moisture holding capacity, making the best land use being the production of trees (Gillespie, Wicklund, & Miller, 1968).

A large area in the northwest corner (Figure 8) consists of “Napanee” series soils, which consist of clay soils that developed from calcareous lacustrine deposits that were likely deposited at the western limit of the Champlain Sea in a mix of salt and fresh water. On Warren NR this soil has a gentle slope of 2-9%, and due to the high clay content, drains poorly and is compacted at depth.

The southwest quadrant of the property is generally made up of “Monteagle sandy loam-Rockland” soil, with more complex topography that varies from 5-15% slope. This area is very stony and rocky, is a mixture of sandy loam and shallow soil over bedrock, and drains well or rapidly. Where the slightly deeper Monteagle soil appears, it is typically stratified due to ponding. The bedrock is within 1m of the surface in all areas of this soil type. The Monteagle soil series develops from noncalcareous glacial till derived mainly from local granitic rocks.

The final section of the property is made up of “Muck” soil. This organic soil is in a bog-like depression, with a very low slope (0-0.5%), and has very poor drainage.

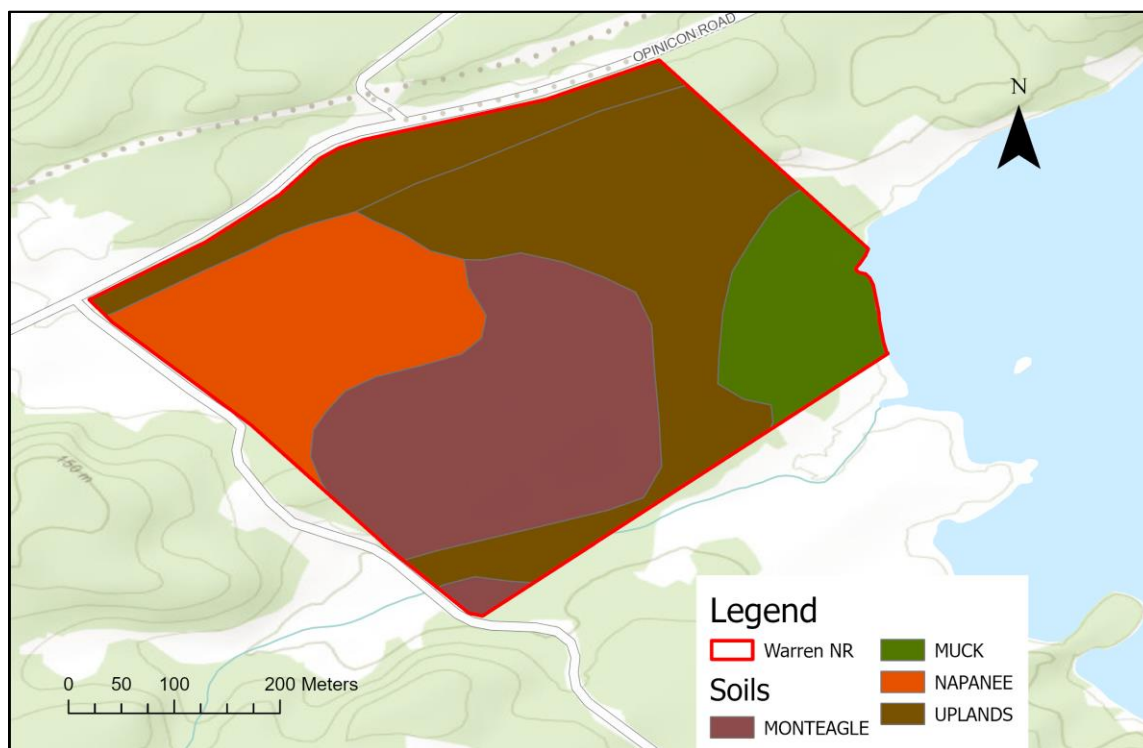


Figure 8: Soils of Warren NR (Ontario Ministry of Agriculture, Food, and Rural Affairs, 2015)

5.1.3 Surface Hydrology

The wetlands and streams of Warren NR provide significant breeding and feeding habitat for a variety of fauna and are some of the most important and sensitive features on the property. Much of the northwest quadrant of the property consists of unevaluated wetlands and vernal pools. A stream flows through this area, starting at two culverts under Queen's University Road. This stream flows across the entire property ending at Opinicon Lake. Two springs on the property contribute to the vernal pools and stream flow. One can be seen in Figure 9 in the eastern half of the property, near the sand pit, and the other is located just south of Opinicon Road. The exact location of the second spring has not been recorded.

A second seasonal stream cuts across the southern corner of the property, flowing into the neighbouring Curtis property and eventually into Opinicon Lake when there is sufficient water. Flow tapers off in the summer, leaving a complex of small pools that likely provide habitat for many species.

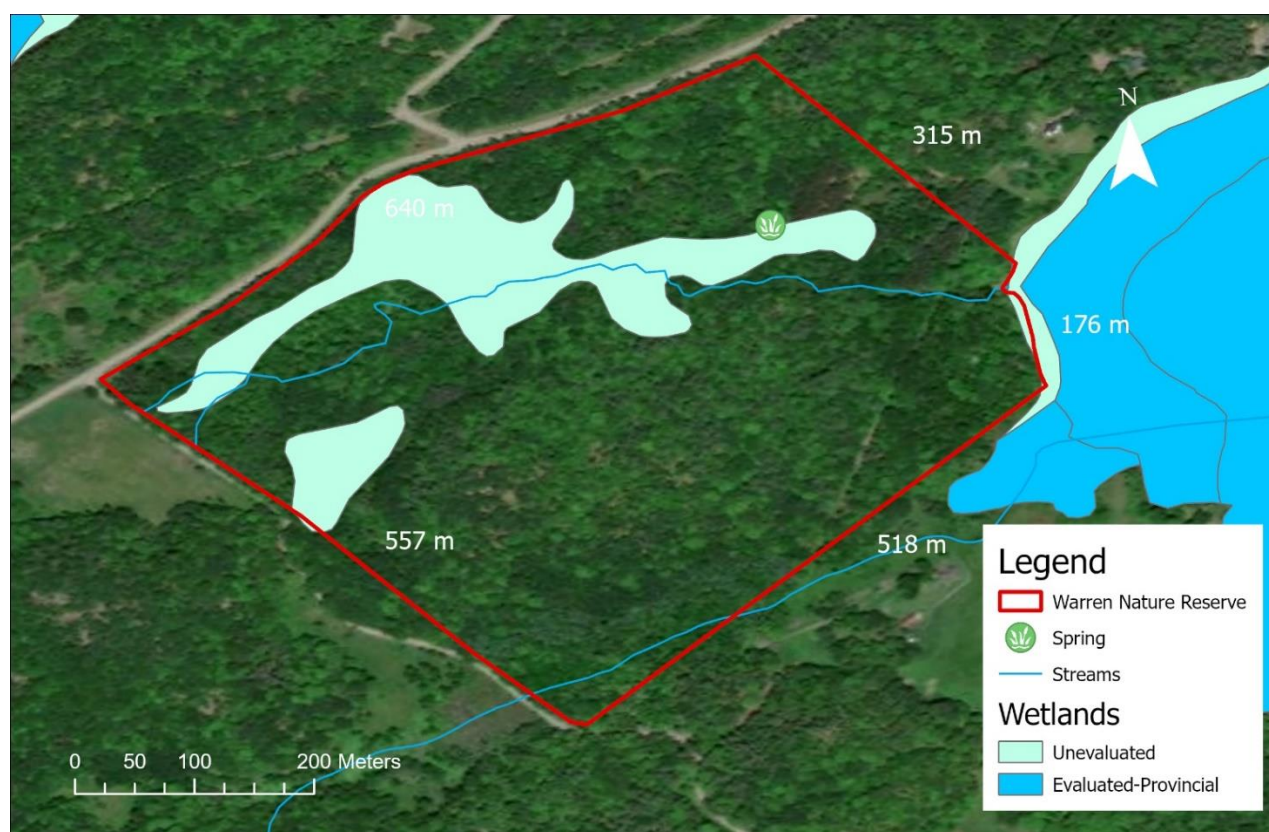


Figure 9: Warren NR Hydrology

5.1.4 Climate

Warren NR lies within the Charleston Lake EcoDistrict (6E-10), which makes up part of the Lake Simcoe-Rideau Ecoregion. The climate of this ecoregion is mild and moist, with a mean annual temperature of 4.9-7.8°C and mean annual precipitation of 759-1,087 mm (Crins, Gray, Uhlig, & Wester, 2009).

5.2 BIOLOGICAL FEATURES

5.2.1 Land Cover

Warren Nature Reserve is almost completely forested, except for the Hydro One corridors that are kept clear under the power lines. According to SOLRIS 3.0, the forest is divided into deciduous forest, mixed forest, and treed swamp (Figure 10). There is also forest where the type could not be determined, and some completely undifferentiated areas. From satellite imagery, we can see that these undifferentiated areas are also mainly forest. There is also a small area on the shores of Opinicon Lake that is emergent marsh habitat.

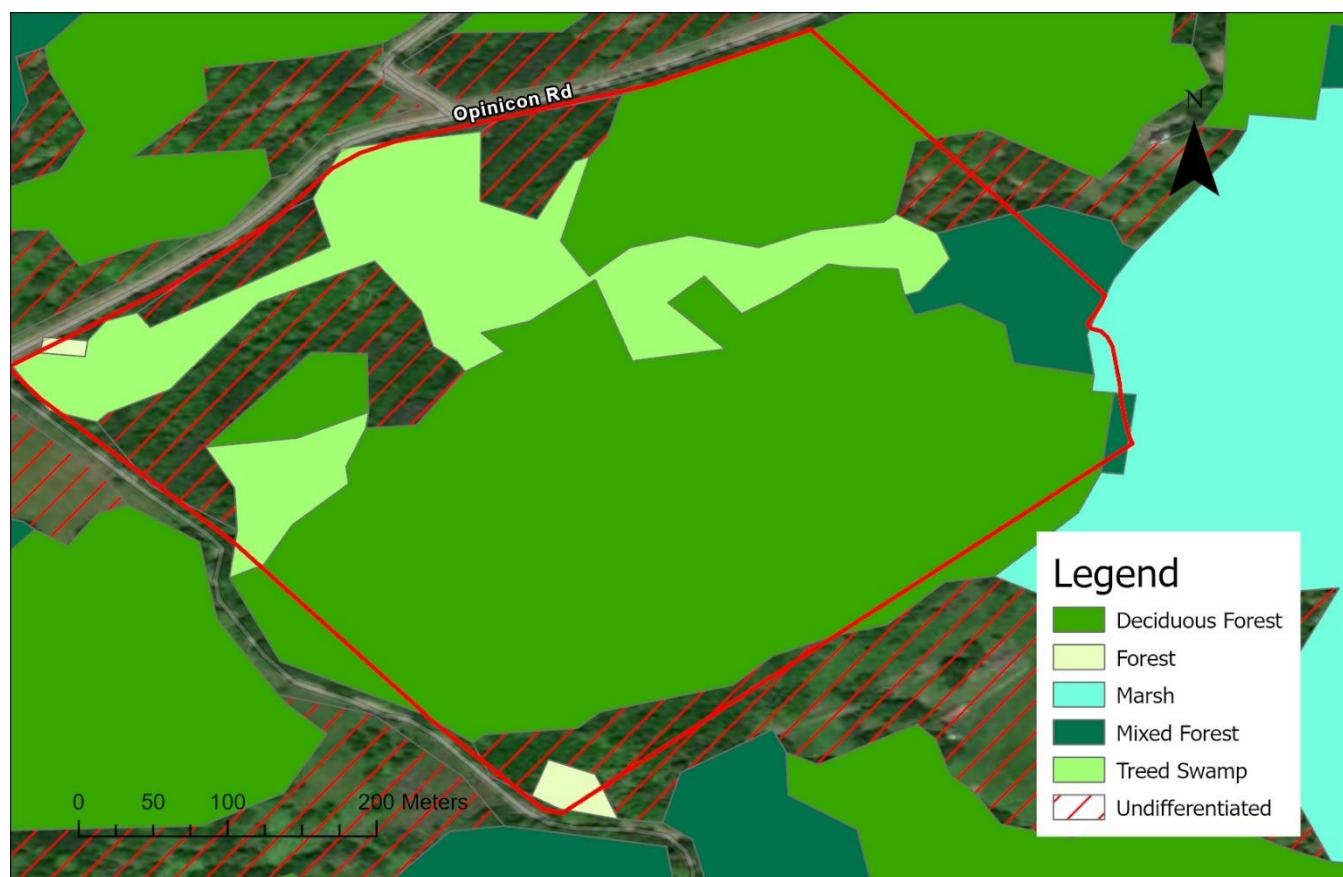


Figure 10 – SOLRIS 3.0 Land Use (Ontario Ministry of Natural Resources and Forestry, 2021)

5.2.2 Flora

While preparing the Baseline Report, an Ecological Land Classification analysis was performed on the Warren NR by experienced consultants Dale Kristensen and Rob Snetsinger. Nine main ecological communities were identified and are summarized below (Table 3). A full description can be found in the Baseline Report (Lougheed, et al., 2021).

Table 3: Vegetation Communities Identified on Warren Nature Reserve

Name	Description
A – Maple mineral deciduous swamp (SWD3)	Rich, wet forest that provides significant breeding habitat for amphibians in the spring; provides critical habitat for some bird spp; vegetation is dominated by red maple, silver maple and green ash;
B – Dry-fresh poplar mixed forest (FOM5-2)	Includes poplar plantation planted in the mid-1970s; small trees over grass/forb layer, relatively early successional after a history of livestock grazing
C – Fresh-moist sugar maple deciduous forest (FOD6)	Largest ecosite; gently rolling, well-treed with sugar maple dominant; traversed by old road and trails
D – Dry-fresh sugar maple deciduous forest	Highest ground least disturbed due to rugged topography; older growth forest with some very large specimens of sugar and black maple, white pine
E – Naturalized coniferous plantation (red pine) (FOCM6)	Planted in cooperation with Ontario Ministry of Natural Resources in mid-1970s; red pine; stunted due to lack of thinning; dense uniform stand with little understory
F – Naturalized coniferous plantation (red/white pine) (FOCM6)	Similar to ecosite F; red and white pine
G – White cedar mineral mixed swamp (SWM1-1)	Straddles the outflow of a marsh on west side of road; dominated by white cedar and bittersweet hickory; seasonal flow east towards Opinicon Lake
H – Sand pit	Was the site of removal of sand and aggregate in the 1950s; slowly regenerating with horsetails, shrubs, and invasive spp; often flooded
I – Fringing marsh	Dominated by cattails; fronts onto Murphy's Bay Complex PSW; important habitat for birds, herptiles, mammals

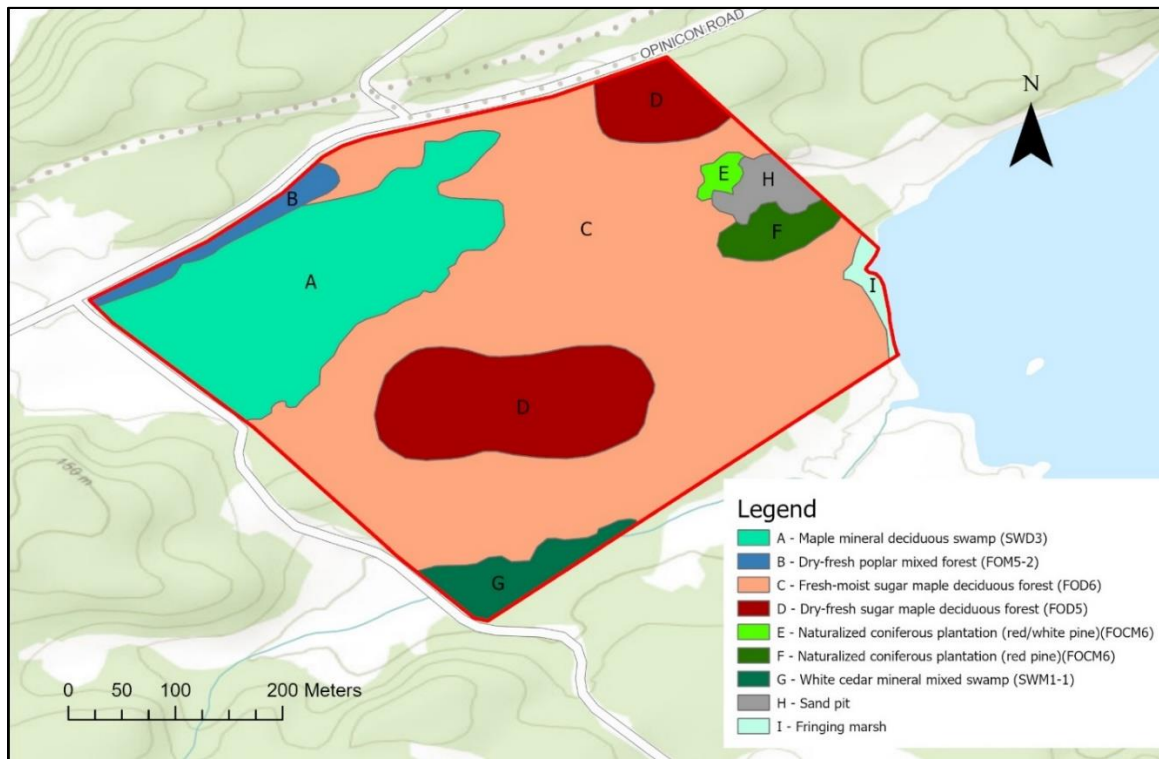


Figure 11: Vegetation Communities (ELC Classification by Dale Kristensen and Rob Snetsinger)

5.2.3 Fauna

Warren NR provides significant forested and wetland habitat for a wide range of wildlife. The forests are home to 58 different species of birds, including 13 that are considered interior dwelling species. Five of these species, hairy woodpecker (*Dryobates villosus*), ovenbird (*Seiurus aurocapilla*), pileated woodpecker (*Dryocopus pileatus*), scarlet tanager (*Piranga olivacea*), and black-and-white warbler (*Mniotilta varia*) breed in forest interiors and are known to have significant declines in population when habitat area is decreased (Rideau Valley Conservation Authority, 2000). Several others, like the red-bellied woodpecker (*Melanerpes carolinus*) and red-eyed vireo (*Vireo olivaceus*), will not breed in forest fragments (University of Florida).

There have also been up to nine mammal species reported on the property, including muskrat (*Ondatra zibethicus*), fisher (*Pekania pennanti*), and beaver (*Castor canadensis*). Six were reported in the Baseline Report (Lougheed, et al., 2021) and have not been personally observed by RWLT staff. Three possible bat species were recorded during acoustic monitoring between August 7-18, 2022. As Warren NR is located within a mostly natural landscape, it provides ideal habitat for mammals away from more developed areas.

Warren NR is also home to seven frog species, three salamander species, five turtle species, and four snake species. Of the nine reptiles, seven are considered species at risk, including the Blanding's turtle (*Emydoidea blandingii*), gray ratsnake (*Pantherophis spiloides*), Northern map turtle (*Graptemys geographica*), and Eastern ribbon snake (*Thamnophis sauritus*). The mosaic of streams, vernal pools, wetlands, and forests make the property ideal habitat for a wide variety of reptiles and amphibians, supporting species in all of their life stages.

5.2.4 Species of Conservation Concern

Warren Nature Reserve provides suitable habitat for a wide range of flora and fauna, including at least 13 species at risk that have been observed on the property (**Error! Reference source not found. Error! Reference source not found.**).

According to the Natural Heritage Information Centre, there are nineteen species of conservation concern known to be present in the area surrounding Warren NR, including four restricted species (Table 4) (Ontario Ministry of Natural Resources and Forestry, 2019).

Table 4: Species of Conservation Concern – NHIC

Common Name	Scientific Name	SARO Status	SARA Status
American Bumble Bee	<i>Bombus pensylvanicus</i>		SC
American Eel	<i>Anguilla rostrata</i>	END	THR
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR
Cerulean Warbler	<i>Setophaga cerulea</i>	THR	END
Eastern Floater	<i>Pyganodon cataracta</i>		
Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR
Eastern Milksnake	<i>Lampropeltis triangulum</i>	NAR	SC
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	SC	SC
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	SC	SC
Gray Ratsnake (Frontenac Axis population)	<i>Pantherophis spiloides</i> pop. 1	THR	THR
Midland Painted Turtle	<i>Chrysemys picta marginata</i>		SC
Northern Map Turtle	<i>Graptemys geographica</i>	SC	SC
Rusty-patched Bumble Bee	<i>Bombus affinis</i>	END	END
Snapping Turtle	<i>Chelydra serpentina</i>	SC	SC
Wood Thrush	<i>Hylocichla mustelina</i>	SC	THR

5.2.5 Species At Risk Inventories

Acoustic monitoring for possible SAR bat species was performed between August 7 – 18, 2022. Data quality was poor due to unknown factors, but initial data analysis suggests that there are three possible bat species on the property, including the Endangered Tri-colored bat (*Perimyotis subflavus*). Further data collection and analysis is necessary to confirm the presence of this SAR on the property.

5.2.6 Invasive Species

Initial surveys of the property indicate a wide range of non-native species, including one bird, one moth, 26 plants, and 5 trees or shrubs. Many of these non-native species are considered invasive, proliferating once introduced and displacing native species in the ecosystem. The invasive species of most concern are listed below in

Table 5.

Table 5: Select Invasive Species

Common Name	Date Observed	Description
Buckthorn	2021 Baseline	Category 1 – Aggressively Invasive
Dog-strangling vine	2021 Baseline	Category 1 – Aggressively Invasive
European frogbit	2021 Baseline	Category 1 – Aggressively Invasive
Garlic mustard	2021 Baseline	Category 1 – Aggressively Invasive
Great hedge bedstraw	2021 Baseline	Category 2 – Very Invasive
Kentucky bluegrass	2021 Baseline	Category 2 – Very Invasive
Spongy moth (LDD)	2021 Baseline	causes defoliation of tree canopy
Purple loosestrife	2021 Baseline	Category 1 – Aggressively Invasive
Tatarian honeysuckle	2021 Baseline	Category 1 – Aggressively Invasive
Tufted vetch	2021 Baseline	Category 2 – Very Invasive
White poplar	2021 Baseline	Category 2 – Very Invasive

5.3 CONSERVATION CONTEXT

5.3.1 Protected Areas

Warren NR is located in the middle of a large number of other protected areas belonging to both the Rideau Waterway Land Trust and various other partner conservation organizations (Figure 12).

Within 10 km lies eight different RWLT-stewarded properties, including Island 296 NR (1.75 km away), James H. Fullard NR (2 km), Mosquito Lake Islands NR (3.5 km), Ken Yen (5.5 km), Islands in the Bog NR (8 km) Kate's Island NR and Jack's Island NR (both 9.25 km away), and Rock Dunder NR (9.75 km).

Hundreds of acres of land nearby are also protected by the Queen's University Biological Station, where environmental research is performed under strict guidelines on vast stretches of the local Provincially Significant Wetlands and Areas of Natural and Scientific Interest.

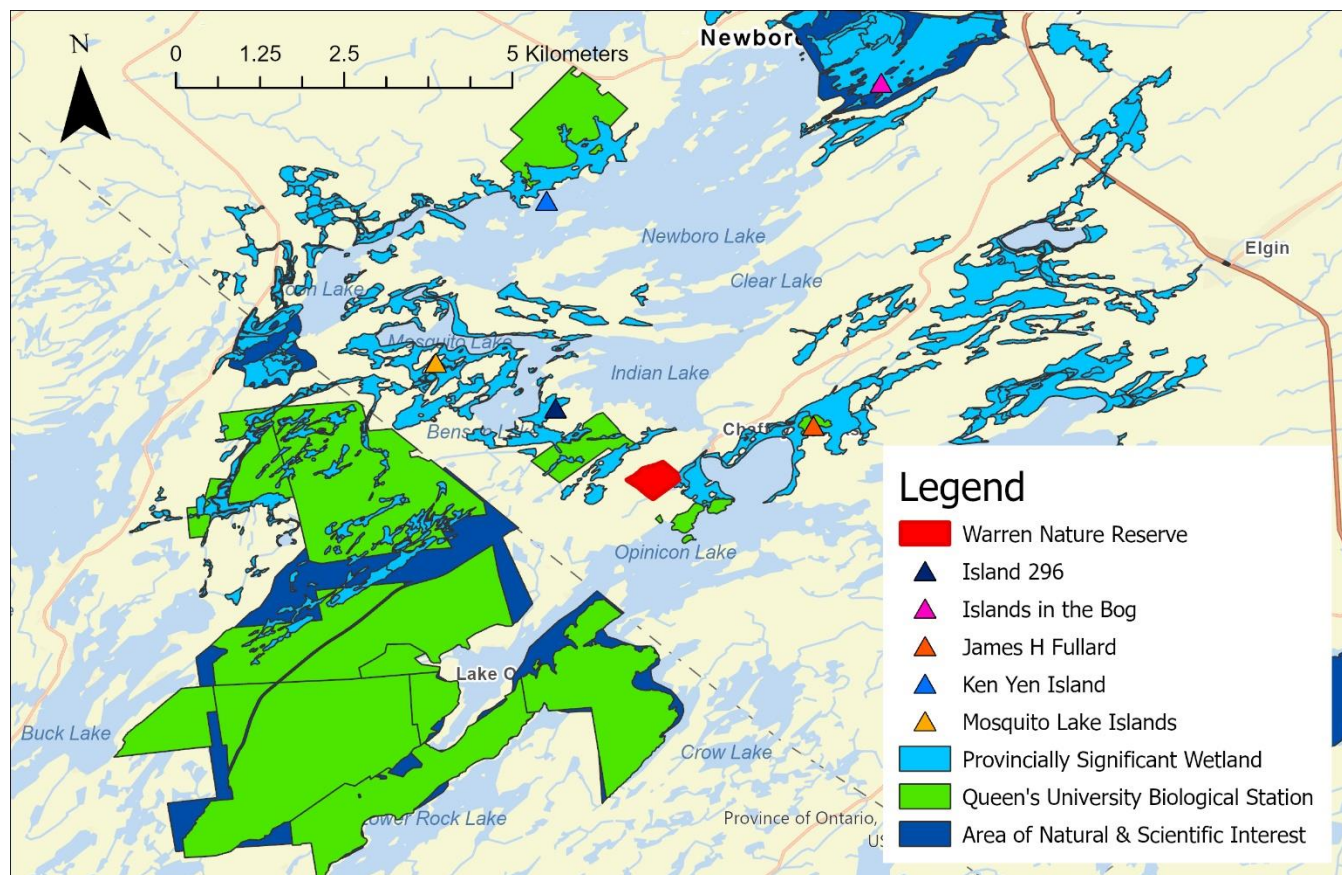


Figure 12: Protected Properties Surrounding Warren Nature Reserve

5.3.2 Policy Areas

5.3.2.1 Official Plan of the United Counties of Leeds & Grenville

The United Counties of Leeds and Grenville Official Plan was adopted by Counties Council on July 23, 2015, by By-law No. 15-47. The Official Plan, as modified by the Minister of Municipal Affairs and Housing, was approved on February 19, 2016.

Under this Official Plan, Warren NR is designated as Rural Lands. One of the objectives of Rural Lands, under Section 3.3.1(i) is to “Provide for the protection of natural heritage features and their ecological functions.” (United Counties of Leeds & Grenville, 2015)

Appendix 2 identifies the land as part of the County's Natural Heritage System. Section 4.3(k) encourages the "creation of a linked Natural Heritage System through the integration" of various publicly owned lands and (ii) areas in the ownership of land trusts."

Section 4.2.12, Crown Lands, Conservation Lands and Significant Local Features, contains general policies applicable throughout the United Counties, including a statement encouraging the activities of land trusts.

5.3.2.2 *Official Plan of the Township of Rideau Lakes*

This official plan was adopted by Council on October 20, 2003 and approved by the Ministry on April 2, 2004. A major amendment to the Official Plan was approved in July 2022, adding new schedules and revised policies. The subject land is designated primarily as Rural with a portion in the northwest corner designated as Mineral Resource (Township of Rideau Lakes, 2003). The policies applicable to these designations are contained in sections 3.3 and 3.7. Under the Mineral Resource designation “Land uses such (as)...conservation...shall be permitted, provided that such uses shall not generally include buildings or activities that would preclude or hinder the establishment of new mineral mining or mineral aggregate operations or access to mineral resources”.

Section 2 of the official plan contains General Development policies applicable to the entire Township. Section 2.12, Crown and Conservation Lands, acknowledges that some conservation lands are owned or managed by non-profit organizations. These are permitted anywhere in the Township.

5.3.2.3 *Zoning By-law #205-6*

The Township of Rideau Lakes Zoning By-law zones the subject lands as Rural (RU), a category which allows conservation uses which “shall mean the preservation, improvement and enhancement of natural resources or the natural environment.” This definition captures the existing and intended use of the Warren Nature Reserve. There is also a small section in the northwest that is zoned as Rural Waterfront (RW) with a permitted use of a single dwelling. When an opportunity arises in the future to provide input into a new comprehensive zoning by-law, it may be appropriate to place the land in a category which limits the permitted uses to just a conservation use.

5.3.2.4 *Environmental Designations*

Almost all of Warren NR would be considered “adjacent land” to the Murphy’s Bay Wetland Complex provincially significant wetland. This gives some protection from development. As well, the property lies within the Natural Heritage System as laid out by the United Counties of Leeds and Grenville Official Plan, Appendix 2 (United Counties of Leeds & Grenville, 2015).

A few small sections of the property, shown in red hatching in Figure 13, are designated as significant groundwater recharge areas. In these areas, an aquifer is replenished through the infiltration of rainfall and snowmelt. This is one of the four types of vulnerable areas identified in the Ontario Clean Water Act, 2006 (Rideau Valley Conservation Authority, 2019). The entire property, as well as the entirety of the Township of Rideau Lakes, is also considered a “highly vulnerable aquifer”, where the groundwater is vulnerable to surface contaminants due to thin overlying soils and fractured bedrock (United Counties of Leeds & Grenville, 2015, p. Appendix 3).

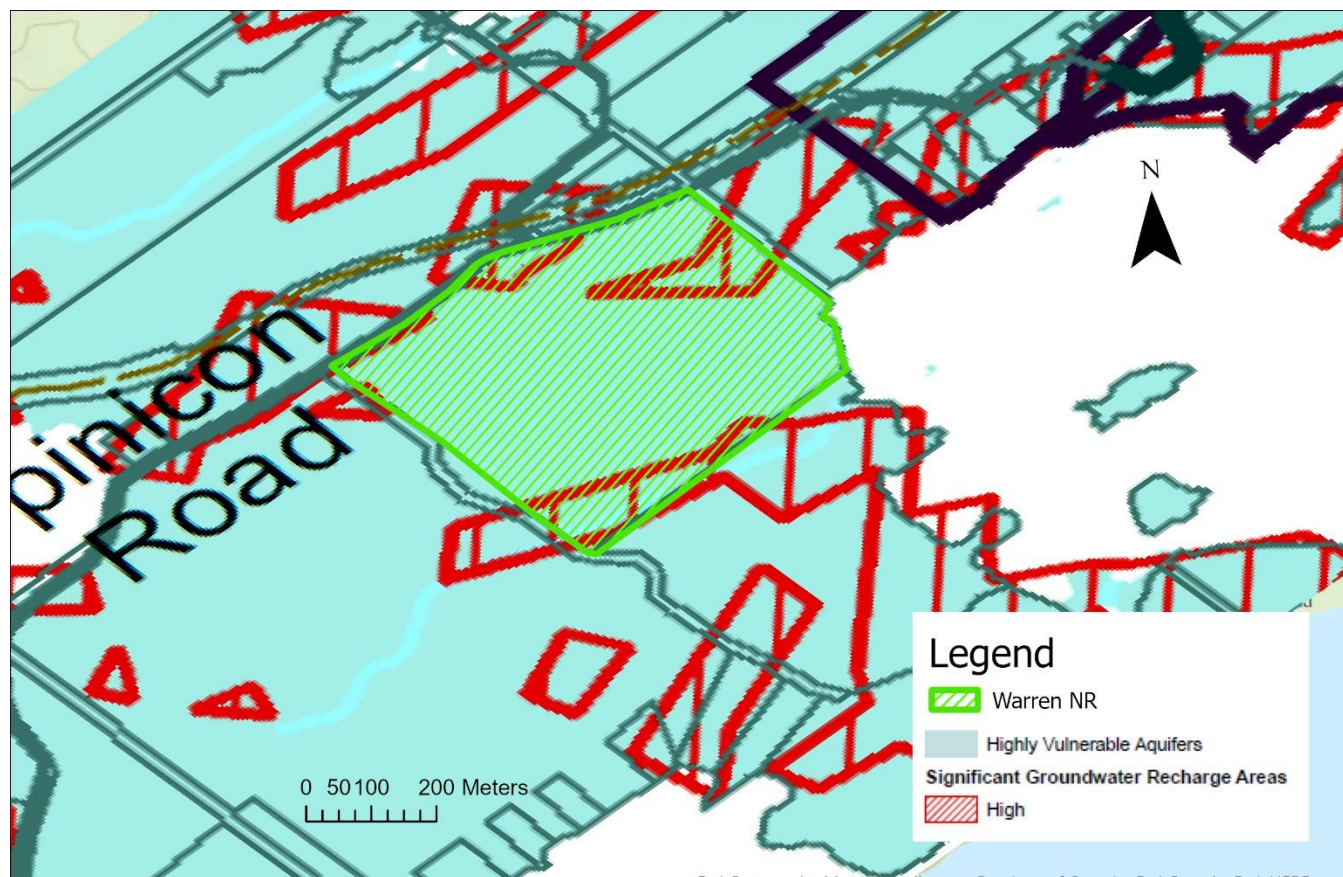


Figure 13: excerpt from Schedule D, Source Water Protection Areas (Township of Rideau Lakes, 2021)

5.4 LANDSCAPE CONTEXT

The majority of the land adjoining Warren NR is zoned Rural and is generally forested and undeveloped. The nearby village of Chaffey's Lock is zoned General Residential, Waterfront Residential, Commercial Tourism, and Open Space. There are also a large number of Environmental Protection – A and – B areas, which correspond to PSWs and ANSIs respectively.

6 CONSERVATION TARGET ANALYSIS

RWLT staff have worked collaboratively to identify conservation targets for Warren NR. Targets include the Forests and Streams/Wetlands of the property. Each of these conservation targets is described below with a particular focus on their ecological significance. General assessment criteria are identified, and a rating is assigned where possible.

6.1 FORESTS

There are several types of forest ecosystems in the Warren Nature Reserve, including:

- Maple swamp – dominated by red and silver maples, and green ash; seasonally wet
- Mixed forest – early successional forest dominated by planted poplars, ironwood, white ash, white birch, basswood and staghorn sumac
- Deciduous forest – most prevalent forest type on the property, dominated by sugar maple, white ash, basswood, white birch, and other hardwood species; ranges from dry to moist along an elevation gradient
- Coniferous plantation – white and red pine planted in the 1970s; poorly managed and overly dense
- Mixed forest swamp – dominated by white cedar with bitternut hickory common on drier hummocks and along margins

6.1.1 Ecosystem Description

Forest is the dominant habitat type on Warren NR, accounting for almost 100% of the land cover on the property. The dominant forest type on the property is primarily deciduous, although there are areas that are dominated by coniferous or mixed forests, especially on the northeastern margin (planted pines) and the southern tip (mixed swamp). Maples, including sugar, red and silver, are the dominant species on the property, with a wide range of other species including ironwood, ashes, basswood, birch, pines, and white cedar making up a good portion of the remaining forest.

6.1.2 Biodiversity

Since its acquisition in early 2021, the Warren NR has been managed as a nature preserve with no public access, and any access in the future is likely to be of limited scope to ensure that the biodiversity of the property is not negatively impacted. Areas of the forest vary widely in age and moisture, resulting in high plant diversity and habitats for a wide range of fauna species.

The forests of Warren NR are home to at least 54 woody tree and shrub species and 137 herbaceous species. The drier interior of the property is primarily dominated by sugar maple, white ash, basswood, and other deciduous hardwoods. Wetter conditions along streams cutting through the property have resulted in a deciduous swamp in the northwestern section, dominated by red and silver maple and green ash, and a mixed swamp in the south primarily dominated by white cedar and bitternut hickory. Planted poplars along Opinicon Road and pine plantations in the northeast section add to the biodiversity, but the planted trees in these areas are aging and being replaced by other species, which may eventually result in them becoming less distinct areas.

The varied forest types also support a wide range of native forbs and ferns, including blue cohosh, wild lily-of-the-valley, false Solomon's seal, white and red trilliums, and bloodroot. Understory plants provide an important food source for white-tailed deer and other forest wildlife. Trail cameras mounted during August 2022 provided ample video evidence of white-tailed deer in the old sand pit.

58 species of birds have been identified on the property, including several area-sensitive forest bird species. Species that nest in interior forest habitats including the hairy woodpecker, pileated woodpecker, black-and-white warbler, scarlet tanager, ovenbird, black-throated green warbler, American redstart, and barred owl (Rideau Valley Conservation Authority, 2000) were all observed or recorded during the summer of 2021, although not necessarily during the breeding season. Other species that prefer to dwell in interior forests were also observed during the 2021 and 2022 surveys, including wood thrush, red-eyed vireo, red-shouldered hawk, broad-winged hawk, and red-bellied woodpecker.

Seven species of frogs and three species of salamanders have been observed at Warren NR, including many that breed in forest vernal pools, such as wood frog, spotted salamander, and blue-spotted salamander.

As well, 10 reptile species (5 turtles and 5 snakes) have been recorded. The snakes in particular spend much of their life in the forest, with gray ratsnakes breeding in forest clearings or edges, climbing trees to feed on bird eggs and hatchlings, and hibernating in rocky outcroppings, and Dekay's brown snake often found under forest floor debris.

Six land mammal species have been recorded on the property, including white-tailed deer, gray squirrel, and chipmunk, all common forest mammals. As well, three potential bat species, big brown bat, hoary bat, and tri-colored bat, were identified after acoustic monitoring. However, these results are based on a small number of recordings and further surveys are necessary to establish presence.

6.1.3 Assessment

Table 6: Target Viability Assessment for Forest Target

Type	Key Attribute	Indicator	Ranking	Notes
Size/Extent	Size/Extent of Characteristic Communities	Area of forest (hectares)	Fair	There are approximately 30 hectares of forest on the Warren NR, some of which connect to the forest on the adjacent property to the north.
	Size/Extent of Characteristic Communities	Area of interior forest (hectares)	Fair	14 hectares of the Warren NR would be considered "interior" habitat, at least 100 m from any edge. Interior habitat is important for some bird species that will not nest in fragmented forests. Large, intact forests reduce nest predation and parasitism that many forest-dwelling bird species are subjected to.
Condition	Indicator Species	Number of forest interior bird species	Good	The presence of forest interior birds, specifically those that are edge-intolerant, is an indicator of quality interior forest habitat. 13 bird species associated with interior forest habitat were located at Warren NR, out of 22 total interior species identified on RWLT properties (Rideau Valley Conservation Authority, 2000; University of Florida; Jones, McCann, & McConville, 2000)
	Indicator Species	Diversity of amphibian species associated with forest habitats	Very Good	There are six amphibian species present on the property that depend on forested habitats for at least part of their life cycle.

Type	Key Attribute	Indicator	Ranking	Notes
	Indicator Species	Diversity of forest understory health indicator plants	Very Good	12 herbaceous plant species present are indicators of a healthy forest understory, including wood ferns, red and white trilliums, bloodroot, blue cohosh, and wild lily-of-the-valley. 23 indicator species have been located on RWLT properties.
	Forest Quality	Percent of trees with disease or damage	Good	12.4% or 13 out of 105 trees assessed showed signs of disease or damage. The highest prevalence of damaged trees was in the area identified as having spongy moth defoliation in 2021.
	Forest Quality	Number of forest layers	Fair	There was an average of four forest layers at forest health points. Very few areas surveyed had significant shrub layers
	Forest Quality	Percent native species	Fair	74.8% or 83 out of 111 “dry” plant species were native to Ontario
Landscape Context	Connectivity with Adjacent Natural Areas	Surrounding landscape	Very Good	Almost the entire adjacent landscape is a fairly undisturbed natural environment. The most significant altered aspects include the village of Chaffey’s Lock and the road system
Overall Ranking			Good	

6.2 WETLANDS/STREAMS

There are several types of wetlands found on Warren NR, including:

- Treed swamps – deciduous swamp dominated by maples in NE corner, mixed swamp in southern corner dominated by white cedar
- Marsh meadow – old sand pit near the eastern boundary has attributes of a marsh meadow
- Lakeshore marsh – fringing march adjacent to the provincially significant Murphy’s Bay wetland/Lake Opinicon

There are also two streams that cut through the property during wetter times of the year.

6.2.1 Ecosystem Description

Wetlands on the Warren NR include deciduous and mixed forest swamps, several ephemeral streams, a flooded sand pit with marsh characteristics, and a marsh fringing the shores of Opinicon Lake. Wetlands on the property are fed by two streams that enter the property along Queen's University Road (Figure 9: Warren NR Hydrology) as well as two springs located on the property.

In the northeast corner of the property, near where Queen's University Road and Opinicon Road meet, is a large deciduous swamp, which has been identified as one of the key features of the property to protect. This area is dominated by red and silver maple as well as green ash and other hardwoods and is seasonally flooded, creating ideal breeding conditions for spotted and blue-spotted salamanders, wood frogs, and other amphibian species. The area also provides critical nesting habitat for some bird species such as northern waterthrush. One of the two streams cuts through this swamp after entering the property via two culverts under Queen's University Road and provides a seasonal connection with Opinicon Lake.

In the southern corner of the property, adjoining Queen's University Road and the neighbouring Curtis property, there is a mixed swamp dominated by White Cedar. This swamp has been less studied but straddles one of the two streams that bisect the property, and often remains flooded longer than other sections of the property. The flow of the stream tapers off in the summer and leaves a series of semi-connected pools of water, divided by higher hummocks of soil.

In the northeast area of the property, near where the pine plantations are located, is an old sand pit that was last used in the 1970s. This area often floods, being fed by rainfall and a nearby spring, and harbours many plant species common to marshes and wet meadows, such as horsetails, yellow-green sedge, spotted joe pye weed, and the invasive purple loosestrife.

The final wetland on the property is a narrow fringing marsh along the shoreline of Opinicon Lake, part of the provincially significant Murphy's Bay Wetland Complex. It is a typical lakefront wetland consisting of cattails, ferns, and sedges. The wetland forms a small strip of emergent vegetation between the open water of the lake and the shoreline forest canopy of maples, elm, and ash. This area provides nesting, foraging, and basking sites for a variety of wildlife including birds, herptiles and mammals.

6.2.2 Biodiversity

The wetlands on the property are varied in type, supporting a wide range of flora and fauna.

The treed swamps on the property are mainly dominated by trees with high wetness coefficients, such as silver maple and green ash in the deciduous swamp and eastern white cedar in the mixed swamp. The sand pit has an open canopy mainly dominated by eastern cottonwood around the margins, and white pines scattered in the middle of the clearing. The fringing marsh has no tree canopy, but nearby trees include maples, ashes, and elm.

These canopies shelter a wide range of wetland plants, with four wetland indicator shrubs (speckled alder, dwarf raspberry, red-osier dogwood, and hairy swamp loosestrife) and 47 wetland indicator herbaceous plants. These wetland plants include a mix of ferns, forbs, sedges, and grasses, including swamp milkweed, blueflag iris, cattails, and spotted jewelweed. Standing and fallen dead trees are abundant and provide habitat for a myriad of fauna.

Many bird species are recorded in the wetlands including both wetland-dependent birds as well as forest interior birds, due to the overlap between habitat types on the property. Species such as the great blue heron, trumpeter

swan, mallard, Virginia rail, swamp sparrow, belted kingfisher, and osprey have all been observed using the Warren NR.

Several reptiles and amphibians found on the Warren NR are also strongly dependent on the presence of the wetlands, including turtles such as the Blanding's, musk, map, snapping, and painted turtles. The presence of northern watersnakes was reported in the Baseline Report, as were bullfrogs, and green frogs (Lougheed, et al., 2021).

6.2.3 Assessment

Table 7: Target Viability Assessment for Wetland Target

Type	Key Attribute	Indicator	Ranking	Notes
Size/Extent	Size/extent of characteristic communities	Size/extent of wetlands relative to historical size	Unknown	
Condition	Indicator Species	Number of wetland indicator plant species	Good	47 herbaceous plants are considered to be wetland indicator species, out of a total of 103 found on RWLT properties
	Species Composition	Percent native plant species	Good	97% (75 out of 77) of species on Warren NR preferring wet areas are native to Ontario
Landscape Context	Connectivity with Adjacent Natural Areas	Landscape Context	Very Good	The majority of the surrounding landscape, except for the nearby village of Chaffey's Lock, is fairly undisturbed natural area. Much of it is protected for research and conservation by Queen's University and various local conservation organizations
	Connectivity with Adjacent Natural Areas	Proximity to other wetlands	Very Good	The stream that cuts diagonally across the property, as well as the stream and associated wetlands in the southern corner of the property, is connected seasonally with Opinicon Lake. There are varied types of wetlands intermixed into the forests of Warren NR
Overall Ranking			Very Good	

7 THREATS

7.1 INVASIVE NON-NATIVE/ PLANTS AND ANIMALS – HIGH

Invasive species are a key issue identified in the Baseline Report:

“A number of invasive species have been noted on the Warren Property. Gypsy Moths are currently in outbreak and are defoliating certain areas. This is a cyclic problem and will subside in due course.

The major species to contend with is Dog-strangling Vine (DSV, *Cynanchum rossicum*). A couple of sizeable patches of DSV are present near the sand pit and red pine plantation. This plant is in the milkweed family and is a threat to the Monarch butterfly, which lays its eggs on the vine but cannot complete its development. Grazers avoid DSV which might be toxic when ingested. An effort to control DSV should be considered in ongoing management planning.” (Lougheed, et al., 2021)

There are currently 33 non-native species identified on Warren NR:

- One bird (mute swan)
- One invertebrate (spongy moth)
- 26 herbaceous plants (including five Category 1 and three Category 2 species)
- Five trees or shrubs (including two Category 1 and one Category 2 species)

7.2 GARBAGE AND SOLID WASTE – MEDIUM

A cultural impact that has historically been a threat to the property is the dumping of garbage and other solid waste on the property. Because of the sand pit’s proximity to the Warren homestead, it ended up being used as a dumping area for many different items including an old trailer, sheets of corrugated metal, and other castoff items. There is also evidence that refuse has been burned in this location in the past. Most of this material should be removed, although the metal sheets may be providing habitat for animals and should be left as is.

Another area of concern is the site of the derelict cabin that was removed in 2021. Care should be taken to make sure that any hazardous materials that may pose a risk to animal or human health have been fully removed, including broken glass and old appliances. Nearby there is also an old car that has had all useful parts removed. As the engine, transmission and gas tank are all gone, there is likely little impact on the environment, and it could probably be left where it is as a point of interest and as a shelter for animals.

7.3 HYDRO CORRIDOR – LOW

A small hydro right-of-way cuts diagonally across the southeastern portion of the property, and another short span of wires cuts across the northernmost corner of the property at the curve of Opinicon Road. In both areas, Hydro One manages the growth of woody vegetation, leading to an old-field type of community.

7.4 TRAILS/ROADS – LOW TO MEDIUM

When the property was being actively farmed, there was likely a network of lanes/roadways providing access to different areas. The remains of this road system can be seen in an old culvert that the main stream goes through just before entering Opinicon Lake, and in overgrown trails throughout the property. In 1980, a Plantation Walking Trail was established and maintained by the Township of Rideau Lakes for public use, but little interest and use led to it being abandoned by 1998.

After the acquisition in 2021, there were some inquiries by donors about whether there would be public access. This has been discussed by the RWLT board and faculty at Queen's University preliminarily, and any decision was deferred to after the Baseline Report and Property Management Plan were finalized. Specific recommendations to avoid any trails or impact on the deciduous swamp in the northeast corner and to refrain from altering the course of the stream in any way were made in the Baseline Report (Lougheed, et al., 2021). These areas are key to the breeding of amphibians on the property and the stream provides a key link between the swamp and Opinicon Lake. Beyond these areas, there is a potential for limited access, possibly via guided hikes or education programs. Owing to the sensitive nature of the property, it would be challenging to develop supporting infrastructure, such as parking, for larger scale use of the property.

7.5 HUNTING – UNKNOWN/LOW

Historically, there has been a low level of hunting of deer and waterfowl on the property by past owners. As the previous owner aged, this diminished and there is currently no sanctioned hunting on the property. There has also been poaching documented on the property by the Warren family, with the venison being sold illegally (Lougheed, et al., 2021). There have been no observations of hunting since its acquisition by RWLT in 2021, but it should be carefully monitored to ensure that poaching does not become a problem in the future. Signage marking the boundaries of the property, and denoting the status as a Nature Reserve, has been erected on the property. If necessary, no hunting signs will be added.

7.6 CLIMATE CHANGE - HIGH

Upon completion of the Climate Change Vulnerability Assessment, climate change is likely to compound existing threats and put new stresses on the conservation targets.

Threats related to invasive non-native species, pests, and diseases may be compounded by an increase in extreme weather events. Extreme weather can cause an increase in habitat disturbance, particularly in treed habitats. Changes in precipitation patterns may lead to heat stress changing habitat structure and composition. Ultimately, these two factors may put significant stress on the conservation targets and create suitable conditions for non-native species to move in.

Climate change may also create new threats that currently do not exist or have very minimal impacts on the conservation targets. Projected changes in temperature and precipitation show an increase in precipitation in the winter, spring, and fall as well as a significant increase in temperature over these periods. This increase in precipitation and temperature will result in more liquid precipitation year-round and potentially less snow cover. Increases in powerful floods may also increase disturbance, creating opportunities for non-native species to invade.

General anticipated changes resulting from climate change also include species migration and changes in species ranges. The changes in temperature and precipitation patterns will affect the species that can thrive on the property under future climate scenarios. It is an important consideration for any restoration work that may take place on the property to ensure that activities are sustainable under current and future climate projections.

8 MANAGEMENT GOAL, OBJECTIVES AND ACTIONS

8.1 MANAGEMENT GOAL

RWLT intends to maintain the ecological integrity of Warren NR. This nature reserve has extensive significant woodland. It is our goal to ensure its persistence as well as the species it supports into the future.

It is RWLT's goal to maintain the ecological integrity of the property with the following objectives:

1. Keep invasive species populations from spreading beyond 2022 limits and reduce coverage where possible.
2. Perform targeted monitoring for Species at Risk on the property, including bats, birds, and herptiles.
3. Remove solid waste dumped or abandoned in the past and prohibit future dumping on the property.
4. Explore opportunities for scientific research using non-destructive techniques and respecting ecologically sensitive areas.

8.2 STEWARDSHIP ACTIONS

The following was compiled based on the Conservation Actions Classification (V2.0) created by the Conservation Management Practices (IUCN, 2012).

Table 8: Planned Stewardship Actions

Action Category	Description	Target(s)	Threat(s)	
A. Target Restoration/Stress Reduction Actions				
Land/Water Management	Monitor property boundaries for evidence of trespass, threats, risks and liabilities	All	All	i) Annual monitoring visits to check property. This includes monitoring the property boundary, changes to the land, evidence of trespass, threats, SAR, and invasive species. ii) Monitoring form is completed and data is stored in a database. Any issues and threats are addressed.
	Monitor property for undocumented anthropogenic features	All	All	i) Annual monitoring visits to check the property for features including trails, cabins, hunting blinds. ii) Monitoring form is completed and data is stored in a database.

Action Category	Description	Target(s)	Threat(s)	
				Features are known and removed/addressed.
	Monitor property for invasive species	All	Invasive species	i) Inventory property to document location and extent of invasive species on the property and develop an action plan. ii) Action plan will mitigate impacts of invasive species. Scope and severity of threat are better understood.
Species	Maintain current species list for the property	All	All	Annual monitoring visits to document incidental SAR, birds, reptiles, and amphibians. Species list is updated. Database is updated with new observations. SAR/tracked species are reported to NHIC.
Species	Breeding Bird Surveys	Forest	All	Undertake approved breeding bird survey and/or targeted SAR bird survey. Sites established for personnel to undertake BBS and Nightjar surveys. Database updated with new records. SAR/tracked species reported to NHIC. Data will help inform management plans, stewardship actions, priorities.
Species	Amphibian Surveys	All	All	Undertake approved amphibian survey and targeted Western Chorus Frog Survey. Sites established for amphibian monitoring. Database updated with new records. SAR/tracked species reported to NHIC. Data will help inform management plans, stewardship actions, priorities.
Awareness Raising	Maintain signage on the property boundaries	All	All	Annual monitoring to check that signs are in good condition and reflect permitted uses on the property.

Action Category	Description	Target(s)	Threat(s)	
				Signs installed/maintained. Trespassing minimized.
Law & Policy	Connect with Indigenous communities	All	All	Meet with local Indigenous communities to discuss the property and community interests. Relationship established and traditional knowledge incorporated into property stewardship.
Research & Monitoring	Identify vegetation communities	All	All	ELC data updated to inform stewardship.
Research & monitoring	Address climate change threats	All	Climate Change	Assess vegetation type and size of buffers around wetlands/watercourses on the property. Understand buffer contributions to water filtration and shade. Inform stewardship to increase buffers and shade.
Research & Monitoring	Monitor vernal pools	Forest	Climate Change	Undertake vernal pool monitoring protocol in forest habitat (amphibian diversity/abundance, hydrological characteristics). Improve understanding of impacts of climate change on vernal pools and amphibians.
Research & Monitoring	Support research and education initiatives by QUBS	All	All	Work collaboratively with researchers at QUBS to further ecological research goals Provide an outdoor learning experience to students and members of the public
Education and Training	Train staff	All	All	Provide personnel with specific knowledge and skills in species ID and survey protocols.

Action Category	Description	Target(s)	Threat(s)	
				Personnel are trained and better able to undertake actions.
Institutional Development	Secure funding for permanent and seasonal staff	All	All	Identify funding sources and positions. Funding secured, increase capacity.
Institutional Development	Establish volunteer community	All	All	Volunteers are trained to undertake annual monitoring and where relevant additional targeted surveys. RWLT grows current volunteer pool and increases engagement with those volunteers.
Institutional Development	Establish alliances/partnerships	All	All	Partnerships are formed with organizations with shared priorities. Coordinated conservation – data is shared.
Institutional Development	Secure financial support for conservation activities	All	All	Funding sources identified and applied for where appropriate. Secured funds support stewardship actions.

8.3 STEWARDSHIP COST SUMMARY

Table 9: Cost breakdown to implement management actions

For a full stewardship budget breakdown, see Appendix D: Stewardship Budget. All prices are based on 2021-22 unit costs.

Action	Cost	Frequency
Property taxes and insurance <ul style="list-style-type: none"> Register property under CLTIP CCL Maintain insurance policy Liaise with MNDMNR, MPAC, Loyalist Township 	Insurance Cost: \$510 Property Taxes: \$0 Staff Time: \$110 Total = \$620	Annually
Signage Replacement <ul style="list-style-type: none"> Identification Sign No Trespassing Signage *Estimated lifespan of signs = 10 years	Cost of Signage: \$600 Labourer Time: \$210 Travel: \$50 Total = \$860	2032, Every 10 years
Signpost Replacement *Estimated lifespan of posts = 20 years	Cost of Materials: \$260 Labourer Time: \$420 Travel: With other trip Total = \$680	2042, Every 20 years
Annual Monitoring: <ul style="list-style-type: none"> Conduct annual monitoring visit and complete form Where appropriate, this visit can also include the following: <ul style="list-style-type: none"> Invasive species inventory Record incidental SAR Record all species encountered Trail monitoring 	Biologist Time: \$380 Assistant Time: \$210 Travel: \$50 Total = \$640	Annually

Action	Cost	Frequency
<ul style="list-style-type: none"> Update database with new information 		
Bi-Annual Monitoring (in addition to annual monitoring) <ul style="list-style-type: none"> Breeding Bird Surveys Amphibian Surveys Vernal Pool Surveys 	Biologist Time: \$270 Assistant Time: \$150 Travel: \$50 Total = \$470	Every 2 years
Planning and Database Update <ul style="list-style-type: none"> Plan monitoring visits Write reports Report SAR to NHIC Update species database 	Biologist Time: \$760 Total = \$760	Annually
Yearly maintenance May include the following as needed: <ul style="list-style-type: none"> Removal of invasive species Removal of unauthorized construction 	Biologist Time: \$270 Labourer Time: \$150 Travel: \$50 Total: \$470	Annually, as needed
Partner Liaison <ul style="list-style-type: none"> Maintain partnerships with CRCA, neighbours, QUBS, Township of Rideau Lakes 	Staff Time: \$220 Total = \$220	Annually
Plan Update <ul style="list-style-type: none"> 2 site visits in addition to annual monitoring (to see the property in 3 seasons) Estimated 5 days of revising PMP and getting approved 	Biologist Time: \$2,650 Assistant Time: \$420 Travel: \$100 Total = \$3,170	2027, Every 5 years

9 MANAGEMENT PLAN REVIEW

Every 5 years – starting June 2027.

10 REFERENCES

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11 APPENDICES

11.1 APPENDIX A: SPECIES LIST (TO DATE) – CONFIDENTIAL

11.2 APPENDIX B: MONITORING REPORT TEMPLATE

Property Monitoring Report Form

Please complete this form and include any supporting illustrations, maps or photos in the appropriate section.
Please email the completed form to lands@rwlt.org or give directly to RWLT Ecologist.

Community Land or Conservation Land (circle one)			
Property:		Date of Visit:	
Name(s) of Monitor(s):		Contact Information:	
Report Completed By:			
Date of Last Monitoring Visit:			
Management Plan Reviewed:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Follow-up Required?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
If yes, please describe:			
Management Action Taken:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
If yes, please describe:			

I - Hazards			
Bears	<input type="checkbox"/>	Tree Snags	<input type="checkbox"/>
Poison Ivy	<input type="checkbox"/>	Other	<input type="checkbox"/>
Describe:			

II - Existing Structures (buildings, signs, footbridges, fences, etc.)							
Structure	Location	Condition	Comments				

III - Recreational Uses (Please check off those activities observed and whether they are either allowed (A) or prohibited (P)).								
	A	P		A	P		A	P
Formal Trails	<input type="checkbox"/>	<input type="checkbox"/>	Picnicking	<input type="checkbox"/>	<input type="checkbox"/>	Skating	<input type="checkbox"/>	<input type="checkbox"/>
Informal Trails	<input type="checkbox"/>	<input type="checkbox"/>	Swimming	<input type="checkbox"/>	<input type="checkbox"/>	Snowmobiling	<input type="checkbox"/>	<input type="checkbox"/>
Hiking	<input type="checkbox"/>	<input type="checkbox"/>	Camping	<input type="checkbox"/>	<input type="checkbox"/>	Snowshoeing	<input type="checkbox"/>	<input type="checkbox"/>
Berry Picking	<input type="checkbox"/>	<input type="checkbox"/>	Boating	<input type="checkbox"/>	<input type="checkbox"/>	Trapping	<input type="checkbox"/>	<input type="checkbox"/>
Nature Appreciation	<input type="checkbox"/>	<input type="checkbox"/>	Cycling	<input type="checkbox"/>	<input type="checkbox"/>	Dog walking	<input type="checkbox"/>	<input type="checkbox"/>
Bird Watching	<input type="checkbox"/>	<input type="checkbox"/>	Rock Climbing	<input type="checkbox"/>	<input type="checkbox"/>	Equestrian use	<input type="checkbox"/>	<input type="checkbox"/>
Photography	<input type="checkbox"/>	<input type="checkbox"/>	X-country Skiing	<input type="checkbox"/>	<input type="checkbox"/>	Angling	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>	Bus tours	<input type="checkbox"/>	<input type="checkbox"/>	Motorized vehicles	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>						
Describe:								

IV - Natural Heritage Values
a) Wildlife Observations (mammals, amphibians, reptiles, fish, birds, other):

b) Vegetation (trees, shrubs, plants):

c) Habitat Features (examples: snags/cavity trees, fallen trees, conifer thickets, brush piles, waterfowl nesting, waterfowl feeding, dens, nests, wildlife trails, etc.):

V - Disturbances

a) Natural

Beaver Dams	<input type="checkbox"/>	Erosion	<input type="checkbox"/>	Fire	<input type="checkbox"/>
Flooding	<input type="checkbox"/>	Heavy deer browsing	<input type="checkbox"/>	Siltation	<input type="checkbox"/>
Wind falls	<input type="checkbox"/>	Invasive species	<input type="checkbox"/>	Other	<input type="checkbox"/>

Describe:

b) Human

Camping	<input type="checkbox"/>	Pesticides	<input type="checkbox"/>	Road widening	<input type="checkbox"/>
Channelization of Streams	<input type="checkbox"/>	Horseback riding	<input type="checkbox"/>	Shoreline alteration	<input type="checkbox"/>
Clearing of municipal drains	<input type="checkbox"/>	Motorized vehicles	<input type="checkbox"/>	Stray animals	<input type="checkbox"/>
Ditching	<input type="checkbox"/>	Mountain bikes	<input type="checkbox"/>	Trampling	<input type="checkbox"/>
Dumping	<input type="checkbox"/>	Pets	<input type="checkbox"/>	Trapping	<input type="checkbox"/>
Feeding wildlife	<input type="checkbox"/>	Plant harvesting	<input type="checkbox"/>	Trespass	<input type="checkbox"/>
Fires	<input type="checkbox"/>	Poaching	<input type="checkbox"/>	Unauthorized construction	<input type="checkbox"/>
Urban runoff	<input type="checkbox"/>	Utility corridors	<input type="checkbox"/>	Vandalism	<input type="checkbox"/>
Other	<input type="checkbox"/>				

Describe:

VI - Contact with Neighbours or Visitors (briefly describe your conversation, provides names if possible):

VII - Notes/Comments:

VIII – Maps, Illustrations, Photographs

11.3 APPENDIX C: CONTACT INFORMATION FOR KEY LOCAL PARTNERS - CONFIDENTIAL

11.4 APPENDIX D: STEWARDSHIP BUDGET

N.B. All dollar values are based on 2021 costs

NECESSARY STEWARDSHIP ITEMS		SUBTOTAL	ENDOWMENT	EXPLANATION
OWNERSHIP			Funds Needed	
	Taxes	0.00	0	Fully covered by CLTIP
	Liability Insurance – total RWLT	4,000.00		
	Acres, RWLT	1,174		
	Average cost per acre	3.41		
	Factor due to public use	2		
	Cost per acre, Warren NR	6.81		
	Acres, Warren NR	74.43		
	Annual Insurance Cost, Warren NR	510.00	12,750	
	Follow up with MNRF/MPAC/Municipality regarding CLTIP	110	2,750	
	Administrator Hours	2		
	Administrator Wage	54		
SIGNAGE		860.00	1,791	
	Replacement period	10		
	Cost of signs	600.00		
	Labourer hours	7		
	Labourer hourly rate	30.00		
	Sub-total, labourer	210.00		
	Travel – number of trips	1		
	Travel – km's per trip	100		

	Travel – rate per kilometre	0.50		
	Sub-total, travel	50.00		
SIGNAGE POSTS			680.00	571
	Replacement period	20		
	Materials	260.00		
	Labourer hours	14		
	Labourer hourly rate	30.00		
	Sub-total, labourer	420.00		
	Travel – number of trips		With other trip	
	Travel – km's per trip	100		
	Travel – rate per kilometre	0.50		
	Sub-total, travel			
MONITORING				
	Annual Property Monitoring		640.00	16,000 Trespassing, invasives, incidental species observations,
	Biologist hours	7		
	Biologist hourly rate	54.00		
	Sub-total, biologist	380.00		
	Labourer hours	7		
	Labourer hourly rate	30.00		
	Sub-total, labourer	210.00		
	Travel – number of trips	1		
	Travel – km's per trip	100		
	Travel – rate per kilometre	0.50		
	Sub-total, travel	50.00		

	Biannual Ecological Monitoring	470.00	5,760	Breeding birds, amphibians,
	Frequency, # of years	2		
	Biologist hours	5		
	Biologist hourly rate	54.00		
	Sub-total, biologist	270.00		
	Labourer hours	5		
	Labourer hourly rate	30.00		
	Sub-total, labourer	150.00		
	Travel – number of trips	1		
	Travel – km's per trip	100		
	Travel – rate per kilometre	0.50		
	Sub-total, travel	50.00		
	Planning and Database Update	760.00	9,314	Plan visit, write reports, update database
	Biologist hours	14		
	Biologist hourly rate	54.00		
	Sub-total, biologist	760.00		
MAINTENANCE				
	Yearly Maintenance	470.00	11,750	invasive species removal, restoration projects
	Biologist hours	5		
	Biologist hourly rate	54.00		
	Sub-total, biologist	270.00		
	Labourer hours	5		
	Labourer hourly rate	30.00		
	Sub-total, labourer	150.00		
	Travel – number of trips	1		

	Travel – km's per trip	100		
	Travel – rate per kilometre	0.50		
	Sub-total, travel	50.00		
	Volunteer recruit/direct			
	Plan Update	3,170.00	14,632	
	Frequency, # of years	5		
	Biologist hours	49		
	Biologist hourly rate	54.00		
	Sub-total, biologist	2,650.00		
	Labourer hours	14		
	Labourer hourly rate	30.00		
	Sub-total, labourer	420.00		
	Travel – number of trips	2		2 extra visits in addition to annual monitoring, to visit in all 3 seasons
	Travel – km's per trip	100		
	Travel – rate per kilometre	0.50		
	Sub-total, travel	100.00		
	Partner Liaison	220.00	5,500	CRCA, QUBS, Township of Rideau Lakes
	Biologist hours	4		
	Biologist hourly rate	54.00		
	Sub-total, biologist	220.00		
		Total	80,817	
		Endowment		
		Fund Needs		

11.5 APPENDIX E: RESTRICTIONS UPON USE OR DISPOSITION OF WARREN NR

11.5.1 CLTIP

The Conservation Land Tax Incentive Program offers a 100% rebate on property taxes on eligible properties in exchange for a long-term commitment to steward them as conservation lands. Only uses deemed compatible with the natural heritage and biodiversity objectives are allowed on properties enrolled in CLTIP. This includes but is not limited to:

- low-impact recreational activities such as hiking, skiing, hunting, fishing, and wildlife viewing,
- routine land-use activities such as invasive species management, prescribed burns, trail maintenance, tree removal for safety or forest health purposes, and planting of native species.

Other land-use activities may be permitted if approval from MNDMNRF program staff is solicited, including:

- culling non-native tree species
- sustainable fuelwood removal for personal use only
- planned trail development or upgrading.

Land uses such as:

- building structures
- landscaping/grooming areas or farming
- use of motorized vehicles (off-trail)
- sale of forest products (timber and non-timber products)
- alteration of ecosystems by draining, dredging, filling, grading, or extracting aggregate

are incompatible with objectives under CLTIP and will likely result in the portions of the property affected becoming ineligible for tax exemption.