Schedule 'C' Municipal Class Environmental Assessment for Merritt Road (Regional Road 37) and Rice Road (Regional Road 54) in the Town of Pelham, the City of Thorold and the City of Welland

APPENDIX

E Environmental Impact Study

If technical reports are required in an alternative format for accessibility needs, please contact:

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NIAGARA REGION

ENVIRONMENTAL IMPACT STUDY FOR THE SCHEDULE C MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT FOR MERRITT ROAD AND RICE ROAD

IM20103036

FEBRUARY 16, 2024

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1 INTRODUCTION

WSP E&I Canada Limited (formerly Wood E&I) has been retained to undertake a Schedule C Municipal Class Environmental Assessment (MCEA) and Detailed Transportation Assessment for Regional Road 37 (Merritt Road) and Regional Road 54 (Rice Road) in the Town of Pelham, City of Thorold, and City of Welland. Situated within the Town of Pelham and the City of Thorold, Merritt Road is a discontinuous east/west roadway. Regional Road 54 (Rice Road) is a continuous north/south roadway located within the Town of Pelham and the City of Welland.

Through various plans and studies, the need for additional east/west transportation capacity has been identified. Merritt Road's extension between Rice Road and Cataract Road and improvements to Merritt Road between Cataract Road and Regional Road 50 (Merrittville Highway)/Niagara Street have been identified and recommended to address the need for additional east/west transportation capacity. The purpose of this MCEA is to address the need for additional east/west transportation capacity and connectivity of the active transportation network through the extension and improvement of Merritt Road and the improvement of Rice Road. To help organize this project, the areas requiring improvement have been divided into four Segments (Figure 1-1).

WSP identified that the Study Area contains terrestrial systems, including woodlots fragmented by the existing Merritt Road and the contiguous Niagara Street – Cataract Road Woodlot Wetland Complex, which will be bisected by an extension of Merritt Road between Rice Road and Cataract Road. Additionally, WSP noted that the project area is adjacent to delineated Environmental Conservation Areas and Potential Natural Heritage Corridors identified within the Region's Core Natural Heritage Maps. As the proposed development is within, and adjacent to, natural heritage features defined by provincial, regional, and local policies and regulations, a dedicated natural heritage study was proposed. The purpose of this document is to objectively assess the environmental impacts of the proposed preferred alternative design.

This report also provides a summary of the provincial, regional, and local plans, policies, regulations, and acts applicable to the area. The report summarizes the transportation master plan and other studies which discuss the need for east/west transportation capacity as well as highlight alternatives considered. Based on the preferred alternative design selected by the Region recommended monitoring, mitigation, and enhancement measures are also discussed.

1.1 DESCRIPTION OF THE TERRESTRIAL STUDY AREA

The Study Area for the EA is irregular in shape (Figure 1-1) and from Rice Road to Kottmeier Road (on the east side of Highway 406). Approximately 120 m north of Port Robinson Road is the northern boundary and the southern boundary is largely Quaker Road until it turns northward at Merritville Hwy and follows approximately 120 m south of Road Rection 3. This EA Study Area was used when considering secondary and background sources. Fieldwork was completed in a Terrestrial Study Area and aquatic habitat assessments were completed where accessible (Section 4.2). The Terrestrial Study Area follows approximately 120 m from the proposed center line of the road improvements but is restricted to the boundaries formed by the EA Study Area (Figure 1-2).

The Study Area is within ecoregion 7E and is comprised of natural forests, agriculture, low-density residential, newly developed high-density residential, and rural roads and area highways. The project is divided into four different sections to align with the various types of proposed improvements, collectively referred to as the Project Location. The four sections are:

Segment 1: Merritt Road between Rice Road and Cataract Road spans an approximate distance of 800 m with an approximate right-of-way width of 20 m. This corridor presently functions as an unopened road allowance with low-voltage hydroelectric power on timber poles traversing the length of the corridor towards the north side. Adjacent land is predominately swamp and it a part of the Niagara Street - Cataract Road Woodlot Wetland Complex. Some motorized vehicle use occurs as well as current and historical agricultural use. One old cement culvert was found in this unopened road allowance.

Segment 2: Merritt Road between Cataract Road and Regional Road 50 (Merrittville Highway)/Niagara Street spans an approximate distance of 800 m with an approximate right-of-way width of 20 m. This corridor presently functions as a two-lane, rural, local, undivided roadway with ditches for drainage. Adjacent land use is a mix of residential on the north side and swamp on both the north and south sides as a part of the Niagara Street - Cataract Road Woodlot Wetland Complex.

Segment 3: Merritt Road between Regional Road 50 (Merrittville Highway)/Niagara Street and Highway 406 spans an approximate distance of 1.80 km with an approximate right-of-way width of 30 m. This corridor presently functions as a two-

lane, rural, arterial, undivided roadway with ditches for drainage. Adjacent land use to the north is agriculture and retained natural area. To the south, high-density residential is under development/newly developed; the residential development fragmented the natural area. The residential development is called Merritt Meadows subdivision and is given access via Eastman Gateway and Grisdale Road. The natural areas along this section are a part of the Niagara Street - Cataract Road Woodlot Wetland Complex.

Segment 4: Rice Road, between the unopened road allowance/Merritt Road and Quaker Road, spans an approximate distance of 1.20 km with an approximate right-of-way width of 20 m. This corridor presently functions as a two-lane, rural, collector, undivided roadway with ditches for drainage. Adjacent land use is predominantly residential and agricultural. To the west is a continuation of the Niagara Street - Cataract Road Woodlot Wetland Complex and two other natural areas, Kunda Park Forest, and Rose Little Woodlot. Approximately 200 m north of Merritt Road, Rice Road transitions from the cross-section mentioned above to a recently reconstructed two-lane, rural, collector, undivided roadway with paved shoulders during a previous capital works project undertaken by Niagara Region.

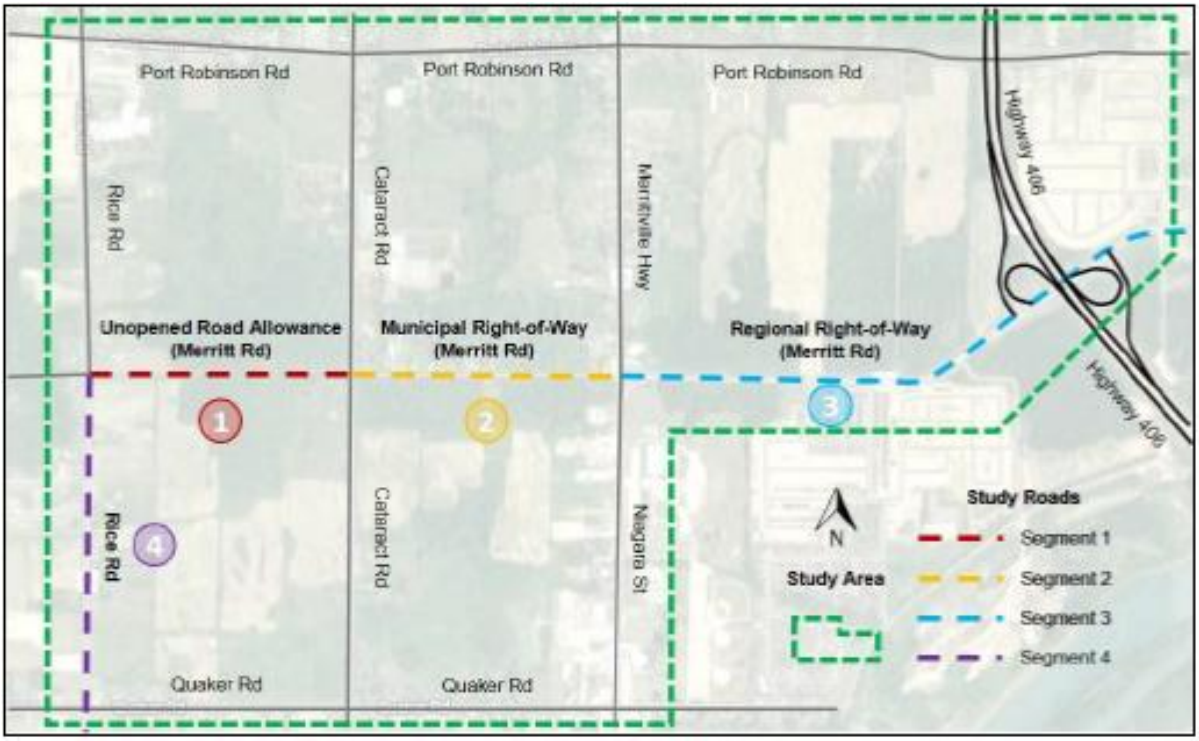


Figure 1-1: Environmental Assessment Study Area

640000 641000 642000 643000 644000 645000

4767000 4766000 4765000

PORT ROBINSON RD
PORT ROBINSON RD
RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY
HWY 406
Kottmeier Road
PELHAM ST
MERRITT RD
HWY 406
CITY OF THOROLD
CITY OF WELLAND
WELLAND CANAL
WELLAND RIVER
TOWN OF PELHAM
CITY OF WELLAND
QUAKER RD
QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure1-2_Terrestrial_Study_Area.mxd

LEGEND

- Terrestrial Study Area
- Municipal Boundaries
- Waterbody
- Watercourse
- Direction of Flow

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd

NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

0 1.25 2.5 Kilometres

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Terrestrial Study Area

PROJECT N°: IM20103036 | FIGURE: 1-2

SCALE: 1:14,000 | DATE: December 2022

1.2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

Generally, the proposed development includes the below and is illustrated in Figure 1-3.

Segment 1 unopened road allowance has been identified for a new road to be constructed connecting Merritt Road between Regional Road 54 (Rice Road) and Cataract Road to address projected growth within the 2017 to 2021 planning horizon within Niagara Region's Transportation Master Plan (TMP). Other studies have demonstrated the need to extend Merritt Road through the unopened road allowance in order to provide adequate transportation capacity given the anticipated growth. Prior to the opening of the road allowance, transfer of ownership in whole to Niagara Region shall be completed. Niagara Region is committed to implementing the overall goals of the TMP as part of its transportation capital projects; therefore, consideration for the implementation of suitable active transportation facilities (i.e., paved shoulders, buffered paved shoulder, bicycle lanes, multi-use pathways, etc.) shall be given.

Segment 2 of Merritt Road needs to be examined and recommendations made as to the required improvements needed to address projected growth and the connectivity to the east and ultimately, Highway 406. Within Niagara Region's TMP, this section of Merritt Road has been identified as being part of Niagara Region's active transportation network. Given the lack of cycling infrastructure along this section of Merritt Road, it has been identified as an infill link requiring consideration for the implementation of suitable active transportation facilities (i.e., paved shoulders, buffered paved shoulder, bicycle lanes, multi-use pathways, etc.).

Segment 3 of Merritt Road was identified for capacity improvements to address projected growth within the 2017 to 2021 planning horizon within Niagara Region's TMP. This section has been identified as being part of Niagara Region's active transportation network. Given the lack of cycling infrastructure along this section of Merritt Road, it has been identified as an infill link requiring consideration for the implementation of suitable active transportation facilities (i.e., paved shoulders, buffered paved shoulder, bicycle lanes, multi-use pathways, etc.).

Segment 4 (Rice Road) was identified for capacity improvements to address projected growth within the 2017 to 2021 planning horizon within Niagara Region's TMP. Rice Road has been identified as being part of Niagara Region's active transportation network. It has been identified as having cycling infrastructure along this section and it will require consideration for the reimplementation of suitable active transportation facilities (i.e., paved shoulders, buffered paved shoulder, bicycle lanes, multi-use pathways, etc.) within the preferred alternative solution and design.

641000
642000
643000
4766000
4765000

RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY
MERRITT RD
TOWN OF PELHAM
CITY OF WELLAND
CITY OF THOROLD
CITY OF WELLAND
QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure1-3_ProposedDevelopment.mxd

LEGEND

Municipal Boundaries

Merritt Road Alignment Plan (2023)

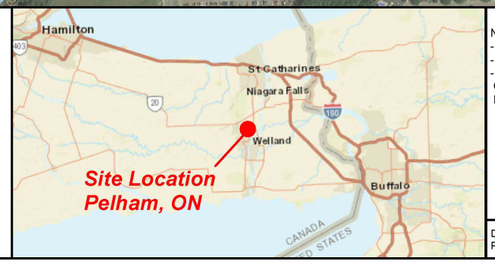
Road Segments

1: Unopened Road Allowance (Merritt Rd)

2: Merritt Rd

3: Merritt Rd

4: Rice Rd



NOTES:
- Imagery from Google, 2018
- Location of features is approximate
- ENtire map extent is with the Growth Plan for the Greater Golden Horseshoe

Datum: NAD83
Projection: UTM Zone 17N

0 0.75 1.5 Kilometres

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Proposed Development

PROJECT N°: IM20103036 | FIGURE: 1-3

SCALE: 1:8,000 | DATE: March 2023

2 REGULATORY AND POLICY CONTEXT

The following sections summarize the various federal, provincial, and municipal planning policies and regulations related to natural heritage and species that may apply to the Project. Provincial EAs must consider Species at Risk (SAR) as well as any other wildlife deemed locally significant. This may include species considered by the proponent, the public, Indigenous communities, the scientific community, and government agencies to have ecological, aesthetic, recreational, economic, and cultural importance.

2.1 FEDERAL LEGISLATIVE REQUIREMENTS

2.1.1 SPECIES AT RISK ACT

The Canadian *Species at Risk Act* (SARA; S.C. 2002, c. 29) was passed into law in 2002 and was last amended on 3 February 2022. The purpose of the SARA is to prevent wildlife species in Canada from disappearing, to provide for the recovery of wildlife species, and to manage species to prevent further risk to their status. SARA provides legal protection to SAR listed in Schedule 1 if they have a designation of Extirpated, Endangered, or Threatened with respect to harming the species (Section 32 of SARA) or its residence (Section 33 of SARA). The SARA applies to federal lands (e.g., Canada's oceans and waterways, national parks, military training areas, national wildlife areas, some migratory bird sanctuaries, and First Nations reserve lands) and outside of federal lands to the following:

- Migratory birds (i.e., those species listed under Article I of the Migratory Birds Convention Act (MBCA), 1994) that also fall under Schedule 1 of the SARA. This does not include the species' critical habitat; however, it does include residences of migratory birds which have residence descriptions (i.e., Barn Swallow); and
- Aquatic species that fall under Schedule 1 of the SARA.

SAR with these federal designations require recovery strategies or conservation action plans that identify their critical habitat for mandatory prohibition from damage or destruction (Section 58 of SARA). Species listed as Special Concern in Schedule 1 are not legally protected under SARA but require a management plan. Species listed in Schedule 2 or 3 of SARA are not legally protected under SARA. Still, they require status assessment through the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to determine conservation status and priority for recovery and action planning pursuant to Section 27 of SARA. Notably, SARA prohibitions can be applied if provincial legislation or voluntary measures do not adequately protect federally listed species and their residence. Generally, compliance with provincial legislation in Ontario does satisfy the requirements under the SARA.

Applicability to the Project

The Project Location is not located within federal lands. Therefore, the SARA only applies if migratory birds that fall under Schedule 1, migratory birds which have residence descriptions, and aquatic species that fall under Schedule 1 are found in the Study Area. The SARA applies to this Project concerning federally listed migratory birds that may occur. Watercourses that were considered aquatic habitat were found in the Study Area. One aquatic species listed on Schedule 1 was identified in the Natural Heritage information Center grid search, but it occurs in the Welland Canal and not in the Study Area.

2.1.2 FISHERIES ACT

The *Fisheries Act* (R.S.C., 1985, c. F-14) was established in 1985 with amendments that came into effect on 25 November 2013 and 29 October 2019. This Act provides protection to fish and fish habitats such that:

"No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish." (Section 34.4 (1)), and

"No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat" (Section 35 (1))."

The Act defines fish habitat as:

"water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas" (Section 2 (1))."

The Fisheries Act requires that any development project avoid the death of fish, as well as Harmful Alteration, Disruption or Destruction (HADD) of fish habitat unless authorized by Fisheries and Oceans Canada (DFO). If mitigation measures cannot be applied, and residual effects will cause a HADD, then provisions under the Act may apply (i.e., authorization).

Applicability to the Project

Watercourses containing fish habitat were documented in the Study Area; therefore, the Fisheries Act applies to this Project, and the death of fish and the HADD of fish habitat must be prevented or permitted through a DFO authorization.

2.1.3 MIGRATORY BIRDS CONVENTION ACT

The *Migratory Birds Convention Act* (MBCA; S.C. 1994, c. 22) was passed in 1917 and updated in 1994, and the last amendment was on 12 December 2017. The MBCA prohibits harming and/or killing most species of birds and/or destroying or collecting their eggs or nests. Protected species are listed under Article I of the MBCA (the MBCA is enforced by Environment and Climate Change Canada). These species are native or naturally occurring in Canada and are species that are known to occur regularly in Canada. Most birds found in the Study Area receive protection under the MBCA, and nearly all of the remaining species receive similar protection under the provincial Fish and Wildlife Conservation Act (FWCA; Section 2.2.2).

The MBCA, together with the *Migratory Birds Regulations* (C.R.C., c. 1035), last amended on 31 July 2022 (new MBR 2022), are federal legislative requirements binding members of the public and all levels of government (Migratory Birds Convention Act, 1994). The new MBR 2022, provides protection to migratory bird nests when they are considered to have a high conservation value for migratory birds (i.e., generally during the nesting period). The nests of 18 species, whose nests are reused or subsequently used by other species, continue to have year-round nest protection unless they have been shown to be abandoned. The "incidental take" of migratory birds and the disturbance, destruction, or taking of the nest of a migratory bird is prohibited. Bird species not regulated under the Act include Rock Dove, American Crow, Brown-headed Cowbird, Common Grackle, House Sparrow, Red-winged Blackbird, and European Starling. Some species are not protected under the MBCA but are listed under the ESA (e.g., Rusty Blackbird).

Environment and Climate Change Canada and the Canadian Wildlife Service have compiled nesting calendars that show the variation in nesting intensity by habitat type and nesting zone within broad geographical areas distributed across Canada (Environment and Climate Change Canada, 2021). While this does not mean nesting birds will not nest outside of these periods, the calendars can greatly reduce the risk of encountering a nest.

Applicability to the Project

The MBCA applies to all of Canada. As such, the MBCA is applicable to the Project. Therefore, if a protected species or its nest is encountered during project activities, the Project must comply with the prohibitions of the MBCA and Migratory Birds Regulations; this includes following appropriate timing windows or Best Management Practices for vegetation removals. The Project site occurs in nesting zone C1, which has a regional nesting period of late March to late August. The nesting period is developed based on the nesting history of species known to occur in the general habitat (open, wetland, forest habitats). In open habitats, it is predicted that nesting is likely to start around late March (28th) and continue to late August (26th). In wetland habitats, it is predicted that nesting is likely to start around late March (23rd) and continue to mid-August (15th). In forest habitats, it is predicted that nesting is likely to start around late March (23rd) and continue to late August (26th). Given the climatic and species variables, vegetation removal should be avoided between March 23rd and August 26th in any given year.

Additionally, the nests of the Pileated Woodpecker, Great Blue Heron, and Green Heron have year-round protection from destruction. A mandatory wait period before the nest of these species must be observed. The nest must be proven abandoned before removal and registered.

2.2 PROVINCIAL LEGISLATIVE REQUIREMENTS

2.2.1 ENDANGERED SPECIES ACT

The *Endangered Species Act* (ESA) was passed into law in 2007 and came into effect on 30 June 2008 and was last amended on 19 October 2021. In Ontario, SAR is determined by the Committee on the Status of Species at Risk in Ontario (COSSARO). If a species is listed under the ESA as Extirpated, Endangered, or Threatened, Section 9 of the ESA prohibits killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling, leasing, trading or offering to buy, sell, lease or trade a member of the species. Similarly, Section 10 of the ESA prohibits the damage or destruction of the habitat of all Endangered and Threatened species. Habitat is broadly characterized within the ESA as the area prescribed by regulation as the habitat of the species or an area on which the species depends directly or indirectly to carry on its life processes, including reproduction, rearing of young, hibernation, migration or feeding. Habitat is specifically defined for some species. Species listed as Special Concern are not afforded protection under Sections 9 and 10 of the ESA; however, the Provincial Policy Statement provides protection through Significant Wildlife Habitat (Section 2.2.4.1).

Destruction of SAR and their habitats constitute a contravention of the ESA unless authorized by the Ministry of the Environment, Conservation and Parks (MECP). The MECP may authorize damage to habitat or individuals by way of registration or permit.

Applicability to the Project

Any SAR ranked as Threatened or Endangered that may be impacted by any Project work requires consideration. If impacts on SAR or their habitat cannot be fully avoided, a permit or registration will be required under the ESA. Based on fieldwork and secondary sources, a SAR screening was completed (Section 6.1) to document which SAR are confirmed or considered to have a high potential to occur. Seven SAR are confirmed in the Project Area: Eastern Flowering Dogwood (Endangered), White Wood Aster (Threatened), Round-leaved Greenbrier (Threatened), Eastern Wood-pewee (Special Concern), Wood Thrush (Special Concern), Monarch (Special Concern), and SAR Bats are considered present. Habitat for endangered and threatened species is protected, and alteration or destruction of individuals and this habitat must be permitted/approved under the ESA. Based on the Project Location SAR may be directly impacted, and the Project is subject to a permit under the ESA and/or its regulatory exemptions under the Act if avoidance is not possible.

2.2.2 FISH AND WILDLIFE CONSERVATION ACT

The *Fish and Wildlife Conservation Act* (FWCA) was passed into law in 1997 and was last amended on 3 June 2021. The FWCA applies to 'fish and wildlife' whereby fish are defined as having the same meaning as in the Fisheries Act, and wildlife are defined as "*an animal that belongs to a species that is wild by nature, and includes game wildlife and specially protected wildlife*". Those species considered "*specially protected wildlife*" include those specially protected amphibians, birds, invertebrates, mammals, and reptiles, as identified within Schedules 6 to 11 under the FWCA (Fish and Wildlife Conservation Act, 1997). The FWCA is managed by the Ministry of Natural Resources and Forestry (MNRF). Where wildlife will require collection or relocation at any point in the project (i.e., through trapping/collection and relocation), permits and approvals under the FWCA may be required.

If a provision of the FWCA and a provision of the ESA conflict with respect to an animal, invertebrate, or fish, the provision that gives the most protection prevails.

Applicability to the Project

Permits under the FWCA are contractor specific, whereby the individual undertaking the work to rescue and relocate or collect wildlife and/or fish will be the responsible party required to obtain the necessary permits and approvals. The probability that wildlife is found in the Project Location and does not leave on their own accord is medium to high. As such, permits/approvals under the FWCA are expected to be necessary during construction.

2.2.3 CONSERVATION AUTHORITIES ACT

The *Conservation Authorities Act* (CAA; R.S.O. 1990, c. C.27) was established in 1990 and was last amended on 1 October 2021. The CAA authorizes the formation of conservation authorities in Ontario and addresses their roles, responsibilities, and governance in resource management and environmental protection. The purpose of the CAA is:

"*to provide for the organization and delivery of programs and services that further the conservation, restoration, development and management of natural resources in watersheds in Ontario*."

Section 28 of the CAA describes which regulations may be made by a conservation authority (CA) within its jurisdiction. A CA can restrict and regulate the use of water in or from rivers, streams, inland lakes, ponds, wetlands and natural or artificially constructed depressions in rivers or streams. The CA can also prohibit, regulate, or require proponents to seek the authority's permission for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland. The CA can also prohibit, regulate, or require proponents to seek the authority's permission for development if, in the authority's opinion, the control of flooding, erosion, dynamic beaches or pollution, or the conservation of land may be affected by the development. The CA may prescribe permits designating privileges in connection with use of the lands or any part thereof and prescribing fees for permits (Section 29).

Each of Ontario's 36 conservation authorities has its own Ontario Regulation (O. Reg.) under the CAA. The core mandate of conservation authorities is to undertake watershed-based programs to protect people and property from flooding and other natural hazards and conserve natural resources for economic, social, and environmental benefits (Conservation Ontario, 2021). In the Study Area, the CAA is applied via O. Reg. 155/06: Niagara Peninsula Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

Applicability to the Project

Based on a review of the Niagara Peninsula Conservation Authority (NPCA) Mapping Tool (Niagara Peninsula Conservation Authority, 2021), there are regulated properties in the Project Location (Figure 2-1). As such, the Project will require consultation and a permit for any planned alteration or development within regulated areas.

2.2.4 PLANNING ACT

The *Planning Act*, R.S.O. 1990, c. P.13 was established in 1990 and was last amended on 14 April 2022. The Planning Act is provincial legislation that sets out the ground rules for land use planning in Ontario. The Act describes how land use may be controlled and who may control them. The Planning Act also provides the basis for developing provincial plans (e.g., Greenbelt Plan and Niagara Escarpment Plan) and municipal official plans to guide development. The Provincial Policy Statement (PPS) is issued under Section 3 of the Planning Act by the Ministry of Municipal Affairs and Housing (MMAH). Under the Planning Act, the PPS is applicable province-wide and provides overall policy directions on matters of provincial interest related to land use planning and development. Regional plans, municipal official plans, and the PPS work together to establish and protect natural features.

2.2.4.1 PROVINCIAL POLICY STATEMENT

The PPS came into effect in 1995 and has been amended several times since - in 1997, 2005, 2014, and in 2019. The latest PPS came into effect on 1 May 2020. The PPS provides policy direction on matters of provincial interest related to land use planning and development and promotes the provincial "policy-led" planning system that recognizes and addresses the complex interrelationship among environmental, economic, and social factors in land use planning (Ministry of Municipal Affairs and Housing, 2020). The PPS provides policies specific to natural heritage and states that natural features must be protected for the long term. All municipal official plans and planning decisions must be consistent with the PPS.

Section 2 of the PPS provides direction for the wise use and management of resources, including the protection of natural areas and features. Within Section 2.1, the PPS states that natural features and areas shall be protected for the long term. Section 2.1 also states that the diversity and connectivity of natural features in an area (including surface and groundwater features) and the long-term ecological function and biodiversity of natural heritage systems should be maintained, restored or, where possible, improved.

Development and site alteration is not permitted in significant wetlands in ecoregion 7E (Figure 2-1). Similarly, development and site alteration are not permitted, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, in:

- Significant Woodlands in ecoregion 7E,
- Significant Valleylands in ecoregion 7E,
- Significant Wildlife Habitat (SWH), and
- Significant Areas of Natural and Scientific Interest (ANSI).

Development and site alteration is not permitted in fish habitat or the habitat of endangered and threatened species, except in accordance with provincial and federal requirements. Lastly, development and site alteration are not permitted on adjacent lands to the natural heritage features and areas identified above unless it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions. Adjacent lands are described as lands contiguous to a natural heritage feature(s) or area(s) where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the plans or based on municipal approaches which achieve the same objectives. The Natural Heritage Reference Manual (Ontario Ministry of Natural Resources, 2010) provides guidance on delineation.

Note that, SWH is inventoried and described based on the appropriate ecoregion schedule and further informed by the Significant Wildlife Habitat Technical Guide (Ontario Ministry of Natural Resources, 2000). The SWH Mitigation Support Tool (Ontario Ministry of Natural Resources and Forestry, 2014) is also used to inform land-use planning.

Development, in the context of the PPS, means the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the Planning Act. Development does not include activities that create or maintain infrastructure (physical structures [facilities and corridors] that form the foundation for development) authorized under an environmental assessment process or works subject to the Drainage Act (1990). Site alteration, in the context of the PPS, means activities such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site.

The PPS provides overall policy direction and should be read in conjunction with other provincial and municipal plans. Where policies from various plans overlap, the more stringent policies apply unless otherwise stated.

Applicability to the Project

Significant wetlands (Provincially Significant Wetlands; PSWs), Significant Woodlands, Significant Wildlife Habitat, regional life science ANSI, fish habitat, and habitat for endangered and threatened species occurs in the Study Area. Unless authorized through an approved environmental assessment, development and site alteration are not permitted in the significant wetlands in the Study Area. Likewise, development and site alteration is not permitted unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions in the other natural heritage features in the Study Area.

2.2.4.2 *GREENBELT ACT, 2005 AND THE GREENBELT PLAN, 2017*

Ontario's Greenbelt protects farmland, communities, forests, wetlands, and watersheds. It also preserves cultural heritage and supports recreation and tourism in Ontario's Greater Golden Horseshoe. The Greenbelt Plan derives its authority from the *Greenbelt Act*, 2005, S.O. 2005, c. 1 (last amended 19 April 2021). The Greenbelt Plan was first released in 2005 and last updated in May 2017. The Greenbelt Plan identifies where urbanization should not occur in order to provide permanent protection to the agricultural land base and functions of the landscape.

Like other provincial plans, the Greenbelt Plan builds upon the policy foundation provided by the PPS. It provides additional and more specific land use planning policies to address issues facing the specific geographic area. The policies of The Greenbelt Plan usually satisfy the policies of the PPS. Where there is conflict, the Greenbelt Plan will take precedence, except where the relevant legislation provides otherwise. Where matters addressed in the PPS do not overlap with policies in the Greenbelt Plan, those PPS policies must be independently satisfied. The Greenbelt Plan must also be read in conjunction with other Provincial Plans, such as the Growth Plan for the Greater Golden Horseshoe and the Niagara Escarpment Plan. Where the plans, regulations or standards are more restrictive than the Greenbelt Plan, the more restrictive provision shall prevail.

Applicability to the Project

The northwest corner of the Study Area is mapped under the Greenbelt Plan as Protected Countryside and the geographic-specific policy Specialty Crop Area (Figure 2-1). Specialty Crop Areas within the Protected Countryside are subject to the entirety of the Greenbelt Plan, except Section 6 (Urban River Valley Policies). The Specialty Crop Area is also called the Niagara Peninsula Tender Fruit and Grape Area and was delineated based on provincial soil and climate analysis of current and potential tender fruit and grape production areas. Non-agricultural uses are generally discouraged in specialty crop areas and may only be permitted after the completion of an agricultural impact assessment.

While within the Study Area, it is not expected that the northwest corner will be impacted by the proposed preferred alternative design.

2.2.4.3 *PLACE TO GROW ACT, 2005 AND THE GROWTH PLAN FOR THE GREATER GOLDEN HORSESHOE (OFFICE CONSOLIDATION 2020)*

The Growth Plan for the Greater Golden Horseshoe was prepared and approved under the Places to Grow Act, 2005, S.O. 2005, c. 13, to take effect on May 16, 2019. Amendment 1 to the Growth Plan for the Greater Golden Horseshoe was approved to take effect on August 28, 2020. This Plan also works in conjunction with the PPS and provides specific land use planning policies to address issues facing the specific geographic area (Greater Golden Horseshoe; GGH) in Ontario. The policies which provide more protection to the natural environment apply.

The Growth Plan is a long-term plan to promote growth of the economy, housing supply, jobs, and communities (Ministry of Municipal Affairs and Housing, 2020). Section 4 of the Growth Plan requires the identification of water resource systems and the protection of key hydrologic features and key hydrologic areas, similar to the level of protection provided in the Greenbelt. Likewise, the Plan also provides for the identification and protection of a Natural Heritage System for the Growth Plan (Figure 2-1). The Natural Heritage System for the Growth Plan excludes lands within settlement area boundaries. Within settlement areas where the Natural Heritage System for the Growth Plan has not been delineated, the municipality is required to continue to protect any other natural heritage features and areas in a manner that is consistent with the PPS and may continue to protect any other natural heritage system or identify new systems in a manner that is consistent with the PPS.

Applicability to the Project

The Project is within the Greater Golden Horseshoe area, but as it is within a settlement area the municipalities are required to continue to protect key hydrologic features, key hydrologic areas, and any other natural heritage features and areas in a manner that is consistent with the PPS. Therefore, unless authorized through an approved environmental assessment, development and site alteration are not permitted in the significant wetlands in the Study Area. Likewise, development and site alteration are not permitted unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions in the other natural heritage features in the Study Area.

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PORT ROBINSON RD

PORT ROBINSON RD

HWY 406

RICE RD

TOWN OF PELHAM

CITY OF THOROLD

CATARACT RD

MERRITTVILLE HWY

PELHAM ST

MERRITT RD

HWY 406

CITY OF THOROLD

CITY OF WELLAND

TOWN OF PELHAM

CITY OF WELLAND

QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure2-1_Natural_Heritage_2.mxd

LEGEND

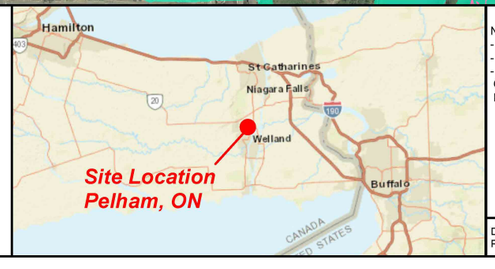
- O. Reg. 155/06: Niagara Peninsula Conservation Authority Regulation Area
- Natural Heritage System for the Growth Plan (Land Information Ontario, 2023)
- Municipal Boundaries
- Greenbelt Protected Countryside - Specialty Crop Area

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd

Provincial Data (GeoHub)

- Drapers Creek Wetland Complex
- Niagara St. Cataract Rd Wetland Complex (removed for subdivision)
- Niagara Street Cataract Road Woodlot Wetland Complex
- Port Robinson Woodlot Wetland Complex
- Welland River Between the Canals Wetland Complex
- ANSI, Life Science - Kunda Park Forest



NOTES:
- Imagery from Google, 2018
- Location of features is approximate
- ENtire map extent is with the Growth Plan for the Greater Golden Horseshoe

Datum: NAD83
Projection: UTM Zone 17N

0 1.25 2.5 Kilometres

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Provincial Information

PROJECT N°: IM20103036 | **FIGURE: 2-1**

SCALE: 1:14,000 | DATE: March 2023

2.3 MUNICIPAL LEGISLATIVE REQUIREMENTS

The Study Area occurs within Niagara Region and overlaps three local municipalities: Town of Pelham, City of Welland, and City of Thorold (Figure 1-2). Pertaining to the region-wide planning, the Niagara Region recently updated the Niagara Official Plan (i.e., the Regional Official Plan). The Niagara Official Plan was sent to Regional Council for adoption and on 23 June 2022, it was approved, instating bylaw 2022-47. The new plan was sent to the Province of Ontario's Ministry of Municipal Affairs and Housing (MMAH) as was approved with modifications on 4 November 2022. The Niagara Official Plan replaces the 2014 Official Plan, however, policy 3.1.30.3.1 of the Niagara Official Plan states, where a formal pre-consultation meeting has been completed within 1 year prior to the MMAH approval, and where the requirements for an environmental impact study or similar study has been established through a signed pre-consultation agreement that has not expired, the environmental impact study may be completed and evaluated in accordance with the Local, Regional, and Provincial polices that existed at the time the preconsultation meeting was completed, provided a complete application is submitted within 2 years of the approval of this plan. Therefore, the policy analysis and later conformity section will consider the 2014 Official Plan for the Region of Niagara.

The *Planning Act* requires that lower tier municipal Official Plans conform to the Official Plan of an upper tier municipality. All lower tier municipalities currently conform to the 2014 Official Plan for the Region of Niagara.

2.3.1 2014 OFFICIAL PLAN (REGION OF NIAGARA OFFICE CONSOLIDATION)

Official Plans are generally comprehensive documents setting out policies for the physical, economic, and social development of a specific geographic area or political jurisdiction. The Regional Official Plan for Niagara addresses provincial policy and legislation as outlined within the Planning Act, PPS, and provincial land use plans (e.g., Greenbelt Plan). The Niagara Region natural environment policy framework is based on maintaining a healthy landscape throughout Niagara, while giving particular attention to natural features of special significance within the broader landscape.

In the 2014 Official Plan (Niagara Region, 2014) policies with respect to Natural Heritage are documented in Chapter 7 Natural Environment and Schedule C Core Natural Heritage. The objectives for a healthy landscape in the Existing 2014 OP are based around maintaining a healthy natural environment, applying an ecosystem-based approach to planning and decision-making, and engagement, conservation, and restoration. The policies listed focus on employing an ecosystem approach to address the health and integrity of the broader landscape and the long term and cumulative impacts on the ecosystem. Policy 7.A.3 states that "New development, including infrastructure, should be designed to maintain or enhance the natural features and functions of a site."

Chapter 7.A contains objectives and policies on a Healthy Landscape. Water Resources (ground and surface water) are to be protected, improved, or restored in quantity and quality and the related Policy 7.A.2.1 states that development and site alteration shall only be permitted if it will not have negative impacts on water resources. The objective of natural heritage conservation is listed to help address climate change (7.A.3), likewise, the objective to ensure that development and site alteration do not create new hazards (e.g., flooding; 7.A.6).

The Core Natural Heritage System (NHS) identified in Chapter 7.B and Schedule C of the 2014 OP contains the most significant natural areas in Niagara and the linkages among them. The Core NHS is comprised of provincially and regionally significant natural features and provides the framework for natural heritage planning and development review in Niagara. The Core Natural Heritage System consists of:

a) Core Natural Areas, classified as either Environmental Protection Areas or Environmental Conservation Areas;

b) Potential Natural Heritage Corridors connecting the Core Natural Areas;

c) the Greenbelt Natural Heritage and Water Resources Systems; and

d) Fish Habitat.

Environmental Protection Areas (EPAs) include provincially significant wetlands, provincially significant Life Science Areas of Natural and Scientific Interest (ANSIs), and significant habitat of endangered and threatened species. In addition, within the Greenbelt NHS, EPAs include all wetlands and natural heritage as defined by the PPS (Policy 7.B.1.3). Environmental Conservation Areas (ECAs) include significant woodlands, significant wildlife habitat, significant habitat of species of concern,

regionally significant Life Science ANSIs, other evaluated wetlands, significant valleylands, savannahs and tallgrass prairies and alvars, and publicly owned conservation lands.

It should be noted that policy 7.B.1.3 states "Mapping of the significant habitat of endangered and threatened species is not included in [Schedule 5] although much of this habitat may be found within the [EPAs and ECAs] shown on the Map. Significant habitat of endangered and threatened species will be identified through the Planning and Development review process. Where such habitat is identified development and site alteration shall be subject to the policies for [EPAs]."

Policy 7.B.1.10 states that development and site alteration shall not be permitted within EPAs. Policy 7.B.1.11 states that development and site alteration may be permitted without an amendment to the OP in ECAs and on adjacent lands to EPAs and ECAs if it has been demonstrated that there will be no significant negative impact through an EIS and the proposed development or site alteration is not prohibited by other Policies. Policy 7.B.1.13 ensures that Potential Natural Heritage Corridors shall be considered in the development review process. Development should be located, designed, and constructed to maintain and, where possible, enhance the ecological functions of the Corridor in linking Core Natural Areas or an alternative corridor should be developed.

Development and site alteration may be permitted within Fish Habitat if it will result in no net loss of the productive capacity of fish habitat as determined by the DFO and within the Greenbelt NHS, if it is not prohibited by other policies and an EIS has been prepared. Additionally, essential public uses of a linear nature (e.g., transportation routes) may be permitted within the Core Natural Heritage System or adjacent lands where an EA for the proposed use has been approved under Provincial or Federal legislation.

Table 7-1 from the 2014 Regional Official Plan provides guidelines for when an EIS is required (Table 2.1). An EIS must be prepared in accordance with Policies 7.B.2.1 to 7.B.2.5. Policy 7.B.1.26 states that expansion to an existing use located within an Environmental Conservation Area, Fish Habitat, or adjacent lands may be permitted if it will have no significant negative impact on the natural feature or its ecological functions. If the expansion involves a substantial intensification in land use or increase in the land area devoted to the use the proponent shall prepare an EIS. EIS requirements may be waived in accordance with the waiving requirements outlined in the EIS guidelines (Niagara Region, 2018).

Table 2.1 Adapted Table 7-1 from the 2014 Regional Official Plan: Guidelines for EIS Requirements

	IS AN EIS REQUIRED?	
NATURAL HERITAGE FEATURE	DEVELOPMENT OR SITE ALTERATION INVOLVES LANDS WITHIN THE NATURAL HERITAGE FEATURE	DEVELOPMENT OR SITE ALTERATION INVOLVES ADJACENT LANDS
Areas identified as EPAs		
PSW	Development not permitted – no EIS	EIS required for development within 120 m
ANSI	Development not permitted – no EIS	EIS required for development within 50 m
Habitat of Endangered and Threatened Species	Where habitat requirements are well defined, development not permitted – no EIS. Where habitat requirements not well defined an EIS is required	EIS required for development within 50 m. Habitat must be defined in consultation with the MNRF
Key features within the Greenbelt NHS	Development not permitted – no EIS	EIS required for development within 120 m
Areas identified as ECAs		
Significant Woodlands	EIS required	
Tree Saving Plan required	EIS required for development within 50 m	

	IS AN EIS REQUIRED?	
NATURAL HERITAGE FEATURE	DEVELOPMENT OR SITE ALTERATION INVOLVES LANDS WITHIN THE NATURAL HERITAGE FEATURE	DEVELOPMENT OR SITE ALTERATION INVOLVES ADJACENT LANDS
SWH	EIS required	EIS required for development within 50 m
Habitat of Special Concern Species	EIS required	EIS required for development within 50 m
Critical Fish Habitat (Type 1)	EIS required	EIS required for development within 30 m
Other Fish Habitat (Type 2 and 3)	EIS required	EIS required for development within 15 m
Significant Valleylands	EIS required	EIS required for development within 50 m
Other Wetlands	EIS required	EIS required for development within 50 m
Other Features in Greenbelt Plan		
Key Hydrologic Feature	Development not permitted – no EIS	EIS required for development within 120 m

Of note, Policy 7.B.1.19 states that where development or site alteration is approved within the Core Natural Heritage System or adjacent lands the applicant shall submit a Tree Saving Plan maintaining or enhancing the remaining natural features and ecological functions. The Plan shall be prepared in accordance with the Regional Forest Conservation By-law and the local tree conservation by-law as appropriate and its implementation monitored by a member of the Ontario Professional Forestry Association.

Lastly, Section 7.C outlines policies for implementation measures and Section 7.C.1 specifically addresses Implementation Measures for Regional Operations. The policy states that the Niagara Region will lead by example and demonstrate environmental responsibility by maintaining a healthy natural environment and protecting, enhancing, or restoring Niagara's natural heritage in the following ways:

Policy 7.C.1.1 In all its operations the Region shall strive to maintain a healthy natural environment and protect, enhance or restore Niagara's natural heritage.

Policy 7.C.1.2 The Region shall minimize the consumption of energy and resources in its own operations and reuse and recycle energy and resources wherever possible.

Policy 7.C.1.3 The Region shall practice good stewardship by:

a) Managing Regionally owned lands within or adjacent to the Core Natural Heritage System to maintain, restore or enhance the System's natural features and ecological functions;

b) Maintaining a program of tree planting and naturalization on Regional properties and roads. Where trees must be removed at least two trees shall be planted for every tree removed, normally using native species from seed sources climatically similar to Niagara.

Policy 7.C.1.4 The Region shall endeavour to reduce the use of pesticides for cosmetic purposes by:

a) Phasing out pesticide use on Regionally-owned properties by January 1, 2007;

b) Promoting alternatives to the use of pesticides; and

c) Supporting and facilitating adoption of local municipal by-laws reducing or eliminating the use of pesticides for cosmetic purposes.

Policy 7.C.1.5 The Region shall reduce the quantity of salt used on Regional roads to protect agriculture, water resources, and natural vegetation and wildlife.

Policy 7.C.1.6 The Region shall give priority to energy based on sources other than fossil fuels to meet its own energy needs and collect methane gas generated by Regional landfills for heating and/or generation of electricity.

Policy 7.C.1.7 The Region, recognizing that excessive, unnecessary or misdirected outdoor lighting can have adverse impacts on the environment, the economy and human health as well as on the quality of the night sky, will investigate outdoor lighting and develop a strategy to address it.

Policy 7.C.1.8 The Region shall aim to divert 65% of waste from landfill by 2012 through waste reduction, recycling and composting.

Applicability to the Project

Under Schedule C of the 2014 Regional Official Plan the Study Area contains Urban Area but also Potential Natural Heritage Corridor, Fish Habitat, ECA, and EPA (Figure 2-2). Development is not permitted in the EPAs and an EIS would be required for proposed development of the ECAs. However, Policy 7.B.2.5 of the 2014 OP states that an EIS is not required for uses authorized under an EA process carried out in accordance with Provincial or Federal legislation. Therefore, it is the intention of this report to satisfy the natural heritage requirements of the EA process. It is also noted that the 2014 Regional Official Plan dedicates the policies in Section 7.C.1 to specifically address Implementation Measures for Regional Operations. As the proposed project is under Regional Operations, these policies apply.

As discussed throughout the body of this report a background review and fieldwork has been conducted. These results have found that the natural features in the Study Area are better classified as EPAs and not ECAs (Section 7.0) as they contain PSWs and habitat for endangered and threatened species. Normally, this would require an Official Plan Amendment (OPA), but a new OP has been adopted by the Region and approved by the MMAH. Although the new OP contains a caveat which allows this project to continue under the 2014 OP, a review of designations and policies was undertaken (Section 2.3.1.1).

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CATARACT RD
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Kottmeier Road
PELHAM ST
MERRITT RD
HWY 406
CITY OF THOROLD
CITY OF WELLAND
TOWN OF PELHAM
CITY OF WELLAND
QUAKER RD

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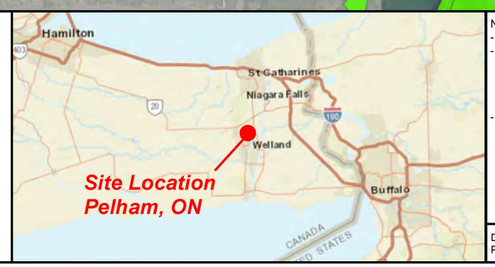
LEGEND

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd

- Environmental Protection Areas (EPA),
- Environmental Conservation Areas (ECA)
- Urban Area

- Potential Natural Heritage Corridor
- Greenbelt Plan Area
- Municipal Drain
- Fish Habitat



NOTES:
- Imagery from Google, 2018
- Environmental Conservation and Protection Areas, CNH Municipal Drains, and CNH Potential Natural Heritage Corridors retrieved from Niagara Official Plan (Schedule C)
- Location of features is approximate

Datum: NAD83
Projection: UTM Zone 17N

0 1.25 2.5 Kilometres

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Niagara Region Official Plan 2014

PROJECT N°: IM20103036 | **FIGURE: 2-2**

SCALE: 1:14,000 | DATE: December 2022

2.3.1.1 *NIAGARA OFFICIAL PLAN (2022)*

This Plan supersedes the Region's previous official plan. The *Planning Act* requires that all official plans contain goals, objectives, and policies to manage and direct physical (land use) change and its effects on the cultural, social, economic, and natural environment within legislated boundaries. It is required to have policies and measures as are practicable to ensure protection of the environment, among other matters. The Niagara Official Plan is a legal document. The *Planning Act* requires that all Regional and Local public works projects, Local official plans, amendments, land-use related by-laws, and all future development must conform to the approved Plan. The Niagara Official Plan is required to be consistent with the Provincial Policy Statement (2020), conform to the Growth Plan (2019, as amended) and Greenbelt Plan (2017), and not conflict with the Niagara Escarpment Plan (2017). Lastly, as the policies in the Niagara Official Plan have been approved by MMAH, all subsequent *Planning Act* decisions shall conform to this Plan, unless otherwise stated.

In the new plan Chapter 3 Sustainable Region and Section 3.1 The Natural Environment outlines the objectives and policies for a Regional NHS and water resource system. The NHS is made up of features such as wetlands, woodlands, valleylands, and wildlife habitat, as well as components such as linkages, buffers, supporting features and areas, and enhancement areas. The Water Resource System (WRS) is made up of both groundwater and surface water features and areas. The establishment of these natural systems is required by Provincial policy. These systems are ecologically linked, rely on, and support each other, and have many overlapping components. Therefore, they have been integrated in this Plan and are known together as the Region's Natural Environment System (NES).

The features and components of the NES are mapped in Schedule C1, C2, C3, and E. Note however, that not all the features and components that make up the NES can or have been mapped as part of the schedules to this Plan. Where features or components of the NES are not mapped, detailed area-specific or site-specific studies such as an environmental impact study, hydrologic evaluation, or subwatershed study are required for their identification. An evaluation prepared by a qualified professional in consultation with the Region, the Local Area Municipality and, where appropriate, the Conservation Authority shall be completed, and the policies of this Plan will be applied to the lands under application as appropriate. Lastly, where lands are mapped or identified as two or more features or components of the NES, the policies which provide the highest level of environmental protection shall apply in the event of any conflict.

The features and components of the NES are listed in Section 3.1.1, 3.1.2, and Schedule L (provided in Appendix A). Schedule L also includes the definitions and criteria for each of the features and components. The components in the NES follow provincial guidance and include all features as identified in the provincial legislative requirements. Section 3.1.5 details NES policies related to lands within the Provincial NHS's and Section 3.1.6 details the Special Policy for Niagara Peninsula Tender Fruit and Grape Area in the Greenbelt Plan. Section 3.1.7 further details Special Policy for Recreational Uses on Lands Subject to Greenbelt Plan while Section 3.1.8 details Lands in the Niagara Escarpment Plan Area.

Section 3.1.9 specifies policies for lands outside of a Provincial NHS and Niagara Escarpment Plan Areas (i.e., urban areas and hamlets; applicable to the Study Area). Section 3.1.9.5 and 3.1.9.7 details the OP rules around Development and Site Alteration in Natural Heritage Features and Areas and Adjacent Lands outside of a Provincial NHS. Beginning with Section 3.1.9.5.1 development and site alteration shall not be permitted in PSWs, significant coastal wetlands, and significant woodlands. Section 3.1.9.5.2 and 3.1.9.7.1 states that development and site alteration shall not be permitted in other woodlands, significant valleylands, SWH, ANSI, and Adjacent Lands unless it has been demonstrated through the preparation of an EIS that there will be no negative impacts on the natural features or their ecological functions. Development or site alteration shall not be permitted in fish habitat (3.1.12.1) or habitat of endangered and threatened species (3.1.13.1) except in accordance with Federal and Provincial requirements.

Adjacent lands (outside of the Provincial NHS) are defined in the OP as:

- 120 m for PSW, Significant Costal Wetland, and Significant Woodland and
- 50 m for Other Woodland, Significant Valleyland, SWH, Habitat of Endangered Species and Threatened Species, and Life Science ANSI.

Notwithstanding the above, Section 3.1.9.5.3 permits activities that create or maintain infrastructure authorized under an EA, including a Class EA, completed in accordance with the *Environmental Assessment Act*, to occur in natural heritage features and areas. Development and site alteration in, and adjacent to watercourses, PSWs, and other wetlands that are regulated by the NPCA, may also be subject to the regulations and land use planning policies of the NPCA (3.1.9.5.4). The NPCA may permit offsetting of wetlands under its policies and in accordance with its regulatory role, but the use of offsetting for any natural heritage feature and areas, key natural heritage features, or key hydrologic features is not supported by the policies of

this Plan (3.1.9.5.5). Natural Hazards (e.g., flooding) is addressed in Section 3.1.23. Development or site alteration shall not be permitted within areas that would be rendered inaccessible to people and vehicles during times of flooding hazards unless it has been demonstrated that the site has safe access appropriate for the nature of the development and the natural hazard. NPCA is responsible for regulating development and site alteration in and adjacent to natural hazards whether it requires Planning Act approval or not.

Section 3.1.9.9 discusses policies related to Buffers in Settlement Areas. Within settlement areas (e.g., the study area), *mandatory* buffers from natural heritage features and areas are required (3.1.9.9.1). The width of the buffer is to be determined through an EIS and/or hydrological evaluation at the time an application for development or site alteration is made (or through the completion of a subwatershed study in support of a secondary plan or other large-scale development). Buffer widths are based on sensitivity of the ecological function from the proposed works and the potential for impacts to the feature and ecological functions as a result of the works. Buffers are to be protected from development and alteration (3.1.9.9.2) except when part of an EA, including a Class EA, completed in accordance with the *Environmental Assessment Act*. Section 3.1.9.9.3 allows the Conservation Authority to implement their own buffer requirements for watercourses but reductions in any buffer must be supported by a site-specific study that is approved by the Local Area Municipality, the Region, and the Conservation Authority and is only allowed in settlement areas.

Section 3.1.10 Key Hydrologic Areas, Key Hydrologic Features, and Other Important Water resources describes restrictions on development or site alteration in in these features. Development or site alteration shall not be permitted unless it can be demonstrated that it will not have negative impacts on form and function and the interaction and linkage with other NES components (3.1.10.1 a-f). Mitigative measures and/or alternative development approaches may be required in order to protect, improve, or enhance the WRS and establishment of appropriate development conditions and monitoring programs may occur through the development approval process (3.1.10.2 and 3.1.10.3). Section 3.1.10.7 states that development or site alteration shall not have negative impacts on key hydrologic areas or their hydrologic functions. In areas where development and site alteration could have negative impacts on ground water quality or quantity the Region or Local Area Municipality shall require further review of potential impacts through the completion of a subwatershed study or through the completion of a hydrologic evaluation during the review of an application for development or site alteration.

Components of the NES that are not explicitly exempt in the OP when part of an EA, including a Class EA, completed in accordance with the *Environmental Assessment Act* are Other Woodlands, Supporting Features and Areas, and Linkages.

- Other Woodlands (3.1.11) are identified and considered a natural heritage feature and area. Inside of settlement areas other woodlands are subject to an ecologically appropriate buffer to be determined at the time an application is made for development or site alteration in accordance with 3.1.9.9.1 (3.1.11.4). In addition to policies of this Plan, the Region also maintains and enforces a Woodland Conservation By-law (No. 2020-79) which governs the protection and preservation of woodlands in Niagara.
- Supporting Features and Areas (3.1.15) are lands that have been restored or have the potential of being restored and contribute to ecological functions of the adjacent NES and Provincial NHS and WRS, valleylands and wildlife habitat which are not included elsewhere, and enhancement areas (3.1.16). If supporting features and areas and enhancement areas are identified (e.g., through an EIS) an evaluation shall occur to determine (3.1.15.3 and 3.1.16.3) extents and inclusions into the NES.
- Linkages are discussed in Section 3.1.17. When development or site alteration is proposed in, or within 30 metres of a linkage shown on Schedule C2, an evaluation shall be completed (3.1.17.3) that assesses and describes the ecological features and functions, boundaries/widths, compatible uses, impacts, and makes recommendations on how to protect, enhance, or mitigate impacts. Possible outcomes of an evaluation carried out in accordance with Policy 3.1.17.3 can include the incorporation of the linkage into the development, such that development would not occur on those lands.

Section 3.1.25.1 states that Woodland cover shall be maintained or enhanced in the Region by 2051. In support and addition to policies of the OP, the Region enforces a Woodland Conservation By-law (No. 2020-79) which governs the protection and preservation of woodlands in Niagara. In addition, through a range of programs that fall outside the Niagara Official Plan, such as a Regional Greening Initiative, the policies in the OP Sections 3.1.25, 3.1.26, 3.1.27, 3.1.28, and 3.1.29 establish protections and enhancements for woodland, wetland, and riparian vegetation cover which will assist in enforcement.

Applicability to the Project

Although the new OP contains a caveat which allows this project to continue under the 2014 OP, a review of designations and policies was undertaken (Section 2.3.1.1). Under this new OP the Study Area contains Linkage, Life Science ANSI, Significant Woodlands, Other Woodlands, PSW, Other Wetlands, and Permanent and Intermittent Streams as part of the NHS (Figure

2-3). It also contains Highly Significant Highly Vulnerable Aquifers, and Significant Groundwater Recharge Area as part of the WRS.

Some differences exist between the two OPs. The Urban Area boundary has expanded in the new OP from the 2014 official plan. The entire study area is now located with the Urban Area boundary, whereas before Segments 1 and 4 were excluded from the boundary. Additionally, ECAs and EPAs are not terms used in the new OP, rather all NHS and WRS components are grouped as an NES but considered as individual components. Boundary refinements to the general overall area of natural features occurred in the new OP. A comparison of the NHS criteria between the 2014 and the new OP is provided in Table 2.2.

Table 2.2 A comparison of the mapped Natural Heritage System between the old and new Official Plans

Criteria	2014 Official Plan	Niagara Official Plan (2022)[1]
Natural Heritage System	Core Natural Heritage System contains Core Natural Areas, classified as either Environmental Protection Areas (EPAs) or Environmental Conservation Areas (ECAs)	Individual Natural Heritage System and Water Resource System components are grouped as a Natural Environment System
Provincially Significant Wetlands (PSW)	Environmental Protection Areas (EPAs)	Mapped according to provincial data. The criteria for identifying provincially significant wetlands are established by the province in accordance with the Ontario Wetland Evaluation System. The MNRF is responsible for review and approval of a wetland evaluation.
Other Evaluated Wetlands	Environmental Conservation Areas (ECAs)	Some mapped according to provincial data. Other Wetlands include evaluated non-PSWs and wetlands that have not been evaluated (provincial). And all wetlands that meet an Ecological Land Classification (ELC) wetland system classification and have not been evaluated as a PSW.
Areas of Natural and Scientific Interest (ANSI)	Environmental Protection Areas (EPAs)	Mapped according to provincial data. Mapping of both provincial and regional Life Science ANSIs and Earth Science ANSIs.
Regionally Significant Life Science ANSI	Environmental Conservation Areas (ECAs)	
Significant Habitat of Endangered and Threatened Species	Environmental Protection Areas (EPAs)	None are mapped. Criteria for the identification SAR is determined in accordance with the habitat regulations of the Endangered Species Act.
Significant Habitat of Species of Concern	Environmental Conservation Areas (ECAs)	
Significant Woodlands	Environmental Conservation Areas (ECAs)	Some are mapped.

		To be identified as significant, a woodland must meet the definition of ELC forest and then meet one or more additional criteria. A significant or other woodland can also be classified as a cultural and regenerating woodland.
Other Woodlands	Not previously considered in OP	Some are mapped. To be identified using specific criteria.
Significant Wildlife Habitat	Environmental Conservation Areas (ECAs)	None are mapped. Significant wildlife habitat shall be identified in accordance with the Significant Wildlife Habitat Criteria schedules for Ecoregion 7E
Significant Valleylands	Environmental Conservation Areas (ECAs)	None are mapped. Significant valleylands include any of the features identified in any of the three prescribed categories
Savannahs and Tallgrass Prairies and Alvars	Environmental Conservation Areas (ECAs)	N/A
Publicly Owned Conservation Lands	Environmental Conservation Areas (ECAs)	N/A
Linkages	Potential Natural Heritage Corridors	Some are mapped. Known linkages have been identified between natural heritage features and areas and key natural heritage features consisting of natural areas (e.g., watercourses, valleylands, meadow, thicket, woodland, wetland, and hedgerows, etc.) or rural/agricultural lands without major barriers (i.e., developed areas or major roads greater than 30 m in width) based a set of criteria.
Fish Habitat or Permanent or Intermittent Stream	Fish Habitat	Some are mapped. For screening purposes, and until such time appropriate studies are completed to assess watercourses and waterbodies, Fish Habitat will be presumed to be/is mapped as permanent or intermittent stream or waterbody and shoreline features

Inland Lakes	Not mapped in Core Natural Heritage System	Some are mapped. Any inland body of permanently standing water larger than a pool or pond or a body of water filling a depression in the earth's surface, where their water levels and hydrologic functions are not directly influenced by either Lake Erie or Lake Ontario. Not including constructed ponds where their ecological function is not a consideration in their management.

Notes: highlighted cells represent when both OPs contain the criteria
1-definations and criteria taken from Schedule L

The new OP states that development and site alteration is not permitted in PSWs and Significant Woodlands. The remaining classifications may allow development and site alteration if the preparation of an EIS demonstrates that there will be no negative impacts on the forms and functions. Of course, Section 3.1.9.5.3 permits activities that create or maintain infrastructure authorized under an EA, including a Class EA, completed in accordance with the Environmental Assessment Act, to occur in natural heritage features and areas and buffers. A summary of the applicable Environmental Assessment Act is provided in the ESR. The consideration of cumulative impacts must still be required in an environmental impact study or ESR. Development and site alteration in, and adjacent to watercourses, PSWs, and other wetlands that are regulated by the NPCA, may also be subject to the regulations and land use planning policies of the NPCA (3.1.9.5.4). Additionally, activities must still be completed in accordance with Federal and Provincial requirements.

Components of the NES that are not explicitly exempt in the OP when part of an EA are Other Woodlands, Supporting Features and Areas, Linkages, and Key Hydrologic Areas, Key Hydrologic Features, and Other Important Water resources. The OP also states that development or site alteration shall not be permitted within areas that would be rendered inaccessible to people and vehicles during times of flooding hazards unless it has been demonstrated that the site has safe access appropriate for the nature of the development and the natural hazard.

640000 641000 642000 643000 644000 645000

4767000 4766000 4765000

PORT ROBINSON RD
PORT ROBINSON RD
HWY 406
RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY
PELHAM ST
MERRITT RD
HWY 406
CITY OF THOROLD
CITY OF WELLAND
TOWN OF PELHAM
CITY OF WELLAND
QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure2-3_NiagaraofficialPlan_NES.mxd

LEGEND

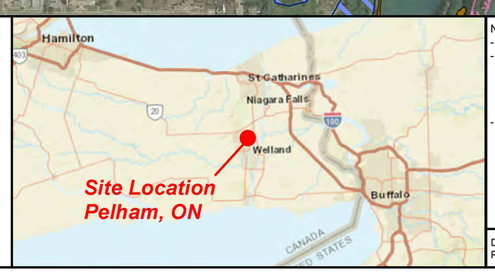
- Municipal Boundaries

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd
- Other Wetlands and Non-PSW
- -Linkages
- Significant Woodlands
- Other Woodlands
- Waterbodies
- Permanent and Intermittent Watercourses

Significant Wetlands (GeoHub)

- Drapers Creek Wetland Complex
- Niagara Street Cataract Road Woodlot Wetland Complex
- Port Robinson Woodlot Wetland Complex
- Welland River Between the Canals Wetland Complex



NOTES:
- Imagery from Google, 2018
- Environmental Conservation and Protection Areas, CNH Municipal Drains, and CNH Potential Natural Heritage Corridors retrieved from Niagara Official Plan (Schedule C)
- Location of features is approximate

Datum: NAD83
Projection: UTM Zone 17N

0 1.25 2.5 Kilometres

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Niagara Official Plan (2022) NH Layers of the NES

PROJECT N°: IM20103036 | FIGURE: 2-3

SCALE: 1:14,000 | DATE: December 2022

2.3.1.2 REGIONAL WOODLAND CONSERVATION BY-LAW NO.2020-79

Region also maintains and enforces a Woodland Conservation By-law (No. 2020-79; Regional Municipality of Niagara, 2020) which governs the protection and preservation of woodlands in Niagara. The intent of the by-law is to conserve woodlands and ensure that, where tree cutting occurs, it is carried out under good forestry practices. The by-law prohibits the injury or destruction of any tree located within a woodland or designated as a Heritage Tree or a Significant Community Tree except under certain specified circumstances.

Woodlands are defined in the bylaw as:

- 1.0 hectare or more in size;
- having an area of less than 1.0 hectare upon delegation of such authority to the Region by a Local Area Municipality in Niagara; and
- heritage and significant community trees identified and designated by the Council of a Local Municipality, but only upon delegation of such authority to the Region.

Only five local municipalities have delegated authority to the Region to deal with woodlands less than one hectare in size; Grimsby, Niagara-on-the-Lake, Niagara Falls, St. Catharines, and West Lincoln. Additionally, Woodlands land on one or more properties with a density of at least:

- 1000 trees of any size, per hectare;
- 750 trees, with a Diameter Breast Height (DBH) of over 5 cm per ha;
- 500 trees, with a DBH over 12 cm per hectare; or
- 250 trees, with a DBH of over 20 cm per ha.

Under the by-law, trees located in woodlands cannot be cut unless a Good Forestry Practices Permit has been issued by the Region or the cutting meets one of the exemptions listed in the bylaw.

Applicability to the Project

Woodlands occur in the three local municipalities in the Study Area, Town of Pelham, City of Welland, City of Thorold. These local municipalities have not delegated authority to the Region. Therefore, the Regional Woodland Conservation bylaw is not applicable. Moreover, these local municipalities do not have their own tree or woodland conservation bylaws.

2.3.2 TOWN OF PELHAM OFFICIAL PLAN

The Town of Pelham Official Plan (Office Consolidation 2014) lays out visions and goals of land use for the future (Town of Pelham, 2012). The Plan addresses local planning issues in a way that aims to be in alignment with the PPS, Greenbelt Plan (Ministry of Municipal Affairs and Housing, 2017) and Growth Plan for the Greater Golden Horseshoe (Ministry of Municipal Affairs and Housing, 2020). The natural environment goal of the Pelham OP is to “maintain, enhance or restore ecosystem health and integrity” (Section A2.1.1). Under the Town of Pelham land use Schedules, the area is mapped as Urban Settlement and Specialty Agriculture, as well as the East Fonthill Secondary Plan, approved by the Region and the OMB in the summer of 2000.

The Provincial Growth Plan for the Greater Golden Horseshoe (Places to Grow 2006) has identified Greenfield Areas within Urban Living Areas. Lands identified as Greenfield are to be developed in such a manner as to attain a minimum population/employment density of 50 people and jobs per hectare. Greenfield occurs within the Study Area and is within the Secondary Plan Area (Schedule A1). However, where natural heritage features are confirmed and coincide with the Greenfield designation on Schedule A1, such lands shall be removed from the Greenfield designation and shall not be considered for urban development. The policies for the East Fonthill Secondary Plan are provided in Section B1.7 and have been prepared in conjunction with the Town OP. Unless otherwise specifically identified, all of the policies of the OP apply to this Secondary Plan.

The natural heritage land use policies from this Official Plan are found in Section B3. The OP splits the natural heritage designations into three categories (Section B3), Environmental Protection One, Two, and Three. Within the Study Area, only Environmental Protection One and Two occur (Figure 2-4); they are summarized as follows:

- Environmental Protection One – Regional Environment Protection Area (EPA): The purpose of the Environmental Protection One designation is to protect and enhance natural heritage features identified as Core Area – Environmental Protection Areas (EPA) by the Niagara Region (Section 2.3.1). Environmental Protection One is shown on Schedule A, Schedule A5 (for the East Fonthill Secondary Plan Area), and the individual components are shown on Schedule B.
    - Schedule B identifies several natural heritage features within the Settlement Areas of Fonthill. it is noted that features located within the East Fonthill Secondary Plan have been assessed in conjunction with the preparation of the Secondary Plan for this area and are therefore designated and subject to the Environmental Protection policies of this Plan (Schedule A5).
- Environmental Protection Two – Regional Environmental Conservation Area (ECA): The purpose of the Environmental Protection Two designation is to recognize and maintain other natural heritage features not included in the Environmental Protection One designation. Features within the Environmental Protection Two designation represent Core Area - Environmental Conservation Areas (ECA) by the Niagara Region (Section 2.3.1). Environmental Protection Two is shown in Schedule A and Schedule A5 (for the East Fonthill Secondary Plan Area). Potential individual components are shown on Schedule B, but outside of the East Fonthill Secondary Plan, they have not been assessed for significance and, therefore, are not included in the Environmental Protection Two designation.
    - It is noted that while the Environmental Protection Two designation is intended to include significant woodlands, the features identified on Schedule B as "Wooded Areas" have not been assessed or confirmed for significance. As a result, these features have not been included in the Environmental Protection Two designation.

Permitted uses on lands designated Environmental Protection One and Two are generally limited to management, conservation, flood control projects, agricultural drains, and small-scale, passive recreational uses where it has been demonstrated that they are necessary and have no negative impact on the features or on the ecological functions. Development and site alteration shall not be permitted within the habitat of endangered species and threatened species, except in accordance with Provincial and Federal requirements.

Policy B.3.2.4.2 states that "[e]xisting, legal uses located within the Environmental Protection One designation shall be recognized as legal non-conforming uses in this Plan or as exceptions in the Town's Comprehensive Zoning By-law, such uses shall not be physically expanded or enlarged." However, policy B3.2.4.6 and B3.3.4.6 states that new or expanding infrastructure is not permitted in the Environmental Protection One and Two designations with the exception of linear infrastructure constructed by a public authority or agency through an environmental assessment process.

Policy B3.3.4.1 states that new development and site alteration may be permitted in the Environmental Protection Two designation, provided it has been demonstrated through an EIS that there will be no negative impact on the natural heritage feature or its ecological functions. In addition, where development or site alteration is proposed, a Tree Preservation Plan (TPP) shall be required to provide recommendations with respect to the protection or enhancement of existing trees. The TPP shall be prepared in accordance with the Niagara Region Tree and Forest Conservation By-law.

Where development or site alteration is proposed in proximity to lands in the Environmental Protection One or Two designations, efforts should be made to identify and create maintain and where possible enhance linkages amongst lands designated Environmental Protection One and Environmental Protection Two. Additionally, impacts must be considered in adjacent lands to natural heritage features. The Town of Pelham OP defines Adjacent Lands as:

- 120 m from the boundary of a (PSW);
- 50 m from the boundary of a Provincially Significant Life Science ANSI;
- 50 m from the significant habitat of endangered species and threatened species; and
- 50 m from the Environmental Protection Two boundary.

No development or site alteration shall be permitted on adjacent lands unless an EIS demonstrates that there will be no negative impact on the feature or its ecological functions. The Region, in consultation with the Town and the NPCA, shall approve any EIS prepared to address impacts on development or site alteration within adjacent lands. Lastly, concerning Environmental Protection areas, Policies B3.2.4.7 and B3.3.4.8 recognize that there may be areas in the Town where Environmental Protection areas have not been mapped are identified. If a natural heritage feature meets the criteria of one or more of the Environmental Protection designations occurs, it should be protected from development in accordance with the policies in the OP.

Subwatershed, Floodplain, valleyland not mapped as Environmental Protection areas, and watercourses are also mapped in the OP. The Study Area falls within the Welland Canal North Subwatershed, however, there is no floodplain or valleyland mapped in the Study Area (Schedule B1). Watercourses are mapped as Rivers and Streams in Schedule B, and the policies in Section C of the OP apply. Where the policies of Section C conflict with the policies elsewhere in the OP, the more restrictive policy is applied. The natural rivers and streams in the Town are considered to be environmentally significant. The OP does not identify the location of fish habitat. As such, the determination of fish habitat type will be required before development and will be established in consultation with the NPCA. It is noted that lands adjacent to rivers and streams are regulated by the NPCA in accordance with Ontario Regulation 155/06. The OP Policy C2.1.1 states that a natural vegetated buffer zone of 30 m for critical fish habitat and 15 m for important or marginal fish habitat is recommended from the stable top of bank.

The Town OP acknowledges that the Regional Policy Plan has illustrated conceptual corridors and linkages on the Region's Core Natural Heritage Map. The Town will require proponents of new development subject to an EIS to assess corridor linkages and, if possible, maintain or enhance such linkages. Lastly, the Earth Science ANSI, known as the Fonthill Kame-Delta, is adjacent to the Study Area. However, the policies of Section C3 of the OP are deferred and not in force and effect.

Applicability to the Project

Parts of Road Sections 1 and 4 of the Project are within the Town of Pelham (Figure 1-2). The area is mapped partly within the Fonthill Settlement Area and is further subject to the East Fonthill Secondary Plan. Environmental Protection One and Environmental Protection Two are found within the Project location (Figure 2-4). New or expanding infrastructure is not permitted in the Environmental Protection One and Two designations with the exception of linear infrastructure constructed by a public authority or agency through an environmental assessment process. The OP also states that where infrastructure is permitted to cross or encroach into such areas, it shall minimize negative impacts and disturbance on the feature or its related functions and, where reasonable, maintain or improve connectivity among such areas and vegetative protection buffers.

In addition, when development or site alteration is proposed within 50 metres of a Wooded Area identified on Schedule B, an assessment will be required to determine if the feature is significant in accordance with the Regional Policy Plan. This assessment will be completed to the satisfaction of the Town, Region and NPCA. Where development or site alteration is proposed in the Environmental Protection Two designation, a Tree Preservation Plan (TPP) shall be required to provide recommendations with respect to the protection or enhancement of existing trees. The TPP shall be prepared in accordance with the Niagara Region Tree and Forest Conservation By-law.

2.3.3 CITY OF WELLAND OFFICIAL PLAN

The City of Welland Official Plan Office Consolidation (2019) defines the community's vision for long-term growth and development of the City. The Official Plan is a guide to local growth and development by designating land for various land uses and contains policies that will guide the development. The Plan addresses local planning issues and aims to be in conformity with the provincial and regional policies that were active during the development of the OP; the 2005 PPS, Growth Plan for the Greater Golden Horseshoe (Ministry of Municipal Affairs and Housing, 2020), and the Regional Municipality of Niagara's Policy Plan. While an office consolidation exists with updates, the City of Welland is in the process of updating its Official Plan. A policy directions report was published in May 2022, but no official policy updates have been made.

The natural heritage land use policies from this Official Plan are found in Section 6.1 Environment. The goal of these policies is to maintain the natural environment for present and future generations, conserve Welland distinctive natural character, and support environmental steward ship and restoration. Modelled from the Regional OP (Section 2.3.1), the Welland OP uses a Core Natural Heritage System to protect sensitive environmental features and functions (Figure 2-4). The components of the Core Natural Heritage System consist of the following (Policy 6.1.2.1C) and are mapped in Schedule C and C1 (Policy 6.1.2.1.I):

- Cores areas which include EPA or ECA;
- Natural heritage corridors between core natural areas; and
- Fish habitat.

EPA and ECA are defined in the same way as within the Regional OP. EPAs include PSWs, Provincially Significant Life Science ANSIs, and the Significant Habitat of Threatened and Endangered Species (Policy 6.1.2.1.E). ECAs include Significant Woodlands, SWH, Significant Habitat of Species of Concern, Regionally Significant Life Science ANSIs, Other Evaluated Wetlands, Significant Valleylands, Savannahs and Tallgrass Prairies, Alvars, and Publicly Owned Conservation Lands (Policy

6.1.2.1.F). Natural Heritage Corridors are natural linkages between core natural areas. Natural heritage corridors include naturally vegetated stream corridors, valleylands, woodlands, natural vegetation communities and other features which provide linkages (Policy 6.1.2.1.G). Fish Habitat includes spawning grounds and nursery, rearing, food supply and mitigation areas on which fish depend directly or indirectly to carry out their life processes (Policy 6.1.2.1.H).

Significant Woodlands within the City of Welland must meet specific criteria; criteria which is consistent with the Significant Woodland Criteria in the Regional OP (Section 2.3.1; Section 6.1.2.2.E). If it is found that there are important environmental features or functions which have not been adequately evaluated, the applicant shall have an evaluation prepared by a qualified biologist in consultation with the City of Welland, the Region of Niagara, the NPCA and, where appropriate, the applicable provincial body. If the evaluation finds one or more natural heritage features meeting the criteria for identification as Core Natural Heritage System components, the appropriate Core Natural Heritage System policies shall apply (Policy 6.1.2.2.D).

The permitted uses within the Core Natural Heritage System included (Section 6.1.2.1.b):

- Forest, fish, and wildlife management uses;
- Conservation and flood or erosion control projects; and
- Small scale passive recreation uses.

It is expected that these uses will have no significant negative impact on natural features or ecological functions of the Core Natural Heritage System. Activities within these lands may be subject to a permit from the Conservation Authority, (refer to NPCA Regulation 155/06, as amended). Existing agricultural uses are also permitted to continue within the Core Natural Heritage System.

Development and site alteration within EPAs is prohibited. Development and site alteration may be permitted in ECAs, Natural Heritage Corridors, and on adjacent lands if it has been demonstrated that, there will be no negative impact on the natural features or their ecological functions (Policy 6.1.2.3.C). An expansion to an existing use located within an Environmental Conservation Area, Fish Habitat, or adjacent lands may be permitted if it will have no significant negative impact on the natural feature or its ecological functions (Section 6.1.2.3.J). The proponent shall be required to prepare an EIS in accordance with the Policies of this Plan (Policy 6.1.2.3.C and 6.1.2.3.J). Adjacent Lands in the Welland OP are defined as:

- 120 m of a PSW,
- 50 m of a Provincially Significant Life Science ANSI, Habitat of Threatened and Endangered Species, ECAs, and
- 30 m of the top of bank from Fish Habitat.

New infrastructure within Welland should be designed to maintain or enhance the natural features and function where they are occur (Section 6.1.2.3.a) and maintain the natural features and function which include the planning of native species (Section 6.1.2.3.K). However, linear transportation routes are permitted within the Core Natural Heritage System or adjacent lands where an Environmental Assessment has been approved under the provincial or federal legislation (Section 6.1.2.3.E). Within fish habitat and their adjacent lands development may be permitted if there will be no net loss of the productive capacity of the fish habitats as determined by the DFO. This would be demonstrated with an EIS (Section 6.1.2.3.f). The vegetated buffer (measured from stable top of bank) around fish habitat is the same as within the Regional Official Plan (Section 2.3.1); 30 m adjacent to Critical Fish Habitat and at a minimum 15 m from Important or Marginal Fish Habitat.

Where development or site alteration is approved within the Core Natural Heritage System or adjacent lands a Tree Saving Plan maintaining or enhancing the remaining natural features and ecological functions to be retained shall be submitted. The Tree Saving Plan shall be prepared by a professional forester in accordance with the Regional Tree and Forest Conservation By-law and the City's Tree Conservation By-Law (Section 6.1.2.3.H). The requirements of the Tree Saving Plan are (Section 6.1.2.3.I):

- Inventory and assess the health and significance of the trees in the woodland;
- Identify the trees to be removed, the reason for removal and the methods to be used;
- Identify the trees to be retained and measures required to prevent detrimental impacts on those trees; and
- Recommend a program to monitor the health of the trees that are retained and implement measures where trees and shrubs found thought the above monitoring to be dead or in poor health are replaced.

Under the Additional Policies of Section 6 in the OP, it is stated that the City of Welland has a target to achieve 30% forest or wetland cover, with at least 10% of each subwatershed in wetland, and a 30 m wide naturally vegetated along 70% of the length of the first and third order steams (Section 6.1.3.2.A). In support of the forest targets, Welland enacted a tree cutting By-law regulating the destruction or injuring of trees in woodlands less than 1.0 hectare in size. Additionally, when a woodland greater than 0.5 hectares in size is located on or adjacent to a development the applicant shall be required to prepare a Tree Saving Plan as a condition of approval. A grading or building permit shall not be issued unless the Tree Saving Plan has been approved by the City (Section 6.1.3.2.B).

Lastly, development and site alteration shall be restricted in the vicinity of vulnerable surface and ground water features (Policy 6.1.3.3) but development and site alteration may be permitted within an Earth Science ANSI if it has been demonstrated that there will be no negative impacts (Policy 6.1.3.5.A). Development and site alteration may be permitted within floodplains if it has been demonstrated, to the satisfaction of the Conservation Authority, that the activity is in accordance with the Conservation Authority's Regulation (Policy 6.1.3.6.A).

Where more than one Policy in the OP applies, all the applicable Policies are to be addressed, with the more restrictive Policies applying where there are conflicts.

Applicability to the Project

Parts of Road Section 4 of the Project are within the City of Welland (Figure 1-2). The area of the Road Section is mapped largely in Urban Structure, but Core Area bisects the Road Section (Figure 2-4). New or expanding infrastructure is not permitted in the EPA except for linear infrastructure constructed by a public authority or agency through an environmental assessment process. Where development or site alteration is approved within the Core Area Natural Heritage System or adjacent lands a Tree Saving Plan maintaining or enhancing the remaining natural features and ecological functions to be retained shall be submitted.

2.3.4 CITY OF THOROLD OFFICIAL PLAN

The Official Plan for the City of Thorold is a land use planning document that guides and shapes development (Town of Thorold, 2016). The Official Plan was approved by the Niagara Region on April 28, 2016. Modelled after the the Regional OP, the natural environment goal of Thorold's OP is to maintain, enhance, or restore ecosystem health and integrity. The Thorold OP is also influenced by provincial policies and acts such as the PPS, the Greenbelt Plan, the Niagara Escarpment Plan, and the Growth Plan for the Greater Golden Horseshoe.

The Provincial Growth Plan for the Greater Golden Horseshoe (Places to Grow 2006) has identified Greenfield Areas within Urban Living Areas. Lands identified as Greenfield are to be developed in such a manner as to attain a minimum population/employment density of 50 people and jobs per hectare. All of the lands within the Port Robinson West Secondary Plan are considered Greenfield. The NHS in the secondary plan area is called the Greenlands System and is comprised of lands designated Environmental Protection One and Environmental Protection Two as identified on Schedule A-6. Where natural heritage features are confirmed the policies of Environmental Protection One and Environmental Protection Two in the OP apply to this Secondary Plan.

The natural heritage land use policies from this Official Plan are found in Section B3. The OP splits the natural heritage designations into three categories (Section B3), Environmental Protection One, Two, and Three as well as having a Greenbelt Natural Heritage Overlay, Niagara Escarpment Plan Area, Floodplain, and Natural Recovery Overlay. Within the Study Area, only Environmental Protection One and Two (Figure 2-4) and Floodplain occur; they are summarized as follows:

- Environmental Protection One designation is intended to reflect the designation and policies for the EPA located in the Core Natural Heritage Area of the Niagara Regional Official Plan (Section 2.3.1). Environmental Protection One is shown on Schedule A, Schedule A6 (for the Port Robinson West Secondary Plan), and the individual components are shown on Schedule B.
- Environmental Protection Two designation is intended to reflect the designation and policies for the ECA located in the Core Natural Heritage Area of the Niagara Regional Official Plan (Section 2.3.1). Environmental Protection One is shown on Schedule A, Schedule A6 (for the Port Robinson West Secondary Plan), and the individual components are shown on Schedule B.
- Lands designated Floodplain constitute regulated areas in accordance with the Conservation Authorities Act and Regulations. Floodplain is shown on Schedule C.

Permitted uses on lands designated Environmental Protection One and Two are generally limited to management, conservation, flood control projects, agricultural drains, and small-scale, passive recreational uses where it has been demonstrated that they are necessary and have no negative impact on the features or on the ecological functions. Development and site alteration shall not be permitted within the habitat of endangered species and threatened species, except in accordance with Provincial and Federal requirements.

Policy B.3.2.4.3 states that "[e]xisting, legal uses located within the Environmental Protection One designation shall be recognized as legal non-conforming uses in this Plan or as exceptions in the City's Comprehensive Zoning By-law, such uses may not be physically expanded or enlarged." However, policy B3.2.4.6 and B3.3.4.7 states that new or expanding infrastructure is not permitted in the Environmental Protection One or Two except for linear infrastructure constructed by a public authority or agency through an environmental assessment process. Policy B3.3.4.3 states that an expansion to an existing use located within an Environmental Protection Two Designation may be permitted if it will have no negative impact. If the expansion involves a substantial intensification in land use or increase in the land area devoted to the use, the proponent shall prepare an EIS.

Policy B3.3.4.1 states that new development and site alteration may be permitted in the Environmental Protection Two designation, provided it has been demonstrated through an EIS that there will be no negative impact on the natural heritage feature or its ecological functions. In addition, where development or site alteration is proposed, a Tree Preservation Plan (TPP) shall be required to provide recommendations with respect to the protection or enhancement of existing trees. The TPP shall be prepared in accordance with the Niagara Region Tree and Forest Conservation By-law.

Where development or site alteration is proposed in proximity to lands in the Environmental Protection One or Two designations, efforts should be made to identify and create maintain and where possible enhance linkages amongst lands designated Environmental Protection One, Two, and Three. Additionally, impacts must be considered in adjacent lands to natural heritage features. The City's OP defines Adjacent Lands as:

- 120 m from the boundary of a (PSW);
- 50 m from the boundary of a Provincially Significant Life Science ANSI;
- 50 m from the significant habitat of endangered species and threatened species; and
- 50 m from the Environmental Protection Two boundary.

No development or site alteration shall be permitted on adjacent lands unless an EIS demonstrates that there will be no negative impact on the feature or its ecological functions. An EIS prepared to address impacts on development or site alteration within adjacent lands shall be reviewed and approved by the appropriate governing bodies. Lastly, concerning Environmental Protection areas, Policies B3.2.4.7 and B3.3.4.9 recognize that there may be areas in the City where Environmental Protection areas have not been mapped are identified. If a natural heritage feature meets the criteria of one or more of the Environmental Protection designations occurs, it should be protected from development in accordance with the policies in the OP.

Floodplain is identified to protect public safety by restricting land use and development. Policy B3.6.2 provides a detailed list of permitted uses. In summary, permitted activities in the floodplain are restricted to uses not likely to incur or create damage from floodwaters. Linear infrastructure is allowed provided that flooding potential is addressed. Policy B3.6.5 acknowledges that the NPCA is responsible for assessing and permitting development within the Floodplain designation.

Applicability to the Project

Sections 1,2, and 3 are all within the City of Thorold. Environmental Protection One, Environmental Protection Two, PSW and Fish habitat has been mapped by The Town of Thorold Official Plan near the Project Location. The Town of Thorold's Official Plan applies to the Project.

640000 641000 642000 643000 644000 645000

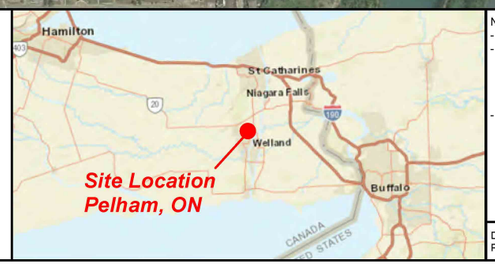
4767000 4766000 4765000

PORT ROBINSON RD
PORT ROBINSON RD
HWY 406
RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY
PELHAM ST
MERRITT RD
Niagara Street - Cataract Road Woodlots – Wetland
HWY 406
CITY OF THOROLD
CITY OF WELLAND
TOWN OF PELHAM
CITY OF WELLAND
QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure2-4_LowerMunicipalities.mxd

LEGEND

- Municipal Boundaries
- Road Segments
  - 1: Unopened Road Allowance (Merritt Rd)
  - 2: Merritt Rd
  - 3: Merritt Rd
  - 4: Rice Rd
- Fish Habitat
- Environmental Protection 1
- Environmental Protection 2
- Environmental Conservations Area (City of Welland, 2022)
- Environmental Protection Area (City of Welland, 2022)
- Port Robinson Land Use Plan Boundary



NOTES:
- Imagery from Google, 2018
- Environmental Conservation and Protection Areas, CNH Municipal Drains, and CNH Potential Natural Heritage Corridors retrieved from Niagara Official Plan (Schedule C)
- Location of features is approximate

Datum: NAD83
Projection: UTM Zone 17N

0 1.25 2.5 Kilometres

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Lower-tier Municipalities, NHS Official Plan Layers

PROJECT N°: IM20103036	FIGURE: 2-4
SCALE: 1:14,000	DATE: February 2023

3 CONSULTATION

As the Region is undertaking a Class EA, consultation has been completed with stakeholders and the public. The Environmental Study Report (ESR) completed by WSP contains a detailed summary of this consultation. Regarding the natural environment, common themes from the Public Information Centres (PICs) are summarized below. Additionally, early on, the NPCA was engaged to understand the concerns and receive approval of the Terms of Reference (TOR), which outlined the fieldwork and scope of reporting.

In addition to PICs and agency consultation, Mississaugas of the Credit First Nation, Hadudensosaunee Confederacy Chiefs Council c/o Haudenosaunee Development Institute have participated in fieldwork for the Project.

3.1 PUBLIC INFORMATION CENTRES

PIC #1, #2, #3 were held online on 24 March, 9 June, 1 December 2021. The comments received through the PICs were summarized and grouped by road segment in PIC Summary Reports prepared for the Region. These reports were made available through project webpage: https://niagararegion.ca/projects/regional-road-37/. Natural environment concerns largely focused on Section 1 and the potential impacts on the natural environment by creating a road in the unopened allowance. Other comments received related to the general well-being of biodiversity, area of disturbance, and vegetation/tree planting. Comments regarding the environmental planning choices by the Region and the Official Plan updates as it relates to natural heritage systems were also provided.

3.2 NIAGARA PENINSULA CONSERVATION AUTHORITY

To support an understanding of the conditions of the natural environment at the project site and to receive approval of a TOR, the first meeting with NPCA was held on 11 February 2021. After this meeting, the TOR was provided for review and comment on 16 February 2021. After addressing comments, acceptance of the TOR was provided on 13 May 2021. It is important to note that the TOR accepted provides an outline for the studies undertaken to support environmental reporting. The NPCA further noted that avoiding the alignment of the proposed road through wetlands is the preference.

Several other meetings with the NPCA occurred. Some focused on watershed elements within their regulations, and others focused on other agency correspondence (i.e., with the MECP). An email on 4 August 2021 an email providing information on the aquatic habitat assessment background review was sent from Adam Aldworth. Floodplain mapping for Singer's Drain as well as the most recent Port Robinson West Subwatershed Study (Aquafor Beech 2014) were provided as well. On 8 December 2021, a meeting to share the preliminary preferred design was held. In this meeting, the NPCA indicated they would require more information to determine if the NPCA policies support the preferred design. The NPCA stated they would inform the Study Team about what additional investigations will be required to inform impacts on wetlands. In a comment letter (dated 23 December 2021), the NPCA specified requirements for a hydrological monitoring plan. A meeting was held on 28 January 2022 to discuss the comment letter and the newly requested hydrological monitoring plan. The hydrological monitoring plan would allow the NPCA to understand flooding impacts from a risk and liability perspective. However, the NPCA would also like to understand what impacts on the wetland in Road Section #1 and flooding will be and how impacts will be mitigated. It was agreed that hydrogeological and geotechnical investigations would be completed to confirm groundwater flow. Any additional surveys to be completed during the detailed design would be clearly described in the ESR.

This report was shared with the NPCA for review on April 28, 2023. The Study Team received comments from the NPCA on the EIS on May 23, 2023. Several of these comments identified need for additional work. The Study Team provided responses to NPCA's comments on June 6, 2023, noting that additional requested work could be completed during detailed design phase. On June 15, 2023, NPCA provided a response noting that the Authority staff look forward to reviewing additional details during detailed design phase. The draft Environmental Study Report (ESR) along with its supporting technical studies was also shared with the NPCA for review on October 2, 2023. On January 17, 2024, the NPCA provided comments on the draft ESR, this report, and the Stormwater Management Report. Responses to NPCA's comments were provided by the Study Team on February 14, 2024. NPCA's comments on the EIS and Study Team's responses are provided in Appendix H.

This report intends to meet the EIS requirements (and the outlined requirements in the TOR) as well as the submission for the ESR under the Class EA. A copy of agency correspondence is also provided in Appendix B.

3.3 NIAGARA REGION

The proponent of the Class EA is the Public Works Department within the Region. Therefore, a stakeholder throughout the Class EA has been Cara Lampman, the Manager of Environmental Planning within the Region. The TOR was also sent to the Region for acceptance and was accepted based on NPCA updates on 26 April 2021 (Appendix B). Niagara Region's environmental planning staff was also present during the consultation with MECP (16 November 2021). It was asked in this meeting that with impacts on wetlands and SAR if it is feasible to proceed. WSP staff, Samantha Hughes, noted that the process is proponent-driven. WSP also reminded the Region that the EIS/Natural Environment reporting would be a factual report noting the existing conditions and perceived impacts. Reporting would have a section on mitigation and recommendations to reduce and offset impacts to the extent possible. The report would provide the Region with the information to assist in decision-making and whether it is appropriate to proceed with the project.

3.4 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS

On 16 November 2021, a meeting to discuss the Class EA and preliminary findings of the natural environment fieldwork with the MECP was held. At this time, during fieldwork, seven SAR were confirmed:

- Round-leaved Greenbrier (Threatened);
- White-wood Aster (Threatened);
- Eastern Flowering Dogwood (Endangered);
- Little Brown Myotis (Threatened) and SAR bat species;
- Barn Swallow (Special Concern-downlisted January 2023);
- Wood Thrush (Special Concern); and
- Eastern wood-pewee (Special Concern).

The meeting intended to receive input on the next steps related to impacts on the SAR and their habitat (specifically White-wood Aster). MECP requested that an Information Gathering Form (IGF) be submitted to receive formal comments. At this time, it was also noted that Little Brown Myotis is assumed to be present, and the wooded habitat is therefore being treated as SAR bat habitat. WSP biologist Samantha Hughes and MECP biologist Brianne Brothers outlined the steps the Region would have to follow for approvals under the ESA. WSP biologist Samantha Hughes agreed that once the preliminary preferred design is confirmed, WSP would submit an IGF for the Ministry's review. Accordingly, mitigation measures informed by MECP response on the IGF will be incorporated in reporting (if received). The IGF was submitted to the MECP by email on 9 November 2022 and was acknowledged received by Joan Del Villar Cuicas on 14 November 2022. A formal response to the IGF was received on 6 February 2023 and noted the additional "occurrence of White Wood Aster, Butternut, Eastern Flowering Dogwood and American Chestnut near the intersection of Merritt and Rice Road". MECP also noted that Blanding's Turtles are known to occur in the area and asked for confirmation of whether vegetation removal will occur outside of the active season for SAR birds in any given year.

3.5 MINISTRY OF NATURAL RESOURCES AND FORESTRY

A summary of correspondence with the MNRF is documented below in Table 3.1.

Table 3.1 Summary of Correspondence with the Ministry Natural Resources and Forestry

METHOD	DATE	SENDER	SUBJECT
Email	9 November 2021	WSP	Request for background natural environment information
Email	24 November 2021	MNRF	Provided in-water fisheries timing windows. The MNRF has identified restricted in-water timing windows for tributaries of the Welland Canal as March 1st to July 1st.
Email	9 September 2021	WSP	Reports for ANSIs and PSWs

4 METHODS

To characterize the natural environment, a background review of available desktop and secondary sources information was completed and supplemented by observations made during field investigations. The additional information gained through consultation was also incorporated as applicable. Aquatic habitat assessments were completed, and vegetation was surveyed to inform Ecological Land Classification (ELC) delineation and document plant SAR locations. Breeding bird surveys and anuran call surveys were also conducted as described in the following subsections.

The Study Area contains the publicly accessible ROW and private property. Permission to Enter (PTE) requests were sent to residents; however, in instances where access was not feasible (e.g., property access not granted), surveys were completed from the closest and safest vantage points. A record of surveys completed, including survey type, date and time, general weather conditions, and surveyors, is provided in Table 4.1. In addition to targeted surveys, opportunistic/incidental wildlife observations were collected during all surveys to record presence and habitat use. Methods used in conducting the field program components and dates for each survey type are outlined in their respective sections below.

Table 4.1 Summary of Field Surveys Completed

FIELD SURVEY TYPE	DATE	GENERAL WEATHER	SURVEYOR(S)
Fall Plant Inventory and ELC	30 September 2020	10°C, no wind, cloudy, rainy	Todd Hagedorn
Amphibian Call Survey 1	13 April 2021	6°C, low wind, no clouds, no rain	William Barbour
Amphibian Call Survey 2	13 May 2021	12°C, light wind, no clouds, no rain	Todd Hagedorn
Amphibian Call Survey 3	9 June 2021	27°C, no wind, no clouds, no rain	Todd Hagedorn
Breeding Bird Survey 1	10 June 2021	16°C, no wind, no clouds, no rain	Todd Hagedorn
Breeding Bird Survey 2	30 June 2021	27°C, mostly cloud, no wind, no rain	Todd Hagedorn
Aquatic Habitat Assessments	21 July 2021	18°C, no wind, partly overcast, no rain	Michael Godard
Summer Plant Inventory and ELC	29 July 2021	23°C, partly cloudy, light wind, no rain	Reuven Martin
Summer Plant Inventory and ELC	30 July 2021	18°C, partly cloudy, light wind, no rain	Reuven Martin
Fall Plant Inventory and ELC	15 September 2021	25°C, no clouds, light wind, no rain	Reuven Martin
Fall Plant Inventory and ELC	16 September 2021	20°C, partly cloudy, light wind, no rain	Reuven Martin and Todd Hagedorn
Spring Plant Inventory	6 May 2022	10°C, partly cloudy, windy, no rain	Reuven Martin
Spring Plant Inventory	20 May 2022	18°C, partly cloudy, windy, no rain	David Dunn

Archeological Support/SAR area of avoidance	20 June 2022	N/A	David Dunn
Archeological Support/SAR area of avoidance	3 October 2022	N/A	Gwyneth Govers

4.1 DESKTOP SCREENING AND SECONDARY SOURCE REVIEW

Screening of available background information from existing studies, plans, databases, and other sources was completed. The desktop screening assisted in the preliminary determination of existing Natural Heritage Features and candidate features, additional sensitivities, and to ascertain potential SAR plant and animal species present, and to contribute to the understanding of watercourses within the Study Area. Data also included potential occurrences of species of conservation concern, including SAR and provincially rare species, and whether any locally or provincially protected features are known within or near the Study Area. Relevant background queries, studies, and reports include:

- All regulatory and policy contexts summarized in Section 2.0;
- Natural Heritage Information Centre (NHIC) database squares encompassing the Study Area;
- eBird (eBird 2022), no hotspot locations were found for the Study Area, but it was still search for SAR;
- iNaturalist (iNaturalist 2022) as a 500 m buffer from the site;
- The Second Atlas (2001 to 2005) of Breeding Birds of Ontario (Ontario Breeding Bird Atlas; OBBA; Cadman et al 2007);
- The Atlas of the Mammals of Ontario range maps (Dobbyn 1994);
- Mammals of the Great Lakes Region range maps (Kurta 1995);
- The Ontario Reptile and Amphibian Atlas (ORAA; Ontario Nature 2022);
- The Ontario Butterfly Atlas (OBA; MacNaughton 2021);
- Natural Heritage data extracted from Land Information Ontario (LIO)/GeoHub (MNRF 2022);
- Online DFO Aquatic SAR map (Fisheries and Oceans Canada 2022);
- ELC data from the NPCA (NPCA 2019);
- Natural Areas Inventory – Study Site PL -10 Rose Little Woods – Merritt Road Swamp (NPCA 2010);
- Port Robinson West Scoped Subwatershed Update and Servicing Plan (Aquafor Beech Limited 2014);
- Port Robinson West Subwatershed Study Final Report (NPCA 1999);
- Niagara Region's Transportation Master Plan (TMP; IBI 2017a); and
- Where applicable hydrological (including stormwater management assessment) and geotechnical assessments completed for the project, have been reviewed and incorporated to characterize the hydrology of the wetlands.

The NHIC database utilizes a 1 km x 1 km system, while the OBBA, ORAA, and OBA, utilize a 10 km x 10 km system (Figure 4-1). Both systems generate a list of species that are documented within the specific square. It is important to note that the recorded presence of a specific species must be viewed in conjunction with existing habitat conditions (e.g., watercourses that are now dry or ephemeral cannot be expected to support the same fisheries community that they may have in the past). Likewise, the 10 km grid encompasses an area larger than the Study Area. Species of conservation concern, including SAR, have been considered in the SAR screening as habitat may not occur in the Study Area (i.e., the record comes from anywhere in the 10 km square). As such, records/element occurrences do not confirm or necessarily indicate species present within the Study Area.

For the purposes of this Report, only common names for species have been provided; the full nomenclature of each reported species is provided in Appendix C.

640000 641000 642000 643000 644000 645000 646000

4767000 4766000 4765000 4764000

PORT ROBINSON RD

PELHAM ST

RICE RD

TOWN OF PELHAM

CITY OF THOROLD

CATARACT RD

MERRITTVILLE HWY

HWY 406

Kottmeier Road

MERRITT RD

CITY OF THOROLD

CITY OF WELLAND

QUAKER RD

TOWN OF PELHAM

CITY OF WELLAND

17TPH4067 17TPH4167 17TPH4267 17TPH4367 17TPH4467

17TPH4066 17TPH4166 17TPH4266 17TPH4366 17TPH4466

17TPH4065 17TPH4165 17TPH4265 17TPH4365 17TPH4465

N/A 17TPH4164 17TPH4264 17TPH4364

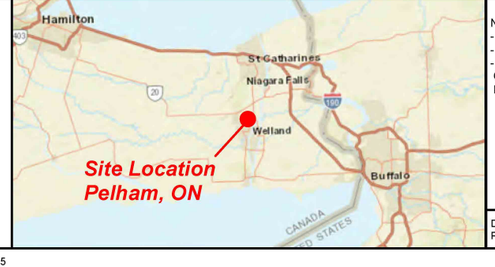
P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\DesktopGrid_4-1.mxd

LEGEND

- Municipal Boundaries
- Natural Heritage Information Centre 1 km Grid
- iNaturalist Search Area

Road Segments

- 1: Unopened Road Allowance (Merritt
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd



NOTES:
- Imagery from Google, 2018
- Location of features is approximate
- ENtire map extent is with the Growth Plan for the Greater Golden Horseshoe

Datum: NAD83
Projection: UTM Zone 17N

0 1.75 3.5 Kilometres

Niagara Region

WSP

NIAGARA MERRITT-RICE ROAD

Desktop Grids and Boundaries

PROJECT N°: IM20103036 | **FIGURE: 4-1**

SCALE: 1:17,000 | DATE: December 2022

4.2 AQUATIC SURVEYS

A field investigation was conducted to document the existing conditions of the aquatic habitat within the study area. The field investigation was conducted in accordance with "Section 4 – Field Investigations" of the Ministry of Transportation (MTO) Environmental Guide for Fish and Fish Habitat (MTO, 2013). Since the aquatic features located within the study area do not require a detailed fisheries assessment (i.e., no fish community sampling) according to the MTO Protocol, field investigations were limited to reconnaissance level observations including substrate characterization, evidence of embankment erosion and instability, in-water habitat features, and barriers to fish passage.

As per the MTO protocol, the aquatic habitat survey was completed approximately 20 m upstream to 50 m downstream in the watercourses within the Study Area where PTE allowed, as shown in Figure 4-2. For the watercourses within the unopened road allowance where no identified road crossing or culvert was present, the centre line of the road was used to determine upstream and downstream habitats. The collection of fish habitat information during the field investigation encompassed the following parameters:

- stream channel dimensions, general gradient, and profile,
- bank/shoreline character (e.g., height and erosion),
- flow characteristics, including evidence of groundwater discharge,
- morphology and substrates,
- instream/in-water cover opportunities (e.g., woody debris, undercut banks, boulders, vegetation),
- riparian vegetation,
- presence of physical barriers to fish movement,
- presence of potential critical or specialized habitat areas including potential spawning areas, good,
- nursery cover, holding habitat (deeper refuge pools),
- disturbances and past habitat alterations (e.g., channelization, potential pollutant point sources), and
- potential habitat enhancement opportunities.

641000 641500 642000 642500 643000

4766000

4765500

RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY

Crossing 1
Crossing 2
Crossing 3
Crossing 4 Midpoint
Crossing 4 Downstream Extent
Crossing 4 Upstream Extent
Crossing 5
Crossing 5 Downstream Extent
Crossing 5 Upstream Extent
Crossing 6
Crossing 7
Crossing 8
Crossing 9

CITY OF THOROLD
CITY OF WELLAND

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Aquatics_Figure_4-2.mxd

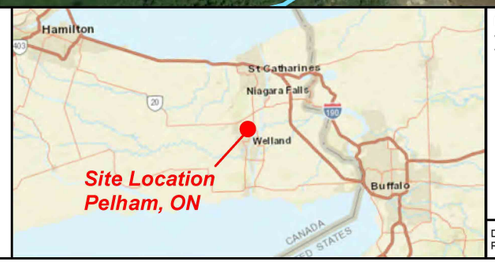
LEGEND

Municipal Boundaries

Road Segments
- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd

Crossing (labelled with ID number)
Downstream Extent (labelled with ID number)
Upstream Extent (labelled with ID number)
Fish Observations

Assessed Area
Waterbody
Watercourse
Direction of Flow



NOTES:
- Imagery from Google, 2018
- Waterbody and Watercourse Information retrieved from LIO, 2022

0 0.5 1 Kilometres

Datum: NAD83
Projection: UTM Zone 17N

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Aquatic Habitat Assessment Areas

PROJECT N°: IM20103036 | FIGURE: 4-2

SCALE: 1:5,500 | DATE: September 2022

4.3 VEGETATION COMMUNITIES AND PLANT INVENTORY

ELC vegetation communities were delineated using aerial photography and ground-truthing during ELC and plant inventories in spring, summer, and fall. Classifications were completed using a combination of methodologies within the Terrestrial Study Area (Figure 1-2) where PTE was available, and access was safe. The Ecological Land Classification for Southern Ontario: First Approximation and Its Application (Lee, et al., 1998) was used first, in keeping with a standardized protocol. However, the 1998 ELC manual was developed in communities not reminiscent of those seen in heavily agrarian landscapes today. An updated version, which is more applicable to agrarian landscapes, has been unofficially released in draft form (Lee H., 2008). This 'Second Approximation' more accurately categorizes and describes landscapes in Ecoregions 6E, 7E and is gaining traction as an industry standard. Both 'Approximations' use the same methods but using both provides a more detailed summary of the Study Area.

Generally, communities at least 0.5 ha in size are mapped following ELC protocols; however, vegetation communities less than 0.5 ha may be included in the analysis if considered unique. Substrate type and depth, moisture regime, topography, floral composition, stand structure and disturbance were inventoried to describe and classify vegetation communities. The terminology used is based on ELC sampling protocols that collect information on four vegetation layers (note: some layers may not be present within a vegetation community sampled). The four layers are:

- Canopy consists of tall vegetation that reaches the light first, typically composed of tall trees (in a forest community).
- Sub-canopy includes vegetation growing just under the canopy, vegetation that receives filtered sunlight through the canopy, typically composed of trees and tall shrubs (in a forest community).
- Understory includes vegetation growing below the sub-canopy, typically composed of both tall and low-growing shrubs (in a forest community).
- Ground layer consists of the vegetation, which is closest to and covers the ground, typically composed of herbaceous vegetation.

ELC is used to identify the presence of rare and/or sensitive vegetation communities and/or species to the extent possible. The occurrence of ELC communities was cross-referenced with provincially significant vegetation communities as identified in the Significant Wildlife Habitat Technical Guide (Ontario Ministry of Natural Resources, 2000). Vegetation communities were also used to screen for SWH using the Significant Wildlife Habitat Criteria Schedule for Ecoregion 7E (Ontario Ministry of Natural Resources and Forestry, 2015). Additionally, the information collected will also be used to confirm the high-level ELC data provided by the NPCA and aid in identifying suitable SAR habitats.

4.4 BREEDING BIRD SURVEYS

Breeding bird stations were chosen to cover as much of the natural habitat as possible. Breeding bird surveys were undertaken on 10 June and 30 June 2021 at 17-point count stations within the Study Area (Figure 4-3). Guidelines for dates of breeding bird surveys provided by Environment Canada were followed; from 24 May to 10 July, split into two periods to target early breeding species (24 May to 17 June) and late breeding species (13 June to 10 July) and surveys were completed 15 days apart.

Surveys were conducted between 6:30 a.m. and 9:00 a.m. to capture the period of maximum bird song activity. Each station consisted of a circle with a 100 m radius from the center point (the location of the observer). All birds heard or observed were recorded at intervals of 0 to 50 m, 50 to 100 m, >100 m and flyovers (birds seen flying overhead). Each point count was ten minutes in duration, following the Forest Bird Monitoring Protocol (Ralph, Sauer, & Droege, 1995). Birds were recorded at intervals of zero to three minutes, three to five minutes, and five to ten minutes. Species were identified through their unique vocalizations and by visual observations. Each bird was recorded once and mapped on the field data sheets to ensure no duplication of individual birds. All observations were recorded on breeding bird survey field forms, shown in Appendix D.

Activity seen and heard directly relates to breeding evidence described in the Ontario Breeding Bird Atlas Guide for Participants (2020). Breeding evidence is reported in four levels:

- Species observed in the breeding season;
- Possibly breeding;

- Probably breeding; and
- Confirmed breeding.

As some species are area sensitive, a higher level of breeding evidence can inform habitat quality. Additionally, occurrence and abundance can inform SWH.

4.5 ANURAN CALL SURVEYS

Amphibians require aquatic habitats for mating, egg incubation, and larval development. The frog and toad species (anurans) that have the potential to occur on-site have distinctive mating calls which can be used in species identification. Therefore, Anuran call surveys were completed at aquatic habitats in the Study Area. The protocol followed was based on the Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (Bird Studies Canada, 2009 Edition).

Anuran call surveys were undertaken on 13 April, 13 May, and 9 June 2021 at 25 stations within the Study Area (Figure 4-3), which captures peak breeding seasons. Surveys followed the protocols described in the Marsh Monitoring Program Participant's Handbook for Surveying Amphibians. Surveys targeted appropriate weather conditions and night-time air temperatures of greater than 5°C for the first survey, 10°C for the second survey and 17°C for the third survey. Surveys took place between a half-hour after sunset and midnight. Surveyors identified species by their unique vocalizations or by direct observation for at least 3 minutes at each station. Anuran call surveys use Call Level Codes to categorize activity intensity and an Abundance Count to estimate numbers, as follows:

1. Code 1 - Individuals can be counted, calls are not simultaneous. An Abundance Count records the number of individual frogs of each species calling beside the Code.
2. Code 2 - Calls distinguishable, some simultaneous calling. An Abundance Count estimates the number of individual frogs of each species calling beside the Code.
3. Code 3 - Full chorus, calls continuous and overlapping. There are too many overlapping calls to allow for any reasonable Abundance Count or estimate.

Dependence on water makes amphibians particularly susceptible to changes in local environmental conditions and therefore are ideal indicators of local ecosystem health (Bird Studies Canada, 2009 Edition). Additionally, occurrence and abundance can inform SWH.

Surveys specific to documenting non-vocal groups of amphibians, such as salamanders, or reptiles and turtles were not completed. Secondary source data was relied on for other herptiles (amphibian and reptile) occurrences. Results from anuran call surveys document current vernal pool and wetland habitat potential, and suitable terrestrial features (such as downed logs for egg-laying) were documented during other surveys.

4.6 INCIDENTAL OBSERVATIONS

During the species-specific surveys listed above, any wildlife sightings, evidence or signs of wildlife use, or other things of note were documented. Findings are included within subsections and species lists (Appendix C).

640000 641000 642000 643000 644000 645000

4767000 4766000 4765000

PORT ROBINSON RD

PORT ROBINSON RD

RICE RD

TOWN OF PELHAM

CITY OF THOROLD

CATARACT RD

MERRITTVILLE HWY

HWY 406

Kottmeier Road

PELHAM ST

MERRITT RD

HWY 406

CITY OF THOROLD

CITY OF WELLAND

TOWN OF PELHAM

CITY OF WELLAND

QUAKER RD

QUAKER RD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

BB1 BB2 BB3 BB4 BB5 BB6 BB7 BB8 BB9 BB10 BB11 BB12 BB13 BB14 BB15 BB16 BB17

P:\2020\Projects_Other\IM20103036_NiagaraMerittRiceRoad\11_GIS\MXD\Figure4-3_Wildlife_Survey_Locations_1.mxd

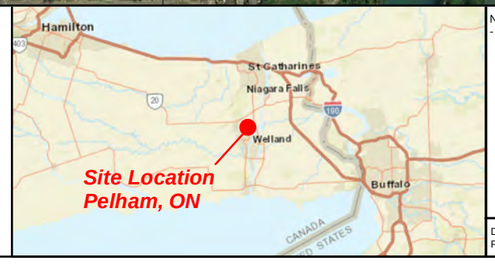
LEGEND

- Terrestrial Study Area
- Municipal Boundaries
- Merritt Rd Breeding Bird Survey
- Merritt Rd Amphibian Call Survey

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd

0 1.25 2.5 Kilometres



NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Wildlife Survey Locations

PROJECT N°: IM20103036 | **FIGURE: 4-3**

SCALE: 1:14,000 | DATE: September 2022

4.7 WETLAND ECOLOGICAL ASSESSMENT

As directed by NPCA in the approval of the TOR (Appendix B), an understanding of the surface and ground water connections in the wetland complex in Segment 1 is needed. To this effect, the hydraulic assessment of Singers Drain was completed (under separate cover; Wood 2022). Additionally, there was NPCA interest in identifying the 'ecohydrology' of the area to inform existing conditions. The representation of ecohydrology was completed for flora and avifauna. Plants, when identified to the species level, can be identified as a 'wetland plant' using a Coefficient of Wetness. In Ontario, the Coefficient of Wetness and its definitions are defined by Oldham, Bakowsky, & Sutherland (1995). Similarly, to determine which obligate wetland bird species were documented in the Study Area, the Coefficient of Wetness from the NHIC species list was used. Coefficient of Wetness is provided in species lists in Appendix C.

The WSP Water Resources Team also performed a wetland hydrologic characterization and a preliminary hydrogeological investigation. These tasks were used to complete Step 1 and Step 2 of a Wetland Water Balance Risk Evaluation (Toronto and Region Conservation Authority [TRCA] 2017), a decision supported by NPCA. The Wetland Water Balance Risk Evaluation has been developed to aid proponents of infrastructure proposals in determining the level of risk a proposal has to the ecological integrity of a wetland through changes to its hydrology (TRCA 2017). The Wetland Water Balance Risk Evaluation assigns a level of risk to consider two main factors:

i. The potential magnitude of hydrological change that would occur in the absence of a mitigation strategy and;

ii. The sensitivity of the wetland to hydrological change.

The potential magnitude of change and the sensitivity of the wetland are evaluated together using a decision tree which determines the overall level of risk of the project to the hydrology of the wetland (TRCA 2017). The WSP Water Resources Team is working to provide the Wetland Water Balance Risk Evaluation as a separate deliverable; however, preliminary results are presented in Section 5.5.

4.7.1 WETLAND WATER BALANCE RISK EVALUATION METHODS

Step 1 of the Wetland Water Balance Risk Evaluation is to delineate the catchment area of all potentially impacted wetlands (the WSP Water Resources Team only evaluated wetlands in Segment 1, the unopened road allowance). Impact on the catchment of a wetland occurs when the proposal changes the size of the catchment, the amount of impervious cover within the catchment, or when water taking is anticipated to require a water taking registration (i.e., >50,000 L/day). The hydrology work to inform the Wetland Water Balance Risk Evaluation refined the location of wetland pockets that form the forest/swamp mosaic and their storage areas. The wetland groups in the area were assigned group identifiers (e.g., SU01, SU21) for the risk evaluation.

Step 2 of the Wetland Water Balance Risk Evaluation is to evaluate the magnitude of the potential hydrological impact of the project on a wetland by:

i. Calculating the proportion of impervious cover in the catchment of the wetland that would result from the project.

ii. Calculating the degree of change in the size of the wetland catchment.

iii. Calculating water taking from, or discharge to, surface water bodies or aquifers directly connected to the wetland catchment (note this was not used in the evaluation due to project scope).

iv. Calculating the impact on locally significant recharge areas (note this was not used in the evaluation due to surface water fed features only).

Step 3 of the Wetland Water Balance Risk Evaluation is to determine the sensitivity of the wetland groups to hydrological change based on the abiotic and biotic characteristics of the wetland. To assess the sensitivity of a wetland to hydrological change, five criteria are used:

i. Vegetation community

ii. Fauna

iii. Flora

iv. Significant wildlife habitat for hydrologically sensitive species

v. Hydrological classification considering ecology.

Once the five criteria are evaluated, the below table is used as a matrix to determine sensitivity. The highest magnitude sensitivity category in Table 4.2 with one or more criteria satisfied determines the overall sensitivity of the wetland to hydrological change.

Table 4.2 Criteria used to evaluate the sensitivity of the wetland to hydrological change (Step 3)

CRITERIA	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVITY
Vegetation community	Presence of a high-sensitivity vegetation community	Presence of a medium sensitivity vegetation community	No high or medium sensitivity criteria were satisfied
Fauna	Presence of a high-sensitivity species	Presence of a medium-sensitivity species	No high or medium sensitivity criteria were satisfied
Flora	Presence of multiple high-sensitivity species	Presence of multiple medium-sensitivity species OR Presence of one high-sensitivity species	No high or medium sensitivity criteria were satisfied
Significant Wildlife Habitat	Presence of Significant Wildlife Habitat for high sensitivity species	N/A	No high criteria were satisfied
Hydrological classification considering ecology	Isolated/palustrine AND Presence of medium or high sensitivity vegetation communities* OR medium or high sensitivity flora or fauna species	Isolated/palustrine AND No medium or high sensitivity vegetation communities* AND no medium or high sensitivity flora or fauna species present	Riverine/lacustrine

Vegetation community

Different ELC communities vary in their sensitivity to hydrological change. Some vegetation communities can withstand some hydrological change without dramatically changing their composition, whereas others require specific hydrological conditions to persist. TRCA ranked ELC communities in their watershed by their sensitivity to hydrological change, which was evaluated using a local rank (L-rank) system created and implemented by TRCA. The local ranking methodology was modified to instead rank Regionally Rare Ecosites and Vegetation Types from the Niagara Region Status (NPCA 2010). Rare plant communities in the Niagara Region are therefore defined as ELC Ecosites and Vegetation Types that are rare in Ontario (i.e., ranked S1, S2 or S3) and/or regionally rare Ecosites and Vegetation Types (i.e., those known from 10 or fewer sites in Niagara Region (NPCA 2010)).

None of the vegetation communities documented in the Terrestrial Study Area are noted as Regionally Rare based on the NAI (NPCA 2010) or Provincially Rare based on NHIC data (Table 4.3). It is noted that previously Aquafor Beech (2014) indicated that Pin Oak Mineral Deciduous Swamp (SWD1-3) as occasional among vernal pools. Pin Oak Mineral Deciduous Swamp is a rare vegetation community (S2S3) but was not documented in the ROW by botanists during fieldwork.

Table 4.3 Rarity Assessment of ELC Vegetation Communities in the Terrestrial Study Area

VEGETATION COMMUNITY	REGIONAL RANK (Y/N)?	PROVINCIAL RANK
Dry - Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3)**[1]	N	S5 (Secure)
Dry – Fresh Deciduous Woodland (WODM4) **	N	N/A
Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3)	N	S5 (Secure)
Inclusion - Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2) **	N	N/A

Notes:
1= This community is not described in the First Approximation of ELC codes but is similar to the Dry-Fresh Sugar Maple Deciduous Forest (FOD5).
Anthropogenic and Successional Communities are not presented. Communities not defined to Vegetation Level are not presented.
Plant community types listed in the draft version of ELC (Lee 2003), but not in Lee et al. (1998), are denoted with a double-asterisk (**) and do not have Provincial Ranks.
Provincial Rank queried from the NHIC Plant Community List created on 2021-08-25 https://www.ontario.ca/page/get-natural-heritage-information

Fauna

Many fauna species are adapted to particular hydrological conditions or are associated with wetlands. Some fauna have adapted to utilizing temporary pools as refuge or habitat that coincides with specific biological needs, while some require permanent water. Fauna species were categorized based on their sensitivity to hydrological change, provincial rarity, and the Coefficient of Wetness provided by NHIC (Table 4.4). Following the Wetland Water Balance Risk Evaluation, the individual species with the highest sensitivity level determines the sensitivity of the fauna community to hydrological change.

Table 4.4 List of Hydrologically Sensitive Fauna Documented in the Terrestrial Study Area

FAUNA	SENSITIVITY	PROVINCIAL RANK[1]	COEFFICIENT OF WETNESS[2]
BIRDS			
Canada Goose	Low	S5	W
Common Yellowthroat	Low	S5B,S3N	W
Double-crested Cormorant	Low	S5B,S4N	W
Great Blue Heron	Low	S4	W
Herring Gull	Low	S4B,S5N	W
Mallard	Low	S5	W
Northern Waterthrush	Medium	S5B	W

FAUNA	SENSITIVITY	PROVINCIAL RANK[1]	COEFFICIENT OF WETNESS[2]
Ring-billed Gull	Low	S5	W
Rusty Blackbird	Medium (as migratory habitat)	S4B,S3N	W
Spotted Sandpiper	Medium	S5B	W
Swamp Sparrow	Low	S5B,S4N	W
Willow Flycatcher	Medium	S4B	W
Wilson's Warbler	Medium	S5B	W
AMPHIBIANS AND REPTILES			
American Bullfrog	High	S4	W
American Toad	Medium	S5	W
Gray Treefrog	High	S5	W
Green Frog	High	S5	W
Northern Leopard Frog	High	S5	W
Pickerel Frog	High	S4	W
Spring Peeper	High	S5	W
Western Chorus Frog - Carolinian Population	Medium	S4	
Blue-spotted Salamander[3]	High	S4	W
Eastern Red-backed Salamander[3]	Medium	S5	
Eastern Gartersnake	Low	S5	
MAMMALS			
American Mink	Low	S4	N/A
Coyote	Low	S5	N/A

FAUNA	SENSITIVITY	PROVINCIAL RANK[1]	COEFFICIENT OF WETNESS[2]
Eastern Chipmunk	Low	S5	N/A
Eastern Gray Squirrel	Low	S5	N/A
Northern Raccoon	Low	S5	N/A
Red Squirrel	Low	S5	N/A
Virginia Opossum	Low	S4	N/A
White-tailed Deer	Low	S5	N/A

Notes:

1 Provincial Rank queried from the NHIC

2 Coefficient of Wetness queried from the NHIC. Described in more detail in Section 5.4.2.1

3 Confirmed present by NPCA

Flora

There is a strong correlation between the hydrology of a wetland and the vegetation community present in the wetland. Some vegetation species require specific hydrological conditions, while others can make use of a broader range of hydrological conditions. Flora sensitivities were assigned using the Coefficient of Conservatism and Wetness provided by NHIC and influenced by the provincial rarity (Table 4.5). Only facultative to obligate wetland species (Coefficient of Wetness score of -2 to -5) were included. Wetland species were then sorted in descending order based on their coefficient of conservatism value (CC). Species with higher CC values are unlikely to tolerate change because they are specialist species that are confined to specific environmental conditions and habitat types. Species with lower CC values are more generalist in nature and can tolerate a wider range of conditions and habitats and as such, are less sensitive to disturbance. Species with a CC value of 8 to 10 were deemed highly sensitive, 4 to 7 were deemed moderately sensitive, and 0 to 3 were deemed mildly sensitive to changes in hydrology. Exotic species (as determined by provincial ranking) were given a low sensitivity.

The high-sensitivity category is met when multiple high-sensitivity species are detected at a wetland. The medium sensitivity category is met when multiple species with medium sensitivity are detected, and the low sensitivity category is met in all other cases.

Table 4.5 List of Hydrologically Sensitive Flora Documented in the Terrestrial Study Area

FLORA	SENSITIVITY	PROVINCIAL RANK[2]	COEFFICIENT OF CONSERVATISM[3]	COEFFICIENT OF WETNESS[4]
Freeman's Maple	Medium	SNA	6	-5
American Black Currant	Medium	S5	4	-3
American Water-horehound	Medium	S5	4	-5
Arrow-leaved Smartweed	Medium	S4S5	5	-5
Bebb's Willow	Medium	S5	4	-3
Bitter Dock	Low	SNA		-3
Black Gum	High	S3	9	-3
Bladder Sedge	Medium	S5	6	-3
Blue Vervain	Medium	S5	4	-3

FLORA	SENSITIVITY	PROVINCIAL RANK[2]	COEFFICIENT OF CONSERVATISM[3]	COEFFICIENT OF WETNESS[4]
Blunt Broom Sedge	Medium	S4	5	-3
Bristly Dewberry	Medium	S4	6	-3
Broad-fruited Burreed	Low	S5	3	-5
Broad-leaved Cattail	Low	S5	1	-5
Brome-like Sedge	Medium	S5	7	-3
Cinnamon Fern	Medium	S5	7	-3
Common Boneset	Low	S5	2	-3
Common Elderberry	Medium	S5	5	-3
Common Marsh Bedstraw	Medium	S5	5	-5
Common Reed	Low	S4?	0	-3
Common Three-square Bulrush	Medium	S5	6	-5
Common Water-parsnip	Medium	S5	4	-5
Common Winterberry	Medium	S5	5	-3
Common Woolly Bulrush	Medium	S5	4	-5
Cottony Willow	Medium	S5	4	-3
Cranberry Viburnum	Medium	S5	5	-3
Creeping Yellow Loosestrife	Low	SNA		-3
Creeping Yellowcress	Low	SNA		-5
Crested Sedge	Low	S5	3	-3
Cursed Buttercup	Low	S5	2	-5
Dark-green Bulrush	Low	S5	3	-5
Devil's Beggarticks	Low	S5	3	-3
Ditch Stonecrop	Medium	S5	4	-5
Dotted Smartweed	Medium	S5	4	-5
Dudley's Rush	Low	S5	1	-3
Dwarf Clearweed	Medium	S5	5	-3
Dyer's Bedstraw	Medium	S5	5	-5
Eastern Buttonbush	Medium	S5	7	-5
Eastern Mannagrass	Medium	S4	7	-5
Eastern White Cedar	Medium	S5	4	-3
European Reed	Low	SNA		-3
False Waterpepper	Medium	S5	4	-5

FLORA	SENSITIVITY	PROVINCIAL RANK[2]	COEFFICIENT OF CONSERVATISM[3]	COEFFICIENT OF WETNESS[4]
Fowl Bluegrass	Medium	S5	5	-3
Fowl Mannagrass	Low	S5	3	-5
Fox Sedge	Low	S5	3	-5
Fringed Sedge	Medium	S5	6	-5
Fringed Yellow Loosestrife	Medium	S5	4	-3
Great Blue Lobelia	Medium	S5	6	-3
Green-fruited Burreed	Medium	SU	6	-5
Hanging Bulrush	Low	S5	3	-5
Harlequin Blue Flag	Medium	S5	5	-5
Highbush Blueberry	High	S4	8	-3
Hooked Buttercup	Medium	S5	4	-3
Hop Sedge	Medium	S5	6	-5
Jack-in-the-pulpit	Medium	S5	5	-3
Limestone Bittercress	Medium	S4	7	-3
Limestone Meadow Sedge	Low	S5	3	-3
Mad-dog Skullcap	Medium	S5	5	-5
Marsh Dandelion	Low	SNA		-3
Marsh Fern	Medium	S5	5	-3
Meadow Willow	Low	S5	3	-3
Mosquito Bulrush	Medium	S4	6	-3
Narrow-leaved Cattail	Low	SNA		-5
Necklace Sedge	Medium	S5	5	-3
New England Aster	Low	S5	2	-3
Northern Pitcher Plant	High	S5	10	-5
Northern Spicebush	Medium	S4	6	-3
Northern Water-horehound	Medium	S5	5	-5
Northern Water-plantain	Low	S5	1	-5
Panicled Aster	Low	S5	3	-3
Pennsylvania Smartweed	Low	S5	3	-3
Philadelphia Fleabane	Low	S5	1	-3

FLORA	SENSITIVITY	PROVINCIAL RANK[2]	COEFFICIENT OF CONSERVATISM[3]	COEFFICIENT OF WETNESS[4]
Pointed Broom Sedge	Medium	S5	5	-3
Porcupine Sedge	Medium	S5	5	-5
Purple Loosestrife	Low	SNA		-5
Purple-stemmed Aster	Medium	S5	6	-5
Purple-stemmed Beggarticks	Medium	S4?	5	-3
Purple-veined Willowherb	Low	S5	3	-5
Pussy Willow	Low	S5	3	-3
Red Ash	Low	S4	3	-3
Red-osier Dogwood	Low	S5	2	-3
Redtop	Low	SNA		-3
Reed Canarygrass	Low	S5	0	-3
Rice Cutgrass	Low	S5	3	-5
Sandbar Willow	Low	S5	1	-3
Sensitive Fern	Medium	S5	4	-3
Silky Dogwood	Low	S5	2	-3
Silver Maple	Medium	S5	5	-3
Slender-leaved False Foxglove	Medium	S4S5	7	-3
Small Duckweed	Medium	S5?	5	-5
Small Forget-me-not	Medium	S5	6	-5
Small-spike False Nettle	Medium	S5	4	-5
Soft Rush	Medium	S5	4	-5
Soft-stemmed Bulrush	Medium	S5	5	-5
Spinulose Wood Fern	Medium	S5	5	-3
Spotted Jewelweed	Medium	S5	4	-3
Spotted Joe Pye Weed	Low	S5	3	-5
Spotted Lady's-thumb	Low	SNA		-3
Spotted Water-hemlock	Medium	S5	6	-5
Stout Woodreed	Medium	S4	7	-3
Straw-coloured Flatsedge	Medium	S5	5	-3
Swamp Milkweed	Medium	S5	6	-5

FLORA	SENSITIVITY	PROVINCIAL RANK[2]	COEFFICIENT OF CONSERVATISM[3]	COEFFICIENT OF WETNESS[4]
Swamp Pin Oak	High	S4	9	-3
Swamp White Oak	High	S4	8	-3
Sycamore	High	S4	8	-3
Torrey's Rush	Low	S5	3	-3
Water Speedwell	Low	SNA		-5
White Elm	Low	S5	3	-3
White Meadowsweet	Low	S5	3	-3
White Turtlehead	Medium	S5	7	-5
White Willow	Low	SNA		-3

Notes:

1 Provincial Rank queried from the NHIC

2 Coefficient of Conservatism queried from the NHIC

3 Coefficient of Wetness queried from the NHIC. As described in more detail in Section 5.4.2.1

Significant wildlife habitat for hydrologically sensitive species

Wetlands provide habitat for many species, and some of this habitat is very sensitive to hydrological change. Furthermore, wetlands provide habitat for some species that are difficult to detect at a particular feature because they are locally rare, cryptic, or use habitats seasonally. In recognition of this, the precautionary principle states that significant wildlife habitat (SWH) for species ranked as having high sensitivity to hydrological change requires increased protection. The SWH criteria schedule for Ecoregion 7E determines which SWH is present (Section 6.5). If determined present with the aforementioned fauna species with High sensitivity, the sensitivity of the wetland is considered high.

Hydrological classification

The hydrogeomorphic setting of a wetland influences its sensitivity to hydrological change. The Wetland Water Balance Risk Evaluation uses four distinct hydrological wetland classifications defined in the Ontario Wetland Evaluation System (OMNR 2013): isolated, palustrine, riverine, and lacustrine. In assessing the hydrological wetland classification, it is important to distinguish true lacustrine and riverine wetlands (in which the hydrology is dominated by larger water bodies) from wetlands that are only ephemerally connected to lakes and rivers (where the hydrology is dominated by local surface water or groundwater). Isolated and palustrine wetlands are considered Medium or High sensitivity, differentiated by the presence of Medium or High sensitivity vegetation communities or Medium or High sensitivity flora or fauna species.

Step 4 is the Risk Characterization and is the evaluation of the hydrological and ecological integrity of a wetland as determined using the criteria in Steps 2 and 3. The level of risk assigned to a proposal is proportional to the magnitude of change that is likely to occur and the sensitivity of the wetland to hydrological change (Figure 4-4).

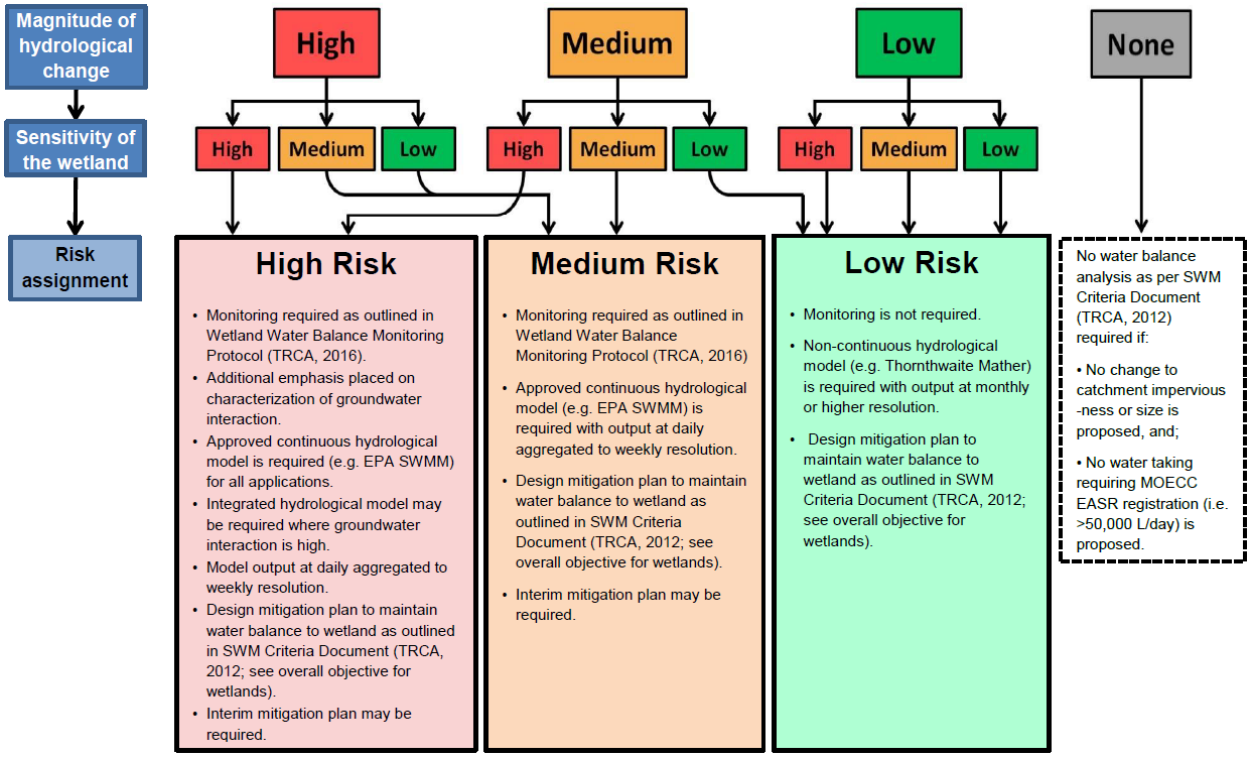


Figure 4-4: Wetland Risk Evaluation Decision Tree

5 EXISTING CONDITIONS

Biophysical condition is presented here as a result of background information and secondary source review and field investigations. The following subsections describe the natural environment within the Study Area and, more specifically, within the Detailed Terrestrial Study Area. These descriptions are intended to provide context and establish the setting of the Project. The complied species lists, field sheets, and photographic logs are provided in Appendix C, Appendix D, and Appendix E, respectively.

Niagara Region is in ecoregion 7E (Lake Erie-Lake Ontario Ecoregion), the Mixedwood Plains Ecozone (Deciduous Forest Region, Niagara Forest Section (Rowe, 1972)). Niagara Region is bound by Lake Ontario to the north and Lake Erie to the south. The climate in this ecoregion is one of the mildest in Canada. It has been classified in the Humid High Moderate Temperate Ecoclimatic Region (Ecoregions Working Group, 1989). This ecoregion is the most imperilled in Canada because of the amount of natural habitat drained, cut, and converted into agricultural and suburban land uses. About 78% of the ecoregion has been converted to cropland and pasture. This is the most heavily urbanized and industrialized ecoregion in Ontario. Some of the province's largest cities are located here, including St. Catharine's and Niagara Falls (Crins et al. 2009).

Historical Imagery from 1934 (via GoogleEarth from Brock University Map Library; Figure 5-1) documents the almost entirely agricultural landscape less than 100 years ago. In this figure, headwater drainage features (HDFs) and small tributaries or farming swales are apparent in most of the landscape draining to the northeast, to the Welland Canal. The Generalized Agricultural Land Use Systems map of The Soils of the Regional Municipality of Niagara Volume 1 and 2 (Kingston & Presant 1989) indicates that the agriculture in the Study Area is row-crops and corn/wheat. The predominant land use remains agriculture, with some rural, residential, and urban developments.

Patches of the woodlots seen in the Study Area today are obvious in the 1934 imagery. These patches were likely to wet to farm and therefore were left and became seed sources for the woodlots present today. These patches could represent old growth, while the successional spread represents second growth. Dense deciduous forest remnants only cover approximately 10% of ecoregion 7E. Sparse deciduous forest remnants only cover 1.0%, and mixed deciduous forest covers 0.8% of the ecoregion (Crins et al. 2009).

Ecoregion 7E is located in the Great Lakes Watershed (Lake Ontario Tertiary Watershed, Welland Canal South Quaternary Watershed). Several rivers have created incised valleys perpendicular to the shores of Lakes Huron, Erie, and Ontario, which add to topographic variation (Crins et al. 2009). There are a few small lakes, and drainage in this ecoregion is poor. There are hundreds of small aquifers in sand and gravel deposits throughout this ecoregion. Although most wetlands have been eliminated, some deciduous and coniferous swamps and open fens remain scattered throughout the ecoregion. The watercourses within the Study Area are located within the Port Robinson West Scoped Subwatershed. The subwatershed drains 14.47 km^2 and is drained by Singer's Drain, which outlets to the Welland Canal east of the Study Area (NPCA 1999).

5.1 LANDFORM AND PHYSIOGRAPHY

The landform of the area is the Haldimand clay plain. The clay plain contains many wet sloughs, which may be seen on the ground, and the pattern in which they occur is visible in air photos (Figure 5-2). The heavy clay soils of the plain not only have poor drainage, which creates numerous wet sloughs, but they are also deficient in lime, phosphorus, and organic matter. Historically, clay plains of low relief are usually farming regions with an emphasis on livestock. The sand and gravel hills at Fonthill are prized for fruit crops, and nearly all the crops of the Niagara fruit belt may be grown here (Chapman & Putman, 2007).

5.2 SOIL AND BEDROCK GEOLOGY

In ecoregion 7E, substantial glaciolacustrine deposits were left from historical lakes, including the Haldimand clay plain (Crins et al. 2009). Deposits are largely derived from the red and grey beds below the Niagara Escarpment (Chapman & Putman, 2007). From the Soils of the Regional Municipality of Niagara Volume 1 and 2 (Kingston & Presant, 1989), most of the soils in the Study Area are the Beverly soil series, with some Toledo series. These soils are mainly lacustrine silty clay. The parent material is 15-40 cm sandy or loamy textures over lacustrine silty clay with imperfect to poor drainage and irregular, very gentle slopes (2-5%). The drainage patterns on site are variable alluvial deposits, typical of floodplains.

Other soil series that occur are Berrien and Tavistock. The parent material is 40-100 cm sandy or loamy sediments, sometimes reddish-hued, over lacustrine clays or loams. Likewise, in the east of the Study Area, a pocket of Tuscola soil series with parent material that is mainly reddish-hued lacustrine silt loam. These soil series are also defined by imperfect drainage and irregular, very gentle slopes (2-5%). On the west of the Study Area, a pocket of Grimsby soil series with reddish-hued parent material and lacustrine fine sandy loam and very fine sandy loam occurs. The western side of the Study Area drains well to imperfectly on smooth, very gentle slopes (5-9%). There are also occasional land units that are too modified to map (i.e., agriculture).

Clay has very low hydraulic conductivity, meaning groundwater cannot readily move through these clay layers and is considered an aquitard (transmits water at a slower rate than an aquifer). To the west of the Study Area is the geological area known as the Fonthill Kame. The coarse-textured glaciolacustrine deposits (i.e., sand and gravel) are considered an aquifer and provide groundwater to the area of the kame. Groundwater within the kame generally flows towards the edges. As groundwater reaches the edge of the kame, it becomes surface water as the underlaying soils have lower permeability (i.e., clay and silt). These lower permeability soils cannot receive the groundwater at the same rate it flows through the sandy soils, so along the boundary of the two soil types, seeps are created. These seeps further create headwaters to watercourses and consistent surface water flow year-round. The geology and soils of the area are why there is so much surface water in the area. Additionally, the geology and soils indicate that wetlands in the areas are fed by surface water (as opposed to groundwater-fed).

Figure 5-1: 1934 Imagery via GoogleEarth, from Brock University Map Library

Figure 5-2: Wet sloughs as seen in aerial imagery

5.3 AQUATIC ENVIRONMENT

The current predominant land use is agriculture, with some rural, residential, and urban developments suggesting Singer's Drain has been impacted by past and present land uses with high sediment deposits that choke aquatic habitat (NPCA 1999). Singer's drain is identified as a warmwater creek with Type II habitat (MNRF, Appendix B). Type I habitat contains sensitive fish species and/or habitat while Type II habitat is important to the fish community, but it is below its productive capacity. The fish community in this creek is comprised of species that are tolerant of the creek's warmwater thermal regime. Water quality monitoring completed by the NPCA for this creek found the water quality to be poor, containing exceedances of several indicators, including chloride, copper, E. coli, lead, total phosphorus, total suspended solids, and zinc (NPCA, 2021).

Sampling data provided in the Port Robinson West Subwatershed Study indicated that fish surveys in 1999 captured six species: Central Mudminnow, Brook Stickleback, Brown Bullhead, Pearl Dace, Fathead Minnow, and Pumpkinseed. The Aquatic Resource Area (ARA) data on Geohub only provides records for Brown Bullhead. MNRF indicates that Singer's Drain supports a low-quality warm water fishery comprised of Brook Stickleback, Central Mudminnow, and Fathead Minnow. The MNRF did not identify the presence of provincially rare aquatic species or aquatic SAR within the Project Location. In addition, DFO SAR mapping (2021) did not identify any SAR in the Singer's Drain System or Study Area.

A review of the NPCA Watershed Explorer online mapping tool was used to identify watercourses within the Study Area that could constitute fish habitat. Watercourse names and fish habitat were also confirmed with NPCA; Singer's Drain - Type 2 Important Fish Habitat and rated as a Class C Drain by DFO, Port Robinson Creek - Type 2 Important Fish Habitat, and southeast of the Study Area Towpath Drain - Type 2 Important Fish Habitat. A total of nine potential watercourse crossings were identified from aerial interpretation (Figure 4-2) within the Study Area. The following descriptions are based on field investigations completed in the summer of 2021, the MTO Environmental Guide for Fish and Fish Habitat, and a review of online imagery.

5.3.1 CROSSING 1

Upstream of Rice Road

Within the assessed upstream reach, this watercourse is representative of an anthropogenically altered system with a morphology that primarily consists of flats. At the time of field reconnaissance, the mean wetted width was approximately 1.2 m, and the mean wetted depth was approximately 0.2 m. Substrates were mainly comprised of cobble, silt, and muck (in order of dominance). Banks were mostly stable and well-vegetated. Approximately 10 m upstream of the Corrugated Steel Pipe (CSP) culvert under Rice Road, water from a nearby SWM facility contributes flows through a large concrete structure. These contributed flows add baseflow to the watercourse, as does a small roadside drainage feature running parallel to Rice Road. The riparian vegetation provided < 85% cover to the channel.

Downstream of Rice Road

Only the initial 0-50 m Zone of Detailed Assessment was assessed due to dense vegetation. During the survey, the watercourse exited under Rice Road through a dilapidated CSP (crushed) with an estimated wetted width of 1.0 m and a mean wetted depth of 0.3 m. Like the upstream assessed section, roadside drainage running perpendicular to the watercourse contributes to flows. At the time of the assessment, no morphology was determined as the water was stagnant at the culvert. The substrate was predominantly sand, assumed to be a product of road maintenance activities. The initial 5 m within the road ROW was recently mowed; however, the remainder of the assessed reach had 100 % cover provided by trees, shrubs, and grasses.

NPCA Watershed Explorer online mapping suggests this watercourse provides baseflows to Crossing 4. However, based on the lack of water and flows at the time of assessment and a lack of connectivity, it is thought that this feature does not contribute to baseflows at Crossing 4. No fish were observed during the assessment.

5.3.2 CROSSING 2

This crossing was assessed to be a drainage conveyance feature taking roadside runoff west to east under Rice Road through a small CSP (equalization culvert). Habitat conditions were insufficient to support fish and/or their life processes.

NPCA Watershed Explorer online mapping suggests this watercourse provides baseflows to Crossing 5. However, based on the lack of water and flows at the time of assessment and the lack of connectivity, it is thought that this feature does not contribute to baseflows at Crossing 5.

5.3.3 CROSSING 3

Upstream of Rice Road

Within the upstream reach, this watercourse is representative of an anthropogenically altered system with the initial 8 m from Rice Road upstream tiled and the remainder of the 50 m assumed to be open based on aerial interpretation. It is unknown where the watercourse outlets as no piping was observed near the location of the CSP crossing of Rice Road. Roadside drainage contributes to flows under the road via a CSP.

Downstream of Rice Road

Only the initial 0-50 m Zone of Detailed Assessment was assessed due to private property. During the survey, the watercourse exited under Rice Road through a CSP with an estimated wetted width of 0.3 m and a mean wetted depth of 0.15 m. Roadside drainage running perpendicular to the watercourse contributes to flows. At the time of the assessment, no morphology was determined as the water was stagnant at the culvert. The substrate was predominantly sand, assumed to be a product of road maintenance activities. The area surrounding the culvert had been recently mowed right up to the watercourse closest to the ROW. The remainder of the assessed reach had 50 % cover provided by trees, shrubs, and grasses. NPCA mapping suggests this feature provides flows to upstream reaches of Crossing 5. No fish were observed during the assessment.

5.3.4 CROSSING 4

As no actual road crossing was present within this watercourse, the Merritt Road ROW was used as the defining point in assessing the upstream and downstream reaches.

Upstream of Merritt Road ROW

To fully understand the source for this watercourse, the upstream reach was assessed to the NPCA mapped confluence with Crossing 1, approximately 500 m upstream; however, no confluence was observed at the time of assessment. A series of low-lying depressions were identified within the upstream section with depths of approximately 0.3 m and substrates comprised of silt and clay. Patches of watercress were also observed within the depressions, as were Centrarchids and Brook Stickleback. Within the assessed upstream 50 m section, a shallow (0.10 m) channel with an approximate 0.8 m wetted width conveys the water from south to north, with a similar channel running east to west also contributing flows. Morphology within the assessed 50 m consisted of flats. A slight depression conveys the flows through the Merritt Road ROW.

Downstream of Merritt Road ROW

Within the initial 20 m of the downstream reach, the watercourse continues in a similar channel to the upstream reach; however, a large, pooled area appeared to contain the flows with small channels running west to Crossing 5. At the time of assessment, these channels were dry, but evidence of flows was observed. Substrates within the assessed pool consisted of muck and detritus with large trees and grasses providing 100% cover. No fish were observed within this section.

5.3.5 CROSSING 5

Within this crossing location, a dilapidated concrete structure was present under the Merritt Road ROW and was used as the defining point in assessing the upstream and downstream reaches.

Upstream of Merritt Road ROW

Similar to Crossing 4, to fully understand the source for this watercourse, the upstream reach was assessed to the NPCA mapped confluence with Crossing 2, approximately 200 m upstream; however, no confluence was observed. At the time of field reconnaissance, the mean wetted width was approximately 1.2 m, and the mean wetted depth was approximately 0.1-0.3 m. Substrates were mainly comprised of detritus, silt, and muck (in order of dominance). Banks were mostly unstable, with signs of slumping and erosion. The surrounding area was heavily wooded with overhanging grasses and the riparian vegetation provided < 95% cover to the channel. No fish were observed within this section.

Downstream of Merritt Road ROW

Within the initial 0-50 m Zone of Detailed Assessment, the assessed watercourse had a mean wetted width of approximately 1.0 m, and the mean wetted depth was approximately 0.1, with no observable flow. Substrates were mainly comprised of detritus, silt, and muck in (order of dominance). Within the 50-100 m assessed reach, this watercourse converges with the main watercourse in the area, which ultimately leads to Crossing 7. Habitat conditions within this section were similar to the initial 0-50 m assessed area. The surrounding area was heavily wooded with overhanging grasses and the riparian vegetation provided < 95% cover to the channel. No fish were observed within this section.

5.3.6 CROSSING 6

A large pond was identified through aerial imagery, and NPCA mapping identifies the feature as crossing under Merritt Road; however, no physical connection was observed. A large pond is present on private lands and behind a fence, and as such, it was not possible to determine the source of features of this pond.

5.3.7 CROSSING 7

Upstream of Cataract Road

Within the assessed upstream reach, this watercourse is representative of a naturalized but also anthropogenically altered system with a morphology that primarily consists of flats. At the time of field reconnaissance, the mean wetted width was approximately 0.8 m, and the mean wetted depth was approximately 0.2 m. Substrates were mainly comprised of silt and muck (in order of dominance). Banks were mostly stable yet mowed within the road ROW. A roadside drainage feature runs parallel to the road and contributes flows through a large CSP under the road. The riparian vegetation provided < 85% cover to the channel.

Downstream of Cataract Road

Only the initial 0-50 m Zone of Detailed Assessment was assessed due to PTE access. During the survey, the watercourse exited under Cataract Road through a large CSP into a pool with an estimated wetted width of 1.0 m and a mean wetted depth of 0.3 m. Like the upstream assessed section, roadside drainage running perpendicular to the watercourse contributes to flows. At the time of the assessment, no morphology was determined as the water was stagnant at the culvert. The substrate was predominantly silt and muck. The initial 5 m within the road ROW was recently mowed. The remainder of the assessed reach had 90 % cover provided by trees, shrubs, cattails and grasses. No fish were observed during the assessment.

5.3.8 CROSSING 8

Upstream of Cataract Road

Within the assessed upstream reach, this watercourse is representative of a naturalized but also anthropogenically altered system with a morphology that primarily consists of runs and flats. At the time of field reconnaissance, the mean wetted width was approximately 0.4 m, and the mean wetted depth was approximately 0.2 m. Substrates were mainly comprised of cobble and silt (in order of dominance). Banks were mostly stable yet mowed within the assessed reach. A roadside drainage feature runs parallel to the road and contributes flows through a large concrete culvert under the road. The riparian vegetation provided <10% cover to the channel as the majority had been cleared and/or mowed. Centrarchids and cyprinids were observed within this reach, as were turtles.

Downstream of Cataract Road

Only the initial 0-50 m Zone of Detailed Assessment was assessed due to PTE access. During the survey, the watercourse exited under Merrittville Highway into a cattail-choked pool with an estimated wetted width of 8.0 m and a mean wetted depth of 0.25 m. Like the upstream assessed section, roadside drainage running perpendicular to the watercourse contributes to flows. At the time of the assessment, no morphology was determined as the water was stagnant at the culvert. The substrate was predominantly silt and muck. The initial 2.5 m within the road ROW was recently mowed. The remainder of the assessed reach had 90 % cover provided by shrubs, cattails and grasses. No fish were observed during the assessment.

5.3.9 CROSSING 9

Upstream of Merritt Road

Within the assessed upstream section, a large pond was identified through aerial imagery and NPCA mapping. At the time of assessment, the large pond is present but behind a fence and as such, was assessed from the roadside. At the time of field reconnaissance, the mean wetted width was approximately 10 m, with substrates mainly comprised of detritus, silt, and muck (in order of dominance). The surrounding area was wooded with overhanging grasses and duckweed, providing < 75% cover to the feature. No fish were observed within this section.

NPCA mapping does not identify connectivity between the upstream and downstream reaches; however, a CSP was observed under Merritt Road.

Downstream of Merritt Road

Due to a wire fence, a roadside assessment was undertaken for an area of approximately 15 m. Within this section, the assessed area constituted a phragmites choked pond feature with a mean wetted depth of approximately 0.1 m, with no observable flow. Substrates were mainly comprised of detritus, silt, and muck (in order of dominance). Habitat conditions within this section did not appear conducive to supporting fish; however, conditions further downstream may provide habitat. No fish were observed within this section. The surrounding area was wooded with overhanging grasses and riparian vegetation, providing < 95% cover to the channel.

5.4 TERRESTRIAL ENVIRONMENT

5.4.1 VEGETATION COMMUNITIES AND FLORA

The Study Area is comprised of rural roads, residential communities, agricultural land, and vegetated areas. A total of 11 ELC communities were identified within the Study Area (Figure 5-4), and a total of 293 plants were identified to the species level, and five species could only be identified to genus (Appendix C). A list of plant species, the ELC community they were found in as well as other information are shown in Appendix C. Photographs of the vegetation communities are provided in Appendix E.

The NPCA NAI Vol 1 identifies Study Site PL-10 Rose Little Woods – Merritt Road Swamp (formerly Rose Little Woodlot; page 410 (NPCA, 2010)). It is described as having an approximate area of 548 ha and predominately draining to the north and east to the Welland Canal North Subwatershed, with a small portion draining to the south and west to Draper's Creek. This natural area is located on the eastern slope of the Fonthill Kame-Delta Complex on the well-drained, sand and loamy sand soils of the Sand Plain. ln the far eastern reaches of this Study Area, inverted soils are likely due to the construction of the Welland Canal.

Study Site PL-10 encompasses the entire project Study Area, and 211 taxa were recorded for the site (it is noted that only 0.84% of PL-10 was visited). In the NAI it is stated that the majority of the areas visited within this study site were dominated by Deciduous Swamps. Common throughout this site were dry meadows occurring along the rims and crests of slight sandy ridges alternating with standing water pools or slough ponds. At the time of this NAI, the swamps were characterized by "Green Ash (*Fraxinus pennsylvanica*), Swamp Maple (*Acer rubrum* X *Acer saccharinum*), and Red Maple (*Acer rubrum*) in the canopy". The understory was largely Spicebush and Glossy Buckthorn and the ground layer was a mix of Spotted Touch-me-not, Fowl Manna Grass, Climbing Poison-ivy, and Rough Goldenrod. In disturbed areas, it was noted that Glossy Buckthorn was the dominant species. On the drier ridges, Mixed Meadow communities contained Little Bluestem and Red Oak, White Elm, and Green Ash were found on slopes. The wetland-terrestrial interface supported a mix of tolerant meadow species such as Alpine Rush, a mix of sedges, Foxglove Beard-tongue, Brown-eyed Susan, and Early Goldenrod. The deeper open water slough ponds were dominated by Bebb's Willow and Narrow-leaved Cattail with Purple Loosestrife, Sensitive Fern, sedges, and Soft Rush.

The ELC published in 2019 from NPCA is delineated to the Community Series. Community Series are normally visible and consistently recognizable on air-photos. Community Series are the lowest level in the ELC that can be identified without a site visit. Community Series are distinguished based on the type of vegetation cover or the plant form that characterizes the community. Typical Community Series in the detailed Study Area are Meadow (ME), Deciduous Forests (FOD), and Deciduous Thicket (THD). The NPCA delineation was compared with field determined ELC to provide update ELC for the detailed Study Area. There are differences between the NPCA ELC and the field determined ELC. Differences include, NPCA determining successional areas which are now agricultural areas and areas which where mapped by NPCA as communities but have since been removed for highway and residential development. Another note is that the swamps and forest areas delineated by NPCA cover the same general areas as the swamps and forest areas observed in the field by WSP, however, WSP mapped different transitional boundaries between the communities.

The Port Robinson SWS (Aquafor Beech 2014) also mapped vegetation community types and noted species of conservation concern. The study area for the SWS was largely east of the detailed Terrestrial Study Area. However, three treed communities at the intersection of Merritt Road and Hwy 406 were inventoried, referred to as Area B, Area C, and Area E (Figure 5-3). The properties currently apart of the Merritt Meadows Subdivision were partly inventoried during the SWS as permission was not granted for the furthest west treed community. The areas from the SWS which remain within the Terrestrial Study Area are extremely impacted by the Hwy 406 expansion and residential development. Vegetation communities are discussed in relation to their current conditions below.

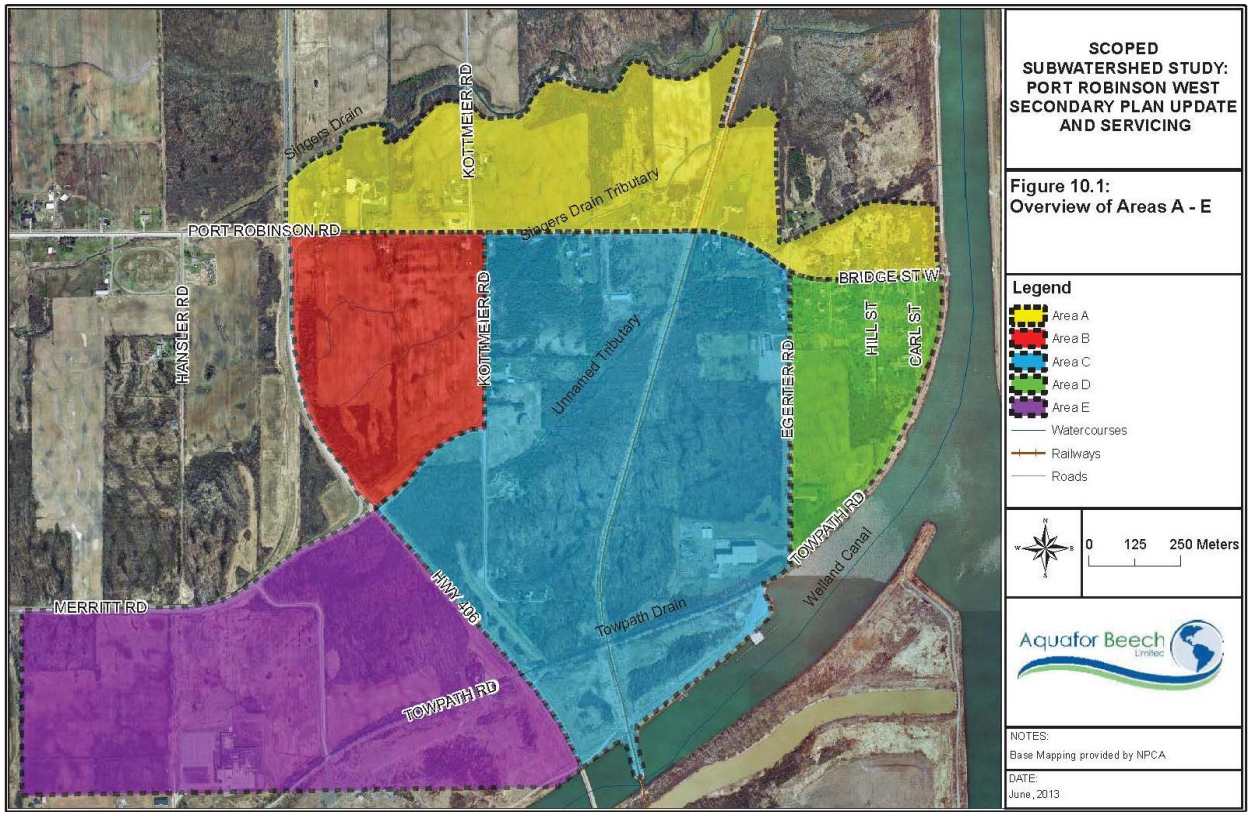


Figure 5-3: Aquafor Beech-Port Robinson-SWS Phase 1 Report Figure 10.1

5.4.1.1 *ANTHROPOGENIC COMMUNITIES*

Anthropogenic Communities dominate the landscape in the Study Area. These communities are not considered under the first approximation and are not mapped. However, the following descriptions are provided.

Recreational

The recreational field is found at southeast corner of the intersection of Merritt Road and Niagara Street. This area has baseball diamonds and is used by the local agricultural society. The NPCA did not map this area.

Transportation and Utilities

One large gravel parking lot area was identified on the west side of Section 4 of the Project Location. This parking lot was identified as Transportation and Utilities. The NPCA did not map most of the CVI area.

Residential

Many residential areas are found in the Study Area. The NPCA maps some areas as successional. The successional polygons of the NPCA ELC appears to be out of date. An example of a known discrepancy is the new residential area south of Merritt Road and west of Grisdale Road which is mapped a successional.

Manicured

Manicured plant communities (both residential and manicured) were found in all sections. These areas experience mowing. The mowed areas were on average about 15 cm tall, comprised of grasses and 'weeds'. Occasional trees and shrubs had been planted in these areas. These trees and shrubs like the grasses experience human influence by the occasional pruning. Trees in this community included Eastern White Pine, Norway Spruce, and Eastern White Cedar. Plants in the understory of this community were Reed Canary Grass and Queen-anne's Lace. The ground layer was mowed grass species.

Open Agriculture

Open agriculture was found along all sections of the Study Area. The two types of crops that were found in the agricultural fields were Soybean and Corn. The NPCA did not map most of the agricultural area.

5.4.1.2 *DECIDUOUS FOREST (FOD) AND WOODLAND (WOD)*

Dry - Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3)

Found in Sections 1, 2, 3 and 4 of the Project. In the areas that WSP has mapped FODM5-3 the NPCA ELC has mapped as either swamp or forest. The forest communities form a complex with the swamp communities where they occur together. In Segment 1, hydrology work to inform the Wetland Water Balance Risk Evaluation refined the location of wetland pockets that form the swamp mosaic (Figure 5-5). In Segment 3, southwest of the Merritt Road and Hwy 406 intersection, Aquafor Beech (2014) delineated Swamp Maple Mineral Deciduous Swamp (SWD3-3) with pockets of Dry-Fresh Sugar Maple Deciduous Forest (FOD5). Aquafor Beech (2014) also states that vernal pools are commonplace within many of the deciduous forest communities owing to the accumulation of water in depressions over impermeable silty clay soils. Mapping the nuances of the boundaries between the forest and swamp communities has always been challenging due to the sites microtopography. The difficulties in mapping these nuances in Segment 3 are presumably exaggerated further by the drainage changes caused by the Hwy 406 expansion.

Aquafor Beech (2014) describes the area southwest of the Merritt Road and Hwy 406 intersection as almost entirely covered by forest and treed swamp containing numerous types of significant wildlife habitat, as well as Provincially Significant Wetlands and Regionally Significant Woodlands. It is also noted that Pin Oak Mineral Deciduous Swamp (SWD1-3) is occasional among vernal pools within this area. Pin Oak Mineral Deciduous Swamp is a rare vegetation community (S2S3). Lastly, the only treed area west of Grisdale Road was classified as a Pin Oak Mineral Deciduous Swamp (SWD1-3) by Aquafor Beech (2014) but was classified as FODM5-3 by WSP.

As the name suggests the Dry - Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3) was dominated by Sugar Maple and Red Oak. This community is not described in the First Approximation of ELC codes but is similar to the Dry-Fresh Sugar Maple Deciduous Forest (FOD5) code used by Aquafor Beech (2014). In the Second Approximation the FODM5-3 code is within the Deciduous Forest family of communities. The height of the Sugar Maple and Red Oak in the canopy was greater than 25 m. The canopy covered greater than 60% of the area. Other tree species in the canopy included American Beech, and Black Cherry. Sugar Maple continue to dominate the sub-canopy. The height of the sub-canopy decreased to between 2-10 m, compared to the canopy and the area covered decreased to 10-25%. Other trees that were found in high dominance were Eastern

Hop-Hornbeam and Green Ash. The understory was comprised of Green Ash, Sugar Maple, and Riverbank Grape. The height of the understory was 0.5-1 m. The understory covered the same amount of area as the sub-canopy at 10-25%. The ground layer was dominated by Large-leaved Aster, sedges, and sapling Sugar Maple, and Green Ash. The ground layer covered 25-60%. The height of the plants in the ground layer was 0.2-0.5 m. Soils in the forest were examined by two cores. The cores found a small layer of organics (about 1 cm). The soil below the organics were sandy clay. Within the sandy clay layer, the mottles were about 55 cm deep.

A wide range of tree sizes were found in high abundances in this community. The vegetation type of this community was very variable due to changes in topography impacting water flow. Deadfall of less than 10 cm to 50 cm DBH was abundant in this community. A few of the forests labeled as Dry – Fresh Sugar Maple – Oak Deciduous Forest had experienced selective logging. Tracks and trails only occurred locally and were well marked. Flooding was a disturbance that has had a heavy impact on this community. The threatened Round-leaved Greenbrier, endangered Eastern Flowering Dogwood, and endangered White Wood Aster were found in this community. Aquafor Beech noted that in Area E (Figure 5-3) SAR included American Chestnut, Barn Swallow, Eastern Flowering Dogwood, Monarch, and Wood Thrush. Regionally rare species included Blue Spotted Salamander, Clammy Ground Cherry, Little Bluestem, and Virginia Water Horehound.

Deciduous Forest (FOD)

In two locations NPCA mapped forest/thicket communities that WSP did not find to be within the FODM5-3 described above. Both locations occur within Section 2, one location is north of a residence adjacent to Merrittville Hwy, and one location is to the south along the detailed Study Area between two agricultural fields. The communities are mapped separately from the adjacent thicket communities as the canopies are denser. These communities were not directly investigated during fieldwork as they are removed from potential impacts, and access was limited.

Much of the area north of Section 2 is delineated as a deciduous forest/swamp complex. NPCA has a variety of swamp, forest, and thicket delineations in this area. These communities were not directly investigated during fieldwork as access behind the residential areas was limited. The area close to Merritt Road is more disturbed than the other forest and swamp communities described here and is complexed with more open habitat (Graminoid Mineral Meadow Marsh (MAM2) and deciduous thicket (THD)) making classification to a finer scale difficult.

Dry – Fresh Deciduous Woodland (WODM4)

Dry – Fresh Deciduous Woodland (WODM4) was found in Section 3 generally near the intersection of Merritt Road and Highway 406 on both the northeast and southeast sides of the intersection. The northeast community was delineated in the SWS (Aquafor Beech 2014) in Area B but was largely removed for the Hwy 406 expansion and the planned residential development. The remaining stand in the Terrestrial Study Area is a fragment of an area previously classified as Mineral Deciduous Swamp (SWD4) or a Mineral Thicket Swamp (SWT2). The SWS (Aquafor Beech 2014) states that the deciduous swamps are dominated by Swamp Pin Oak, American Elm, and Green Ash, with an understory mix of mostly facultative wetland species including Tall Goldenrod, Rough-stemmed Goldenrod. and Panicled Aster. The shrub layer generally consists of the non-native European buckthorn and native narrow-leaved meadowsweet and pussy willow. The mineral thicket swamps were dominated by Glossy Buckthorn.

The southeast community was delineated in the SWS (Aquafor Beech 2014) in Area C but was also largely removed for the Hwy 406 expansion. The remaining stand in the Terrestrial Study Area is a fragment of an area previously classified as Red Maple Mineral Deciduous Swamp (SWD3-1) and Fresh-Moist Oak-Maple-Hickory Deciduous Forest (FOD9). The dominant tree species of the previously classified forest communities differed upon the prevailing soil moisture regime. The deciduous swamps contain varying levels of Freeman's Maple, Red Maple, American Elm, Green Ash, and Swamp Pin Oak. The SWS (Aquafor Beech 2014) states that several high-quality vegetation communities are present and most of the forests and swamps have been classified as Provincially Significant Wetlands and/or Significant Woodlands. It was also noted that a portion of the existing forest/swamp communities have been cleared for the new alignment of Hwy 406 and the newly isolated sections of forest/swamp communities are suffering from changes in hydrology and edge effects.

During WSP field surveys it was found that the thin remnant community was not accurately represented by an ELC code under the First Approximation. Rather, the Second Approximation community code WODM4 under the Deciduous Woodland Community Series represented conditions. Deciduous Woodland Communities have less than 60% canopy cover. Woodland areas, as determined by the second approximation, are typically dominated by more invasive species when they have a 'cultural legacy', and tree cover can be more closed and shaded. The NPCA delineation in these areas was completed before the construction of the highway ramps. The current delineations are largely remnant patches of wooded area. Some areas where

WSP mapped WODM4 that were not mapped by the NPCA are areas which have experienced significant impacts and increased edge effects.

Trees in the canopy and sub-canopy covered between 25-60% and were approximately 10-25 m in height. Species include Trembling Poplar, Shagbark Hickory, Swamp Pin Oak, and a willow hybrid. The understory covered between 25-60% and was approximately 1-2 m in height and was dominated in equal amounts of Red-osier Dogwood and Glossy Buckthorn. European Buckthorn in high abundance and regenerating Green Ash were also found in this layer. The ground layer is less than a metre in height and has greater than 60% vegetation cover. The ground layer was dominated by Rough-stemmed Goldenrod, Thicket Creeper, Broad-leaved Enchanter's Nightshade, and Spotted Jewelweed.

Based on the size of the trees, the abundant number of standing snags, and deadfall (10 to 24 cm DBH), this community appears to be young. The changes and increase in snags and deadfall are thought to be a factor of Emerald Ash Borer, Dutch Elm Disease, and significantly increased edge effects (i.e., wind throw). Wind throw was also apparent and widespread, as a result of the increased development and removal of edge habitat. Due to the location and influences of development around the community, the area is disturbed by human use and non-native species are widespread. Inclusions in this community were wetlands and pools. The SWS (Aquafor Beech 2014) noted Eastern Wood-pewee and Monarch in northeast community and Butternut, Eastern Flowering Dogwood, Eastern Ribbonsnake, and Little Bluestem (a rare species) in the are of the southeast community.

5.4.1.3 *DECIDUOUS SWAMP*

Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3)

Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3) was found along Sections 1, 2 and 3 of the Project. The NPCA delineated the areas WSP identified as SWDM3-3 as swamp. In Segment 3, Aquafor Beech (2014) delineated Swamp Maple Mineral Deciduous Swamp (SWD3-3) with pockets of Dry-Fresh Sugar Maple Deciduous Forest (FOD5). The forest communities form a complex with the swamp communities where they occur together. In Segment 1, hydrology work to inform the Wetland Water Balance Risk Evaluation refined the location of wetland pockets that form the swamp mosaic (Figure 5-5).

In Segment 3, southwest of the Merritt Road and Hwy 406 intersection, Aquafor Beech (2014) delineated Swamp Maple Mineral Deciduous Swamp (SWD3-3) with pockets of Dry-Fresh Sugar Maple Deciduous Forest (FOD5). Aquafor Beech (2014) also states that vernal pools are commonplace within many of the deciduous forest communities owing to the accumulation of water in depressions over impermeable silty clay soils. Mapping the nuances of the boundaries between the forest and swamp communities has always been challenging due to the sites microtopography. The difficulties in mapping these nuances in Segment 3 are presumably exaggerated further by the drainage changes caused by the Hwy 406 expansion.

Aquafor Beech (2014) describes the area southwest of the Merritt Road and Hwy 406 intersection as almost entirely covered by forest and treed swamp containing numerous types of significant wildlife habitat, as well as Provincially Significant Wetlands and Regionally Significant Woodlands. It is also noted that Pin Oak Mineral Deciduous Swamp (SWD1-3) is occasional among vernal pools within this area, but this was not found during WSP surveys. Pin Oak Mineral Deciduous Swamp is a regionally rare vegetation community (S2S3).

Under the First Approximation, the community is classified as SWD3-3. The Second Approximation community code is SWDM3-3 under the Deciduous Swamp Community Series. Deciduous Swamp Communities have greater than 25% tree canopy cover, and trees are greater than 5 m in height. Deciduous Swamp Communities are dominated by hydrophytic shrub and tree species and are typically fern and sedge rich. These communities have variable flooding regimes and water depth less than 2 m. Standing water or vernal pooling is greater than 20% of ground cover in the spring but flooding duration is short, and the substrate is aerated by early to mid-summer. Generally, is trapped in these vernal pools by soils containing a high amount of clay and water evaporates rather than drains to creeks. Soil cores taken from this community found about 2 cm of organics, followed by clay to a depth of about 1 m, when the auger could not be dug deeper. Mottles in the clay were found at about 30 cm.

The Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3) had a canopy of a hybrid maple (*Acer rubrum* X *Acer saccharinum*). Trees found in lower amounts in the canopy included White Elm, Bur Oak, and Shagbark Hickory. White Elm was found more often than the Bur Oak and Shagbark Hickory. Bur Oak and Shagbark Hickory were found in the same abundances. The canopy covered greater than 60% of the area in this community. The height of the canopy was greater than 25 m. Trees in the subcanopy reflected those found in the canopy; with most abundant species being the hybrid Maple, followed by the White Elm. Green Ash was also found in the sub-canopy. The subcanopy stands at a height of 10-25 m and covers 10-25% of the area. In the understory there was more of the hybrid Maple, Northern Spicebush, Green Ash, and the invasive Glossy Buckthorn. The understory covered 10-25% of the area and was about 1-2 m tall. In the ground layer there were Panicled

Aster, Poison Ivy, sedges, and grasses. The plants covered greater than 60% of the area and were about 0.2–0.5 m tall. All sizes (DBHs) of trees were found to be abundant. Very few trees were dead and standing, but there was a lot of small (0-24 cm DBH) logs on the ground. The SWDM3-3 was complex with small marsh communities being found within the swamp where large enough gaps in the canopy occurred. Tracks and trails occurred in a few locations and were well worn. Diseased and dead trees were found to be in a high abundance throughout the whole swamp. The diseases that have injured or killed trees in the swamp are Emerald Ash Borer, and Dutch Elm disease. Another disturbance found in the community was flooding of the vernal pools. Flooding was found to be heavy and widespread within the community. Endangered White Wood Aster was found in this community. Aquafor Beech noted that in Area E (Figure 5-3) SAR included American Chestnut, Barn Swallow, Eastern Flowering Dogwood, Monarch, and Wood Thrush. Regionally rare species included Blue Spotted Salamander, Clammy Ground Cherry, Little Bluestem, and Virginia Water Horehound.

A large portion of the area north of Section 2 is delineated as a deciduous forest/swamp complex. NPCA has a variety of swamp, forest, and thicket delineations in this area. These communities were not directly investigated during fieldwork as access behind the residential areas was limited. The area close to Merritt Road is more disturbed than the other forest and swamp communities described here and is complexed with more open habitat (Graminoid Mineral Meadow Marsh (MAM2) and deciduous thicket (THD)) making classification to a finer scale difficult.

5.4.1.4 *MEADOW MARSH*

Graminoid Mineral Meadow Marsh (MAM2)

Graminoid Mineral Meadow Marsh (MAM2) community is interspersed within the swamp/forest area on the north side of Section 2. The MAM2 code is found in the First Approximation, as part of the Meadow Marsh ecosites. In some areas the bordering Red and Freemans Maple form a canopy (10% cover; 2-25m tall). Shrubs standing 1-2m tall, such as White Meadowsweet and Red-osier Dogwood, were sporadic. Largely, Dark-green Bulrush, Rough-stemmed Goldenrod, White Meadowsweet, and Reed Canary Grass dominate (>60% cover; 0.2 m to 0.5 m). Like the SWDM3-3 flooding was a large disturbance to the plants in this community. Another disturbance was deer browse. Deer browse was found to be light and local. The NPCA mapped the area as wetland, WSP mapped as MAM2.

Meadow Marsh (MAM)

In one location NPCA mapped successional wet meadow behind a residence on the south side of Section 2. Based on a desktop review and general assessments in the field, these areas have been delineated as meadow marsh (MAM). Also, in Section 2 on the south side, there is a complex of impacted wet meadow and thicket around industrial and agricultural land uses. These impacted areas have been group as a wet meadow thicket (MAM/THD) complex.

Inclusion - Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2)

Another type of meadow marsh found in the Study Area was the Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2). MAMM1-2 was found in two locations along Section 1 within the swamp and forest communities. These MAMM1-2 communities are inclusions and are too fine scale to map. These Cattail Marshes were linear and followed the unopened road allowance. Pooling water and the open conditions kept for the unopened road allowance (which contains a utility corridor) allowed for the establishment of these Cattail Marshes. The canopy of this community was dominated by Narrow-leaved Cattail with a bit of Rough Cocklebur. The canopy covered 25-60% of the area. The height of the canopy was 0.5-1 m. The subcanopy had a species of lady's thumb and Sensitive Fern. The subcanopy was not very dense only covering about 10-25% and stands at 0.2-0.5m tall This community was only found in Section 1. MAMM1-2 was not within the First Approximation of southern Ontario's ELC communities but is found in the Second Approximation.

5.4.1.5 *SUCCESSIONAL COMMUNITIES*

Successional Communities are often complexed together as they change in short timeframes and with stochastic environmental events (e.g., flooding can drastically change an ecosystem within five years). NPCA mapping has a 'successional' general natural area category which largely applies to one of the following community types or ecosites.

Meadow (ME)

The Meadow (ME) communities are heavily influenced by humans and are not natural occurring meadows. ELC communities heavily impacted by humans do not fit will within the ELC coding system for Southern Ontario and were taken to the highest level. Disturbance in this community was high from ambient noise, non-native and invasive species, and dumping. Many of the meadows in the Detailed Study Area are generally thin and near roadways. In Sections 3 and 4 meadow communities occur on their own (i.e., not complexed) as a result of development and areas left fallow. These Meadows were kept at a high level

because they were highly variable. Generally, there is no community structure and the species in the meadows consist of Garden Bird's-foot Trefoil, Canada Bluegrass, Tall Goldenrod, and Common Teasel. The ME code is classified under the Cultural community series as cultural meadow (CUM) in the First Approximation and was split into its own community series in the Second Approximation (ME).

In some cases, meadow thicket (ME/THD) complexes occur. These areas are equally influenced by disturbance and have abundant and extensive non-native/introduced species. In Section 4, the ME/THD community contains some plantings, well-marked trials crossed, disturbance from Rice Road, and hedgerows which contribute to the thicket (THD) complex. The ME/THD in Section 4 additionally has a highly impacted watercourse. Similarly, a ME/THD community follows the watercourse in Section 1, north of the unopened road allowance but within residential property. This meadow thicket complex appears to be successional from the forest/swamp community adjacent. This community is still heavily influenced by the anthropogenic uses.

Inclusion - Dry – Fresh Forb meadow Ecosite (MEFM1)

Another community in a similar location and shape as the MAMM1-2 was Dry – Fresh Forb meadow Ecosite (MEFM1). As mentioned above, meadows were lumped with the cultural community series in the First Approximation, but in the Second Approximation, the meadows became their own series. This community was narrow and followed the unopened road allowance. The community was not mapped as it is an inclusion to the overall swamp community. The canopy was populated with White Ash, Gray Dogwood, and Bebb's Willow. The height of the canopy was between 2-10 m. The percent of the community covered by the canopy was 0-10%. The plants in the sub-canopy were Canada Goldenrod, and Lance Leaved Goldenrod. covered 25-60% of the community. The sub-canopy was about 0.5-1 m tall. The understory was 0.2-0.5 m tall, and the ground layer was less than 0.2 m tall. The plants in both the understory and ground layer were the same with Hog Peanut, Wild Raspberry, and Reed Canary Grass. The understory covered greater than 60% of the area. The ground layer covered 10-25% of the area.

This was a very young and successional area. The topsoil was found to be sandy. This community was only found in Section 1. The NPCA mapped this area as wooded area.

Native Shrub Deciduous Hedgerow Thicket Type (THDM3)

The Native Shrub Deciduous Hedgerow Thicket Type (THDM3) was in a small area on the east side of Section 1 at the intersection with the unopened road allowance and Cataract Road. This community is complexed within meadow community. It appears this community underwent significant alteration before 2014 (GoogleEarth imagery) but has been left fallow. The Thicket series was lumped into the cultural group of vegetative communities in the First Approximation of ELC (Cultural Thicket; CUT). Although the history of this community is very closely linked to cultural influences the Second Approximation has been used by WSP to identify this community. Trees found at the road intersection were White Ash and American Elm. The heights of these trees were between 10-25 m, and cover a small area of this community, about 0-10%. The thick (covering greater than 60% of the area) sub-canopy was dominated by Choke Cherry, Glossy Buckthorn and Red Osier Dogwood. The height of the sub-canopy was 1 to 2 m tall. The understory was mostly Rough Agrimony, and Riverbank Grape. The height of this layer was between 0.5-1 m tall and covered 25-60% of the area. The NPCA mapped the community and the larger extent as a complex of thicket, meadow, and wet meadow. Due to the evolving nature of the community WSP has mapped the area as ME/THDM3, a meadow and Native Shrub Deciduous Hedgerow Thicket complex. A watercourse has been identified to drain from this community north towards the swamp community.

Other Thickets and Thicket Complexes

In other locations, along the limits of the detailed Study Area in Sections 1, 2, and 3, NPCA had mapped meadows, wet meadows, thickets, and hedgerows. Based on a desktop review and general assessments in the field, these areas have been delineated as thickets (THD) and wet meadow thickets (MAM/THD).

640000 641000 642000 643000 644000

4767000 4766000 4765000

PORT ROBINSON RD

PORT ROBINSON RD

RICE RD

TOWN OF PELHAM

CITY OF THOROLD

CATARACT RD

MERRITTVILLE HWY

MERRITT RD

QUAKER RD

TOWN OF PELHAM

CITY OF WELLAND

CITY OF THOROLD

CITY OF WELLAND

HWY 406

FODM5-3
ME/THD
SWDM3-3
MAM2
SWD/FOD
MAM2/THD
ME/THDM3
FFODM5-3
WODM4
ME

P:\2020\Projects_Other\IM20103036_NiagaraMerittRiceRoad\11_GIS\MXD\Figure5-4_ELC_3.mxd

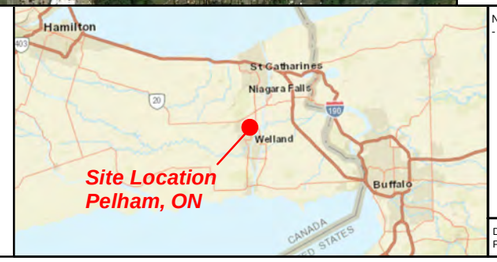
ELC Code	Description
FOD	Deciduous Forest
FODM5-3	Dry Fresh Sugar Maple - Oak Deciduous Forest
MAM	Meadow Marsh
MAM/THD	Meadow Marsh / Successional Deciduous Thicket
MAM2/THD	Graminoid Mineral Meadow Marsh / Deciduous Thicket
ME	Meadow
ME/THDM3	Meadow and Native Shrub Deciduous Hedgerow Thicket Type complex
ME/THD	Meadow / Successional Deciduous Thicket
SWD/FOD	Deciduous Swamp / Forest
SWDM3-3	Swamp Maple Mineral Deciduous Swamp Type
THD	Successional Deciduous Thicket
WODM4	Dry – Fresh Deciduous Woodland

LEGEND

- Terrestrial Study Area
- Municipal Boundaries
- ELC Boundaries

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd



NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

0 1.25 2.5 Kilometres

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Ecological Land Classification

PROJECT N°: IM20103036 | **FIGURE: 5-4**

SCALE: 1:12,000 | DATE: September 2022

5.4.1.6 *FLORA*

Of the 298 plants recorded by WSP the Niagara Status from the NAI identified 216 of them as native, and the other 67 as introduced, and the last 15 plants as data deficient or a hybrid plant with no status or could not be identified to species. The percentage of all plants inventoried by WSP was almost 72% native. This percentage is high for plant communities along roads and near agriculture land uses in Southern Ontario. There were five provincially rare (S1-S3) species present during surveys (including SAR). Twelve locally Rare species from the NAI Status lists (NPCA, 2010) and 11 locally rare species from the Niagara County Status from Oldham Carolinian List (Oldham, 2017; Table 5.1). Additionally, three plant SAR were documented during field surveys.

Table 5.1 Flora Species of Conservation Concern Found during WSP Surveys

SCIENTIFIC NAME	COMMON NAME	S-RANK[1]	ESA[2]	NAI[3]	OLDHAM[4]
Agalinis tenuifolia	Slender-leaved False Foxglove	S4S5		Rare, Native	Native, Rare
Cardamine douglassii	Limestone Bittercress	S4		Rare, Native	Native, Rare
Carex arctata	Drooping Woodland Sedge	S5		Rare, Native	Native, Rare
Carex projecta	Necklace Sedge	S5		Rare, Native	Native, Rare
Coreopsis tripteris	Tall Tickseed	S1S2		Uncommon, Native	Native, Uncommon
Cornus florida	Eastern Flowering Dogwood	S2	END	Uncommon, Native	Native, Uncommon
Erigeron strigosus	Rough Fleabane	S5		Rare, Native	Native, Rare
Smilax rotundifolia	Round-leaved Greenbrier	S2	THR	Uncommon, Native	Native, Uncommon
Galium tinctorium	Dyer's Bedstraw	S5		Rare, Native	Native, Rare
Lobelia siphilitica	Great Blue Lobelia	S5		Rare, Native	Native, status unknown or not specified
Eurybia divaricate	White Wood Aster	S3	END	Rare, Native	Native, Rare
Persicaria hydropiperoides	False Waterpepper	S5		Rare, Native	Native, Rare
Prunus nigra	Canada Plum	S4		Rare, Native	Native, Rare
Schoenoplectus pungens	Common three-square Bulrush	S5		Rare, Native	Native, Rare
Scirpus hattorianus	Mosquito Bulrush	S4		Rare, Native	Native, Rare
Nyssa sylvatica	Black Gum	S3		Uncommon, Native	Native, Uncommon

Notes:

1. S-Rank= Provincial (Sub-national) Rank, S1=Critically Imperiled, S2=Imperiled, S3=Vulnerable, S4=Apparently Secure, S5=Secure, S#S#=Range. Breeding Status Qualifiers: B – Breeding, N – Nonbreeding, M – Migrant. ? =Inexact or Uncertain.
2. ESA= Endangered Species Act (Ontario), END= Endangered, THR= Threatened
3. NAI= Niagara Status from Natural Area Inventory (Niagara Peninsula Conservation Authority, 2010)
4. Oldham= Niagara County Status from Oldham Carolinian List (Oldham, 2017)

Ultimately, 418 plant species were documented between the fieldwork and the review of secondary sources (Appendix C). Of the species documented, 283 (68%) are native species as defined by the NPCA NIA (NPCA, 2010) and 135 (32%) are non-native species or not identified to species. Within secondary sources, there are 15 provincially rare (S1-S3) species; five provincially endangered or threatened species; two provincial species of special concern; 34 locally rare and 44 locally uncommon species as defined by the NPCA NIA (NPCA, 2010). The endangered and threated plant species that were not found by WSP but found in the secondary source review were American Chestnut (endangered) and Butternut (endangered). The

NHIC had a record of Broad Beech Fern, a species of special concern in Ontario. Provided the vegetation community types present there is a moderate to high probability for additional SAR to occur in the Study Area.

ECOHYDROLOGY - FLORA

Plants are identified as wetland plants using a Coefficient of Wetness (must be identified to the species level). The Coefficient of Wetness has been identified for the plants in the Study Area in Appendix C. The definitions of the Coefficient are show in Table 5.2 as defined by Oldham, Bakowsky, & Sutherland, 1995.

Table 5.2 Coefficient of Wetness Categories

COEFFICIENT OF WETNESS[1]	PREFERRED SOIL MOISTURE REGIME
5	Almost always occur on uplands
3	Usually occur on uplands
0	Found on uplands and in wetlands
-3	Usually occur in wetlands
-5	Almost always occur in wetlands

Notes:
1. Oldham, Bakowsky, & Sutherland, 1995.

Many of the plants documented in field surveys are wetland plants, for example, 45 species of plants are almost always occurring in wetlands (Coefficient -5), 63 plants are usually found in wetlands (Coefficient -3). Combined, a total of 108 wetland plants were found equal to approximately 36% of all the species seen during field investigation. However, wetland plants should be viewed at an ecosite basis. Wetland ecosites identified in the detailed Study Area are Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3), Inclusion - Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2), and Graminoid Mineral Meadow Marsh (MAM2). These three wetland ecosites and the number of plants per Coefficient of Wetness is provided in Table 5.3, along with the number of plants for the Dry - Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3) ecosite.

Table 5.3 Number of Plant Species by Coefficient of Wetness per Select Ecosites

COEFFICIENT OF WETNESS[1]	SWD3-3	MAMM1-2	MAM2	FODM5-3
5	3	2	0	8
3	16	3	0	35
0	17	1	7	20
-3	33	2	14	8
-5	33	3	12	0
Identified to Species	**102**	**11**	**33**	**71**

Notes:
1. Oldham, Bakowsky, & Sutherland, 1995.

Within the SWDM3-3, 102 species were identified to the species level (required to be assigned a Coefficient of Wetness). Of these 102 plants, 33 always occur in wetlands (Coefficient -5) while another 33 usually occur in wetlands (Coefficient -3). Resulting in 66, or 65%, wetland species. In the MAMM1-2 inclusion, five of 11 species (approximately 45%) that could be identified to the species level were wetland plants (Coefficients of -3 or -5), the low number of plants identified is a factor of the small size and disturbed nature of the area. In the MAM2 ecosite, 26 of the 33 (or 79%) were wetland plants.

As a comparison, the FODM5-5 ecosite has 71 species identified to the species level. Of the 71 species, zero plants were Coefficients of -5 and eight were Coefficients of -3 (approximately 11%). Alternatively, eight plants always occur upland (Coefficient 5) and 35 usually occur upland (Coefficient 3), resulting in 40 or 55%, upland species.

5.4.2 BIRDS

Breeding bird surveys were conducted to characterize the nature, extent, and significance of avian usage within the Study Area. During surveys, a total of 48 species of birds were documented from 17 point-counts (Figure 4-3; detailed species lists with breeding evidence in Appendix C). Nine additional birds were observed incidentally during other surveys. The majority of species documented are associated with agricultural, wooded and successional habitats, and one SAR bird (Barn Swallow) was documented during the field investigations. Two Carolinian indicator species were documented on site by Wood, Carolina Wren and Tufted Titmouse. Three additional Carolinian indicator species were documented in secondary sources, Hooded Warbler in the OBBA and Northern Bobwhite and White-eyed Vireo in NHIC. Northern Bobwhite is considered extirpated from the area.

Three species, American Robin, Wild Turkey, and European Starling were confirmed breeding. An additional 19 species were considered probable breeders, 20 were possible breeders, and six were observed with no evidence of breeding noted.

The 19 species considered probable breeders are:

- American Crow;
- American Goldfinch;
- Black-capped Chickadee;
- Blue Jay;
- Brown-headed Cowbird;
- Chipping Sparrow;
- Common Grackle;
- Eastern Wood-pewee;
- Great Crested Flycatcher;
- House Sparrow;
- Killdeer;
- Mourning Dove;
- Northern Cardinal;
- Red-eyed Vireo;
- Red-winged Blackbird;
- Savannah Sparrow;
- Song Sparrow;
- Swamp Sparrow; and
- Willow Flycatcher.

The 20 species considered possible breeders are:

- Baltimore Oriole;
- Carolina Wren;
- Cedar Waxwing;
- Common Yellowthroat;
- Downy Woodpecker;
- Gray Catbird;
- Hairy Woodpecker
- House Finch;
- Mallard;
- Northern Flicker;
- Red-bellied Woodpecker;
- Red-tailed Hawk;
- Rose-breasted Grosbeak;
- Turkey Vulture;
- Warbling Vireo;
- White-breasted Nuthatch;

- House Wren;
- Indigo Bunting;
- Wood Thrush; and
- Yellow Warbler;

A review of secondary sources identified 111 species of birds (Appendix C). The majority of which are found in sources that extend beyond the Study Area. From field data and secondary sources, there are four provincially rare (S1-S3) species; six provincially Endangered or Threatened species; six provincial species of Special Concern. The six provincially endangered or threatened species are: Bank Swallow, Barn Swallow, Bobolink, Chimney Swift, Eastern Meadowlark, and Northern Bobwhite. Provided the range of successional habitat and vegetation communities present, there is a moderate probability for SAR birds to occur in the Study Area.

5.4.2.1 *ECOHYDROLOGY – BIRDS*

To determine which obligate wetland bird species were documented by WSP in the Study Area the Coefficient of Wetness from the NHIC species list was used. Similar to plants, if the species was assigned a "W" it is considered an obligate wetland bird (i.e., the species depends on wetlands to carry out it's life processes). Thirteen species designated as wetland birds were documented by Wood, of which seven were documented during breeding bird surveys Table 5.4. Rusty Blackbird, special concern, was documented incidentally. Rusty Blackbird breeds in the boreal forest but was seen migrating through the area in May.

One species, Common Yellowthroat, was documented once during breeding bird surveys in suitable habitat (Station 12) resulting in a 'possible' breeding status. Two additional species, Swamp Sparrow and Willow Flycatcher, were documented during each breeding bird survey. Swamp Sparrow was documented during both rounds at Station 12 in the same general location, suggesting the species is probably breeding here. Willow Flycatcher was documented during both rounds at Station 17 in the same general location, suggesting the species is probably breeding here.

Results from breeding bird surveys imply that the habitat at Station 12 and 17 supports wetland dependent species. Station 12 occurs in the unopened road allowance (Section 1) and is classified as PSW (Figure 2-1) and swamp community (Figure 5-4). Station 17 occurs along Rice Road (Section 4) and contains a wet meadow thicket community and a watercourse, ideal habitat for Willow Flycatcher.

Table 5.4 Summary of Wetland Bird Breeding Evidence in the Study Area found by Wood

SPECIES COMMON NAME	SURVEY TYPE	BREEDING EVIDENCE[1]
Canada Goose	Incidental	Unknown
Common Yellowthroat	Incidental and BBS	Possible, only documented once
Double-crested Cormorant	BBS	Not likely, Fly overs
Great Blue Heron	Incidental	Unknown
Herring Gull	BBS	Not likely, Fly overs
Mallard	Incidental and BBS	Observed
Northern Waterthrush	Incidental	Not likely, observed once
Ring-billed Gull	Incidental and BBS	Not likely, Fly overs
Rusty Blackbird	Incidental	Not likely, observed once
Spotted Sandpiper	Incidental	Not likely, observed once
Swamp Sparrow	Incidental and BBS	Probable, observed both rounds in suitable habitat
Willow Flycatcher	BBS	Probable, observed both rounds in suitable habitat
Wilson's Warbler	Incidental	Not likely, observed once
Canada Goose	Incidental	Unknown
Common Yellowthroat	Incidental and BBS	Possible, only documented once

SPECIES COMMON NAME	SURVEY TYPE	BREEDING EVIDENCE[1]
Double-crested Cormorant	BBS	Not likely, Fly overs
Great Blue Heron	Incidental	Unknown
Herring Gull	BBS	Not likely, Fly overs

Notes:
1. Appendix C

5.4.3 AMPHIBIANS AND REPTILES

Anuran call surveys were conducted to characterize the nature, extent, and significance of anuran (frogs and toads) usage within and adjacent to the Study Area. During surveys, a total of eight species of anurans were documented from 25-point counts (Figure 4-3); species lists with abundance and call codes in Appendix C). Eight were documented calling from suitable habitat at appropriate breeding times, and it is assumed all species successfully breed at Stations 1 through 25 (Table 5.5).

Table 5.5 Species Documented During Anuran Call Surveys

STATION NUMBER	SPECIES OF ANURAN NOTED		
	APRIL SURVEY	MAY SURVEY	JUNE SURVEY
1	Western Chorus Frog, Spring Peeper	Western Chorus Frog, Spring Peeper	Green Frog
2	Western Chorus Frog, Spring Peeper	Spring Peeper	Green Frog
3	None	None	Gray Treefrog
4	Western Chorus Frog, Spring Peeper	Spring Peeper	None
5	Western Chorus Frog, Spring Peeper, Northern Leopard Frog	Western Chorus Frog, Spring Peeper	American Bullfrog, Green Frog
6	Western Chorus Frog, Spring Peeper, Northern Leopard Frog	Western Chorus Frog, Spring Peeper, Green Frog	American Bullfrog, Gray Treefrog, Green Frog
7	Western Chorus Frog, Spring Peeper	American Toad, Spring Peeper	Gray Treefrog, Green Frog
8	Western Chorus Frog, Spring Peeper	None	Green Frog
9	Western Chorus Frog, Spring Peeper	Western Chorus Frog	Green Frog
10	Western Chorus Frog, Spring Peeper	American Toad, Spring Peeper	Gray Treefrog
11	Western Chorus Frog, Spring Peeper	Spring Peeper	None
12	Western Chorus Frog, Spring Peeper	None	None
13	Western Chorus Frog, Spring Peeper	Spring Peeper	Gray Treefrog

STATION NUMBER	SPECIES OF ANURAN NOTED		
	APRIL SURVEY	MAY SURVEY	JUNE SURVEY
14	Western Chorus Frog, Spring Peeper	American Toad, Western Chorus Frog, Gray Treefrog	Gray Treefrog
15	Western Chorus Frog, Spring Peeper	None	American Bullfrog, Green Frog
16	Western Chorus Frog	None	None
17	Western Chorus Frog	None	None
18	Western Chorus Frog	None	None
19	Western Chorus Frog	None	Gray Treefrog
20	Western Chorus Frog, Spring Peeper	None	Gray Treefrog
21	Western Chorus Frog, Spring Peeper	Western Chorus Frog	Gray Treefrog
22	Western Chorus Frog	Western Chorus Frog, Spring Peeper	Gray Treefrog
23	Western Chorus Frog	Western Chorus Frog	Gray Treefrog
24	Western Chorus Frog	American Toad	Gray Treefrog, Green Frog
25	Western Chorus Frog, Spring Peeper, Pickerel Frog	None	Gray Treefrog, Green Frog

The two SAR anurans in Ontario do not have ranges that overlap the Study Area however two locally significant (as defined in the NAI) anurans occur in the Study Area. The two locally significant frogs observed are Pickerel Frog and American Bullfrog. An inventory of habitat features on-site determined that the swamp community and vernal pools are suitable breeding habitat (seasonal standing water) for some amphibians (frogs, toads, salamanders). Blue-spotted Salamanders have been found in the forests between Highway 406 and Grisdale Road (Aquafor Beech Limited, 2014). The large ORAA square that covers the area identified Wood Frog to potentially occur (Ontario Nature, 2022). Two other salamanders identified in the ORAA were Eastern Red-backed Salamander and Mudpuppy. Eastern Red-backed Salamander likely occurs and is breeding in the Study Area. The Mudpuppy record is likely from the Welland canal which is in the large ORAA square for the general area.

Other features such as large, downed trees, and debris piles present suitable habitat for snakes. Eastern Gartersnakes were observed by WSP in the Study Area and one was found dead-on-road. Secondary sources documented the presence of seven snake species, however one is historical (Eastern Hog-nosed Snake). Of the six snake species which could occur, one is a provincial SAR, Eastern Ribbonsnake. The Eastern Ribbonsnake was observed in 2014 by Aquafor Beech Limited as part of the Port Robinsons Subwatershed Study (Aquafor Beech Limited, 2014). Common snake species present includes Eastern Milksnake, Red-bellied Snake, and Dekay's Brownsnake. Northern Watersnake was also documented from the 10 x 10 km Ontario Reptile and Amphibian Atlas but is likely to occur along the Welland Canal (not in the Study Area).

Secondary sources identify three turtle species that could be found in the Study Area. Common and urban adapted turtle species that may be documented include Snapping Turtle (Special Concern), Midland Painted Turtle, and Northern Map Turtle (Special Concern). Like the Mudpuppy observation the Northern Map Turtle observation comes from the ORAA which covers the Welland Canal. The Welland Canal has appropriate habitat for Northern Map Turtle, the Study Area does not. The Study Area has some permanent bodies of water and wetlands, which allow for at least Midland Painted Turtle to occur on site throughout the year. However, some turtles travel long distances over land to find mating and nesting opportunities. This seasonal travel may occur through the Study Area. During WSP field surveys, Midland Painted Turtle was observed.

5.4.4 OTHER WILDLIFE

No additional targeted surveys were completed for wildlife species (e.g., mammals, butterfly, or dragonfly surveys). A review of secondary sources founds that 40 mammals, and 34 arthropods to potentially occur in the Study Area.

5.4.4.1 MAMMALS

WSP observed eight mammal species incidentally in the Study Area. These species were: American Mink (dead-on-road), Coyote, Eastern Chipmunk, Eastern Gray Squirrel, Northern Raccoon, Red Squirrel, Virginia Opossum (a Carolinian indicator species), and White-tailed Deer. These are common species in Niagara Region.

The Atlas of the Mammals of Ontario shows about 40 species of mammals that could be found in the Study Area because they occur in the general area. Most of these species are common mammals such as Muskrat, Striped Skunk, and Woodchuck. Endangered bats as listed by the ESA were identified as potentially occurring in the Study Area. These bats are Northern Myotis, Tricolored Bat, Eastern Small-footed Myotis, and Little Brown Myotis (Appendix C). Little Brown Myotis, Tri-coloured Bat have been reported in the potentially occur in the generally area (Humphrey & Fotherby, 2019). The Study Area has many forests that are assumed to provide habitat for SAR bats.

The only small mammal observation comes from the Port Robinson West Scoped Subwatershed. The mammal observed was a Meadow Vole. Other mammals observed as part of the field work for the Port Robinson West Scoped Subwatershed included: Beaver, European Hare, Red Fox, Striped Skunk, and Woodchuck (Aquafor Beech Limited, 2014). Small mammals such as shrews (Northern Short-tailed Shrew), rats, mice, and voles (White-footed Mouse, Deer Mouse, Muskrat, House Mouse, Norway Rat, Meadow Jumping Mouse) have the potential to occur and be undocumented or underrepresented. Meso-and large mammals such as Eastern Cottontail, Gray Fox, and weasels (Ermine, Long-tailed Weasel, Mink) likely occur in the Study Area. White-tailed Deer was observed by WSP in the Study Area. White Tailed deer wintering areas that are mapped by the province are in the Study Area (and acknowledged in the Regional OP (Niagara Region, 2014).

5.4.4.2 ARTHROPODS

Two incidental sightings of common arthropods were recorded during fieldwork, both of which have been previously recorded for the area in secondary sources. These two species were Common Wood-nymph, and Northern Cloudywing.

The Ontario Butterfly Atlas identified 34 species of butterflies. One of these species is a species of conservation concern, Monarch (Special Concern). iNaturalist held records of insects such as Black-legged Meadow Katydid, Common Eastern Bumble Bee, and Hickory Tussock Moth (Appendix C). In addition to these insects iNaturalist had records of eight other butterflies. The Port Robinson West Scoped Subwatershed found five butterflies, one which was the Monarch.

5.5 WETLAND ECOLOGICAL ASSESSMENT

The hydrology work (presented under separate cover) to inform the Wetland Water Balance Risk Evaluation refined the location of wetland pockets that form the forest/swamp mosaic and their storage areas (Figure 5-5). The hydrology work evaluated the existing conditions of each wetland group and the proposed conditions of each wetland group. After comparing existing conditions and proposed changes in surface area, max volume, drainage area, impervious area, and impervious cover, the Risk Magnitude (criteria used to evaluate the probability and magnitude of hydrological change) was determined. The resulting Magnitude of Hydrological Change (Table 5.6) suggests that there is largely a low magnitude of hydrological change in all but three wetland groups: SU06, SU11, and SU12. These Magnitudes of Hydrological Change will be used in the Evaluation Decision Tree.

The Wetland Water Balance Risk Evaluation looks at drainage change but does not necessarily factor in the size of the footprint change. For example, SU10 has a minimal change in drainage area but will largely be removed by the proposed road. Equally, wetland groups which are on-line with a watercourse but are not located within or directly impacted by the proposed road (e.g., SU14) see a change as a result of run-off from a new road. Lastly, detailed design, including grading impacts, is not yet available. Therefore, this assessment is used to understand the character of the change and is not a definitive calculation of change.

Table 5.6 Summary of Potential Changes/Impacts of Wetland Groups and the Magnitude of Hydrological Change

WETLAND GROUP REFERENCE ID#	CHANGE IN DRAINAGE AREA (%)[1]	CHANGE IN IMPERVIOUS COVER (%)[1]	IMPERVIOUS COVER SCORE	INCREASE OR DECREASE IN CATCHMENT SIZE	MAGNITUDE OF HYDROLOGICAL CHANGE[2]
SU01	0%	0%	Low	Low	Low
SU02	0%	0%	Low	Low	Low
SU03	0%	4%	Low	Low	Low
SU04	0%	4%	Low	Low	Low
SU05	6%	7%	Low	Low	Low
SU06	-20%	-20%	Low	Medium	Medium
SU07	1%	1%	Low	Low	Low
SU08	-4%	0%	Low	Low	Low
SU09	0%	0%	Low	Low	Low
SU10	-3%	-3%	Low	Low	Low
SU11	3%	13%	Medium	Low	Medium
SU12	-21%	-21%	Low	Medium	Medium
SU13	-6%	-6%	Low	Low	Low
SU14	0%	10%	Low	Low	Low
SU15	0%	0%	Low	Low	Low
SU16	0%	0%	Low	Low	Low
SU17	0%	0%	Low	Low	Low
SU18	0%	0%	Low	Low	Low
SU19	0%	0%	Low	Low	Low
SU20	0%	0%	Low	Low	Low

WETLAND GROUP REFERENCE ID#	CHANGE IN DRAINAGE AREA (%)[1]	CHANGE IN IMPERVIOUS COVER (%)[1]	IMPERVIOUS COVER SCORE	INCREASE OR DECREASE IN CATCHMENT SIZE	MAGNITUDE OF HYDROLOGICAL CHANGE[2]
SU21	0%	0%	Low	Low	Low

Notes: Adapted from Water Resources draft work

1= 0% change is white, change <+/-10% is yellow, and change > +/-10% is red.

2= Risk Magnitude (Based on Table 2 – TRCA 2017) without ecological input. Used in Step 4 Decision Tree.

The ecological sensitivity to hydrological change of the wetland groups was completed using the results gathered within the Terrestrial Study Area for the five criteria as presented in Section 4.7.1. The resulting Sensitivity of the Wetland (Table 5.7) suggests that all wetland groups are highly sensitive to change. The Sensitivity of the Wetland is used in the Evaluation Decision Tree (Section 5.5.1).

None of the vegetation communities documented are considered to have High sensitivity. Breeding Bird Stations BB11, BB12, BB13 and Anuran Call Stations 1, 2, 5, 6, 25 (Appendix F; Figure 4-3) are used to assess Fauna species for all the wetland groups as these stations are located within the Water Resources Team study area. Additionally, salamanders are assumed present as a precautionary principle and as directed by the NPCA (Blue-spotted Salamander has High sensitivity). The Fauna for all wetland groups is determined as High sensitivity based on the individual species with the highest sensitivity level.

To determine the sensitivity of flora for all the wetland groups, species lists gathered for FODM5-3, SWDM3-3, MEFM1 (inclusion in the utility corridor), and THDM3 is used (Section 5.4.1; Appendix F). Six species were determined to be of High sensitivity, 47 of Medium sensitivity, and 31 of Low sensitivity. The Flora for all wetland groups is determined as High sensitivity, as the high sensitivity category is met when multiple high sensitivity species are detected.

A SWH screening is completed in Section 6.5 where SWH types are confirmed. For this Wetland Water Balance Risk Evaluation, only those SWH types which include the previously identified High sensitive fauna species (Appendix F) are considered. Three types of SWH are confirmed utilizing the High sensitive species; Amphibian Breeding Habitat: Woodland, Amphibian Breeding Habitat: Wetland, and Amphibian Movement Corridors (Figure 6-4). Therefore, the sensitivity of the wetland groups is considered high.

Lastly, all the wetland groups are considered Isolated and palustrine wetlands, which are automatically considered Medium or High sensitivity. They are differentiated by the presence of Medium or High sensitivity vegetation communities or Medium or High sensitivity flora or fauna species. Since all the wetland groups have High sensitivity flora and fauna species, the hydrological classification is also High sensitivity.

Table 5.7 Summary of Wetland Groups Ecological Sensitivity

WETLAND GROUP REFERENCE ID#	VEGETATION COMMUNITY	FAUNA	FLORA	SWH FOR HYDROLOGICALLY SENSITIVE SPECIES	HYDROLOGICAL CLASSIFICATION	SENSITIVITY OF THE WETLAND
SU01	Low	High	High	High	High	**High**
SU02	Low	High	High	High	High	**High**
SU03	Low	High	High	High	High	**High**
SU04	Low	High	High	High	High	**High**
SU05	Low	High	High	High	High	**High**
SU06	Low	High	High	High	High	**High**
SU07	Low	High	High	High	High	**High**
SU08	Low	High	High	High	High	**High**
SU09	Low	High	High	High	High	**High**

WETLAND GROUP REFERENCE ID#	VEGETATION COMMUNITY	FAUNA	FLORA	SWH FOR HYDROLOGICALLY SENSITIVE SPECIES	HYDROLOGICAL CLASSIFICATION	SENSITIVITY OF THE WETLAND
SU10	Low	High	High	High	High	**High**
SU11	Low	High	High	High	High	**High**
SU12	Low	High	High	High	High	**High**
SU13	Low	High	High	High	High	**High**
SU14	Low	High	High	High	High	**High**
SU15	Low	High	High	High	High	**High**
SU16	Low	High	High	High	High	**High**
SU17	Low	High	High	High	High	**High**
SU18	Low	High	High	High	High	**High**
SU19	Low	High	High	High	High	**High**
SU20	Low	High	High	High	High	**High**
SU21	Low	High	High	High	High	**High**

5.5.1 EVALUATION DECISION

The evaluation of the hydrological and ecological integrity of a wetland, as determined using the Magnitude of Hydrological Change and Sensitivity of the Wetland, was combined to assign risk (Table 5.8). Where the Magnitude of Hydrological Change is low, the overall risk of change is low; this does not exclude the requirement for designing mitigation to maintain water balance. Where the Magnitude of Hydrological Change is medium, the risk is high due to the sensitivity of the wetland groups. The focus of the evaluation is on protecting the ecology of a wetland by assessing the risk of the Project to the maintenance of hydrological conditions. The Wetland Water Balance Risk Evaluation prescribes monitoring, an emphasis on understanding groundwater interaction, and a mitigation plan to maintain water balance with an interim mitigation plan as required. These measures are carried forward in impacts and mitigation (Section 8.2.6).

Table 5.8 Risk Assignment

WETLAND GROUP REFERENCE ID#	MAGNITUDE OF HYDROLOGICAL CHANGE[2]	SENSITIVITY OF THE WETLAND	RISK ASSIGNMENT
SU01	Low	High	**Low**
SU02	Low	High	**Low**
SU03	Low	High	**Low**
SU04	Low	High	**Low**
SU05	Low	High	**Low**
SU06	Medium	High	**High**

WETLAND GROUP REFERENCE ID#	MAGNITUDE OF HYDROLOGICAL CHANGE[2]	SENSITIVITY OF THE WETLAND	RISK ASSIGNMENT
SU07	Low	High	**Low**
SU08	Low	High	**Low**
SU09	Low	High	**Low**
SU10	Low	High	**Low**
SU11	Medium	High	**High**
SU12	Medium	High	**High**
SU13	Low	High	**Low**
SU14	Low	High	**Low**
SU15	Low	High	**Low**
SU16	Low	High	**Low**
SU17	Low	High	**Low**
SU18	Low	High	**Low**
SU19	Low	High	**Low**
SU20	Low	High	**Low**
SU21	Low	High	**Low**

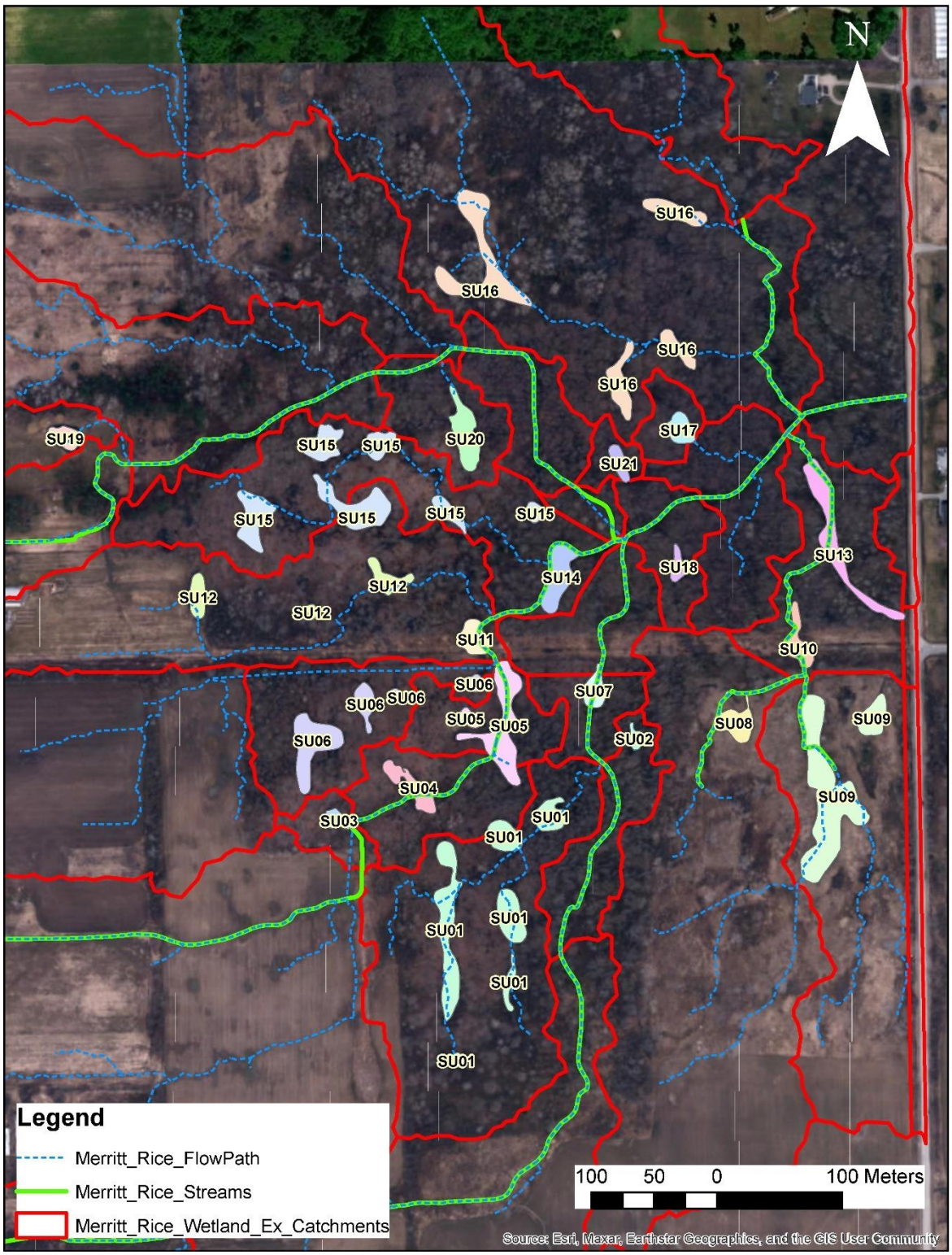


Figure 5-5: Wetland Pockets and their Drainage Areas in Segment 1

6 EVALUATION OF SIGNIFICANCE

Natural heritage features protected by policies applicable to the Study Area include Significant Wetlands, Significant Woodlands, Significant Valleylands, Significant Wildlife Habitat (SWH), Significant Areas of Natural and Scientific Interest (ANSI), and Adjacent Lands. Additionally, fish habitat and the habitat of endangered and threatened species is protected. As part of wetland mapping, water resources should also be considered. Significant Groundwater Recharge Area and Highly Vulnerable Aquifers that are mapped in the area are also considered significant. The new Regional OP highlights Significant Groundwater Recharge Area and Highly Vulnerable Aquifers in the Study Area.

6.1 SPECIES AT RISK SCREENING

In Ontario, Species of Conservation Concern include SAR and rare and rapidly declining species. SAR are species whose individuals or populations are considered Extirpated (EXT), Endangered (END), Threatened (THR), or Special Concern (SC), as determined by the provincial COSSARO and the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC). SAR in the Study Area are regulated by the ESA. The potential for SAR and rare species to occur within the Study Area was determined based on a review of secondary source information and the completion of field investigations. Information collected was then used to evaluate SAR occurrence potential based on habitat preferences for each species. Provincially rare species are those with a provincial rank (sub-national rank) of S1, S2, or S3 and considered provincially vulnerable to imperiled. The NHIC tracks provincially rare species, and provincial rarity does not automatically provide a listing under the ESA.

An NHIC search was completed for the squares that encompass the Study Area. It is important to note that the NHIC search is based on element occurrences and does not necessarily confirm species' presence or absence within the Study Area. Species which have element occurrences in the Study Area are provided in (Table 6.1). Species lists indicate which species were documented in NHIC (Appendix C). The IGF was submitted to the MECP by email on 9 November 2022 as described in Section 3.4.

Table 6.1 NHIC Species Records (28 October 2020)

SPECIES	S-RANK	COSEWIC	SARA	COSSARO	ESA STATUS
American Chestnut	S1S2	END	END		END
Bobolink	S4B	THR	THR		THR
Broad Beech Fern	S3	SC	SC		SC
Butternut	S2?	END	END	END	END
Eastern Flowering Dogwood	S2?	END	END		END
Eastern Meadowlark	S4B,S3N	THR	THR		THR
Halberd-leaved Smartweed	S3				
Mapleleaf Mussel	S2	SC	SC	SC	SC
Midland Painted Turtle	S4	SC	SC	NAR	
Northern Bobwhite	S1?	END	END	END	END
Snapping Turtle	S4	SC	SC		SC
Swamp Rose-mallow	S3	SC	SC		SC
White Wood Aster	S3	THR	THR		THR
White-eyed Vireo	S1B				
Whorled Milkwort	S3?				
Wood Thrush	S4B	THR	THR	SC	SC

Notes:

1. END= Endangered, THR= Threatened, SC=Special Concern
2. SARA = Species at Risk Act, 2002 Schedule 1 unless otherwise noted. The protection and/or conservation measures afforded by SARA apply only to species as described in Section 2.1.1.
3. ESA = Endangered Species Act, 2007
4. S-Rank = S1 - Extremely rare throughout its range in the province; S2 - Rare throughout its range in the province; S3 - Uncommon or vulnerable species; S4 - Apparently Secure Species; S5 - Secure Species; SX - Extirpated; B - Breeding; N - Non-breeding; ? - Uncertainty

Based on the results of field investigations and background and secondary data sources, a list of species protected under the ESA and SARA that could potentially occur was generated. For each species, an assessment was made as to the likelihood of habitat occurrence in the Study Area based on the biology of the species and the results of field investigations (Table 6.2). Each species was classified into one of five probabilities of occurrence:

- **Confirmed**: Species for which suitable habitat is present in the Project Area and the species was confirmed during field investigations or confirmed in secondary sources (e.g., consultation with MECP, locations provided in previous reports).
- **High**: Those species recorded in the vicinity of the Project Area during field surveys or typically within 10 km and recorded in the past 20 years in secondary sources. The preferred habitat is abundant within the Project Area. Species with a high probability of occurrence would be expected to breed within or frequently use the habitats available within the Project Area and would be known to have a high relative abundance within the region (i.e., compared to other regions in Ontario). Species within regulated habitat may also have high probabilities of occurrence.
- **Moderate**: Species for which suitable habitat is present but limited or uncommon in the Project Area and breeding in the area is rare. However, species with moderate probabilities of occurrence may intermittently use the area for foraging, migration, or movement to other parts of their home range and therefore may have been documented in secondary sources or field surveys in the last 20 years.
- **Low**: Those species recorded in the vicinity of the Project Area, but whose preferred habitat does not occur or is extremely limited within the Project Area. These species may intermittently move through the Project Area but are unlikely to become permanent residents. These species have likely not been documented in secondary sources or field surveys in the last 20 years, but historical records are possible.
- **None**: Those species whose preferred habitat is completely absent from the Project Area, or the species is extirpated from Ontario. Unlikely these species have been documented. However, historical or vagrant records (e.g., a species that is currently outside their wintering and breeding area) may exist.

Note that other SAR may come into the area, or species already occurring in the area may be up-listed at any time. Species that have a moderate or high potential to occur in the Study Area or have been confirmed in the Study Area will be carried forward to the impact assessment. Additionally, some SAR bird species may be documented as flyovers or vagrants in the Study Area during migration. These species are not expected to nest or overwinter, nor to have any individual site that is important as a migratory stopover location in the Project Area. These species have not been included in the SAR screening (Table 6.2).

Seven SAR are confirmed in the Project Area: Eastern Flowering Dogwood (Endangered), White Wood Aster (Threatened), Round-leaved Greenbrier (Threatened), Eastern Wood-pewee (Special Concern), Wood Thrush (Special Concern), Monarch (Special Concern), and SAR Bats are considered present. Habitat for endangered and threatened species is protected, and alteration or destruction of this habitat must be permitted/approved under the ESA. It is also noted that several species in Niagara Region have a habitat regulation defined (above the standard definition of habitat under the ESA). A habitat regulation defines a species' habitat, and many describe features (e.g., a creek, cliff, or beach), geographic boundaries, or other unique characteristics.

Table 6.2 SAR Probability of Occurrence within the Study Area

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
Plants		
American Chestnut (*Castanea dentata*) SARA: Endangered ESA: Endangered COSEWIC: Endangered COSSARO: Not Evaluated[2] S-Rank: S1S2 Source: NHIC, NAI, Port Robinsons SWS, MECP IGF response	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils. In Ontario, it is only found in the Carolinian Zone between Lake Erie and Lake Huron. The species grows alongside Red Oak, Black Cherry, Sugar Maple, American Beech and other deciduous tree species (Ministry of the Environment, Conservation and Parks, 2021).	**High** – Individuals have been confirmed elsewhere in the Region, and suitable habitat could occur in the Study Area. The record occurs in grid 17PH4065 which crosses the western edge of the Study Area and includes the Kunda Park Forest Regional ANSI (it is believed this is also the record that MECP refers to in the IGF response). It is possible the soils in the ANSI are more suitable for this species. The NAI also documents this species from Brady et al., 1980, although no location is provided. Lastly, American Chestnut was reported in the Port Robinson SWS (Aquafor Beech 2014) in an area was found in the woodlot between Highway 406 and Grisdale Road.
Eastern Flowering Dogwood (*Cornus florida*) SARA: Endangered ESA: Endangered COSEWIC: Endangered COSSARO: Not Evaluated[2] S-Rank: S2? Source: NHIC, NAI, Port Robinsons SWS, iNaturalist, field surveys, MECP IGF response	Eastern Flowering Dogwood grows under taller trees in mid-age to mature deciduous or mixed forests. It most commonly grows on floodplains, slopes, bluffs and in ravines, and is also sometimes found along roadsides and fencerows (MECP, 2022). Ontario Regulation 832/21: HABITAT, lists the following as Regulated Habitat; occurs anywhere in the regional municipality of Niagara in: – a "terrestrial area" within 20 metres of the stem of an Eastern Flowering Dogwood. – an area populated by a vegetation type referred to in the land classification system for southern Ontario if, the vegetation type occurs naturally in Ontario, and Eastern Flowering Dogwood also exists in the area. "terrestrial area" means an area where, (a) the water table is rarely or briefly above the substrate surface, and (b) hydric soils have not developed.	**Confirmed** – One individual was found along Merritt Road at the edge of the woodlot to the west of the Merritt Meadows subdivision (Figure 6-1). NHIC records in several grid squares occur. This species was included in the IGF to MECP. The NAI also documents this species from Brady et al., 1980. The Eastern Flowering Dogwood was found in the woodlot between Highway 406 and Grisdale Road in the Port Robinson SWS. Regulated habitat occurs in the Niagara Region, which means that a buffer of 20m around the individual found is protected under the ESA.

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
		Regulated habitat also means that all the forest, woodland, swamp, marsh, and naturally occurring successional communities are regulated habitat as well. Eastern Flowering Dogwood was found in Area C of the SWS (Figure 5-3).
White Wood Aster (*Eurybia divaricata*) SARA: Threatened ESA: Threatened COSEWIC: Threatened COSSARO: Not Evaluated[2] S-Rank: S3 Source: NHIC, NAI, Port Robinsons SWS, field surveys, MECP IGF responses	White wood aster grows in open, dry deciduous forests that are dominated by Sugar maple and American beech trees. It is often found mixed in with other asters. The plant does best in well-drained soils and it may prefer a low level of disturbance, as it has been found to grow along trails. It does well in partial to full shade (MECP, 2021).	**Confirmed** – Individuals and colonies have been found (Figure 6-1). This species was included in the IGF to MECP. NHIC records in several grid squares occur. The NAI also documents this species from Brady et al., 1980.
Swamp Rose-mallow (*Hibiscus moscheutos*) SARA: Special Concern ESA: Special Concern COSEWIC: Special Concern COSSARO: Not Evaluated[2] S-Rank: S3 Source: NHIC	In Ontario, Swamp rose-mallow is restricted to shoreline marshes, in the Carolinian and Great Lakes - St. Lawrence forest regions, associated with lakes Erie, Ontario or St. Clair. Swamp rose-mallow is most commonly found in deep-water cattail marshes and in meadow marshes. It reaches its greatest numbers in dyked wetlands, where competition from other plants is controlled and the open habitat is maintained by periodic flooding. It is also found in open wet woods, thickets, spoil banks, and drainage ditches (MECP, 2021).	**Moderate** - Found in many sites along the Welland Canal and in NHIC grids centered on the canal. Open wet woods or cattail marshes (preferred habitat) in the immediate Study Area are present.
Butternut (*Juglans cinerea*) SARA: Threatened ESA: Threatened COSEWIC: Endangered COSSARO: Endangered S-Rank: S2? Source: NHIC, NAI, Port Robinsons SWS, MECP IGF Responses	Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. This species does not do well in the shade, and often grows in sunny openings and near forest edges (MECP, 2021).	**High** – Individuals have been confirmed elsewhere in the Region, and suitable habitat could occur in the Study Area. The record occurs in grids which cover the western edge of the Study Area and includes the Kunda Park Forest Regional ANSI. It is possible the soils in the ANSI are more suitable for this species. This species was included in the IGF to MECP. The NAI also documents this species from Brady et al., 1980. Butternut

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
		was found in Area C of the SWS (Figure 5-3).
Broad Beech Fern (*Phegopteris hexagonoptera*) SARA: Not on Schedule 1 ESA: Special Concern COSEWIC: Special Concern COSSARO: Not Evaluated[2] S-Rank: S3 Source: NHIC	The Broad Beech Fern prefers to grow in rich soils in deciduous forests, often in areas dominated by maple and beech trees. It requires moist soil and usually grows in full shade (MECP, 2021).	**High** – while not found during field surveys habitat occurs on site and numerous NHIC records occur across the Study Area.
Round-leaved Greenbrier (*Smilax rotundifolia*) SARA: Threatened (Great Lakes Plains population) ESA: Threatened COSEWIC: Threatened (Great Lakes Plains population) COSSARO: Not Evaluated[2] S-Rank: S2 Source: Field surveys	Round-leaved Greenbrier is found mainly in the warmer climate of the Carolinian Forest. It prefers open moist to wet woodlands, often growing on sandy soil (MECP, 2021).	**Confirmed** – A colony was found north of Section 3 (Figure 6-1). This species was included in the IGF to MECP.
Birds		
Bank Swallow (*Riparia riparia*) SARA: Threatened ESA: Threatened COSEWIC: Threatened COSSARO: Threatened S-Rank: S4B Source: OBBA	Bank Swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable (Falconer, et al., 2016).	**None** – No suitable nesting habitat (vertical sand or gravel faces) were observed or is expected to occur.
Barn Swallow (*Hirundo rustica*) SARA: Threatened ESA: Special Concern COSEWIC: Special Concern COSSARO: Special Concern S-Rank: S4B Source: OBBA, field surveys	Barn Swallows have shifted largely to nesting in and on artificial structures, including buildings, bridges, and road culverts. This species prefers various open habitats for foraging including grassy fields, pastures, agricultural crops, and over open water (Heagy, et al., 2014).	**High** – There are potentially suitable nesting sites on the bridges and buildings, however, no nesting habitat was observed in the Study Area. An individual(s) was documented during breeding bird surveys (Figure 6-2). Barn Swallow was down-listed from Threatened to Special Concern in the ESA in January 2023. However, they are still listed as Threatened on SARA and have residence descriptions. Nest protection applies.

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
Bobolink (*Dolichonyx oryzivorus*) SARA: Threatened ESA: Threatened COSEWIC: Special Concern COSSARO: Not Evaluated[2] S-Rank: S4B Source: NHIC, OBBA, Port Robinsons SWS	Bobolink nest primarily in forage crops, hayfields, and associated pastures. Bobolink also occur in wet prairie, graminoid peatlands, and abandoned fields dominated by tall grasses, no-till cropland, small-grain fields, reed beds, and irrigated fields in arid regions. The species does not generally occupy fields of row crops such as corn, soybean, and wheat, pastures in valleys with high shrub density, or intensively grazed pastures (McCracken, et al., 2013).	**None** – currently in the Study Area there are no agricultural grasslands.
Chimney Swift (*Chaetura pelagica*) SARA: Threatened ESA: Threatened COSEWIC: Threatened COSSARO: Threatened S-Rank: S4B,S4N Source: OBBA	Chimney Swifts forage aerially over virtually any habitat. Nesting and roosting take place in a dark sheltered spot with vertical surfaces to cling to. This may include large hollow trees, chimneys, and other structures (COSEWIC, 2007).	**None** – As the OBBA square covers Welland and parts of Fonthill, it is likely these records come from chimneys and other structures in the urban areas.
Eastern Meadowlark (*Sturnella magna*) SARA: Threatened ESA: Threatened COSEWIC: Threatened COSSARO: Not Evaluated[2] S-Rank: S4B Source: OBBA, NHIC, Port Robinsons SWS	Eastern Meadowlarks nest in a variety of open grassy habitats, preferring native grasslands, pastures, and savannahs. Larger tracts of grassland are preferred (McCracken, et al., 2013).	**None** – currently in the Study Area there are no agricultural grasslands.
Eastern Wood-Pewee (*Contopus virens*) SARA: Special Concern ESA: Special Concern COSEWIC: Special Concern COSSARO: Special Concern S-Rank: S4B Source: OBBA, field surveys, Port Robinsons SWS	Eastern Wood-Pewee breeding occurs in mature to intermediate-aged forests with an open understory, often being associated with clearings and edges. Migrants may occur in a wide variety of habitats (COSEWIC, 2012).	**Confirmed** – Suitable habitat is present. This species was considered a probable breeder during field investigations (Figure 6-2).
Golden-winged Warbler (*Vermivora chrysoptera*) SARA: Threatened ESA: Special Concern	Golden-winged Warblers are found in areas of early successional scrub surrounded by mature forests. They are found in dry uplands, swamp forests and marshes. Preferred habitat areas include utility right-of-ways, field edges, recently logged areas, beaver	**Low** – This species has been documented in locations such as the Wainfleet Bog (to the south) and Short Hills Provincial Park (to the north). This species might be

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
COSEWIC: Threatened COSSARO: Not Evaluated[2] S-Rank: S4B Source: OBBA	marshes and areas which have been burned or intermittently farmed (Committee on the Status of Endangered Wildlife in Canada, 2006).	documented on site as passing through but it unlikely to stay or breed in the Study Area.
Grasshopper Sparrow (*Ammodramus savannarum*) SARA: Special Concern ESA: Special Concern COSEWIC: Special Concern COSSARO: Special Concern S-Rank: S4B Source: OBBA	Grasshopper Sparrows breed in large grasslands, including both human-created pastures and hayfields as well as natural prairies and alvars. Habitats used are typically dry with relatively low and sparse vegetation. Large fields of 5 hectares or more are usually required (Ministry of the Environment, Conservation and Parks, 2016).	**None** – currently in the Study Area there are no agricultural grasslands.
Northern Bobwhite (*Colinus virginianus*) SARA: Endangered ESA: Endangered COSEWIC: Endangered COSSARO: Endangered S-Rank: S1 Source: NHIC	The Northern Bobwhite requires an early successional habitat. Minimally it requires an interspersion of grassland, cropland, and brushy cover. The species is now extremely rare in Ontario (Committee on the Status of Endangered Wildlife in Canada, 2003). The occupied habitat should initially be identified as those areas occupied by a bird or covey within the last 20 years and should continue to be protected for a further 10 years after the last confirmed record of occupancy (Wyshynski, 2019).	**Low** – This record is thought to be over 30 years old, as the populations of this species are very small and sparsely distributed in Ontario.
Peregrine Falcon (*Falco peregrinus*) SARA: Special Concern ESA: Special Concern COSEWIC: Not at Risk (subsp. anatum/tundrius) COSSARO: Special Concern S-Rank: S3B Source: Field surveys	Most Peregrine Falcons nest on cliff ledges or crevices, but some will also use tall buildings and bridges near good foraging areas (Committee on the Status of Endangered Wildlife in Canada, 2007). Habitat for Peregrine Falcons has three scales: a nest site with associated perching sites, a nesting territory, and a home range (Ontario Peregrine Falcon Recovery Team, 2010). Characteristics of urban nests are often similar to those of natural cliff nests in that chosen nest sites are usually on one of the taller buildings in an area and within one block of other tall buildings and a reliable food source. They mostly feed on medium-sized birds such as Rock Pigeon and Ring-billed Gull. Other common prey is the European Starling, Blue Jay, Baltimore Oriole, House Sparrow, and Kinglet species (Ontario Peregrine Falcon Recovery Team, 2010).	**None** – No available habitat in the Study Area.
Wood Thrush (*Hylocichla mustelina*) SARA: Threatened	Wood Thrush breed in mature or second growth deciduous and mixed wood forests. They prefer forests with dense understory and large continuous areas of forest but are not reliant on this. Habitat	**Confirmed** – Suitable habitat is present. This species was observed during field investigations as a possible breeder (Figure 6-2).

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
ESA: Special Concern COSEWIC: Threatened COSSARO: Special Concern S-Rank: S4B Source: Port Robinsons SWS, NHIC	fragmentation due to human development and over-grazing by White-tailed Deer are the main threats to this species. Prefers fairly large tracts of interior forest, and typically do not nest in sparsely canopied habitats heavily influenced by human activities (COSSARO, 2013).	
Amphibians and Reptiles		
Eastern Ribbonsnake (*Thamnophis sauritus*) SARA: Special Concern ESA: Special Concern COSEWIC: Special Concern COSSARO: Special Concern S-Rank: S4 Source: Port Robinson SWS	Eastern Ribbonsnakes are found in a variety of wetland habitats with both flowing and standing water such as marshes, bogs, fens, ponds, lake shorelines and wet meadows. Most sightings of Eastern Ribbonsnakes outside of the overwintering period occur near the water's edge. Eastern Ribbonsnakes spend winter in underground hibernacula where they must avoid freezing and dessication. They may hibernate in well-drained sites or in areas close to water and may even be completely submerged inside their hibernacula. Some Eastern Ribbonsnakes may move considerable distances from water to overwinter in forested areas, but the extent of movements to their hibernation sites is not known (Government of Canada, 2017).	**Moderate –** there is wetland habitat in the study area, and the Welland canal is adjacent. The record comes from the Port Robinson SWS although it is unknown if a sighting was made or an old record existed at the time. Eastern Ribbonsnake was found in Area C of the SWS (Figure 5-3). Based on the lack of connectivity, as Hwy 406 bisects habitat, it is unknown if Ribbonsnake is utilizing habitat west of the Hwy.
Snapping Turtle (*Chelydra serpentine*) SARA: Special Concern ESA: Special Concern COSEWIC: Special Concern COSSARO: Not Evaluated[2] S-Rank: S4 Source: ORAA	Snapping Turtles prefer slow-moving waters with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays, or river edges and slow streams and wetlands. Individuals can also exist in developed areas (e.g., golf course ponds, irrigation canals); however, it is unlikely that populations persist in such habitats. Snapping Turtles can occur in highly polluted waterways, but environmental contamination is known to limit reproductive success (Ministry of the Environment, Conservation and Parks, 2014).	**Low** – often wander on land and may turn up in temporary ponds; however, there is no available overwintering habitat in the Study Area and nesting habitat is limited/absent
Northern Map Turtle (*Graptemys geographica*) SARA: Special Concern ESA: Special Concern COSEWIC: Special Concern COSSARO: Special Concern S-Rank: S3 Source: iNaturalist	Inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as emergent rocks and logs) and exposure to the sun for at least part of the day (COSEWIC 2002). Shallow, soft-bottomed habitats are preferred, with wintering occurring in deeper sections (COSSARO, 2013).	**None** - Prefers larger bodies of water such as the Welland Canal. There are no large permanent water sources within the Study Area. This ORAA record cover the canal and therefore likely present elsewhere in the 10km grid.
Midland Painted Turtle (*Chrysemys picta marginata*)	Occupy slow moving, relatively shallow, and well-vegetated wetlands and water bodies with abundant	**Low** –There is no available overwintering habitat in the Study

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
SARA: Special Concern ESA: Not Listed COSEWIC: Special Concern COSSARO: Not at Risk S-Rank: S4 Source: ORAA	basking sites and organic substrate. These turtles can be found primarily in open swamps, marshes, ponds, fens, and bogs (COSEWIC, 2008).	Area and nesting habitat is limited/absent. Likely the ORAA record come from open wetlands elsewhere in the 10km grid.
Mammals		
Little Brown Myotis (*Myotis lucifugus*) SARA: Endangered ESA: Endangered COSEWIC: Endangered COSSARO: Endangered S-Rank: S3	The Little Brown Myotis is widespread throughout the southern half of Canada and is especially associated with humans, often forming nursery colonies in buildings, attics, and other man-made structures. Little Brown Myotis forage over water where their diet consists of aquatic insects, mainly midges, mosquitoes, mayflies, and caddisflies. They also feed over forest trails, cliff faces, meadows, and farmland where they consume a wide variety of insects, from moths and beetles to crane flies (Ministry of the Environment, Conservation and Parks, 2014). Roosts in tree cavities, including small spaces or crevices found in loose bark, hollow trees, rock faces and human structures such as attics, walls, and bat boxes. Hibernates in caves and abandoned mines during the winter months. Typically forages over water (Ministry of the Environment, Conservation and Parks, 2014). Maternity roosts are primarily live deciduous trees and males, juveniles, and non-reproductive females can be found in dead trees, on average all trees are over 20 cm DBH (Humphrey & Fotherby, 2019). Maternity sites typically have sufficient protection from predators, an abundance of roosting locations, and adequate solar exposure (Humphrey & Fotherby, 2019).	**High/Confirmed** – In the absence of surveys this species is considered to be present/utilizing wooded habitat as summer roosting in all wooded ecosites in the Study Area. Additionally, within 50 kms at least one hibernaculum and/or swarming site occurs (Humphrey & Fotherby, 2019).
Eastern Small-footed Myotis (*Myotis leibii*) SARA: Not on Schedule 1 ESA: Endangered COSEWIC: Not Evaluated COSSARO: Endangered S-Rank: S2S3	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year (MECP, 2021).	**High** – No known records of this species occur in Niagara Region (Humphrey, 2017) but habitat does occur, and the Study Area is within range.

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
Northern Myotis (*Myotis septentrionalis*) SARA: Endangered ESA: Endangered COSEWIC: Endangered COSSARO: Not Evaluated[2] S-Rank: S3	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines (MECP, 2021).	**High** – Within 50 kms at least one hibernaculum and/or swarming site occurs but no confirmed observations have been made (Humphrey & Fotherby, 2019).
Tricolored Bat (*Perimyotis subflavus*) SARA: Endangered ESA: Endangered COSEWIC: Endangered COSSARO: Endangered S-Rank: S3?	During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They forage over water and along streams in the forest. Tri-colored Bats eat flying insects and spiders gleaned from webs. At the end of the summer they travel to a location where they swarm; it is generally near the cave or underground location where they will overwinter. They overwinter in caves where they typically roost by themselves rather than part of a group (MECP, 2021).	**High** – Within 50 kms at least one hibernaculum and/or swarming site occurs. Additionally, observations of this species has been made in Niagara region before 1999 and between 1999-2019 (Humphrey & Fotherby, 2019).
Invertebrates		
Monarch (*Danaus plexippus*) SARA: Special Concern ESA: Special Concern COSEWIC: Endangered COSSARO: Special Concern S-Rank: S2N,S4B Source: OBA, Port Robinsons SWS	Monarch is very widely distributed across North America and found in a wide variety of habitats. Populations fluctuate dramatically but have been generally declining likely due to habitat destruction on the hibernation grounds in Mexico, as well as pesticide use and other factors on the vast breeding grounds. Monarchs require milkweeds (Asclepias sp.) to lay their eggs on and will use a variety of other flowers for adult food. In February Monarchs come out of hibernation and find a mate in the Oyamel Fir forests found in central Mexico; generation zero. They migrate north to the southern states to lay eggs on milkweed plants around March and April; first generation. The butterflies that result from those eggs continue to fly further north and lay eggs in May and June; second generation. The third generation will be born in July and August. The generation which reproduces dies after the egg laying stage except for the fourth generation. The fourth generation is born in September and October and does not die after two to six weeks but migrates south back to Mexico and will live for six to eight months until it is time to start the whole process again. Sometimes in the southern states the Monarchs	**Confirmed** – Several species of milkweed are present in Niagara Region. This species may be found in any habitat with milkweed or nectar-producing flowers.

SPECIES NAME, STATUS (SARA, ESA, S-RANK[1]), AND DATA SOURCE	PREFERRED HABITAT	POTENTIAL FOR SPECIES OCCURRENCE/BREEDING IN STUDY AREA
	migrating south for the winter will breed again, creating a fifth generation which will continue south (Journey North, 2021). Monarch butterfly is provincially listed as S2N, S4B, which means non-breeding Monarch in the province are imperiled while breeding Monarch are apparently secure. Monarch is also listed as a Special Concern in the ESA. Monarchs are frequently reported between May and September in Ontario (Cavasin, 2016) which can encompass all life stages and breeding and non-breeding individuals.	

Notes:

1. SARA rankings provided reflect Schedule 1 Status as of 14 July 2022

2. COSSARO: Not Evaluated means not assessed by Cossaro from 2013-2017. Species assessed prior to December 2013 were classified according to COSSARO's previous criteria and are not provided here. The MECP must amend the Species at Risk in Ontario (SARO) list regulation (O. Reg 230/08) within twelve months following the Minister's receipt of a report from COSSARO. COSSARO species are found here http://cossaroagency.ca/species/

3. S-Rank = S1 - Extremely rare throughout its range in the province; S2 - Rare throughout its range in the province; S3 - Uncommon or vulnerable species; S4 - Apparently Secure Species; S5 - Secure Species; SX - Extirpated; B - Breeding; N - Non-breeding; ? – Uncertainty

641000
641500
642000
642500
643000
4766000
4765500
RICE RD
CATARACT RD
MERRITTVILLE HWY
TOWN OF PELHAM
CITY OF THOROLD
CITY OF THOROLD
CITY OF WELLAND
P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure5-2a_PlantSpeciesofConservationConcern_1.mxd

LEGEND

- Municipal Boundaries
- Waterbody
- Watercourse

Road Segments
- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd

- Watercourse Crossing
- Common Greenbrier (Smilax rotundifolia) patch
- White Wood Aster (Eurybia divaricata) - Survey 1
- White Wood Aster (Eurybia divaricata) - Survey 2

- Slender-leaved False Foxglove (Agalinis tenuifolia)
- Eastern Flowering Dogwood (Cornus florida)
- Black Gum (Nyssa sylvatica)

MAP AREA

NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

0 0.5 1 Kilometres

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Plant Species of Conservation Concern

PROJECT N°: IM20103036	**FIGURE: 6-1a**
SCALE: 1:6,000	DATE: June 2023

641400 641500 641600 641700 641800 641900

4765900

4765800

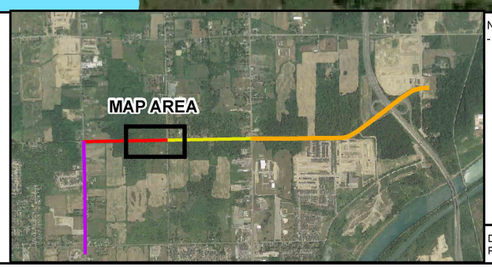
4765700

CATARACT RD

P:\2020\Projects_Other\IM20103036_NiagaraMerittRiceRoad\11_GIS\MXD\Figure5-2b_PlantSpeciesofConservationConcern_1.mxd

LEGEND

- Municipal Boundaries
- Waterbody
- Watercourse
- Road Segments
  - 1: Unopened Road Allowance (Merritt Rd)
  - 2: Merritt Rd
- Watercourse Crossing
- White Wood Aster (Eurybia divaricata) - Survey 1
- White Wood Aster (Eurybia divaricata) - Survey 2
- Slender-leaved False Foxglove (Agalinis tenuifolia)
- Black Gum (Nyssa sylvatica)



NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

0 50 100 200 300 Metres

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Plant Species of Conservation Concern

PROJECT N°: IM20103036 | FIGURE: 6-1b

SCALE: 1:1,400 | DATE: June 2023

642200 642300 642400 642500

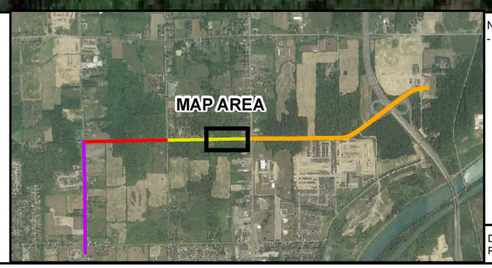
4765800

4765700

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure5-2c_PlantSpeciesofConservationConcern_1.mxd

LEGEND

- Waterbody
- Watercourse
- Road Segments
- 2: Merritt Rd
- Watercourse Crossing
- White Wood Aster (Eurybia divaricata) - Survey 2
- Black Gum (Nyssa sylvatica)



NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

0 50 100 200 Metres

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Plant Species of Conservation Concern

PROJECT N^{O}: IM20103036	**FIGURE: 6-1c**
SCALE: 1:1,000	DATE: June 2023

642800
642900
643000
643100
4765900
4765800
10
m
CITY OF WELLAND
CITY OF THOROLD

LEGEND

- Municipal Boundaries
- Waterbody
- Watercourse
- Road Segments
- 3: Merritt Rd
- Watercourse Crossing
- Common Greenbrier (Smilax rotundifolia) patch
- White Wood Aster (Eurybia divaricata) - Survey 1
- White Wood Aster (Eurybia divaricata) - Survey 2
- Eastern Flowering Dogwood (Cornus florida)

0 50 100 200 Metres

MAP AREA

NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Plant Species of Conservation Concern

PROJECT N°: IM20103036 | **FIGURE: 6-1d**

SCALE: 1:1,000 | DATE: June 2023

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad11_GIS\MXD\Figure5-2d_PlantSpeciesofConservationConcern_2.mxd

640000 641000 642000 643000 644000 645000

4767000 4766000 4765000

PORT ROBINSON RD
PORT ROBINSON RD
RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY
HWY 406
HWY 406
PELHAM ST
MERRITT RD
CITY OF THOROLD
CITY OF WELLAND
TOWN OF PELHAM
CITY OF WELLAND
QUAKER RD
QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMeritRiceRoad\11_GIS\MXD\Figure5-3_Species_of_Conservation_Concern_1.mxd

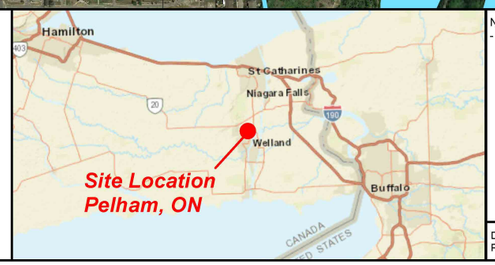
LEGEND

- Study Area
- Municipal Boundaries
- Waterbody
- Watercourse

- Barn Swallow
- Eastern Wood-pewee
- Wood Thrush

Terrestrial Project Location Sections

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Municipal Right-of-Way (Merritt Rd)
- 3: Regional Right-of-Way (Merritt Rd)
- 4: Rice Rd



NOTES:
- Imagery from Google, 2018

0 1.25 2.5 Kilometres

Datum: NAD83
Projection: UTM Zone 17N

Niagara Region wood.

NIAGARA MERRITT-RICE ROAD

Species of Conservation Concern

PROJECT N°: IM20103036 | **FIGURE: 6-2**

SCALE: 1:14,000 | DATE: May 2022

6.2 SIGNIFICANT WETLANDS AND OTHER WETLANDS

PSWs are identified by the MNRF using evaluation procedures established by the province, as amended from time to time (MMAH, 2020). The wetland evaluation procedure defines, identifies, and measures wetland functions and values. Wetlands are assessed based on their perceived values in maintaining natural processes (ecosystem values) and on the benefits provided to society (human utility values). The system ranks wetlands relative to one another, and only trained evaluators can evaluate wetlands. Wetlands in the study area are regulated by the Niagara Peninsula Conservation Authority (NPCA) under Ontario Regulation 155/06.

An analysis of NPCA ELC mapping was undertaken (Section 5.4.1), and a review of the Port Robinson SWS (Aquafor Beech Limited, 2014) was completed. The Port Robinson SWS (Aquafor Beech Limited, 2014) delineated the boundaries of wetlands within the study area where PTE was obtained. It was noted that refinements to the NPCA and/or provincial mapping layers would have to be approved by the respective governing agency prior to acceptance and therefore, only the approved boundaries of PSWs have been included in natural heritage maps within the report. The report does note that most of the woodlots in their study area contained PSW.

According to provincial NHIC/Geohub mapping, within the Study Area, wetlands have been evaluated and they are all a part of the Niagara Street - Cataract Road Woodlot Wetland Complex which is designated as Provincially Significant Wetland (PSW). Other wetlands in the general area include the PSW Port Robinson Woodlot Wetland Complex, which occurs north of Port Robinson Road, the Welland River Between the Canals PSW Complex southeast around the Welland Canal, and Drapers Creek PSW Complex to the southwest.

The Niagara Street - Cataract Road Woodlot Wetland Complex PSW is mapped as Core Natural Heritage in the 2014 Existing Niagara Region OP Schedule C as ECA, and a minor amount as EPA. The new OP maps the areas as Natural Environment System and their corresponding individual components, which align with provincial data. The lower-tier municipalities also map these areas as part of their natural heritage systems.

For the purposes of this report, Significant Wetlands are mapped from the provincial data (Figure 2-1) as they encompass the Port Robinson SWS delineation (Aquafor Beech Limited, 2014), and the OP and NPCA delineations are based on them. As part of wetland mapping, water resources are also considered. The new OP highlights Significant Groundwater Recharge Areas and Highly Vulnerable Aquifers in the Study Area. Significant Groundwater Recharge Areas and Highly Vulnerable Aquifers that are mapped in the area are also considered significant.

6.3 SIGNIFICANT WOODLANDS

In the Study Area, the Province has mapped wooded areas. Additionally, NHIC lists nature areas such as Kunda Park Forest and Rose Little Woodlot. The 2014 Existing Niagara Region OP Schedule C maps large areas of ECA in the Study Area, which can contain Significant Woodlands. In the proposed new OP, significant woodlands and other woodlands are mapped. The Port Robinson West Scoped Subwatershed Update and Servicing Plan (Aquafor Beech Limited, 2014) indicate southwest of the Merritt Road and Hwy 406 intersection as almost entirely covered by forest and swamp containing Regionally Significant Woodlands. During fieldwork, it was found that all deciduous forests and swamps meet the criteria for Significant Woodland.

Woodlands are treed areas that provide environmental and economic benefits. Benefits can include erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products (MMAH, 2020). Woodlands may be delineated according to the Forestry Act definition or the Province's Ecological Land Classification system definition for "forest" (MMAH, 2020). Significant Woodland means an area that is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. Significant Woodlands are to be identified using criteria established by the MNRF (MMAH, 2020). The 2014 and new OP contain definitions of Significant Woodland which are compared in Table 6.3. Largely, MNRF considers woodlands significant if they are located within a sensitive or threatened watershed or in proximity to sensitive groundwater discharge, sensitive recharge, sensitive headwater area, watercourse, or fish habitat. Additionally, MNRF considers woodlands significant if they have a naturally occurring composition of native forest species that have declined significantly or have a high native diversity through a combination of composition and terrain.

Woodlands should be considered significant if they have a unique species composition; a vegetation community with a provincial ranking; habitat of rare, uncommon, and/or restricted plant species; and are characterized as older communities.

Table 6.3 Regional Official Plan Significant Woodland Criteria

2014 OP has policy 7.B.1.5 which states that "to be identified as significant a woodland must meet one or more of the following criteria":	**The new Niagara Region OP Schedule L states a woodland must meet the definition of ELC forest (≥60% tree cover), and then meet one or more of the following criteria:**
In size, be equal to or greater than: - 2 hectares, if located within or overlapping Urban Area Boundaries; - 4 hectares, if located outside Urban Areas and north of the Niagara Escarpment; - 10 hectares, if located outside Urban Areas and south of the Escarpment;	- 2 ha or greater in size, or - 1 ha or greater in size meeting at least one of the following criteria: a. Naturally occurring (i.e., not planted) trees (as defined in the species list of Appendix D in the Greenbelt Technical Paper); b. Treed areas planted with the intention of restoring woodland; c. 10 or more trees per ha greater than 100 years old or 50 cm or more in diameter; d. Wholly or partially within 30 m of a provincially significant wetland or habitat of an endangered or threatened species; e. Overlapping or abutting one or more of the following features: i. Permanent streams or intermittent streams; ii. Fish habitat; iii. Significant valleylands;
Abut or be crossed by a watercourse or water body and be 2 or more hectares in area.	
Contain threatened or endangered species or species of concern;	0.5 ha or greater in size meeting at least one of the following criteria: a. A provincially rare treed vegetation community with an S1, S2 or S3 in its ranking by the MNRF's NHIC.; b. Habitat of a woodland plant species with an S1, S2 or S3 in its ranking or an 8, 9, or 10 in its Southern Ontario Coefficient of Conservatism by the NHIC, consisting of 10 or more individual stems or 100 or more sqm of leaf coverage; c. Any woodland overlapping or abutting one or more of the following features: i. Significant wildlife habitat; ii. Habitat of threatened species and endangered species; or iii. Non-Provincially Significant Wetlands
Contain interior woodland habitat at least 100 m in from the woodland boundaries;	

2014 OP has policy 7.B.1.5 which states that "to be identified as significant a woodland must meet one or more of the following criteria":	The new Niagara Region OP Schedule L states a woodland must meet the definition of ELC forest (≥60% tree cover), and then meet one or more of the following criteria:
Contain older growth forest and be 2 hectares or greater in area;	
Overlap or contain one or more of the other significant natural heritage features	Any size overlapping or abutting one or more of the following features: a. Provincially significant wetland; and b. Life Science area of natural and scientific interest

Under the new OP, a Significant Woodland can be classified as a cultural and regenerating woodland if all of the criteria outlined in Schedule L are met. None of the woodland communities in the Terrestrial Study Area meet the requirements for cultural and regenerating woodland.

Based on a review of the Wooded Area layer from Geohub, secondary sources, and field surveys, Significant Woodlands are mapped from the wooded area type 'Treed' (Geohub) where it occurs within a forest and/or swamp community determined through fieldwork (Figure 6-3). These Significant Woodlands meet the requirements according to the 2014 and new OP Regional criteria.

6.3.1 TOWN OF PELHAM OP B3.3.4.11 SIGNIFICANT WOODLANDS

It is noted that while the Environmental Protection Two designation is intended to include significant woodlands, the features identified on Schedule B as "Wooded Areas" have not been assessed or confirmed for significance. As a result, these features have not been included in the Environmental Protection Two designation. When an assessment of these features has been completed (and accepted), the "Wooded Areas" shown on Schedule B, which are confirmed as being significant, will be added to the Environmental Protection Two designation. When development or site alteration is proposed within 50 m of a Wooded Area identified on Schedule B, an assessment will be required to determine if the feature is significant in accordance with the Regional Policy Plan. In the interim, when development or site alteration is proposed within 50 m of a Wooded Area identified on Schedule B, an assessment may be required to determine if the feature is significant.

In the Town of Pelham, Section 4 and the western side of Section 1 of the project occur. The "Wooded Area" in Schedule B does occur within 50 m of the proposed Rice Road widening. The Significant Woodland mapped in Figure 6-3 is considered Significant Woodlands and applicable to the Town of Pelham policies.

6.3.2 CITY OF WELLAND

In the City of Welland, ECAs include Significant Woodlands. Significant Woodlands within the City of Welland must meet specific criteria, criteria which are consistent with the Significant Woodland Criteria in the Regional OP (Section 2.3.1; Section 6.1.2.2.E). The Significant Woodland mapped in Figure 6-3 is considered Significant Woodlands and applicable to the City of Welland policies. Additionally, when a woodland greater than 0.5 hectares in size is located on or adjacent to a development, the applicant shall be required to prepare a Tree Saving Plan as a condition of approval. A grading or building permit shall not be issued unless the Tree Saving Plan has been approved by the City (Section 6.1.3.2.B).

6.3.3 CITY OF THOROLD B3.3.4.12 SIGNIFICANT WOODLANDS

Similar to the Town of Pelham, Environmental Protection Two designation is intended to include Significant Woodlands and the features identified on Schedule B as "Wooded Areas" have not been assessed or confirmed for significance. As a result, these features have not been included in the Environmental Protection Two designation. When a field assessment of these

features has been completed (and approved), the “Wooded Areas” confirmed as being significant will be added to the Environmental Protection Two. In the interim, when development or site alteration is proposed within 120 m of a Wooded Area identified on Schedule B, an assessment may be required to determine if the feature is significant.

In the City of Thorold, most of Segment 1 and all of Segments 2 and 3 of the project occur. The “Wooded Area” in Schedule B does occur within 120 m of the proposed Merritt Road extension and widening. The Significant Woodland mapped in Figure 6-3 is considered Significant Woodlands and applicable to the City of Thorold policies.

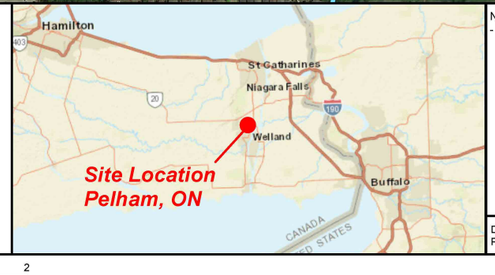
641000
642000
643000
644000
4766000
4765000

RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY
HWY 406
CITY OF THOROLD
CITY OF WELLAND
WELLAND CANAL
WELLAND RIVER
QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure6-2_SigWoodland.mxd

LEGEND

- Terrestrial Study Area
- Municipal Boundaries
- Terrestrial Project Location Sections
  - 1: Unopened Road Allowance (Merritt Rd)
  - 2: Municipal Right-of-Way (Merritt Rd)
  - 3: Regional Right-of-Way (Merritt Rd)
  - 4: Rice Rd
- Wooded Area
- Waterbody
- Watercourse
- Direction of Flow



NOTES:
- Imagery from Google, 2018

Datum: NAD83
Projection: UTM Zone 17N

0 1 2 Kilometres

N W E S

Niagara Region

wood.

NIAGARA MERRITT-RICE ROAD

Significant Woodlands

PROJECT N°: IM20103036 | **FIGURE: 6-3**

SCALE: 1:9,500 | DATE: December 2022

6.4 SIGNIFICANT VALLEYLANDS

The Natural Heritage Resource Manual (NHRM; MNR 2010) states that within headwater areas, valleylands may not have a defined watercourse channel. Flow might be overland and originate from springs, seepage areas, and surface runoff. For these less well-defined valleylands, as is the case in the Study Area, the physical boundary may be defined in several ways, including floodlines, the consideration of riparian vegetation, the flooding hazard limit, the meander belt or the highest general level of seasonal inundation. Valleys are dynamic and should be delineated based on the historic, current, and likely future zone of geomorphic influences. The identification and evaluation of significant valleylands is the responsibility of planning authorities. Many conservation authorities have identified valleylands as part of their regulation mapping.

The NPCA and Region of Niagara do not explicitly map valleylands. However, NPCA does map regulated floodplain extents (separate mapping from regulation limits); regulated floodplain does occur in the Study Area. The Town of Pelham mapped Valleyland in their OP, although not in the Study Area. The Thorold OP makes a specific note that Valleylands has not yet been mapped, and lands that the NPCA confirms as being valleylands will be placed in a Hazard Land Overlay Zone.

Valleylands, which may occur in the Study Area, are protected under NPCA regulation. However, it is not thought that any Significant Valleylands occur in the Study Area.

6.5 SIGNIFICANT WILDLIFE HABITAT

SWH is considered of provincial significance in Ontario. Development in SWH is prohibited unless it can be demonstrated that development will have no negative impact on features and functions. Wildlife habitat is considered 'significant' if it is deemed ecologically important in terms of feature, function, representation, or amount and contributes to the quality and diversity of an identifiable geographic area or Natural Heritage System (MMAH 2020). The SWH criteria schedule for Ecoregion 7E (OMNRF 2015) is used to determine the presence of SWH. Other provincial documents used to identify and assess SWH are the NHRM (OMNR 2010), the SWH Technical Guide (OMNR 2000) and the Significant Wildlife Habitat Mitigation Support Tool (SWHMiST; OMNRF 2014).

SWH has been screened for the Project Area (Appendix G). Ten SWH types have been evaluated as candidate and five as confirmed (Habitats for Species of Conservation Concern has been evaluated as both candidate and confirmed). Habitats not discussed below were evaluated as not present as either habitat requirements or species are not present (Appendix G). Only the SWH determined to be either candidate or confirmed is discussed below. Further studies to confirm the presence of certain species could be conducted to determine the presence/absence of candidate SWH.

6.5.1 SEASONAL CONCENTRATION AREAS

Seasonal concentration areas are those where wildlife species occur annually in aggregations at certain times of the year. Such areas are sometimes highly concentrated with members of a given species, or several species, within relatively small areas. Some wildlife species will concentrate where they can rest and feed, and other wildlife species require habitats where they can survive winter.

Raptor Wintering – Candidate

Red-tailed Hawk, Northern Harrier, and American Kestrel are documented in the secondary source information, and Red-tailed Hawk was documented during surveys. The habitat for this type of SWH is >20 ha with a combination of forest and upland communities. Based on potential species occurrences and vegetation communities present, Raptor Wintering SWH is considered candidate in all the forest and swamp communities in the Study Area until studies can confirm the presence/absence of one or more Short-eared Owls, or one or more Bald Eagles, or at least 10 individuals of two indicator species. The site is considered significant if it is used three years out of five for a minimum of 20 days.

Bat Maternity Colonies – Candidate

It is assumed both indicator species, Big Brown Bat and Silver-haired Bat, occur in the Study Area. It is thought that the Study Area represents an important foraging site and contains maternity habitat. The required habitat type, mature deciduous forest, occurs. To qualify as suitable habitat, the forest must have >10 large diameter (>25cm DBH) wildlife trees per hectare. Wildlife

trees were not inventoried as it was assumed the density of trees would fit the criteria. This SWH type is considered Candidate SWH as the presence of >10 Big Brown Bats or >5 adult female Silver-haired Bats were not confirmed in the Study Area.

Reptile Hibernaculum – Candidate

Eastern Gartersnake, Northern Watersnake, Northern Red-bellied Snake, DeKay's Brownsnake, Eastern Milksnake, and Eastern Ribbonsnake have been documented in the general area in the secondary source information. Eastern Gartersnake has been documented during field surveys. The area has a history of agriculture, and rock and debris piles may provide access to areas below the frost line. It is also noted that small mammal burrows and cavities within root structures of large trees could be potentially suitable hibernacula. Studies confirming a minimum of five individuals of a snake species or individuals of two of more species near suitable habitats on appropriate weather days during spring and fall are required to confirm this type.

Deer Winter Congregation Areas – Confirmed

Deer movement during winter in the southern areas of Eco-region 7E is not constrained by snow depth; however, deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions. The Regional OP and the MNRF map deer congregation areas in the Study Area and therefore, this type is considered confirmed (Figure 6-4). The figure shows the 'White-tailed Deer Wintering Area (Stratum 2)' from Geohub. This layer has not been updated to current land conditions, as this can only be done in consultation with the MNRF.

6.5.2 RARE VEGETATION COMMUNITIES SPECIALIZED HABITATS FOR WILDLIFE

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for survival and cannot readily move to or find alternative habitats. One of the most important criteria for determining a rare vegetation community is the current representation of the community within a planning area based on its area relative to the total landscape or the number of examples within the planning area. NHIC uses a system that considers the provincial rank of a species or community type as a tool to prioritize protection efforts (the sub-national or s-rank).

Old Growth Forest – Candidate

Old Growth Forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage the development of a multi-layered canopy and an abundance of snags and downed woody debris. The criteria state that the woodland area must be over 0.5 ha, dominant trees are >140 years old, and the forested area containing the old-growth characteristics will have experienced no recognizable forestry activities. Based on aerial imagery from 1934 (88 years ago; Figure 5-1), some wooded areas occur, look mature, and are larger than 0.5 ha. These wooded areas still occur today, so core sections of the wooded areas may be classified as old growth.

Other Rare Vegetation Communities – Candidate

This SWH includes plant communities that often contain rare species which depend on the habitat for survival. It is noted that Aquafor Beech (2014) found Pin Oak Mineral Deciduous Swamp (SWD1-3) as occasional among vernal pools. Pin Oak Mineral Deciduous Swamp is a rare vegetation community (S2S3) but was not documented by botanists during fieldwork in the Terrestrial Study Area.

Waterfowl Nesting Area – Candidate

Important to local waterfowl populations, upland habitats (120 m) adjacent to wetlands are considered. The presence of three or more nesting pairs of indicator species or ten or more pairs of indicator species, including Mallards confirms SWH. Mallard was documented during field surveys, and other indicator species were documented in secondary sources. To confirm this habitat type, nesting surveys completed April-June could confirm the presence/absence of this type.

Woodland Raptor Nesting Habitat – Candidate

Woodland raptor nesting sites are rarely identified but are sensitive habitats that are often used annually. Cooper's Hawk and Sharp-shinned Hawk have been documented in the general area in secondary sources. All natural or conifer plantations and woodland/forest stands > 30 ha with > 4 ha of interior habitat (interior habitat is defined as a 200 m buffer in this instance) are considered suitable habitats. Habitat is present, however, no nests were confirmed during field studies in the Terrestrial Study Area. Sharp-shinned Hawk nests almost exclusively in coniferous forests (OMNRF, 2014) and is unlikely to nest in the Study Area. However, Cooper's Hawk tends to nest in intermediate-aged and mature upland deciduous forests. Cooper's Hawk hunt at the edge of forests and in forest openings and is common in urban areas (OMNRF, 2014). This habitat type is confirmed

with one active nest from an indicator species. Nesting surveys can be completed from early March to the end of May, and call broadcasts can help locate territorial raptors.

Seeps and Springs – Candidate

Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams in forested areas. Wild Turkey, salamanders, and White-tailed Deer are indicator species and were documented in the Study Area. The confirmation of two or more locations with seeps/springs is SWH. Further hydrological work could help confirm its presence; however, based on the geological condition which creates surface water wetlands, it is likely seeps are present.

Amphibian Breeding Habitat: Woodland – Confirmed

These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations. Studies must confirm the presence of a breeding population of 1 or more of the newt/salamander indicator species, or two or more of the frog indicator species with at least 20 individuals, or two or more of the listed frog species with a call level code 3. Gray Treefrog and Spring Peeper indicator species for woodland breeding were documented during fieldwork in the required amounts. Additionally, Blue-spotted Salamander is confirmed present and breeding by the NPCA. The SWH habitat is defined as the presence of a wetland, pond, or woodland pool (including vernal pools) >500 m^2 within or adjacent (within 120 m) to a woodland (no minimum size). Therefore, SWH is delineated in Figure 6-4.

Amphibian Breeding Habitat: Wetland – Confirmed

Wetlands supporting breeding for these amphibian species are extremely important and rare within south and central Ontario landscapes. SWH habitat requirements are wetlands (including swamps) >500 m^2 (Figure 6-4), and studies must confirm the presence of breeding populations of;

- 1 or more of the listed newt/salamander species; or
- 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses); or
- 2 more of the listed frog/toad species with Call Level Codes of 3; or
- Wetland with confirmed breeding Bullfrogs.

As mentioned above, Blue-spotted Salamander was confirmed breeding by NPCA and is an indicator species. Additionally, several indicator frog and toad species were documented during surveys in appropriate numbers. American Toad, Gray Treefrog, Green Frog, and Northern Leopard Frog were all documented. Lastly, American Bullfrog was also documented and is assumed to be breeding. Therefore, all the wetland communities on site are confirmed SWH (Figure 6-4).

Woodland Area-Sensitive Bird Breeding Habitat – Candidate

Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area-sensitive interior forest songbirds. Habitats are considered large forest stands or woodlots >30 ha in size and >60 yrs old. Habitat is confirmed when interior forest breeding birds (indicator species) are breeding. Studies must confirm the presence of nesting or breeding pairs of three or more of the indicator species. Indicator species have been documented in the general area through secondary sources and fieldwork documented Black-throated Blue Warbler, Black-throated Green Warbler, Ovenbird, Scarlet Tanager, and Veery migrating through the Study Area in the spring. However, none of the indicator species were documented in the Study Area during breeding bird surveys.

The habitat present in the Study Area is considered to be at least 60 years old and possibly 140 years old (based on historical imagery) and contains interior woodland habitat. Subsequent years of breeding bird surveys should be completed to confirm the presence/absence of this type.

6.5.3 HABITAT FOR SPECIES OF CONSERVATION CONCERN

Habitats of Species of Conservation Concern include wildlife species that are listed as Special Concern or provincially/regionally rare. Habitats of Species of Conservation Concern do not include habitats of Endangered or Threatened species, as identified by the ESA, 2007. Special Concern Species have been confirmed on site (Section 6.1) in secondary sources or during fieldwork in the Terrestrial Study Area.

Confirmed species include:

- Barn Swallow,
- Eastern Wood-Pewee,
- Wood Thrush,
- Monarch,
- Tall Tickseed (S1S2),
- Black Gum (S3), and
- Species considered Rare in the NPCA NAI but not listed above or an Endangered and Threatened species under the ESA: Slender-leaved False Foxglove, Limestone Bittercress, Drooping Woodland Sedge, Necklace Sedge, Rough Fleabane, Dyer's Bedstraw, Great Blue Lobelia, False Waterpepper, Canada Plum, Common Three-square Bulrush, and Mosquito Bulrush.

Linking SWH on-site is completed by defining the habitat area to the finest ELC scale that protects the habitat form and function is the SWH. The forest and swamp habitats are confirmed SWH for Eastern Wood-pewee and Wood Thrush. Barn Swallow was documented flying overhead during breeding bird surveys, likely foraging. Monarch was also observed during surveys, but it is not confirmed if it was a breeding individual. Further survey work to confirm appropriate habitat for Barn Swallow and Monarch would be required to delineate this type.

Limestone Bittercress, Great Blue Lobelia, False Waterpepper, and Black Gum were documented in swamps (SWD3-3), and Necklace Sedge and Canada Plum were documented in forests (FODM5-3). In the unopened road allowance (Inclusion - Dry – Fresh Forb meadow Ecosite (MEFM1)) and meadows (ME) in the Terrestrial Study Area, Rough Fleabane was documented. Tall Tickseed and Dyer's Bedstraw were documented in a MAM2. Along roadside and hedgerows, Sledner-leaved False Foxglove, Drooping Woodland Sedge, Common Three-square Bulrush, and Mosquito Bulrush were found. This SWH type is not mapped as this type is not limited and all ELC communities would be mapped SWH.

Candidate species include:

- Swamp Rose-mallow,
- Broad Beech Fern, and
- species considered Rare in the NPCA NAI but not listed above or an Endangered and Threatened species under the ESA: Broomsedge Bluestem, Fireberry Hawthorn, Rough Barnyard Grass, Alder-leaved Buckthorn, Robin's-plantain Fleabane, Twinleaf, Alpine Rush, Canada Rush, Tamarack, Virginia Water-horehound, Clammy Ground-cherry, Whorled Milkwort, Balsam Poplar, Pin Cherry, Greater Water Dock, Little Bluestem, Sphinx Ladies'-tresses, Great Duckweed, Hoary Vervain

These candidate species must be confirmed present and further studies to delineate suitable habitats would be required.

6.5.4 ANIMAL MOVEMENT CORRIDORS

Animal Movement Corridors are elongated areas used by wildlife to move from one habitat to another. They are important to ensure genetic diversity in populations, to allow seasonal migration of animals (e.g., deer moving from summer to winter range) and to allow animals to move throughout their home range from feeding areas to cover areas. Where a confirmed or candidate Specialized Habitat for Wildlife has been identified Animal Movement Corridors must also be identified.

Amphibian Movement Corridors - Confirmed

Movement corridors for amphibians moving from their terrestrial habitat to their breeding habitat can be extremely important for local populations. Movement corridors must be determined when Amphibian Breeding Habitat – Wetland is confirmed or candidate. As Amphibian Breeding Habitat – Wetland is confirmed, this SWH type must also be considered. Corridors can be mapped from the habitat in all directions. Corridors should have at least 15 m of vegetation on both sides of a waterway or be up to 200 m wide of woodland habitat. Habitat is considered continuous if gaps are <20 m (OMNR, 2010 and OMNRF, 2015). Merritt Road is less than 20m wide in Section 2, so the habitat is considered continuous. Corridors should consist of native vegetation with a diversity of community layers. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant. Shorter corridors are more significant than longer corridors. However, amphibians must be able to get to and from their summer and breeding habitat.

It is likely that amphibians breeding within the Study Area are increasingly isolated and must find breeding, foraging, and wintering habitats all within the general area. Hwy 406 is likely a barrier to movement and individuals in the study area are isolated from those on the west side. Corridors are mapped in Figure 6-4b based on findings in the Terrestrial Study Area and NPCA swamp community delineations outside of the Terrestrial Study Area. Linkages and Corridors are also considered in the 2014 Regional OP (Section 6.7.1) and the new Niagara Region OP.

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4767000 4766000 4765000

PORT ROBINSON RD

PORT ROBINSON RD

RICE RD

TOWN OF PELHAM
CITY OF THOROLD

CATARACT RD

MERRITTVILLE HWY

HWY 406

PELHAM ST

MERRITT RD

HWY 406

CITY OF THOROLD

CITY OF WELLAND

TOWN OF PELHAM

CITY OF WELLAND

QUAKER RD

P:\2020\Projects_Other\IM20103036_NiagaraMerrittRiceRoad\11_GIS\MXD\Figure6-4a_ConfirmedSWH.mxd

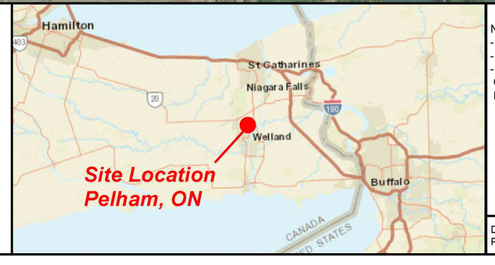
LEGEND

- EA Study Area
- Municipal Boundaries
- Deer Winter Congregation Areas
- Amphibian Breeding Habitat – Woodland
- Amphibian Breeding Habitat - Wetland

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd

0 1.25 2.5 Kilometres



NOTES:
- Imagery from Google, 2018
- Location of features is approximate
- ENtire map extent is with the Growth Plan for the Greater Golden Horseshoe

Datum: NAD83
Projection: UTM Zone 17N

N W E S

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Confirmed SWH

PROJECT N°: IM20103036 | **FIGURE: 6-4a**

SCALE: 1:14,000 | DATE: March 2023

640000 641000 642000 643000 644000 645000

4767000 4766000 4765000

PORT ROBINSON RD
PORT ROBINSON RD
RICE RD
TOWN OF PELHAM
CITY OF THOROLD
CATARACT RD
MERRITTVILLE HWY
HWY 406
HWY 406
PELHAM ST
MERRITT RD
CITY OF THOROLD
CITY OF WELLAND
TOWN OF PELHAM
CITY OF WELLAND
QUAKER RD

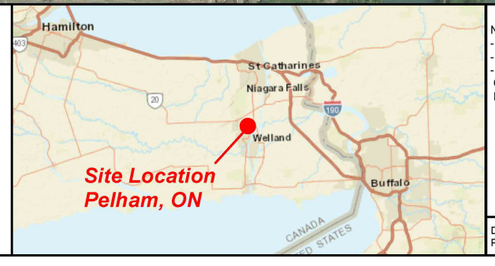
P:\2020\Projects_Other\IM20103036_NiagaraMerittRiceRoad\11_GIS\MXD\Figure6-4b_ConfirmedSWH1.mxd

LEGEND

- EA Study Area
- Municipal Boundaries
- Amphibian Breeding Habitat - Wetland
- NPCA Wetland
- Amphibian Movement Corridor

Road Segments

- 1: Unopened Road Allowance (Merritt Rd)
- 2: Merritt Rd
- 3: Merritt Rd
- 4: Rice Rd



NOTES:
- Imagery from Google, 2018
- Location of features is approximate
- ENtire map extent is with the Growth Plan for the Greater Golden Horseshoe

Datum: NAD83
Projection: UTM Zone 17N

0 1.25 2.5 Kilometres

Niagara Region

wsp

NIAGARA MERRITT-RICE ROAD

Amphibian Movement Corridors

PROJECT N°: IM20103036 | **FIGURE: 6-4b**

SCALE: 1:14,000 | DATE: March 2023

6.6 AREAS OF NATURAL SCIENTIFIC INTEREST

Northwest of the intersection of Merritt Road and Rice Road is the Kunda Park Forest Life Science ANSI as identified by the province (Figure 2-1), Town of Pelham OP, and Niagara Region OP. Life science ANSIs are significant representative segments of Ontario's biodiversity and natural landscapes, including specific types of forests and wetlands, their native plants and animals, and their supporting environments. They contain relatively undisturbed vegetation and landforms, and their associated species and communities (OMNR 2010). It is noted that Eastern Flowering Dogwood, American Chestnut, other species of conservation concern including Pignut Hickory, Pin Oak, and Downy Woodmint have been found in this ANSI.

6.7 ADJACENT LANDS

Adjacent Lands are the lands relevant to which impacts must be considered and the compatibility of a development proposal must be addressed. The extent of adjacent lands may vary, depending on such factors as hydrology, topography, soil conditions, potential disruption of wildlife movement patterns, adjacent land uses and other features. The 2014 Regional OP has guidelines for Adjacent Lands:

- 120 m for a PSW, Key NHS within the Greenbelt NHS, Key Hydrologic Feature;
- 50 m for an ANSI, Habitat of SAR, Significant Woodland, SWH, Significant Valleylands, other wetlands;
- 30 for Type I fish habitat; and
- 15 m for Type 2 and 3 fish habitat.

The Welland OP similarly defines Adjacent Lands while the other lower-tier municipal OPs do not. The new Niagara Regional OP defines Adjacent Lands (outside of the Provincial NHS) as:

- 120 m for PSW, Significant Coastal Wetland, and Significant Woodland and
- 50 m for Other Woodland, Significant Valleyland, SWH, Habitat of Endangered Species and Threatened Species, and Life Science ANSI.

Adjacent Lands are also protected from development, not just as a trigger for further studies, according to the PPS. Adjacent Lands occur in the Study Area, and the proposed project intersects all of the Regional definitions from both OPs.

6.8 FISH HABITAT

Part of the Twelve Mile Creek Headwaters, Singer's Drain is Type 2 Important Fish Habitat and rated as a Class C Drain by DFO. Port Robinson Creek is also Type 2 Important Fish Habitat, and southeast of the Study Area Towpath Drain is Type 2 Important Fish Habitat. Of the surveyed crossings, Crossing 1, Crossing 3, Crossing 4, Crossing 5, Crossing 7, Crossing 8, and Crossing 9 could contain fish habitat however, only Crossing 4 and Crossing 8 had fish at the time of surveys.

6.9 OTHER ITEMS OF SIGNIFICANCE

6.9.1 LINKAGES AND CORRIDORS

The 2014 Regional OP has illustrated conceptual corridors and linkages on the Region's Core Natural Heritage Map (Figure 2-2). The new Niagara Regional OP maps linkages as areas between natural heritage features and areas and key natural heritage features consisting of natural areas (e.g., watercourses, valleylands, meadows, thicket, woodland, wetland, and hedgerows, etc.) or rural/agricultural lands without major barriers (Figure 2-3). The goal of these linkages is to represent or provide ecological connectivity between natural features and areas. The impact screening below will consider ecological connectivity.

The new Niagara Regional OP requires supporting features and areas to be determined to evaluate the ecological contribution of the supporting feature and area to other components of the natural environment system. Likewise, enhancement areas are intended to consist of natural self-sustaining vegetation that increases the ecological resilience and function of individual key natural heritage features, key hydrological features and/or natural features and areas. The impact screening below recommends that compensation and restoration required by the Project be considered in these areas.

7 DEVELOPMENT ALTERNATIVES

The Niagara Region Transportation Master Plan (TMP) is a long-term, strategic planning document. As such, the TMP does not address site-specific or corridor-specific issues. Rather, the TMP presented a package of actions that, when implemented over time, helps the Region achieve its strategic vision (IBI 2017a). Further details regarding the development of the recommended network are documented in the Road Network Strategy Technical Paper (IBI 2017b). An updated travel demand model was developed for the Technical Paper to provide a technical base upon which to assess the transportation system in Niagara Region. The model forecasted that a few regional roads in Niagara Region would exceed capacity in 2041 (Figure 7-1).

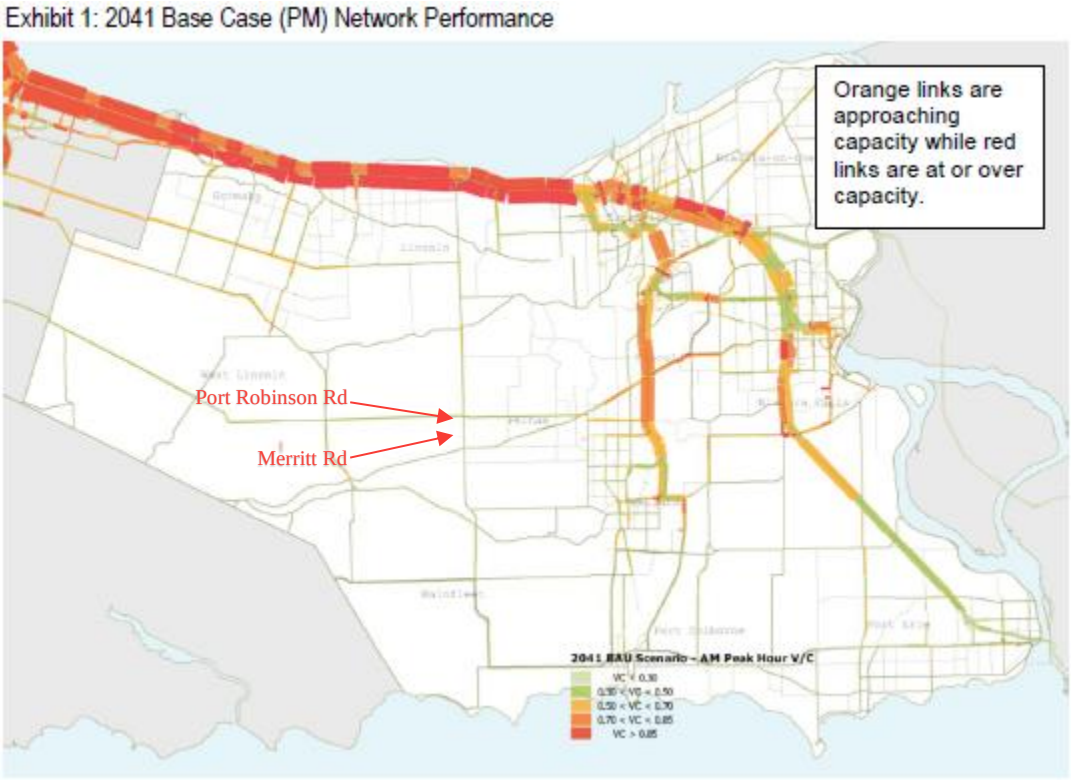


Figure 7-1: Exhibit 1 from the Road Network Strategy Technical Paper

As part of the TMP, a detailed transportation modelling exercise was undertaken for five subareas identified as special analysis areas (Subarea Analysis Summary IBI 2017c). Sub-area 3: Port Robinson Road is bounded by Rice Road to the west, Quaker Road to the south, Towpath Road and Kottmeier Road to the east, and Port Robinson Road to the north (i.e., the EA Study Area Figure 1-1). At the time of the Subarea Analysis Summary (2017) the OP for the City of Thorold identified the following as the most significant transportation improvements within the study area:

1) the widening of Highway 406 to four lanes,
2) the implementation of a full interchange for Merritt Road, and
3) extension of Merritt Road west of Cataract Road.

Improvements 1 and 2 had already been implemented during the Subarea Analysis. Therefore, the Subarea Analysis investigated the extension of Merritt Road west of Cataract Road (i.e., Segment 1). The findings of this subarea model work *"would support these recommendations as the new Regional Road* [i.e., Merritt Road] *connection will provide an alternate connection to Highway 406 in the south, providing some relief to traffic on Highway 20 and the parallel routes* [i.e., Port Robinson Road]. *It also complete*[s] *the Regional Road network and takes advantage of the newly built interchange at Merritt Road and Highway 20 by the Province"* (IBI 2017c).

Building from the recommendations to make Merritt Road an alternate connection to Highway 406 and complete the regional network while taking advantage of the newly built interchange at Merritt Road and Highway 20, an Evaluation of Alternative Solutions (Wood 2021) was prepared as part of the Schedule 'C' MCEA. Specifically, the Evaluation of Alternative Solutions explores alternatives which meet the recommendation to make Merritt Road an east-west connection. To do so, the three problems/opportunities addressed are:

- Address transportation capacity issues,
- Address active transportation connectivity issues, and
- Address Complete Street theme.

The following alternative solutions were identified to address the problems/opportunities:

Alternative Solution 1 - Do Nothing: As the name implies, this alternative would not propose any improvements to the Merritt Road and Rice Road within the study area. This alternative maintains existing transportation and natural environment conditions.

Alternative Solution 2 - Manage Transportation Demand: Transportation Demand Management (TDM) alternative would manage the demands placed on transportation infrastructure by implementing a set of policies, programs, services, and/or initiatives that aim to increase efficiency in the transportation network by changing how, how much, when, where, and why people travel. This alternative would improve facilities for other modes of transportation, such as walking, cycling, and transit. This alternative would maintain existing conditions in the natural environment.

Alternative Solution 3 – Limit Growth and Development: Land development and other changes in land use may give rise to roadway capacity problems. This alternative would involve restricting the development of adjacent lands. This alternative would maintain existing conditions in the natural environment.

Alternative Solution 4 – Improve Other North-South and East-West Roads: This alternative considers infrastructure improvements to the other north-south and east-west roads. This alternative would or could impact the natural environment elsewhere but would likely be less impactful to the natural environment than alternative solution 5.

Alternative Solution 5 – Improve Merritt Road and Rice Road: This alternative is the most impactful to the natural environment and would involve the following:

- Extension of Merritt Road between Rice Road and Cataract Road;
- Improvements to Merritt Road between Cataract Road and Highway 406;
- Improvements to Rice Road between 200m north of Merritt Road and Quaker Road;
- Localized intersection improvements, such as the addition of dedicated turn lanes, traffic signals/roundabouts and/or improvements to the timing of the existing traffic signal at Merritt Road and Merrittville Highway/Niagara Street intersection to improve traffic operations; and
- Providing active transportation facilities on both Merritt Road and Rice Road.

To identify the impacts and advantages of each alternative solution, evaluation criteria were developed related to transportation, socio-economic, natural and cultural environments, and technical and cost considerations. Through this evaluation, it was found that Alternative Solution 5 was preferred as it is the only alternative that addresses the recommendations of the TMP (i.e., to make Merritt Road an east-west connection). Alternative Solution 5 provides opportunities to address existing and future traffic congestion on Merritt Road and Rice Road, as well as provide active transportation facilities.

Phase 3 of the MCEA process involves developing and evaluating alternative design concepts for the Preferred Solution (Alternative Solution 5). Alternative design concepts were identified for Road Alignment, Road Cross-Section, and Road Intersections. The design concepts were similarly evaluated related to transportation, socio-economic, natural and cultural environments, and technical and cost considerations to identify the impacts and advantages of each design concept. Each Segment was evaluated separately, i.e., Segments 1 through 4 (Figure 1-1).

7.1 ROAD ALIGNMENT ALTERNATIVES

Based on the evaluation presented in the Evaluation of Alternative Designs (Wood 2021), the following were selected as the preferred alignments for each segment:

- The Preliminary Preferred Road Alignment for Segment 1 is Alternative A: Centre Alignment
- The Preliminary Preferred Road Alignment for Segment 2 is Alternative B: South Alignment
- The Preliminary Preferred Road Alignment for Segment 3 is Alternative B: North Alignment
- The Preliminary Preferred Road Alignment for Segment 4 is Alternative B: Hybrid Alignment

The decision for the preferred alignments was made based on factors other than the natural environment, as an impact on the natural environment is expected in every design alternative.

7.2 ROAD CROSS-SECTION ALTERNATIVES

Once the preliminary preferred alignments were identified for the road segments, the next step was to identify and evaluate alternative cross-sections for the road segments. Cross-section alternatives were identified and evaluated based on transportation, engineering/constructability, and cost for each road segment. i.e., the decision for the preferred cross-sections was made based on factors other than the natural environment, as the spatial impacts are included in the footprint selected by the alignment. All cross-sections have a combination of travel lanes, sidewalks, and cycle tracks.

7.3 ROAD INTERSECTION ALTERNATIVES

Once the preliminary preferred alignments were identified for the road segments and preliminary preferred alignments were selected, a review of intersection alternatives was completed. Four key intersections along the study corridor occur Merritt Road and Rice Road, Merritt Road and Cataract Road, Merritt Road and Merrittville Highway/Niagara Street, and Rice Road and Quaker Road. The alternatives considered for road intersections were traffic signals or roundabouts. Roundabouts are typically safer for drivers and are ultimately the preferred alternative at all intersections. From the natural environment perspective, roundabouts reduce idling vehicles and result in fewer delays/smooth traffic flow, which reduces emissions, so they are also preferred. However, more area may be required in comparison to traffic signals.

7.4 PRELIMINARY PREFERRED DESIGN

Based on the alternatives and evaluation summarized above, it was determined from the TMP and first phases of the MCEA that to address transportation capacity issues and active transportation connectivity issues, Rice Road and Merritt Road require development and expansion. To address the Complete Street theme, various road alignment and cross-section alternatives were evaluated and selected, all resulting in the Preferred Preliminary Design. Once the EA is approved, the design can be refined in the Detailed Design stage.

The current Preferred Preliminary Design aims to accommodate the problem and opportunity statement of the MCEA. As a factor of the location of road improvements, impacts on the natural environment cannot be avoided and therefore, must employ mitigation measures. Mitigation measures will aim to reduce and offset impacts caused by the project. The current Preferred Preliminary Design is presented in Figure 1-3.

8 ASSESSMENT OF POTENTIAL IMPACTS AND MITIGATION

Potential impacts on NHS features, areas, and other aspects of the natural environment due to the road expansions may be short-term (i.e., occurring during construction and resolving a short time after construction) or long-term (i.e., lasting effects of construction or effects resulting from the altered ground). Impacts may be direct and immediately evident (e.g., wetland filling/draining, woodlot clearing, vegetation removal) or indirect and not immediately apparent at the time of initial development (e.g., downstream sedimentation, reduced base flow, change in hydroperiod, eutrophication, noise/light disturbance, invasion of exotic or invasive species, loss of biodiversity). Additionally, several impacts are addressed in various sub-sections as they are interconnected.

The MCEA manual (2022) states, "[w]*ith any potential adverse environmental effects, the objectives are to avoid, prevent or minimize impacts*". The current Preferred Preliminary Design aims to accommodate the problem and opportunity statement of making Merritt Road an alternate connection to Highway 406. As a factor of the location of road improvements, some impact on the natural environment cannot be avoided and, therefore, must employ mitigation measures to minimize impacts. Some potentially negative impacts can be minimized by implementing mitigation measures during construction and incorporating long-term mitigation measures into the project design. A summary of which mitigation measures will avoid or reduce impacts is provided in Sections 8.1 and 8.2. Some mitigation measures are provided as recommendations and are subject to engineering and site limitations.

The proposed works involve new road extending across a PSW and widening roads into retained natural areas. Vegetation (including trees), SAR and their habitat, Significant Wetlands, Wetlands, Water Recourses, Significant Woodlands, SWH, Adjacent Lands (including Linkages and Corridors), and Fish Habitat will have to be damaged or destroyed to accommodate the Preliminary Preferred Design. Natural Hazards such as flooding will also be an issue; however, flooding hazards and their mitigation are presented under separate cover.

8.1 SHORT-TERM IMPACTS

Specific short-term impacts are described below and summarized with mitigation measures. If mitigation measures such as removing vegetation outside of the active window, wildlife sweeps, and appropriate selection and enforcement of ESC and other plans are implemented, the short-term impacts listed below are expected to be mitigated and not result in a negative impact.

8.1.1 MIGRATORY BIRDS

Most species of birds in Canada are protected under the Migratory Birds Convention Act (MBCA), 1994, through the MBR and the Migratory Birds Sanctuary Guidelines. These policies and regulations protect listed migratory bird species, their nests, eggs, and offspring. These Acts and Regulations protect migratory bird nests when they are considered to have a high conservation value for migratory birds (i.e., generally during the nesting period). Removal of vegetation to accommodate the construction of the project could directly harm nesting birds. **This impact can be avoided by removing vegetation outside of the typical bird nesting period in this area (late March to late August)**.

For activities (including vegetation removal) that must occur during bird nesting season, surveys to identify nesting activity should be completed by an experienced Avian Biologist within 24 hours of scheduled work activities. Nest surveys should only be completed in simple habitats such as singular trees where all elements of the vegetation can be thoroughly observed. Complex habitats, such as vegetation communities with layers and dense foliage, reduce the certainty of capturing all potential breeding and can not be reliably cleared for removal. The Avian Biologist conducting the nest sweeps must be able to identify birds by species and be knowledgeable of nesting seasons and activities for appropriate species. Due to the uncertainty that lies with nest sweeps during construction, especially during leaf-on conditions, it is, as noted, recommended that all vegetation clearing activities occur outside the above-noted bird nesting window. In the event that bird nests protected under the MBCA, FWCA, or ESA are encountered during construction, work must stop in the vicinity of the sighting until further direction is provided. These species and their nests must not be disturbed, tormented, injured in any way, destroyed, and/or separated from

young. A protective buffer area should be established around the nest and should be determined in consultation with a qualified avian biologist, as well as the MNRF, MECP and/or Canadian Wildlife Service (CWS), as necessary.

Ultimately, the objective from a compliance perspective is to not circumvent the MBCA and its regulations. Due diligence measures should be implemented and documented for any nest searching efforts, including record control, to ensure compliance with the MBCA.

Additionally, the nests of the Pileated Woodpecker, Great Blue Heron, and Green Heron have year-round protection from destruction unless they have been shown to be abandoned. If the nest of these species has not been occupied by a migratory bird for the entirety of the waiting time indicated, it is considered to be abandoned and no longer has high conservation value for migratory birds. The waiting time for Pileated Woodpecker is 36 months, and the waiting time for Great Blue Heron and Green Heron is 24 months.

To avoid contravention of the MBCA and updated regulations, it is recommended that breeding bird surveys continue for three successional years before vegetation removal and included search effort for Pileated Woodpecker, Great Blue Heron, and Green Heron nests (i.e., wildlife sweeps). **If a nest of one of these species is encountered and there is a need to damage, disturb, destroy, or remove the nest, it must be documented that the nest has remained unoccupied by a migratory bird for the waiting period (24 to 36 months depending on the species) and a notice must be submitted on the Abandoned Nest Registry** (https://www.canada.ca/en/environment-climate-change/services/migratory-bird-permits/notice-abandoned-nest-registry.html).

8.1.2 FISH AND FISH HABITAT

Watercourses containing fish habitat were documented in the Study Area; therefore, the Fisheries Act applies to this Project. The death of fish and the HADD of fish habitat must be prevented or permitted through a DFO authorization. **Consultation with the DFO** will inform appropriate timing windows to complete the work and the effort required (i.e., fish salvage). **Sediment and erosion control measures** installed in adjacent areas to wetlands and the watercourse should aid in preventing sediment spills in aquatic habitats. Additionally, the **MNRF has identified restricted in-water timing windows for tributaries of the Welland Canal from March 1st to July 1st**. Crossings 1, Crossing 3, Crossing 4, Crossing 5, Crossing 7, Crossing 8, and Crossing 9 have been identified as suitable or seasonally suitable fish habitat. Dewatering activities could cause impacts on fish and fish habitat by:

- Direct mortality if fish are present or spawning occurs in the watercourses
- The introduction of warmer water from ponds into colder surface watercourses
- Modification or removal of aquatic habitat; displacement of plants and animals
- Increased nutrient loading of existing habitats

If the connectivity of watercourses is maintained in detailed design, these effects are expected to remain as short-term; they could become long-term if not mitigated properly. The death of fish and the HADD of fish habitat must be permitted through a DFO authorization as impacts can not be avoided. During detailed design, the following must be provided during DFO consultation/Request for Review (RFR):

- Whether the project includes work in water – if so, whether the work will be below the high-water mark,
- Project components that are proposed in or near water for each crossing (including riparian vegetation or sediment removal, temporary or permanent shoreline protection and ESC measures, temporary re-routing of the during construction, etc.),
- A brief description/list of the construction materials, methods, and equipment that is planned to be used, and
- The most recent detailed drawings.

Mitigation includes:

- appropriate selection of ESC ponding sites and design (if applicable) and choose suitable sites for stream diversions,
- any drainage should infiltrate into the groundwater system,
- stage work to non-critical fishery time window,
- restoration of stream substrate, and
- provisions for spill control.

8.1.3 WILDLIFE MORTALITY DURING CONSTRUCTION

During site prep and construction, wildlife may cross the site and be at risk for mortality. The probability that wildlife is found in the Project Location and does not leave on its own accord is medium to high. **To mitigate the risk of mortality wildlife sweeps prior to vegetation removal must be completed.** When wildlife cannot leave the area, permits under the FWCA may be required. FWCA permits are contractor specific, whereby the individual undertaking the work to rescue and relocate or collect wildlife and/or fish will be the responsible party required to obtain the necessary permits and approvals. Likewise to MBCA, the FWCA also protects the nest or eggs of a bird that belongs to a species that is wild by nature from destruction. If a den or habitual dwelling of a forbearing mammal (other than a fox or skunk) is documented in wildlife sweeps, the habitat is protected from damage or destruction unless it is removed by a licensed trapper or authorized by the Minister.

The brush piles and other moveable habitat features in the area should be relocated before construction. As feasible, the work area will be surrounded by a silt (exclusion) fence within 48 hours of the commencement of construction activities to keep wildlife out of the site. The exclusion fencing will be examined daily and repaired as needed to ensure it functions as intended.

8.1.4 NOISE, VIBRATIONS, AND LIGHT AND DUST POLLUTION

Construction activity may cause localized, short-term increases in noise, vibrations, and dust, which could disturb wildlife and deter animals from the area. Wildlife could also be disturbed by artificial lighting if construction occurs outside of daylight hours, and dust from work activities may settle on vegetation. **This impact can be mitigated by completing work in daylight hours only and having a dust management plan conducive to the environment.**

In order to prevent impacts on wildlife as a result of noise and vibrations, equipment idling should be kept to a minimum during construction. Minimizing equipment idling will also reduce carbon emissions and reduce the overall carbon footprint of construction. A dust management plan should consider wind erosion of exposed stockpiles and faces by reducing the height of stockpiles (i.e., maximum of 5 m in height), suspend excavation and dump truck loading if wind speed exceeds 60 km/hr. Loaded materials shall not exceed the dump truck tray wall. Best management land use practices and best management stormwater practices are required for pollution prevention and source control.

8.1.5 CONSTRUCTION CAUSED LOSS OR DAMAGE

The impacts below could lead to long-term impacts if left unchecked and unmitigated. If the below impacts occur, immediate action could rectify the impact and result in only a short-term influence. These impacts can largely be mitigated with an appropriate Erosion and Sediment Control Plan (ESCP), including dewatering and a construction staging and project phasing plan.

Surface water effects such as:

- Sedimentation and turbidity of adjacent water bodies (e.g., after site grading and during construction)
- Ponding effects on adjacent properties due to natural drainage disruption
- Streambank erosion (drainage outlets) from diversion, construction, or channelization of watercourses
- Contamination of surface waters through runoff, spills, leaks, and disinfection activities

Groundwater effects such as:

- Interference of shallow aquifers and springs
- Depletion or lowering of shallow aquifers and springs by groundwater utilization/reduced groundwater quantity through construction dewatering
- Spills or leaks resulting in contamination of groundwater supply
- Drainage of wetland areas resulting in a reduced groundwater contribution to surface waterbodies
- Reduced surface water recharge to groundwater, particularly in soils (as a result of impervious area)
- Interference with groundwater movement

Vegetation loss or damage to facilitate construction activities, such as:

- Soil compaction from equipment, access routes, or laydown areas;
- Changes in vegetative composition as a result of loss of topsoil and subsoil or mixing;
- Introduction of invasive plant material from previous construction sites, disturbance activities, and erosion control restoration;
- Lowering of water table resulting in a reduced contribution to streams and stress of riparian vegetation;
- Drainage of wetland areas causing mortality or stress to animals and possible changes in species composition;
- Siltation to surface watercourses resulting in "smothered" plants and animals due to the deposition of silt and increased turbidity of surface watercourses;
- Contamination of vegetation, natural features, and groundwater due to unplanned release or discharge of deleterious substances to the environment, including fuels, lubricants (engine oil, etc.) and coolants;

To reduce the surface water, groundwater and wildlife and vegetation loss/damage an appropriate Erosion and Sediment Control Plan (ESCP), including dewatering, construction staging, and a project phasing plan is required. In general:

- Staging and access areas will be minimized as feasible to avoid disturbing the natural environment beyond the proposed disturbance limit;
- Proper dewatering techniques and ensuring appropriate controls measures to collect sediment before entering the drainage channel, trench drainage should be discharged to settling areas before being permitted to enter surface waterbodies, such as sediment traps, seasonal constraints on construction, install check dams on drainage swales, buffers and setbacks;
- Ensure the appropriate use of culverts, porous backfill, tile drains, and apply natural channel design principles and bio-engineering techniques.
- Complete hydrogeologic investigations to identify shallow aquifers and springs in advance to develop alternatives to avoid impacts.
- Maintain the existing groundwater regime through engineering design, restrict the extent of impervious surfaces (e.g., staging) in zones of high infiltration, utilize appropriate backfill material
- Prohibit access to the extent possible to any natural areas outside of the project footprint to ensure the protection of these areas; this includes temporary access. A sediment control fence should be installed around the perimeter of the work area to provide a visual barrier and isolate wildlife from the work area;
- Operate and store materials and equipment in such a manner that prevents any deleterious substance from entering the natural environment (e.g., construction refuelling precautions and sediment fencing at the base of stockpiles). Ensure a Spill Management Plan (including spill kit materials, instructions regarding their use, staff education, and emergency contact numbers) is present on-site at all times for implementation in the event of an accidental spill. Ensure fast, accurate reporting of spills and all spills are to be reported to the Spills Action Centre (SAC) at 1 800-268-6060. Have a contingency plan for clean-up.
- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds. Implement disinfection techniques in concert with fisheries requirements;
- Changes in vegetative composition as a result of loss of topsoil and subsoil or mixing can be mitigated by stripping and stockpiling of topsoil separate from the subsoil and replacing soils in preconstruction horizons;
- When seeding/restoring for ESCP purposes, use annuals which later die out and ensure only locally native species are used; and
- Identify local regulatory authorities and have contact information available on-site. Local regulatory authorities are to include the MECP, MNRF, ERCA, the City and local emergency service providers.

8.2 LONG-TERM IMPACTS

Specific long-term impacts are described below and summarized with mitigation measures where applicable. Avoidance is often the prescribed mitigation measure where activities will result in a contravention of legislation or a negative impact. However, avoidance is not possible if development proceeds through an approved EA and therefore, mitigation measures to reduce negative impacts are provided; however, they may not eliminate or sufficiently reduce long-term negative impacts.

8.2.1 SPECIES AT RISK

Any SAR ranked as Threatened or Endangered that may be impacted by any Project work requires consideration to avoid contravention of the ESA. If impacts on SAR or their habitat cannot be fully avoided, a permit or registration will be required under the ESA. Based on fieldwork and secondary sources, three SAR listed as Threatened or Endangered are confirmed in the Study Area: Eastern Flowering Dogwood, White Wood Aster, and Round-leaved Greenbrier. It is also noted that SAR Bats are considered present. Two other Endangered SAR were screened as High probability of occurrence, American Chestnut and Butternut; species-specific mitigation measures for these Endangered and Threatened species are as follows:

- American Chestnut (Endangered; High probability of occurrence) – Suitable habitat could occur in the Study Area and MECP notes in IGF responses that the corner of Merritt and Rice Road has records for this species. It is thought that individuals occur along the western edge of the Study Area in the Kunda Park Forest Regional ANSI. The NAI also documents this species from Brady et al., 1980 with no locations and American Chestnut is also noted in the woodlot between Highway 406 and Grisdale Road based on secondary sources. **A thorough tree inventory of the footprint and 5-10m beyond (as applicable) is required to confirm presence.** Detailed Design to avoid damage and destruction of individuals found and the General Habitat (i.e., ELC polygon) to avoid contravention of the ESA. If avoidance is not feasible, permitting and consultation with MECP are required.
- Butternut (Endangered; High probability of occurrence) – Suitable habitat could occur in the Study Area and MECP notes in IGF responses that the corner of Merritt and Rice Road has records for this species. It is thought that individuals occur along the western edge of the Study Area in the Kunda Park Forest Regional ANSI. The NAI also documents this species from Brady et al., 1980. Butternut was found in Area C of the SWS. **A thorough tree inventory of the footprint and 5-10m beyond (as applicable) is required to confirm presence.** If Butternut is found during tree inventories, the first step is to have a Butternut Health Expert categorize tree health during the leaf-on period (May-August for this species). All Butternut must be assessed to inform permitting/registration/exemption requirements depending on an individual's health. Butternut trees are divided into three categories:
    - Category 1: the tree is in the advanced stages of disease as a result of Butternut Canker
    - Category 2: the tree does not have Butternut Canker, or the disease is not in advanced stages
    - Category 3: the tree could be useful in determining how to prevent or resist Butternut Canker

    You do not need a permit if you are able to register your activity and follow the conditions of the conditional exemption.
- Eastern Flowering Dogwood (Endangered; Confirmed) – An individual was found along Merritt Road at the edge of the woodlot to the west of the Merritt Meadows subdivision. Additionally, NHIC records in several grid squares occur and MECP notes in IGF responses that the corner of Merritt and Rice Road has records for this species. The NAI also documents this species from Brady et al., 1980. The Eastern Flowering Dogwood was found in the woodlot between Highway 406 and Grisdale Road based on secondary sources. **A thorough tree inventory of the footprint and 5-10m beyond (as applicable) is required to confirm presence. Detailed Design to avoid damage and destruction of the known individual and the Regulated Habitat to avoid contravention of the ESA. If avoidance is not feasible, permitting and consultation with MECP are required.** Regulated Habitat is defined in O. Reg. 832/21 as the area within 20 m of the stem and the vegetation type (i.e., ELC vegetation type).
- White Wood Aster (Threatened; Confirmed) – Individuals and colonies have been found along the length of the project. Additionally, NHIC records in several grid squares occur and MECP notes in IGF responses that the corner of Merritt and Rice Road has records for this species. The NAI also documents this species from Brady et al., 1980. The Eastern Flowering Dogwood was found in the woodlot between Highway 406 and Grisdale Road based on secondary sources. **Detailed Design to avoid damage and destruction of the known individuals/colonies and the General Habitat to avoid contravention of the ESA. If avoidance is not feasible, permitting and consultation with MECP are required.** For the purposes of this document, General Habitat is considered as the extent of biophysical attributes up to 80 m (radial distance) around existing mapped observations of the White Wood Aster. In addition, in cases where the suitable habitat extends for less than 50 m around a White Wood Aster, a critical function zone capturing an area within a radial distance of 50 m is also included as habitat.
- Round-leaved Greenbrier (Threatened; Confirmed) – A colony was found north of Section 3. **Detailed Design to avoid damage and destruction of the known individuals/colonies and the General Habitat to avoid contravention of the ESA. If avoidance is not feasible, permitting and consultation with MECP are required.** For the purposes of this

document, General Habitat is considered as wooded area occupied by Round-leaved Greenbrier, including all contiguous wooded habitat around Round-leaved Greenbrier plants.

- Little Brown Myotis, Northern Myotis, Tricolored Bat (Endangered; **High/Confirmed**) – In the absence of surveys, this species is considered to be present/utilizing wooded habitat as summer roosting in all wooded ecosites in the Study Area. Additionally, within 50 km at least one hibernaculum and/or swarming site occurs (Humphrey & Fotherby, 2019). **Detailed Design to avoid damage and destruction of individuals (i.e., no vegetation removal from April 1 to September 30) and the General Habitat to avoid contravention of the ESA. If avoidance is not feasible, permitting and consultation with MECP are required.** For the purposes of this document, hibernacula, swarming sites, and maternity sites are considered General Habitat. In addition, the habitat for hibernacula and swarming sites include areas of associated foraging and roosting resources, and the maternity habitat for each species includes the maternity roost site and areas of associated foraging resources.

8.2.2 SIGNIFICANT WILDLIFE HABITAT

Development in SWH is prohibited unless it can be demonstrated that development will have no negative impact on features and functions. Impacts on SWH as a result of the proposed road extension and widening will be the removal of areas of vegetation communities and habitats which contribute to confirmed SWH. One confirmed SWH type, **Deer Winter Congregation Areas – Confirmed, must be addressed in consultation with the MNRF and is not discussed here**. Impacts and removal to all of the forest and swamp complexes on site will result in impacts to three types of Confirmed SWH; Amphibian Breeding Habitat: Woodland, Amphibian Breeding Habitat: Wetland, and Amphibian Movement Corridors.

As most amphibians require a source of water to reproduce the impacts on Amphibian Breeding Habitat: Woodland and Wetland SWH are similar. For an aquatic environment to function as a breeding pond it requires unpolluted water (permanent or temporary), emergent and submergent vegetation, shoreline structures (e.g., woody debris), and surrounding habitat to provide a closed canopy and moist understory (terrestrial habitat). Therefore, a development which results in the draining or filling of small woodland ponds will destroy the function of the pond and the surrounding land for amphibians. The loss of the breeding pond will affect the population dynamics of essentially all amphibian populations in the vicinity of the development (OMNRF 2014). Development on adjacent land can significantly impact breeding pond functions if it alters ground or surface water quality or quantity, and adjacent development can have a very high impact if it separates the breeding habitat from the summer or winter habitat (OMNRF 2014).

In addition to direct habitat destruction, if a road is routed through amphibian breeding habitat, roads introduce salt, sediments, gasoline and oil, etc. in road surface runoff that may affect nearby breeding ponds owing to the sensitivity that amphibians show to aquatic toxicants. Likewise, sedimentation may reduce water levels of wetland areas, and may also change the composition of pond substrates. Moreover, as adults move to and from breeding ponds or juveniles disperse from ponds, large numbers are often killed by vehicles. Traffic noise from major roads may interfere with amphibian breeding choruses.

The best mitigation option is to avoid developing in the habitat. Other alternatives include minimizing the amount of habitat affected or locating the road where wetlands are not on both sides. As these options are not possible based on the TMP, **it will be necessary to install passages and fencing to direct amphibian movement underneath roads**. Passages must be designed to allow the maximum number of amphibians to use them. Light and moisture are important criteria for amphibian use of passages. The diameter of a culvert must increase with increasing length, or open grates passages are required. Open grate culverts also allow for increased moisture, however, the contaminant load must be considered. There should be enough moisture in the culvert during wet weather to result in a flow of water through the culvert, but without excessive ponding, flooding, or high water velocities (unless 'dry ledges' are provided). There should be no drainage patterns perpendicular to either mouth of the culvert that might direct amphibians away from the culvert. It is important that there is substrate in the culvert, and 15 cm of native soil should be placed in it to facilitate amphibian passage, or the culvert should be open-bottomed. The best designs incorporate a perpendicular wall or funnel fence at each end of the culvert that runs parallel to the road, or out from it on an angle. This needs to be designed such that it prevents amphibians from accessing the road surface and directs them into the culvert (OMNRF 2014). Sufficient culverts should be installed to allow for the normal passage of water to the wetlands but examples of passages could be a culvert >0.5 m in diameter lined with soil or gravel, or oversize box culverts installed in shallower areas that support emergent vegetation, or a raised road may be preferable. All culverts/passages must be paired with suitable funnel fencing (e.g., 0.6-0.9 m high funnel fencing with additional buried section and top-lip).

Additionally, runoff from the road should not be allowed to run directly into the wetlands. Stormwater detention areas should be installed to intercept water and allow it to settle prior to discharge to the wetland. For roads within or immediately

adjacent to the wetland, thought should be given to installing splash guards along the edge of the road. These are barriers that attach to the railings and help reduce salt spray and the introduction of other contaminants. If these types of barriers are planned, there should be adequate room under the road to allow wildlife movement from one side of the wetland to the other.

The Detailed Design must consider the passages of amphibians to maintain the form and function of Amphibian Breeding Habitat: Woodland, Amphibian Breeding Habitat: Wetland, and Amphibian Movement Corridor SWH. If road design can incorporate appropriate passages and fencing to mitigate the loss of habitat and direct mortality of individuals, the overall negative impact may be reduced or avoided.

It was also found that Eastern Wood-Pewee is a probable breeder in the Study Area, and Wood Thrush is a possible breeder and is considered under Special Concern and Rare Wildlife Species SWH. Eastern Wood-Pewee breeding occurs in mature to intermediate-aged forests with an open understory, often associated with clearings and edges (COSEWIC, 2012). Wood Thrush breeds in mature or second-growth deciduous and mixed wood forests (COSSARO, 2013). Therefore, the forest complexes are considered under Special Concern and Rare Wildlife Species SWH. The footprint of the road, along with associated shoulders, banks, and ditches, will result in habitat loss. Indirect loss of habitat may occur through changes in hydrology, the introduction of non-native plant species, the introduction of sediments and other contaminants, and salt spray and runoff. As sediments and changes in hydrology are potential problems, **surface water runoff from the road should be directed to stormwater management ponds prior to being discharged to the adjacent forested areas. Additionally, natural flow to the significant habitat should be maintained** with sufficient culverts so that the road does not form a barrier to groundwater or surface water flow. **All areas must be revegetated and kept free of invasive species until native regeneration occurs. Lastly, the loss of habitat due to the road footprint must be compensated along other forest edges.**

The Detailed Design must include a restoration and compensation plan to offset the negative impact of Special Concern and Rare Wildlife Species SWH loss.

8.2.3 FRAGMENTATION

Fragmentation is a severe threat to the survival of many wildlife species, particularly area-sensitive species and/or those with large home ranges (OMNR 2010). Fragmentation leads to habitat degradation and modification, edge effects, overcrowding, and invasion by non-native species. Increased isolation of species, compounded with other stresses, puts them at greater risk of disappearing from a region (OMNR 2010). There is a negative impact to consider when creating a road through a natural feature when a road does not currently exist, as is the proposal for Segment 1. Additionally, the widening of roadways in other Segments will further increase the distance and barrier between retained natural areas and features.

The creation and widening of Merritt Road will directly result in woodland cutting and vegetation removal and indirectly result in the reduction of interior forest habitat due to the loss of forest edge, the potential for increased access because of road creation, human disturbance, the introduction of predators such as cats, invasion by non-native species, and the effects of noise on wildlife. Additionally, the Project is located in an area identified in the Regional 2014 OP as a linkage which represents ecological connectivity between natural features and areas.

The leading mitigation measure is to reduce the footprint of Segment 1, through the unopened road allowance, to the extent possible. Mitigation of fragmenting wildlife habitat also includes maintaining connectivity and managing adjacent areas to improve habitat availability (e.g., invasive species management, plantings, and restoration programs). It is recommended that once a grading plan and detailed design are understood, an analysis of the current interior forest (i.e., the size of the interior forest as a 200m buffer from the current woodland edge) and the proposed interior forest occur.

8.2.4 ALTERING WILDLIFE MOVEMENT DUE TO AVOIDANCE OF THE ROADS AND TRAFFIC

Wildlife movement through the area is unknown; however, as this Study Area does not currently have roads, it is feasible that wildlife choose to move through it. **Mitigation includes baseline studies to identify wildlife use in the area (all four Segments).** If it is found that wildlife moves through the area, to maintain wildlife connectivity, the implementation of wildlife passages would be required. As the proposed location of the road will not avoid intersecting the most likely wildlife migration routes, **mitigation will include funnelling wildlife through passages**. As passages will likely align with drainage structures, the structures should be built with roadside wings, and be sized accordingly. Additionally, to accommodate

wildlife passage the diameters of passages should extend beyond watercourse 'shorelines' to provide dry 'shelves'. **Lastly, appropriate funnel/barrier fencing or vertical walls to direct wildlife under the road that extends *beyond* suitable habitat is required. A long-term maintenance plan for passages and fencing is also required to maintain efficacy.**

8.2.5 TREES AND VEGETATION REMOVAL

The removal of trees and vegetation could result in the following negative impacts:

- loss of shade, possibly resulting in increased water temperatures,
- drying up of refugia due to increased evaporation,
- reduced bank stability and ability to trap sediment from upland areas; increased erosion, sedimentation and turbidity,
- decrease cover and diversity of vegetation leading to a decrease in biodiversity and loss of natural linkages and animal movement corridors,
- direct loss of habitat (e.g., winter cover, vernal pools, nesting trees, important food sources),
- reduction in habitat (e.g., woodland habitat for area-sensitive birds) below a critical level,
- habitat fragmentation,
- loss of rare plant species and SAR.

Mitigation for the loss of trees and vegetation removed to accommodate the extension and widening includes:

- identify sensitive species before beginning the work with a tree inventory; design grading to avoid disturbing sensitive species,
- develop a tree conservation plan to encourage the retention of trees where possible,
- maintain as much riparian vegetation as possible and restore vegetative buffers,
- reduce slopes to prevent erosion issues
- plant appropriate native species (of local stock if possible and suited to the local hydrology and soils of the area they are planted) and replace trees and shrubs at a compensation ratio determined by regulators,
    - 2014 Regional OP Policy 7.C.1.3 states that the Region shall practice good stewardship by:
    - Managing Regionally owned lands within or adjacent to the Core Natural Heritage System to maintain, restore or enhance the System's natural features and ecological functions;
    - Maintaining a program of tree planting and naturalization on Regional properties and roads. Where trees must be removed at least two trees shall be planted for every tree removed, normally using native species from seed sources climatically similar to Niagara.
- develop and implement an erosion and sediment control plan before removing vegetation,
- identify and avoid or protect critical components of wildlife habitat (e.g., winter cover, vernal pools, grasslands that support indicator species, hibernation sites, migration staging areas, nesting trees), and
- leave a buffer around significant features and habitats of significant species.

8.2.6 WETLAND FORM AND FUNCTION

The hydrology work (presented under separate cover) to inform the Wetland Water Balance Risk Evaluation refined the location of wetland pockets that form the forest/swamp mosaic and their storage areas. Some of these storage areas are on-line, with watercourses explored in the fish habitat assessment. The realignment of channels may not only cause negative impacts on the aquatic communities (e.g., barriers to fish movements, sediment deposition, separation of steams from floodplains) they may also change the composition of wetland communities. The increase in impervious surfaces will increase surface runoff and stream peak flows and reduce infiltration and change baseflows and upwelling. Stormwater and hazards are considered under separate cover.

Drainage of wetland areas can cause mortality or stress to animals and possible changes in species composition. During TOR approval, NPCA required consideration of ecohydrology to inform existing conditions that should be maintained during

construction activities and post-development. NPCA noted that post-construction monitoring may be an expectation of NPCA staff to demonstrate no negative effects on the hydrology and ecohydrology of the area potentially impacted by the proposed works. **The results of the Wetland Water Balance Risk Evaluation prescribed monitoring, an emphasis on understanding groundwater interaction, and a mitigation plan to maintain water balance with an interim mitigation plan.**

Mitigation for the loss of wetland form and function to accommodate the extension and widening includes (may not apply to all road Segments):

- schedule grading to avoid times of high runoff volumes (spring and fall),
- minimize changes in land contours and natural drainage; maintain streams (permanent and intermittent) and timing and quantity of flows,
- ensure grades are matched at the limit of the natural feature or area or the limit of any buffer area,
- maintain existing stream channel if possible, or realign using natural channel design (accompanied by replanting plan using native vegetation),
- use bridges to span watercourses,
- minimize the width of the ROW,
- develop and implement an erosion and sediment control plan,
- revegetate as soon as possible,
- install adequate culverts and gravel base to maintain the flow of surface water and shallow groundwater,
- use vegetated swales to capture pollutants,
- minimize area of paved surfaces,
- design roads without curbs, gutters and sidewalks to promote infiltration,
- promote infiltration galleries and other infiltration devices,
- maintain or provide vegetative buffers, and
- control quantity and quality of stormwater using best management practices.

Additionally, the removal of wetland areas should be compensated for, with the objective of a net gain in habitat function with the local watershed. Compensation lands and requirements should be the responsibility of the Region to obtain and enforce. Feature compensation considerations include but are not limited to:

- Topography and drainage of the existing and proposed feature,
- Community type (based on ELC),
- Wildlife habitat types and structures to be replicated or added as enhancements,
- Soil types, structure, and quality of the existing and proposed feature composition and processes,
- Surface water contributions and hydroperiod, and
- Groundwater processes and interactions.

The area for wetland compensation should be close to the current project as possible but also protected from future development. Wetland compensation may also take the form of an Enhancement Plan of existing wetlands in the Study Area. The new Niagara Regional OP considers supporting features and enhancement areas which are intended to consist of natural self-sustaining vegetation that increase the ecological resilience and function of individual key natural heritage features, key hydrological features and/or natural features and areas. **It is recommended that these areas be considered for compensation and restoration plantings.** Enhancement areas are identified where; the area is comprised of natural vegetation communities (as determined according to Ecological Land Classification); or the area is currently under agricultural production; or the area does not contain a permanent form of development (i.e., house, road, or related infrastructure). Enhancement areas inside of settlement areas are to be identified as follows; in ‘bays and inlets’ along the edge of features - < 60 m wide; interior gaps in features - < 0.5 ha; gaps between features - < 60 m.

9 MONITORING

9.1 COMPLIANCE MONITORING

It is essential to ensure that the ESC measures designed for the Project are installed, well-maintained, and functioning as intended daily. The ESC plan should provide the framework for the inspection and maintenance, including the need for repair and record-keeping procedures during all stages of construction. Additionally, specific monitoring requirements may be provided with environmental approvals and permits. Compliance monitoring intends to provide environmental protection and compliance with all applicable legislation while contributing to the overall success of a project.

High-risk areas should be identified on drawings and inspected daily during calm weather. They may need to be inspected several times a day in adverse weather or as otherwise indicated in permits. High-risk areas include soil stockpiles, excavations, dewatering locations, protected features/areas, and locations where site runoff discharges into a receiving watercourse, water body, or wetland. Before a large storm event, an inspection of the construction site should be undertaken and any deficiencies should be suitably fixed. After periods of significant precipitation or snowmelt, additional inspections should also occur. Regular inspections may be decreased as the risk of the adverse effect decreases (e.g., construction is nearing completion or inactive periods with no exposed soils).

Inspections prior to the start of an undertaking to document the pre-disturbance conditions and to ensure that the erosion and sediment control plan is initiated are required. Similarly, post-construction monitoring documentation is required to ensure the restoration, stabilization, and required monitoring of constructed features/habitats is established. Post-construction monitoring should be continued at suitable intervals for several years, as tied to effectiveness monitoring (e.g., restoration plans).

9.2 EFFECTIVENESS MONITORING

Monitoring programs for various elements of the project may be recommended or required during permitting processes (e.g., water resources, landscape plantings). Additionally, pre-development monitoring of wetland hydrology is recommended based on water resource work completed (described under separate cover). The two natural heritage monitoring programs currently recommended based on the results of this report are On-site Restoration Monitoring and Ecohydrology Monitoring.

It is recommended that a program to monitor the health of the trees and vegetation that are retained is completed. This monitoring plan is different from a landscape monitoring plan as it would not include planted vegetation but rather only vegetation which was retained during construction. Similar to a monitoring plan considered in an arborist report, this plan would evaluate retained vegetation for signs of damage immediately after construction and evaluate retained trees every year for five years and every five years for 15 years. For some species, such as trees, signs of damage may take years to show poor health and decay. Where damage and destruction of retained vegetation are found, replacements should be made and similarly monitored.

Post-construction ecohydrology monitoring to document impacts in the proposed Project area is recommended. This monitoring would be conducted in conjunction with hydrology monitoring of groundwater and surface water conditions. Detailed vegetation surveys in the spring, summer, and fall to update the FQA and track the diversity of the ‘wetness’ of plants (i.e., Section 5.4.1.6) as well as breeding bird surveys to determine which obligate wetland bird species (i.e., Section 5.4.2.1) continue to be documented and where. The ELC communities in the area should also be updated yearly and all results and changes tracked and documented in a monitoring report along with recommendations submitted to the municipalities, region, and NPCA. This type of effectiveness monitoring should occur during construction and after construction every year for five years and every five years for a period of up to 15 years.

10 POLICY CONFORMITY AND DISCUSSION

To remain in conformity with the federal legislation discussed in this report, consultation with DFO is required regarding aquatic species, and vegetation removal must avoid bird breeding windows (Late March to Late April). To remain in conformity with the Endangered Species Act, damage and destruction of SAR must be avoided. As the Project does not avoid impacts, consultation with MECP and permits under the ESA are required. Conformity with the FWCA must be considered on a case-by-case base (e.g., permits to remove wildlife from the area). Permits will be required from the NPCA for the natural hazards and lands within their regulatory areas.

Under the PPS, development and site alteration are not permitted as it can not be demonstrated that there will be no negative impacts on the natural features or areas and their ecological functions in the Study Area. The Region is required to continue to protect Natural Heritage Features and Areas in a manner that is consistent with the policy and legislation outlined in Section 2; unless authorized through an approved Environmental Assessment. Likewise, the Regional OP and the municipal OPs, map several components of their respective NHS within the Study Area, and all contain language regarding development and site alteration derived from the PPS. The Project can not avoid negative impacts based on the footprint but may minimize negative impacts with mitigation or compensation measures.

As noted in Section 3.2 above, the EIS was shared with NPCA for review. NPCA's comments on the EIS and Study Team's responses are provided in a separate appendix (Appendix H). NPCA's comments identified need for additional work, which is to be completed during detailed design phase.

11 RECOMMENDATIONS

It is recommended if the EA is approved that, the Region considers updating this EIS based on the detailed design components (e.g., ESCP, grading plan, tree protection plans, etc.). It is also recommended that the detailed design be refined in consultation with biologists to include wildlife passage considerations. Lastly, removing wetland areas should be compensated for, with the objective of a net gain in habitat function with the local watershed. Compensation lands and requirements or a wetland Enhancement Plan of existing wetlands in the Study Area should also be considered during the detailed design.

As noted in Section 3.2 above, the EIS was shared with NPCA for review. NPCA's comments on the EIS and Study Team's responses are provided in a separate appendix (Appendix H). NPCA's comments identified need for additional work, which is to be completed during detailed design phase. Continued consultation with NPCA will be required to obtain a permit for any planned alteration or development within regulated areas. Consultation with MECP regarding SAR should be continued, and the permitting process should start in conjunction with Detailed Design (or in advance, if possible, considering the timelines for obtaining SAR permits). DFO should be contacted as well once sufficient information can be provided.

12 CONCLUSIONS

This EIS report addresses the natural heritage features and associated functions currently found on and adjacent to the Project ROW. The report provides an impact analysis using the results of the field program and supplementation of applicable literature and historical studies completed for the Study Area to date. Through this analysis, it has been determined that the Study Area contains PSWs, Significant Woodlands, SWH, fish habitat, SAR and their habitat.

The development alternatives were created based on the TMP and associated studies, eliminating the chance for the avoidance of negative impacts. As such, direct impacts associated with the proposed development are expected. Mitigation measures to reduce the negative impact and compensation recommendations to offset the negative impact are provided; however, it is likely a negative impact will remain through Segment 1. Under the PPS, Regional OP, and various municipal OPs, development and site alteration are not permitted unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions; unless otherwise authorized through an approved Environmental Assessment.

The loss of SAR and their habitat can not be approved through an EA process, and permitting/consultation with MECP is required. An IGF (the first stage in SAR permitting) has been submitted, and comments have been received. Additional confirmatory studies may be required in consultation with MECP (e.g., installation of bat recorders). As noted in Section 3.2 above, the EIS was shared with NPCA for review. NPCA's comments on the EIS and Study Team's responses are provided in a separate appendix (Appendix H). NPCA's comments identified need for additional work, which is to be completed during detailed design phase. Lastly, ongoing consultation with NPCA may result in further fieldwork to inform CA permitting requirements.

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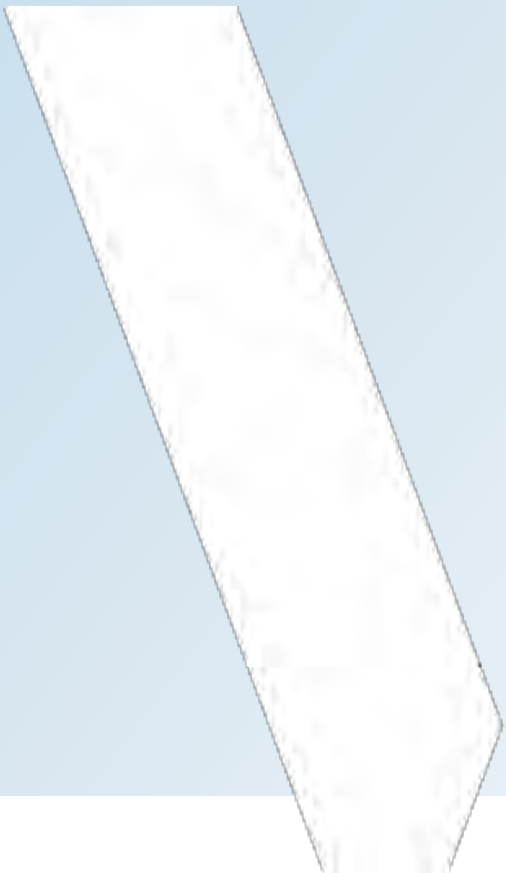
APPENDIX

A SCHEDULE L

THE REGION OF NIAGARA OFFICIAL PLAN



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Schedule L

Natural Environment System: Components, Definitions, & Criteria

SUSTAINABLE REGION

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1.0 Purpose

This document is a schedule to the Niagara Official Plan and should be read in conjunction with the policies of the Plan. The purpose of this schedule to the Niagara Official Plan is to:

- list the components of the Region's integrated *Natural Environment System* (NES);
- outline the definitions and criteria for the individual features and components of the NES; and
- provide additional information to support the implementation of the policies of the Official Plan.

2.0 Introduction

The establishment of a regional-scale *natural heritage system* (NHS) and *water resource system* (WRS) is required by Provincial policy. The NHS and WRS are ecologically linked, rely on and support each other, and have many overlapping components, together these systems collectively form the Region's integrated *Natural Environment System* (NES).

3.0 Components of the Natural Environment System

The Region's NES includes the *Natural Heritage System for the Growth Plan* and *Greenbelt Plan Natural Heritage System* as components of the system. These systems are identified by the Province and are required to be implemented by the Region. Collectively these two systems are referred to as the *Provincial Natural Heritage System*, and apply outside of *settlement areas* only in accordance with Provincial requirements.

The Region's NES however extends beyond the *Provincial Natural Heritage System* into the Niagara Escarpment Plan area and into other areas that are not within the *Provincial Natural Heritage System*, including within the Region's *settlement areas*. Included within, and outside of the *Provincial Natural Heritage System* are many individual natural features which are identified by the Region through various sources of data and information. **Table 3-1** provides a complete list of all of the components of the integrated NES.

Table 3-1: Components of the Region's Natural Environment System

	Lands in the *Provincial Natural Heritage System*	Lands in the Niagara Escarpment Plan Area	Lands outside of the *Provincial Natural Heritage System* and the Niagara Escarpment Plan Area[9]
Natural Heritage System for the Growth Plan	yes		
Greenbelt Plan Natural Heritage System	yes		
Provincially significant wetlands	yes[1,4]	yes[1,4]	yes[2,5]
Other wetlands	yes[1,4]	yes[1,4]	yes[3,5]
Significant coastal wetlands	yes[1,4]		yes[2,5]
Habitat of endangered species and threatened species	yes[1]	yes[1]	yes[2]
Habitat of special concern species		yes[1]	
Fish habitat	yes[1]	yes[1]	yes[2]
Life science areas of natural and scientific interest	yes[1]	yes[1]	yes[2]
Earth science areas of natural and scientific interest	yes	yes	yes[2]
Significant valleylands	yes[1]	yes[1]	yes[2]
Significant woodlands	yes[1]	yes[1]	yes[2]
Other woodlands	yes[3]	yes[3]	yes[3]
Significant wildlife habitat	yes[1]	yes[1]	yes[2]
Permanent and intermittent streams	yes[4]	yes[4]	yes
Inland lakes and their littoral zones	yes[4]	yes[4]	yes - outside of settlement areas only

	Lands in the *Provincial Natural Heritage System*	Lands in the Niagara Escarpment Plan Area	Lands outside of the *Provincial Natural Heritage System* and the Niagara Escarpment Plan Area[9]
Seepage areas and springs	yes[4]	yes[4]	yes
Significant groundwater recharge areas	yes[7]		yes
Highly vulnerable aquifers	yes[7]		yes
Significant surface water contribution areas	yes[7]		yes
Large and medium *linkages*	yes	yes	yes – outside of settlement areas only
Small *linkages*	yes	yes	yes
Supporting features and areas	yes	yes	yes
Minimum *buffers* adjacent to *natural heritage features and areas*			yes - outside of settlement areas only
Mandatory *buffers* adjacent to *natural heritage features and areas*			yes - inside of settlement areas
Vegetation protection zone adjacent to *key natural heritage features*	yes	yes	
Vegetation protection zone adjacent to *key hydrologic features*	yes	yes	yes[6] - - outside of settlement areas only
Shoreline areas	yes	yes	yes
Setbacks to regulated features and areas in accordance with Niagara	yes	yes	yes

	Lands in the *Provincial Natural Heritage System*	Lands in the Niagara Escarpment Plan Area	Lands outside of the *Provincial Natural Heritage System* and the Niagara Escarpment Plan Area[9]
Peninsula Conservation Authority policies			
Hazardous lands adjacent to the shorelines of Lake Erie and Lake Ontario that are impacted by flooding hazards, erosion hazards and/or dynamic beach hazards	yes[8]		yes[8]
Hazardous lands adjacent to rivers, streams and small inland lake systems that are impacted by flooding hazards and/or erosion hazards	yes[8]	yes[8]	yes[8]

Footnote 1: Included as a *key natural heritage feature* as identified in the Growth Plan, Greenbelt Plan and/or Niagara Escarpment Plan

Footnote 2: Included as a *natural heritage feature and area* as defined in the Provincial Policy Statement and the Niagara Official Plan

Footnote 3: Included as a *natural heritage feature and are*a by the Niagara Official Plan

Footnote 4: Included as a *key hydrologic feature* in accordance with the Growth Plan, Greenbelt Plan and Niagara Escarpment Plan

Footnote 5: Included as a *natural heritage feature and area* in *settlement areas* by the Niagara Official Plan and a *key hydrological feature* outside of settlement areas

Footnote 6: Only applies to lands adjacent to *key hydrologic features* outside of *settlement areas*

Footnote 7: Included as *key hydrologic areas* in accordance with the Growth Plan and Greenbelt Plan

Footnote 8: *Hazardous lands* are identified by the Niagara Peninsula Conservation Authority

Footnote 9: Including in *settlement areas* (i.e. urban areas and hamlets)

The following features and areas would also be included as required components of the integrated NES. However, they are not appropriately identified or managed until more detailed watershed planning or equivalent is completed at a subsequent stage of the planning process (e.g. a subwatershed study completed in support of a secondary plan, etc.).

- *Ground water features*
  - Recharge/discharge areas
  - Water tables
  - Aquifers and unsaturated zones
- *Surface water features*
  - Headwater drainage features (HDF)
  - Recharge/discharge areas
  - Associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.
- Other hydrologic functions

4.0 Definitions and Criteria

Table 4-1 provides the definition for individual components of the NES. Also included in **Table 4-1** are the criteria for the identification of features.

Table 4-1: Definitions and Criteria for the Components of the Region's Natural Environment System

NES Component	Definition	Criteria
Areas of Natural and Scientific Interest	**Areas of natural and scientific interest (ANSI)** means areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education. (PPS, 2020) **Life Science ANSIs** means an area identified as being high quality example(s) of ecological form and function in each Ecodistrict in the province (provincially significant) and the Region (regionally significant) and are generally defined by natural heritage features (e.g., a *woodland*, valley top of bank, etc.) and generally exclude anthropogenic land uses (e.g., residential areas / properties). Life Science ANSIs include areas identified as provincially significant and regionally significant by the Ontario Ministry of Natural Resources and Forestry using evaluation procedures established by the Province, as amended from time to time. **Earth Science ANSIs** means an area that represent the best examples of geologic and geomorphic landforms and areas (e.g., a moraine) in each Ecodistrict in the province (provincially significant) and the Region (regionally significant). They may encompass a single feature or a group of related features (e.g., a drumlin field). As geologic / geomorphic landforms, the overlying land use may include a composite of natural and anthropogenic uses (e.g., woodland, agricultural, rural residential, etc.). Earth Science ANSIs include areas identified as provincially significant and regionally significant by the Ontario Ministry of Natural Resources and Forestry using evaluation procedures established by the Province, as amended from time to time.	The identification of both provincial and regional Life Science ANSIs and Earth Science ANSIs is determined by the Province using criteria established by the Province.

NES Component	Definition	Criteria
Buffers	**Buffer** means an area of land located adjacent to *natural heritage features and areas*, *other wetlands*, and *watercourses* and usually bordering lands that are subject to *development* or *site* alteration. The purpose of a *buffer* is to protect the features and areas and their *ecological functions* by mitigating impacts of the proposed *development* or *site alteration*. *Buffers* shall consist of natural self-sustaining vegetation as a condition of development (except where certain agricultural uses are exempt from the requirement of a buffer).	The policies of the Niagara Official Plan identify two types of *buffers*, minimum (prescribed) buffers and mandatory (non-prescribed) buffers. For a minimum *buffer*, the policies of the Plan state what minimum *buffer* is required. The *buffer* width cannot be less than the required minimum, but may be larger as determined through an *environmental* impact *study*, *hydrologic evaluation*, or *subwatershed study*. Minimum *buffers* apply outside of *settlement areas* and outside of the *Provincial Natural Heritage System*. For a mandatory *buffers*, the policies of the Plan state that a *buffer* is required, but do not state any minimum for the *buffer* width. The width of an ecologically appropriate *buffer* would be determined through an *environmental impact study and/or hydrologic evaluation* at the time an application for *development* is made. The width of the *buffer* would be based on the sensitivity of the ecological functions from the change in adjacent land use, and the potential for impacts to the feature and ecological functions as a result of that change in land use.

NES Component	Definition	Criteria
Cultural and Regenerating Woodland	**Cultural and regenerating woodland** means *woodlands* where the ecological functions of the site are substantially compromised as a result of prior land use activity and would be difficult to restore and/or manage as a native *woodland* and which provide limited *ecological function* and ecosystem services.	A *significant* or *other woodland* can be classified as a *cultural and regenerating woodland* if <u>all</u> of the following are met: a) The *woodland* is less than 2 ha in size; b) The removal of a portion of *woodland* will not result in a *negative impact* to the *ecological functions* of the remaining portion; c) There are no other important *ecological functions* that the *woodland* provides (e.g., critical function zone for wetlands, etc.); d) The *woodland* is not identified as another component of the *Natural Environment System* (e.g., *significant wildlife habitat*, *linkage*, *enhancement area*, *buffer*); e) The canopy is dominated by invasive, non-native species including, but not limited to: Norway Maple, Manitoba Maple, Siberian Elm, Scots Pine, European Buckthorn, White Mulberry, Tree-of-heaven, Apple, Black Locust and White Poplar, or any combination thereof; f) The area was not treed approximately 20-25 years ago as determined through air photo interpretation or other suitable techniques; g) The soil is deemed to preclude the development of a native *woodland*; for example: soil that is degraded, soil that is compacted, the top soil has been removed, soil displaying substantial erosion from over-use and/or the woodland is regenerating on fill or spoil that was introduced to the site; h) There is limited ability to maintain or restore self-sustaining *ecological functions* typical of native *woodlands*; and i) The *woodland* provides limited social values (e.g., does not contain sanctioned trails, nor currently provides organized research or educational opportunities). Woodlands (including plantations) established and/or managed for the purpose of restoring a native tree community (e.g., naturalization or restoration projects) would still qualify as significant woodland.
Ecological Function	**Ecological function** means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions (PPS, 2020)	*Ecological functions* are to be identified and assessed through the completion of an *environmental impact study*, *hydrologic evaluation*, or *subwatershed study*.

NES Component	Definition	Criteria
Fish Habitat	**Fish Habitat** as defined in the *Fisheries* Act, means spawning grounds and any other areas, including nursery, rearing, food supply, and migration areas on which 'fish' depend directly or indirectly in order to carry out their life processes (PPS, 2020).	*Fish habitat* is identified as any *watercourse* or waterbody identified by the MNRF or provided / approved by the Federal Department of Fisheries and Oceans (DFO) or a delegated authority of DFO (including Conservation Authorities, as appropriate). For screening purposes, and until such time appropriate studies are completed to assess *watercourses* and waterbodies, *Fish Habitat* will be presumed to be: • Any *permanent or intermittent stream* or waterbody excluding constructed and actively managed offline ponds (e.g., stormwater ponds, active farm irrigation ponds, etc.); • Intermittent or ephemeral watercourses, or Headwater Drainage Features that provide contributions in terms of baseflow, material (e.g., substrates, etc.) or allochthonous inputs that are important to the maintenance of downstream *fish habitat*; or • Shoreline features that provide contributions in terms of material (e.g., substrates, etc.) or allochthonous inputs that are important to the maintenance of *fish habitat* in the Great Lakes.

Floodplains, Flooding Hazards, Floodways	**Floodplains** for river, stream and small inland lake systems, means the area, usually low lands adjoining a *watercourse*, which has been or may be subject to *flooding hazards* (PPS, 2020). **Flooding hazard** means the inundation, under the conditions specified below, of areas adjacent to a shoreline or a river or stream system and not ordinarily covered by water: a) along the shorelines of the Great Lakes - St. Lawrence River System and large inland lakes, the *flooding hazard* limit is based on the one hundred year flood level plus an allowance for wave uprush and other water related hazards; b) along river, stream and small inland lake systems, the *flooding hazard* limit is the greater of: 1. the flood resulting from the rainfall actually experienced during a major storm such as the Hurricane Hazel storm (1954) or the Timmins storm (1961), transposed over a specific watershed and combined with the local conditions, where evidence suggests that the storm event could have potentially occurred over watersheds in the general area; 2. the one hundred year flood; and 3. a flood which is greater than 1. or 2. which was actually experienced in a particular watershed or portion thereof as a result of ice jams and which has been approved as the standard for that specific area by the Minister of Natural Resources and Forestry; except where the use of the one hundred year flood or the actually experienced event has been approved by the Minister of Natural Resources and Forestry as the standard for a specific watershed (where the past history of flooding supports the lowering of the standard) (PPS, 2020). **Floodway** for river, stream and small inland lake systems, means the portion of the flood plain where development and site alteration would cause a danger to public health and safety or property damage. Where the one zone concept is applied, the floodway is the entire contiguous flood plain. Where the two zone concept is applied, the floodway is the contiguous inner portion of the flood plain, representing that area required for the safe passage of flood flow and/or that area where flood depths and/or velocities are considered to be such that they pose a potential threat to life and/or property damage. Where the two zone concept applies, the outer portion of the flood plain is called the flood fringe (PPS, 2020)	The *floodplain*, *flooding hazard* and *floodway* shall be identified in accordance with protocols deemed acceptable by the Niagara Peninsula Conservation Authority.

NES Component	Definition	Criteria
Greenbelt Plan Natural Heritage System	**Greenbelt Plan Natural Heritage System** means the *natural heritage system* mapped and issued by the Province in accordance with the Greenbelt Plan.	A mapped *Greenbelt Plan Natural Heritage System* is provided by the Province in accordance with S. 3.2.1 of the Greenbelt Plan.
Ground Water Feature	**Ground water features** means water-related features in the earth's subsurface including recharge/discharge areas, water tables, aquifers and unsaturated zones that can be defined by surface and subsurface hydrogeological investigations (PPS, 2020). **Sensitive** means *ground water features* areas that are particularly susceptible to impacts from activities or events including, but not limited to, water withdrawals, and additions of pollutants.	*Ground water features* and *sensitive groundwater features* which have not been mapped as *key hydrologic areas* are to be identified through more detailed studies such as *watershed plans* and *subwatershed studies* completed in accordance with watershed planning guidelines and best practices.
Habitat of Endangered Species and Threatened Species	**Habitat of endangered species and threatened species** mean habitat within the meaning of Section 2 of the *Endangered Species Act*, 2007 (PPS, 2020).	Criteria for the identification of the *Habitat* of *Endangered Species* and *Threatened Species* is determined in accordance with the habitat regulations of the *Endangered Species Act* (2007).
Hazardous Lands	**Hazardous lands** means property or lands that could be unsafe for development due to naturally occurring processes. Along the shorelines of the Great Lakes - St. Lawrence River System, this means the land, including that covered by water, between the international boundary, where applicable, and the furthest landward limit of the *flooding hazard*, erosion hazard or dynamic beach hazard limits. Along the shorelines of large inland lakes, this means the land, including that covered by water, between a defined offshore distance or depth and the furthest landward limit of the *flooding hazard*, erosion hazard or dynamic beach hazard limits. Along river, stream and small inland lake systems, this means the land, including that covered by water, to the furthest landward limit of the *flooding hazard* or erosion hazard limits (PPS, 2020)	The primary responsibility for implementing restrictions on development and site alternation in natural hazards rests with the NPCA. Policies are included in the Niagara Official Plan related to natural hazards to ensure conformity with the Provincial Policy Statement. How conformity is achieved and how the policies are implemented is determined by the NPCA, who should be consulted when development (whether it requires Planning Act approval or not) is proposed within or adjacent to natural hazards.
Highly Vulnerable Aquifers	**Highly vulnerable aquifers** means aquifers, including lands above the aquifers, on which external sources have or are likely to have a significant adverse effect (Greenbelt Plan 2017).	*Highly vulnerable aquifers* are identified based primarily on vulnerability mapping completed as part of the 2005 NPCA. Groundwater Study (Waterloo Hydrogeologic Inc., 2005). In accordance with the 'Groundwater Vulnerability Analysis, Niagara Peninsula Source Protection Areas' (NPCA, 2009) *Highly Vulnerable Aquifers* are areas of high groundwater vulnerability that "typically consist of granular aquifer materials or fractured rock that have a high permeability, are exposed near the ground surface, and have a relatively shallow water table".

NES Component	Definition	Criteria
Hydrologic Functions	**Hydrologic function** means the functions of the hydrological cycle that include the occurrence, circulation, distribution and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water's interaction with the environment including its relation to living things (PPS, 2020)	*Hydrologic functions* are to be identified and assessed through the completion of a *hydrologic evaluation* or *subwatershed study*.
Inland Lakes and their Littoral Zones	**Inland lakes** means any inland body of permanently standing water larger than a pool or pond or a body of water filling a depression in the earth's surface, where their water levels and hydrologic functions are not directly influenced by either Lake Erie or Lake Ontario. Inland lakes do not include storm water management ponds, ponds constructed for irrigation purposes, such as those on a golf course or used for agriculture, lakes that have been constructed and managed with the sole purpose of supporting essential infrastructure, and where their *ecological function* is not a consideration in their management.	N/A
Key Hydrologic Area	**Key hydrologic areas** means *significant groundwater recharge areas*, *highly vulnerable aquifers*, and *significant surface water contribution areas* that are necessary for the ecological and hydrologic integrity of a *watershed* (Growth Plan, 2019)	N/A – criteria are identified for each individual component
Key Hydrologic Features	**Key hydrologic features** means *permanent streams*, *intermittent streams*, *inland lakes and their littoral zones*, *seepage areas and springs*, and *wetlands*. (Growth Plan, 2019)	N/A – criteria are identified for each individual component
Key Natural Heritage Features	**Key natural heritage features** means *habitat of endangered species and threatened species*; *fish habitat*; *wetlands*; *life science areas of natural and scientific interest* (ANSIs), *significant valleylands*, *significant woodlands*; *significant wildlife habitat* (*including habitat of special concern species*); *sand barrens*, *savannahs*, and *tallgrass prairies*; and *alvars* (Growth Plan, 2019)	N/A – criteria are identified for each individual component

NES Component	Definition	Criteria
Linkages	**Linkage** means an area, that may or may not be associated with the presence of existing natural features and areas, that provides and maintains ecological connectivity between core areas consisting of natural features and areas, and supports a range of community and ecosystem processes enabling plants and animals to move among natural heritage features, in some cases over multiple generations, thereby supporting the long-term sustainability of the overall natural environment system. **Core areas** means an individual natural features and areas, or a group of features and areas in close proximity to each other (i.e., less than or equal to 30 m distance in settlement areas, less than or equal to 60 m distance outside of settlement areas) that have functional ecological connectivity (i.e., their proximity to each other supports ecological functions, such as wildlife habitat, exchange of genetic material, etc.).	Known *linkages* have been identified between *natural heritage features and areas* and *key natural heritage features* consisting of natural areas (e.g., *watercourses*, valleylands, meadow, thicket, woodland, *wetland*, and hedgerows, etc.) or rural/agricultural lands without major barriers (i.e., developed areas or major roads greater than 30 m in width) based on the following set of criteria: 1. Large *linkages* (outside *settlement areas* and outside of the *Provincial Natural Heritage System*) that are: a. 200-400 m in width; and b. connect *core areas* (i.e., a group of natural features and areas within 30 m of each other) with a combined area of ≥50 ha in size; 2. Medium *linkages* (outside of *settlement areas* and outside of the *Provincial Natural Heritage System*) that are: a. 100-200 m in width, and b. connect *core areas* (i.e., a group of natural features and areas within 30 m of each other) with a combined area of ≥20 ha in size; 3. Small *linkages*, both inside and outside of *settlement areas* and outside of the *Provincial Natural Heritage System*) that are: a. 60-100 m in width, and b. connect *core areas* (i.e., a group of natural features and areas within 30 m of each other) with a combined area of ≥10 ha in size. Opportunities for additional, ecologically appropriate *linkages* shall be screened for when a *subwatershed study* is being completed in support of a secondary plan
Natural Environment System	**Natural environment system** means an ecologically integrated system made up of the *Provincial natural heritage systems*, *natural heritage features and areas*, *other wetlands*, *key natural heritage features*, *key hydrologic features*, *key hydrologic areas*, *shoreline areas*, *hydrologic functions*, *supporting features and areas*, *hazardous lands*, and *linkages* intended to provide connectivity and support natural processes which are necessary to maintain biological and hydrological diversity, *ecological functions*, ecosystem services, viable populations of indigenous species, and ecosystems.	N/A – criteria are identified for each individual component

NES Component	Definition	Criteria
Natural Heritage Features and Areas	**Natural heritage features and areas** means features and areas, including *significant wetlands*, *significant coastal wetlands*, other coastal wetlands, *fish habitat*, *significant woodlands*, *significant valleylands*, *habitat of endangered species and threatened species*, *significant wildlife habitat*, and *significant areas of natural* and *scientific interest*, which are important for their environmental and social values as a legacy of the natural landscapes of an area (modified from PPS, 2020). For the purposes of this definition, *natural heritage features and areas* includes *other woodlands*, *earth science areas of natural* and *scientific interest* (provincial and regional), and *life science areas of natural and scientific interest* (provincial and regional).	N/A – criteria are identified for each individual component
Natural Heritage System	**Natural heritage system** means a system made up of *natural heritage features and areas*, *wetlands*, and *linkages* intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include *key natural heritage features*, *key hydrologic features,* federal and provincial parks and conservation reserves, other *natural heritage features and areas,* lands that have been restored or have the potential to be restored to a natural state, associated areas that support *hydrologic functions*, and working landscapes that enable ecological functions to continue.	N/A – criteria are identified for each individual component
Natural Heritage System for the Growth Plan	**Natural heritage system for the growth plan** means the *natural heritage system* mapped and issued by the Province in accordance with the Growth Plan.	A mapped *Natural Heritage System for the Growth Plan* has been provided by the province in accordance with 4.2.2.1 of the Growth Plan
Other Woodlands	**Other woodlands** means *woodlands* determined to be ecologically important in terms of features, functions, representation, or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system. Other woodlands include all terrestrial treed vegetation communities where the percent tree cover is >25%. *Other woodlands* would not include *woodlands* meeting the criteria as *significant woodlands*.	To be identified as an other *woodland*, a terrestrial treed area must have ≥ 25% tree cover and meet one or more of the following criteria: 1. an average minimum width of 40 m and is ≥0.3 ha, measured to crown edges; or 2. any size abutting a *significant woodland*, *wetland* or *permanent stream*. Treed areas that "abut" a *significant woodland*, *wetland* or *permanent stream* are considered adjacent when located within 20 m of each other. *Other woodlands* are identified based on the Ecological Land Classification (ELC) methodology. Terrestrial vegetation communities that would meet the ≥ 25% tree cover are identified in **Table 5-1**.

NES Component	Definition	Criteria
Permanent and Intermittent Streams	**Permanent streams** means watercourses that contain water during all times of the year. **Intermittent streams** means stream-related watercourses that contain water or are dry at times of the year that are more or less predictable, generally flowing during wet seasons of the year but not the entire year, and where the water table is above the stream bottom during parts of the year (Greenbelt Plan, 2017).	Criteria for the identification of a *permanent or intermittent stream* should follow protocols established by the Province, such as the Ontario Stream Assessment Protocol.
Provincial Natural Heritage System	**Provincial Natural Heritage System** means collectively the *Natural Heritage System for the Growth Plan* and the *Greenbelt Plan Natural Heritage system*.	N/A – criteria are identified for each of the two individual systems.
Seepage Areas and Springs	**Seepage areas and springs** means sites of emergence of groundwater where the water table is present at the ground surface (Greenbelt Plan, 2017).	Seepage areas are to be identified based on the observation of ground water discharge at the surface as evident by springs, standing water, saturated soils, and/or vegetation indicating groundwater discharge (e.g., watercress).
Setback [to regulated features and areas in accordance with NPCA policies[	**Setback** means a physical separation that forms a boundary by establishing an exact distance from a fixed point, such as a property line, an adjacent structure, or a natural feature, within which *development and*/or *site alteration* is prohibited in accordance with the policies of the NPCA	Setbacks are identified in accordance with the NPCA policies.
Shoreline Areas	**Shoreline areas** means the interface between terrestrial and aquatic environments, allowing for interactions between them, providing: specialized habitats (e.g., natural beach, overhanging cover, bird stopover or nesting, etc.), natural cover, areas of shoreline erosion or accretion, nutrient and sediment filtration / buffering, shading, foraging opportunities.	Shoreline areas include any natural vegetation community (as determined according to Ecological Land Classification) and will be identified based on the following criteria: a) ≥ 0.1 ha in size; and b) located within 30 m of the limits of the shoreline *flood hazard* associated with the Great Lakes, or within 15 m of a *surface water feature*, as defined by the PPS

NES Component	Definition	Criteria
Significant Coastal Wetlands	**Coastal wetland** means: a) Any *wetland* that is located on one of the Great Lakes or their connecting channels; or b) any other *wetland* that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located 2 km upstream of the 1:100 year floodline (plus wave run-up) of the large water body to which the tributary is connected (PPS, 2020). **Significant coastal wetlands** means those identified as provincially significant by the Ontario Ministry of Natural Resources and Forestry using evaluation procedures established by the Province, as amended from time to time (PPS, 2020)	The criteria for identifying *significant coastal wetlands* are established by the Province. At the time of writing this report the Ontario Wetland Evaluation System, Southern Manual, 3rd Edition, Version 3.3. (MNRF, 2014) is considered the document by which an evaluation should be undertaken. The MNRF is responsible for review and approval of a wetland evaluation.
Significant Groundwater Recharge Area	**Significant groundwater recharge area** means an area that has been identified as: a) a *significant groundwater recharge area* by any public body for the purposes of implementing the PPS; b) a *significant groundwater recharge area* in the assessment report required under the Clean Water Act, 2006; or c) an ecologically significant groundwater recharge area delineated in a *subwatershed study* or equivalent in accordance with provincial guidelines. For the purposes of this definition, ecologically *significant groundwater recharge areas* are areas of land that are responsible for replenishing groundwater systems that directly support sensitive areas like cold water streams and *wetlands*. (Greenbelt Plan, 2017) Groundwater recharge areas are also classified as “significant” where they supply more water to an aquifer than the surrounding area (NPCA, 2013). In other words, a recharge area is considered significant when it helps to maintain the water level in an aquifer that supplies a community with drinking water, or supplies groundwater recharge to a coldwater ecosystem that is dependent on this recharge to maintain its ecological function (N.V.C.A., 2015b).	*Significant groundwater recharge areas* have been delineated for the entire Niagara Peninsula Source Protection Area using methodology developed by the Niagara Peninsula Conservation Authority in consultation with the Ministry of Natural Resources (MNR) and was based on the March 2007 Draft Guidance Module – Water Budget and Water Quantity Risk Assessment (Guidance Module). The identification of the significant groundwater recharge areas adheres to the Assessment Report Technical Rules (MOE, 2009), Regulation 287/07 and Technical Bulletin methodology descriptions (MNR, MOE, 2009).

NES Component	Definition	Criteria
Significant Surface Water Contribution Areas	**Significant surface water contribution areas** mean areas, generally associated with headwater catchments that contribute to baseflow volumes which are significant to the overall surface water flow volumes within a watershed (Greenbelt Plan, 2017). *Significant surface water contribution areas* include headwater drainage features classified as protection, conservation and mitigation.	The identification of *significant surface water contribution* areas will be undertaken as part of more detailed studies such as *watershed plan* and *subwatershed studies* completed in accordance with watershed planning guidelines and best practices. The identification, evaluation and management recommendations for headwater drainage features should follow that of 'The Evaluation, Classification and Management of Headwater Drainage Features Guideline', prepared by the Toronto and Region Conservation Authority and Credit Valley Conservation (2014, or as amended from time to time).
Significant Valleylands	**Valleylands** means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year (PPS, 2020). **Significant valleyland** means *valleyland* which is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system. These are to be identified using criteria established by the Province. (Growth Plan, 2019). Note: the NPCA also regulates *valleyland* erosion hazards. The definitions for valleys and the identification of *valleylands* that are regulated by the NPCA is not necessarily consistent with the definition for *valleyland* and significant *valleyland* of the PPS nor the identification of significant *valleylands* in accordance with the criteria for *significant valleylands*.	Significant valleylands include any of the features identified in any of the following three categories: 1. all streams with well-defined valley morphology (i.e., *floodplains*, riparian zones, meander belts and/or valley slopes) of an average width of 25 metres or more; the physical boundary is defined by the stable top of bank (as defined by the conservation authority); or 2. all spillways and ravines with the presence of flowing or standing water for a period of no less than two months in an average year. Such features must be greater than 50 metres in length (as defined from the point of valley formation downstream to the confluence of the valley being assessed); 25 metres in average width with a well-defined morphology (i.e., two valley walls of 15% slope or greater with a minimum height of 5 metres, and valley floor), and having an overall area of 0.5 ha or greater; or 3. additional features or areas beyond the ones described above that have been identified by the Region, local area municipality, or the Niagara Peninsula Conservation Authority as providing one or more of the features or functions described in the table contained in Appendix A of the Greenbelt Plan 2005 Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area (OMNR, 2012).

NES Component	Definition	Criteria
Significant Wildlife Habitat	**Wildlife habitat** means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific *wildlife habitats* of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species (PPS, 2020) **Significant Wildlife Habitat** means *wildlife habitat* that is ecologically important in terms of features, functions, representation, or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system. These are to be identified using criteria established by the Province (PPS, 2020).	*Significant wildlife habitat* shall be identified in accordance with the Significant Wildlife Habitat Criteria schedules for Ecoregion 7E (MNRF, January 2015) and/or the appropriate provincial guidance document(s) as may be developed or amended from time to time. Where any disagreements arise with respect to interpretation of significant wildlife habitat, the Region may confer with the Province, however the Region's interpretation shall prevail if it provides equal or greater protection for *wildlife habitat*.

Significant Woodland	**Woodlands** means treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. *Woodlands* include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels. *Woodlands* will be delineated according to the Province's Ecological Land Classification system definition for forest (PPS, 2020). For the purposes of this definition, forests include terrestrial vegetation communities as defined in accordance with the Ecological Land Classification (ELC) system, where the tree cover is greater than 60%. **Significant woodlands** means *woodlands* that are ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history (PPS, 2020).	To be identified as significant, a *woodland* must meet the definition of ELC forest (as per the definition of '*woodland*'), and then meet one or more of the following criteria: 1. 2 ha or greater in size; 2. 1 ha or greater in size meeting at least one of the following criteria: a. Naturally occurring (i.e., not planted) trees (as defined in the species list of Appendix D in the Greenbelt Technical Paper); b. Treed areas planted with the intention of restoring *woodland*; c. 10 or more trees per ha greater than 100 years old or 50 cm or more in diameter; d. Wholly or partially within 30 m of a *provincially significant wetland* or *habitat of* an *endangered or threatened* species; e. Overlapping or abutting one or more of the following features: i. *Permanent streams* or *intermittent streams*; ii. *Fish habitat*; iii. Significant *valleylands*; 3. 0.5 ha or greater in size meeting at least one of the following criteria: a. A provincially rare treed vegetation community with an S1, S2 or S3 in its ranking by the MNRF's N.H.I.C.; b. Habitat of a *woodland* plant species with an S1, S2 or S3 in its ranking or an 8, 9, or 10 in its Southern Ontario Coefficient of Conservatism by the NHIC, consisting of 10 or more individual stems or 100 or more sqm of leaf coverage; c. Any *woodland* overlapping or abutting one or more of the following features: i. *Significant wildlife habitat*; ii. *Habitat of threatened species and endangered species*; or iii. Non-Provincially Significant *Wetlands* 4. Any size overlapping or abutting one or more of the following features: a. *Provincially significant wetland*; and b. *Life Science area* of *natural and scientific interest* *Woodlands* that abut another feature are considered adjacent when located within 20 m of each other. *Significant woodlands* are identified based on the Ecological Land Classification (ELC) methodology. Terrestrial vegetation communities that would meet the ≥ 60% tree cover and be considered a forest are identified in **Table 5-1**.

NES Component	Definition	Criteria
		Guidance for delineating the boundary of a *woodland* as defined by the Region should follow those of Appendix B in the Greenbelt Plan 2005 – Technical Definitions and Criteria for Key Natural Heritage Features in the Natural heritage System of the Protected Countryside (Ontario Ministry of Natural Resources, 2012)

NES Component	Definition	Criteria
Supporting Features and Areas	**Supporting features and areas** means lands that have been restored or have the potential of being restored. *Supporting features* and *areas* include grasslands, meadows, and thickets (defined in accordance with Ecological Land Classification for Southern Ontario); other *valleylands*; and other *wildlife habitat*; and *enhancement* areas where they are determined to contribute to the biodiversity and *ecological function* of the *natural environment system* **Enhancement areas** means ecologically supporting areas adjacent to *natural heritage features* and *areas*, *key natural heritage features*, *key hydrologic features*. *Enhancement areas* can also be measures internal to features that increase the ecological resilience and function of individual features or groups of natural features and areas. *Enhancements areas* are identified where they: • connect natural features and areas to create larger contiguous natural areas; • Reduce edge habitat and increase proportion of interior conditions (> 100 m from edge); and • Include critical function zones and important catchment areas critical to sustaining ecological functions.	The identification of *supporting features and areas* is to be determined through a detailed study, such as an *environmental impact study*, *hydrological evaluation*, or *subwatershed study* which would evaluates the ecological contribution of the *supporting feature and area* to other components of the *natural environment system*. *Enhancement areas* are identified where: 1. The area is comprised of natural vegetation communities (as determined according to Ecological Land Classification); or 2. The area is currently under agricultural production; or 3. The area does not contain a permanent form of development (i.e., house, road, or related infrastructure). *Enhancement areas* inside of *settlement areas* are to be identified as follows: • in 'bays and inlets' along the edge of features - < 60 m wide • interior gaps in features - < 0.5 ha • gaps between features - < 60 m Enhancement areas outside of settlement areas are to be identified as follows: • in 'bays and inlets' along the edge of features - < 120 m wide • interior gaps in features - < 1 ha • gaps between features - < 120 m
Surface Water Feature	**Surface water features** means water-related features on the earth's surface, including headwaters, rivers, stream channels, inland lakes, *seepage areas*, recharge/discharge areas, springs, *wetlands*, and associated riparian lands that can be defined by their soil moisture, soil type, vegetation, or topographic characteristics (PPS, 2020). **Sensitive** means in regard to *surface water features* and *groundwater features*, means areas that are particularly susceptible to impacts from activities or events including, but not limited to, water withdrawals, and additions of pollutants (PPS, 2020).	*Surface water features* and *sensitive surface water features* which have not been mapped as *key hydrologic features* are to be identified through more detailed studies such as *watershed plans* and *subwatershed studies* completed in accordance with watershed planning guidelines and best practices.

NES Component	Definition	Criteria
Water Resource System	**Water resource system** means a system consisting of *groundwater features* and areas and *surface water features* (including shoreline areas), and *hydrologic functions*, which provide the water resources necessary to sustain healthy aquatic and terrestrial ecosystems and human water consumption. The *water resource system* comprises of *key hydrologic features* and *key hydrologic areas* (Growth Plan, 2019).	N/A – criteria are identified for each individual component
Wetlands, Provincially Significant Wetlands, and Other Wetlands	**Wetland** means lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of *wetlands* are swamps, marshes, bogs and fens. Periodically soaked or wet lands being used for agricultural purposes which no longer exhibit wetland characteristics are not considered to be *wetlands* for the purposes of this definition. (PPS, 2020). **Provincially significant wetlands** means those identified as provincially significant by the Ontario Ministry of Natural Resources and Forestry using evaluation procedures established by the Province, as amended from time to time (PPS, 2020). **Other wetlands** means lands that meet the definition of a *wetland*, and which have not been evaluated as a *provincially significant wetland*.	The criteria for identifying *provincially significant wetlands* are established by the Province in accordance with the Ontario Wetland Evaluation System. At the time of writing this report the Ontario Wetland Evaluation System, Southern Manual, 3rd Edition, Version 3.3. (MNRF, 2014) is considered the document by which an evaluation should be undertaken to identify a *Provincially Significant Wetland*. The MNRF is responsible for review and approval of a *wetland* evaluation. *Other Wetland* include**:** • all *wetlands* that meet an Ecological Land Classification (ELC) wetland system classification and have not been evaluated as a *provincially significant wetland* (PSW). Vegetation communities that would be considered other *wetlands* are identified in **Table 5-1**; • both evaluated non-PSWs and *wetlands* that have not been evaluated. These include *wetlands* that are regulated, and *wetlands* that are not regulated by the Conservation Authority; and • *wetlands* with *ecological* and *hydrological functions* and *wetlands* that have only have a *hydrological function*. In *settlement areas other wetlands* which are not regulated by the Conservation Authority require further evaluation to determine the appropriate protection or management of the feature. Within *settlement areas*, *other wetlands* which are not regulated by the Conservation Authority are considered to be a required component of the *water resource system* and are protected or managed in accordance with the policies of this Plan. In accordance with the definitions and polices of the Greenbelt Plan and Growth Plan, all *wetlands* outside of *settlement areas* are *key hydrologic features* and are protected in accordance with the policies of those Plans.

NES Component	Definition	Criteria
Vegetation Protection Zone	**Vegetation protection zone** means a vegetated *buffer* area surrounding a *key natural heritage feature* or *key hydrologic feature* (Greenbelt Plan, 2019).	*Vegetation protection zones* apply to *key natural heritage* features in a *Provincial Natural Heritage System* and to any *key hydrologic features* outside of a *settlement area*. Elsewhere in the Region the term *buffer* is used. The width of a *vegetation protection zone* is determined in accordance with Provincial policy and the policies of this Plan.

5.0 Mapping of the Natural Environment System

The basis for mapping of *significant woodlands*, *other woodlands*, *other wetlands**, *shoreline areas*, and *linkages* is Ecological Land Classification (ELC) system.

**provincially significant wetlands* are identified based on Provincial mapping, regardless of the ELC code.

Table 5-1 are ELC types which feature they would be associated with (i.e. *woodland*, *other woodland*, or *wetland*).

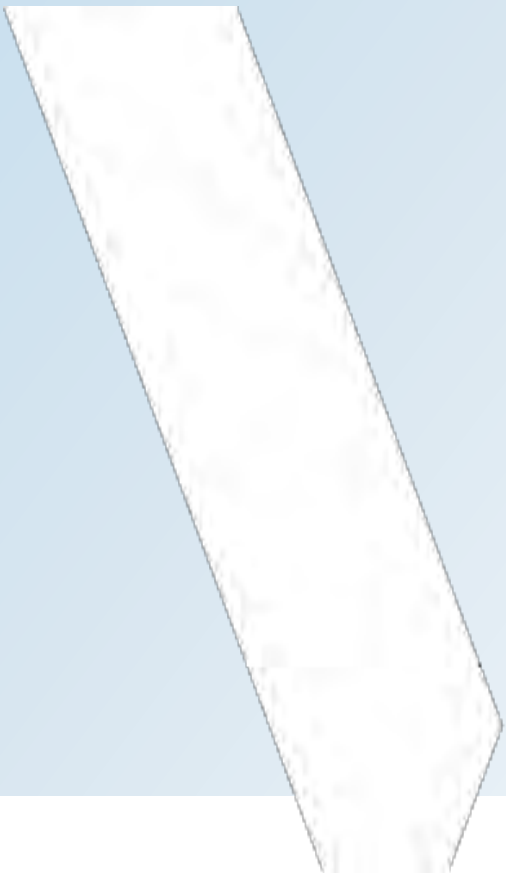
Table 5-1: ELC Type and Associated Natural Feature Classification

ELC - Code	Ecological Land Classification - Name	Woodland (>60% canopy)	Other Woodland (>25% canopy)	Natural Cover	Wetland
TAG	Treed Agriculture	yes	yes	yes	no
BOT	Treed Bog	no	yes	yes	yes
HOC	Coniferous Hedgerow	no	yes	yes	no
SVC	Coniferous Savanna	no	yes	yes	no
WOC	Coniferous Woodland	no	yes	yes	no
HOD	Deciduous Hedgerow	no	yes	yes	no
SVD	Deciduous Savanna	no	yes	yes	no
WOD	Deciduous Woodland	no	yes	yes	no
SVM	Mixed Savanna	no	yes	yes	no
WOM	Mixed Woodland	no	yes	yes	no
BLT	Treed Bluff	no	yes	yes	no
CLT	Treed Cliff	no	yes	yes	no
RBT	Treed Rock Barren	no	yes	yes	no
SBT	Treed Sand Barren and Dune	no	yes	yes	no
SHT	Treed Shoreline	no	yes	yes	no
TAT	Treed Talus	no	yes	yes	no
FOC	Coniferous Forest	yes	yes	yes	no
FOD	Deciduous Forest	yes	yes	yes	no
FOM	Mixed Forest	yes	yes	yes	no
SWC	Coniferous Swamp	no	no	yes	yes
SWD	Deciduous Swamp	no	no	yes	yes
SAF	Floating-leaved Shallow Aquatic	no	no	yes	yes
MAM	Meadow Marsh	no	no	yes	yes

ELC - Code	Ecological Land Classification - Name	Woodland (>60% canopy)	Other Woodland (>25% canopy)	Natural Cover	Wetland
SAM	Mixed Shallow Aquatic	no	no	yes	yes
SWM	Mixed Swamp	no	no	yes	yes
MAS	Shallow Marsh	no	no	yes	yes
SAS	Submerged Shallow Aquatic	no	no	yes	yes
SWT	Swamp Thicket	no	no	yes	yes
BOS	Shrub Bog	no	no	yes	yes
OAO	Open Aquatic	no	no	yes	no
IAG	Agricultural Infrastructure	no	no	no	no
CVC	Commercial and Institutional	no	no	no	no
THC	Coniferous Thicket	no	no	yes	no
THD	Deciduous Thicket	no	no	yes	no
MEF	Forb Meadow	no	no	yes	no
MEG	Graminoid Meadow	no	no	yes	no
CGL	Green lands	no	no	yes	no
MEM	Mixed Meadow	no	no	yes	no
THM	Mixed Thicket	no	no	yes	no
OAG	Open Agriculture	no	no	yes	no
BLO	Open Bluff	no	no	yes	no
CLO	Open Cliff	no	no	yes	no
RBO	Open Rock Barren	no	no	yes	no
SHO	Open Shoreline	no	no	yes	no
TAO	Open Talus	no	no	yes	no
OAW	Open Water	no	no	yes	no
CVR	Residential	no	no	no	no
SAG	Shrub Agriculture	no	no	yes	no
BLS	Shrub Bluff	no	no	yes	no
CLS	Shrub Cliff	no	no	yes	no
RBS	Shrub Rock Barren	no	no	yes	no
SHS	Shrub Shoreline	no	no	yes	no
TAS	Shrub Talus	no	no	yes	no
CVI	Transportation and Utilities	no	no	no	no

APPENDIX

B RECORD OF CORRESPONDENCE



Hughes, Samantha

From: David Deluce <ddeluce@npca.ca>
Sent: Thursday, 13 May, 2021 12:40
To: Hughes, Samantha
Cc: Adam Aldworth; Nigel Ward; Lampman, Cara; Maged.Elmadhoon@niagararegion.ca; Suggett, Jeff; Talpur, Mir; Nigel Ward
Subject: RE: Merritt Road/Rice Road MCEA - NPCA Comments on TOR for the EIS

CAUTION: External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Hi Samantha,

Sorry for the delay. Here's our response:

1. Further to the response, the surface and ground water connections should be understood and maintained. This is important because if the proposed works are implemented, the water balance of the subject area can be maintained. For example, infiltration galleries, series of surface water culverts or other measure may be beneficial by assisting with achieving the maintenance of surface and subsurface connection of the wetlands.
    a. The ecohydology identified by the studies suggested by the proponent can be used to inform existing conditions. This information can target the conditions that should be maintained during construction activities and post development. Post construction monitoring may be an expectation of NPCA staff to demonstrate no negative effects to the hydrology and ecohydrology of the area potentially impacted by the proposed works.
2. Noted.
3. Please demonstrate reasonable efforts to gain landowner access. Should reasonable efforts not grant permission to access lands, the precautionary principle should be utilized and assume presence of salamanders that could occur in the study area. The mitigation measures should specify appropriate avoidance and mitigation measures to applicable salamander habitat. This should also include the ability for salamanders to traverse the road by a safe means, for example a wildlife passages.
4. Noted.
5. Noted.

Please note that NPCA staff reiterate that avoiding the alignment of the proposed road through wetlands is NPCA strong preference.

Please let me know if you have any questions.

David Deluce, MCIP, RPP
Senior Manager, Planning & Regulations
Niagara Peninsula Conservation Authority (NPCA)
250 Thorold Road West, 3rd Floor, Welland, ON, L3C 3W2
905-788-3135, ext. 224
ddeluce@npca.ca
www.npca.ca

Thank you for your email. Due to the COVID-19 pandemic, the NPCA has taken measures to protect staff and public while providing continuity of services. NPCA enforcement, permitting and planning functions are continuing to operate, however there may be delays in receiving responses to inquiries or complaints due to staff restrictions and remote work locations. Updates with regards to NPCA operations and activities can be

found on our website at www.npca.ca/our-voice, the NPCA Facebook page at https://www.facebook.com/NPCAOntario and on Twitter at https://twitter.com/NPCA_Ontario.

For more information on Permits, Planning and Forestry please go to the Permits & Planning webpage at https://npca.ca/administration/permits.

For mapping on features regulated by the NPCA please go to our GIS webpage at https://gis-npca-camaps.opendata.arcgis.com/ and utilize our Watershed Explorer App or GIS viewer.

To send NPCA staff information regarding a potential violation of Ontario Regulation 155/06 please go to the NPCA Enforcement and Compliance webpage at https://npca.ca/administration/enforcement-compliance.

From: Hughes, Samantha <samantha.hughes@woodplc.com>
Sent: April 26, 2021 9:51 AM
To: David Deluce <ddeluce@npca.ca>
Cc: Adam Aldworth <aaldworth@npca.ca>; Nigel Ward <nward@npca.ca>; Lampman, Cara <Cara.Lampman@niagararegion.ca>; Maged.Elmadhoon@niagararegion.ca; Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
Subject: RE: Merritt Road/Rice Road MCEA - NPCA Comments on TOR for the EIS

Hi David,

Have you had a chance to review? Please let me know.

Thanks,
Samantha

Samantha Hughes
Senior Biologist
Mobile: +1 (416) 540 8475

From: Hughes, Samantha
Sent: Thursday, 8 April, 2021 03:10 PM
To: David Deluce <ddeluce@npca.ca>
Cc: Adam Aldworth <aaldworth@npca.ca>; Nigel Ward <nward@npca.ca>; Lampman, Cara <Cara.Lampman@niagararegion.ca>; Maged.Elmadhoon@niagararegion.ca; Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
Subject: RE: Merritt Road/Rice Road MCEA - NPCA Comments on TOR for the EIS

Hi David,

Just following up on the below, and if you had further comments. I have updated the TOR based on the below and comments from the Region, this is attached. Can you please provide acceptance or let me know if there are further items to discuss? We will be mobilizing next week for anuran call surveys.

Thanks,
Samantha

Samantha Hughes
Senior Biologist
Mobile: +1 (416) 540 8475

From: Hughes, Samantha
Sent: Friday, 26 March, 2021 10:58 AM
To: David Deluce <ddeluce@npca.ca>
Cc: Adam Aldworth <aaldworth@npca.ca>; Nigel Ward <nward@npca.ca>; Lampman, Cara <Cara.Lampman@niagararegion.ca>; Maged.Elmadhoon@niagararegion.ca; Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
Subject: RE: Merritt Road/Rice Road MCEA - NPCA Comments on TOR for the EIS

Hi David,

I have received the go ahead from Maged to response directly for items relating to the TOR. My responses to your below comments are as follows:

1. NPCA stated they did not want a water balance but the design should consider watercourse connections to maintain drainage. I will note (and update the TOR) that we will be reviewing and incorporating stormwater studies as applicable, once completed by the team. As for ecohydrology, we can ensure species in the plant lists are provided with their coefficient of wetness. We will also discuss the percentage of plants determined to the facultative or obligate wetland plants; however, if we do not have access outside of the ROW, we may not have a true representation of species. Likewise, we can discuss bird species recorded and their wetland affiliation. Does the above satisfy the characterization of hydrology and ecohydrology of the unopened road allowance?
2. Thank you for the correction, yes we will be accessing watercourses adjacent to roads where possible. Will update the TOR.
3. Salamander breeding habitat is considered under amphibian breeding habitat in the SWH schedule. Calling anuran surveys is proposed, but as noted below, salamander surveys have not been proposed due to land access. Likewise, permitting for salamander trapping has not been initiated. If the species is known, we will consider this a confirmed occurrence and address impacts accordingly.
4. Accepted
5. Accepted

If you want to discuss more feel free to connect with me via phone or email. If you are okay with the above responses please let me know so I can finalize the TOR.

Thanks,
Samantha

Samantha Hughes
Senior Biologist
Mobile: +1 (416) 540 8475

From: Talpur, Mir <mir.talpur@woodplc.com>
Sent: Thursday, 11 March, 2021 01:31 PM
To: David Deluce <ddeluce@npca.ca>
Cc: Adam Aldworth <aaldworth@npca.ca>; Nigel Ward <nward@npca.ca>; Lampman, Cara <Cara.Lampman@niagararegion.ca>; Maged.Elmadhoon@niagararegion.ca; Suggett, Jeff <jeff.suggett@woodplc.com>; Hughes, Samantha <samantha.hughes@woodplc.com>
Subject: RE: Merritt Road/Rice Road MCEA - NPCA Comments on TOR for the EIS

Hi David,

Thank you for your review and comments on the ToR for the EIS in support of the Merritt Rd-Rice Rd EA. We will review these comments and let you know if we have any questions.

Mir Ahsan Talpur, M.Env.Sc., EP
Environmental Planner
Mobile: +1 (647) 545 8974
www.woodplc.com

From: David Deluce <ddeluce@npca.ca>
Sent: Thursday, March 11, 2021 1:20 PM
To: Talpur, Mir <mir.talpur@woodplc.com>
Cc: Adam Aldworth <aaldworth@npca.ca>; Nigel Ward <nward@npca.ca>; Lampman, Cara <Cara.Lampman@niagararegion.ca>
Subject: Merritt Road/Rice Road MCEA - NPCA Comments on TOR for the EIS

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Hi Mir,

The NPCA has the following comments with respect to the Terms of Reference for the EIS circulated to us on March 2:

1. NPCA staff note that the characterization of hydrology and ecohydrology of the wetland and watercourse features present within the Study Area has not been identified in the Terms of Reference. NPCA staff recommend that the Terms of Reference be revised to include consideration for the hydrology and ecohydrology of NPCA regulated features within the Study Area. This information could be used to ensure that the hydrology of the wetlands is not impacted and inform mitigation design in subsequent submissions.

2. NPCA staff note that assessment of watercourses is only proposed within the unopened road allowance. NPCA staff note that available mapping identifies several watercourses within the study area which are adjacent to the existing roadway or cross the roadway. NPCA staff request that the Terms of Reference be revised to include assessment of all watercourses within the study area as opposed to being limited to the unopened road allowance.

3. NPCA staff have identified wetland and forested habitat present on the site, these features indicate candidate salamander breeding habitat and/or movement corridors may be present within the study area. Blue Spotted Salamanders are known to inhabit the wetland complex. NPCA staff recognize that access to properties adjacent to the Right of Way may be limited, however an assessment of salamander habitat should be undertaken and salamander surveys should be undertaken in addition to calling anuran surveys. NPCA staff request that the Terms of Reference be revised to include salamander surveys.

4. NPCA staff recognize that access outside of the Right of Way may limit the scope of investigations. Where data gaps exist due to limited access uncertainty and risk to NPCA regulated features may exist. In these instances the NPCA staff will look for the application of the precautionary principle when evaluating preferred alternatives to minimize and mitigate potential impacts.

5. Once the features within the study area are understood, the proposed development should take these features into account when determining the preferred alternative. Please demonstrate that all other alternatives have been exhausted and that the final road footprint is minimized to the extent possible to reduce impact to the Provincially Significant Niagara Street Cataract Road Wetland Complex. If removals of wetland features are required as a result of the preferred alternative, reconfiguration options of wetlands will be required to be

explored through collaboration and agreement with NPCA staff. This can be a mitigation measure to reduce overall impacts to the wetland features within the watershed.

The comments above are specific to the project titled above. Comments are informed by the available information presented to date and therefore reflect the current best understanding of the project and anticipated impacts. They are subject to change based on the submission of new information.

I hope this information is helpful. If you have any questions and/or would like to arrange a meeting to discuss, please let me know.

Regards,

David Deluce, MCIP, RPP
Senior Manager, Planning & Regulations
Niagara Peninsula Conservation Authority (NPCA)
250 Thorold Road West, 3rd Floor, Welland, ON, L3C 3W2
905-788-3135, ext. 224
ddeluce@npca.ca
www.npca.ca

Thank you for your email. Due to the COVID-19 pandemic, the NPCA has taken measures to protect staff and public while providing continuity of services. NPCA enforcement, permitting and planning functions are continuing to operate, however there may be delays in receiving responses to inquiries or complaints due to staff restrictions and remote work locations. Updates with regards to NPCA operations and activities can be found on our website at www.npca.ca/our-voice, the NPCA Facebook page at https://www.facebook.com/NPCAOntario and on Twitter at https://twitter.com/NPCA_Ontario.

For more information on Permits, Planning and Forestry please go to the Permits & Planning webpage at https://npca.ca/administration/permits.

For mapping on features regulated by the NPCA please go to our GIS webpage at https://gis-npca-camaps.opendata.arcgis.com/ and utilize our Watershed Explorer App or GIS viewer.

To send NPCA staff information regarding a potential violation of Ontario Regulation 155/06 please go to the NPCA Enforcement and Compliance webpage at https://npca.ca/administration/enforcement-compliance.

From: Talpur, Mir <mir.talpur@woodplc.com>
Sent: March 8, 2021 11:19 AM
To: David Deluce <ddeluce@npca.ca>; Adam Aldworth <aaldworth@npca.ca>
Cc: Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>; Suggett, Jeff <jeff.suggett@woodplc.com>; Hughes, Samantha <samantha.hughes@woodplc.com>
Subject: RE: Merritt Road/Rice Road MCEA - Natural Environment Assessment - Meeting with NPCA

Good Morning David and Adam,

We would appreciate if you can please provide your comments on the Terms of Reference for the EIS for Merritt Rd-Rice Rd Class EA by March 10.

Mir Ahsan Talpur, M.Env.Sc., EP
Environmental Planner
Mobile: +1 (647) 545 8974
www.woodplc.com

From: Talpur, Mir
Sent: Tuesday, March 2, 2021 11:47 AM
To: David Deluce <ddeluce@npca.ca>; Adam Aldworth <aaldworth@npca.ca>; Lampman, Cara <Cara.Lampman@niagararegion.ca>
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Subject: RE: Merritt Road/Rice Road MCEA - Natural Environment Assessment - Meeting with NPCAShams, Aniqa <aniqa.shams@woodplc.com>

Hello David/Adam/Cara,

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Mir Ahsan Talpur, M.Env.Sc., EP
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Please let me know of any comments or questions.

Thanks,
Samantha

Samantha Hughes
Senior Biologist
Mobile: +1 (416) 540 8475

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Greetings all:

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Best Regards,

Jeff Suggett, M. Sc.
Senior Manager, Integrated Mobility Solutions
Mobile: 905-380-3601
www.woodplc.com

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Hughes, Samantha

From: Lampman, Cara <Cara.Lampman@niagararegion.ca>
Sent: Monday, 26 April, 2021 09:53
To: Hughes, Samantha
Cc: Elmadhoon, Maged; Suggett, Jeff; Talpur, Mir
Subject: RE: Merritt Road/Rice Road MCEA - Natural Environment Assessment

CAUTION: External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Hi Samantha,

Sorry for the delay in getting this to you. I have no objection to the updated TOR.

Cara Lampman
Manager Environmental Planning
Planning and Development Services, Niagara Region
Phone: 905-980-6000 ext. 3430 Toll-free: 1-800-263-7215
Cell: 289-668-4812
www.niagararegion.ca

From: Hughes, Samantha <samantha.hughes@woodplc.com>
Sent: Monday, April 26, 2021 9:51 AM
To: Lampman, Cara <Cara.Lampman@niagararegion.ca>
Cc: Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>; Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
Subject: RE: Merritt Road/Rice Road MCEA - Natural Environment Assessment

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Hi Cara,

Have you had a chance to review? Please let me know.

Thanks,
Samantha

Samantha Hughes
Senior Biologist
Mobile: +1 (416) 540 8475

From: Hughes, Samantha
Sent: Thursday, 8 April, 2021 03:12 PM
To: Cara.Lampman@niagararegion.ca

Cc: Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>; Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
Subject: RE: Merritt Road/Rice Road MCEA - Natural Environment Assessment

Hi Cara,

Just following up on the below, and if you had further comments. I have updated the TOR based on the below and comments from the NPCA, this is attached. Can you please provide acceptance or let me know if there are further items to discuss? We will be mobilizing next week for anuran call surveys.

Thanks,
Samantha

Samantha Hughes
Senior Biologist
Mobile: +1 (416) 540 8475

From: Hughes, Samantha
Sent: Friday, 26 March, 2021 10:51 AM
To: Cara.Lampman@niagararegion.ca
Cc: Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>; Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
Subject: FW: Merritt Road/Rice Road MCEA - Natural Environment Assessment

Hi Cara,

I have received the go ahead from Maged to response directly for items relating to the TOR. My responses to your below comments are as follows:

1. Okay, glad to hear.
2. Bat Surveys→ As MECP regulates SAR species we will be discussing with MECP. Since the change in SAR responsibility from MNRF to MECP in 2018, there has been little support/guidance from MECP on how we should be handling bats. In early 2020 I spoke with the bat bio (Michelle Karam who is now on mat. Leave). It was her opinion that essentially all wooded habitat would be considered SAR bat habitat (in southern ON). Therefore, the habitat at this site qualifies as SAR habitat (and is therefore protected). Additionally, in my experience in this area you will definitely get myotis calls in acoustic surveys. As my direction from the Region has been to only do surveys necessary to advance the EA, I will be operating under the assumptions that habitat is present as well as SAR bats. Therefore my consultation with MECP will be focused on that and asking them what mitigation measures (e.g., timing windows) can be done to avoid a contravention of the ESA. OR determining next steps should MECP determine a contravention is likely (e.g., permitting). All this will be recorded in the EA. I will update and explain this wording in the TOR, should you agree with it.

   Incidental Wildlife Observations→ In Section 4 it says, "Documentation of incidental wildlife sighting and evidence or signs of wildlife use during other subsequent field surveys."

   SAR Screening→ This will be completed. It is mentioned that MECP will be "contacted after a Species at Risk (SAR) screening". However, I agree it could be made more clear and will update the TOR. To confirm, a SAR screening will be completed.

   Identification of SWH→ this is identified in Section 5 Evaluation of Habitat Features "This section will provide an analysis and evaluation of wildlife habitat features, potentially significant wildlife habitat, general extent of habitat use and potential linkage functions between the natural areas corridor, particularly for SAR, to the extent feasible." To confirm, a SWH screening will be completed.

3. Snake Surveys will not be conducted, but presence is assumed. Mitigation measures will consider snake habitat and how to mitigate for no significant negative impact to relevant snake species and habitat. I can add something to this effect in the TOR.

If you want to discuss more feel free to connect with me via phone or email. If you are okay with the above responses please let me know so I can finalize the TOR.

Thanks,
Samantha

Samantha Hughes
Senior Biologist
Mobile: +1 (416) 540 8475

From: Talpur, Mir <mir.talpur@woodplc.com>
Sent: Monday, 8 March, 2021 10:03 AM
To: Hughes, Samantha <samantha.hughes@woodplc.com>
Cc: Suggett, Jeff <jeff.suggett@woodplc.com>
Subject: FW: Merritt Road/Rice Road MCEA - Natural Environment Assessment - Meeting with NPCAShams, Aniqa <aniqa.shams@woodplc.com>

Hi Samantha - Please see Niagara Region's comments on the EIS ToR below.

Mir Ahsan Talpur, M.Env.Sc., EP
Environmental Planner
Mobile: +1 (647) 545 8974
www.woodplc.com

From: Lampman, Cara <Cara.Lampman@niagararegion.ca>
Sent: Monday, March 8, 2021 9:56 AM
To: Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>
Cc: Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
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Good morning,

Regional Environmental staff have reviewed the subject Terms of Reference and offer the following comments:

1) Utilization of the MTO Fish Guide is proposed for aquatic assessments instead of OSAP (which was requested by the NPCA). The Region has no objection to the use of the MTO Fish Guide as the Guide specifically addresses road construction

2) Bat Surveys, Incidental Wildlife Observations, SAR Screening and identification of SWH does not appear to be proposed. Staff recommend including Incidental Wildlife Observations and SAR Screening. Any habitat not thoroughly assessed for Bats and SWH will need to be identified as candidate habitat based on the baseline field data.
3) Snake Surveys are not proposed and snake habitat is likely given the features identified. Mitigation measures should include those to ensure no significant negative impact to relevant snake species and habitat.

I trust this information to be satisfactory, do not hesitate to reach out with any questions or concerns.

Cara Lampman
Manager Environmental Planning
Planning and Development Services, Niagara Region
Phone: 905-980-6000 ext. 3430 Toll-free: 1-800-263-7215
Cell: 289-668-4812
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From: Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>
Sent: Monday, March 8, 2021 8:47 AM
To: Lampman, Cara <Cara.Lampman@niagararegion.ca>
Cc: Suggett, Jeff <jeff.suggett@woodplc.com>; Talpur, Mir <mir.talpur@woodplc.com>
Subject: FW: Merritt Road/Rice Road MCEA - Natural Environment Assessment - Meeting with NPCAShams, Aniqa <aniqa.shams@woodplc.com>

Good morning Cara,

I appreciate if you can review and provide your comments on the Terms of Reference for the EIS for Merritt Rd-Rice Rd EA by March 10.

Thanks
Maged

Maged Elmadhoon, M.Eng., P.Eng.
Manager, Transportation Planning
Transportation Systems & Planning
Public Works, Niagara Region
1815 Sir Isaac Brock Way, Thorold, ON
Maged.Elmadhoon@niagararegion.ca
Phone: 905-980-6000 ext. 3583
Cell: 289-407-6862
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APPENDIX

C SPECIES LISTS

APPENDIX

C-1 LEGEND

*=Introduced Species
S rank (provincial)= NatureServe Subnational Conservation Status Definitions. The term "subnational" refers to state or province-level jurisdictions (e.g., California, Ontario).
G rank (global)= NatureServe Global Conservation Status Definitions

RANK	DEFINITION
GX **SX**	**Presumed Extirpated**—Species or ecosystem is believed to be extirpated from the jurisdiction (i.e., nation, or state/province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. [equivalent to “Regionally Extinct” in IUCN Red List terminology]
GH **SH**	**Possibly Extirpated** – Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
G1 **S1**	**Critically Imperiled** At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
G2 **S2**	**Imperiled** — At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3 **S3**	**Vulnerable** — At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
G4 **S4**	**Apparently Secure** — At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
G5 **S5**	**Secure** — At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
G#G# **S#S#**	**Range Rank —** A numeric range rank (e.g., G2G3, G1G3) is used to indicate uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).
GU **SU**	**Unrankable —** Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.
GNR **SNR**	**Unranked —** Global rank not yet assessed.
GNA **SNA**	**Not Applicable —** A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities. A global conservation status rank may be not applicable for several reasons, related to its relevance as a conservation target. For species, typically the species is a

APPENDIX

	hybrid without conservation value, or of domestic origin. For ecosystems, the type is typically non-native (e.g, many ruderal vegetation types), agricultural (e.g. pasture, orchard) or developed (e.g. lawn, garden, golf course).
?	**Inexact Numeric Rank -** Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.
Q	**Questionable taxonomy that may reduce conservation priority -** Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The “Q” modifier is only used at a global level and not at a national or subnational level.
C	**Captive or Cultivated Only -** Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The "C" modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to "Extinct in the Wild (EW) in IUCN’s Red List terminology (IUCN 2001).

MBCA=Migratory Birds Convention Act, 1994 (individual protection)

FWCA=Fish and Wildlife Conservation Act, 1997 (individual protection)

- SCH. 3=Game Bird
- SCH. 7=Specially Protected Raptors
- SCH. 8=Specially Protected Birds

COSEWIC= The Committee on the Status of Endangered Wildlife in Canada

ESA= Endangered Species Act, 2007, S.O. 2007, c. 6

SARA Schedule 1= Species at Risk Act (SC 2002, c. 29)

EXT	**Extinct** - A species shall be classified as an extinct species if it no longer lives anywhere in the world.
EXP	**Extirpated** - A species shall be classified as an extirpated species if it lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.
END	**Endangered** - A species shall be classified as an endangered species if it lives in the wild in Ontario but is facing imminent extinction or extirpation.
THR	**Threatened** - A species shall be classified as a threatened species if it lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening to lead to its extinction or extirpation.
SC	**Special Concern** - A species shall be classified as a special concern species if it lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered because of a combination of biological characteristics and identified threats.

Coefficient of Wetness = indicates the plant's soil moisture tolerance
Coefficient of Conservatism = numeric values assigned to plant species to indicate their sensitivity to anthropogenic disturbance

APPENDIX

C-2 FLORA LIST

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Niagara Status from NAI	Niagara County Status from Oldham Carolinian List	Coefficient of Wetness	Coefficient of Conservatism	iNaturalist Study Area	Wood ELC (Appendix C-3)	NHIC	NAI	Port Robinson SWS
Acer negundo	Manitoba Maple	S5	G5			Common, Native	Native, status unknown or not specified	0	0		x			x
Acer pensylvanicum	Striped Maple	S4	G5					3	7					x
Acer platanoides	Norway Maple	SNA	GNR			Common, Introduced	Introduced, Status unknown or not specifie	5						x
Acer pseudoplatanus	Sycamore Maple	SNA	GNR			Rare, Introduced	Introduced, Status unknown or not specifie	5						x
Acer rubrum	Red Maple	S5	G5			Common, Native	Native, status unknown or not specified	0	4		x		x	x
Acer saccharinum	Silver Maple	S5	G5			Common, Native	Native, status unknown or not specified	-3	5		x			x
Acer saccharum	Sugar Maple	S5	G5			Common, Native	Native, status unknown or not specified	3	4		x			x
Acer x freemanii	(Acer rubrum X Acer saccharinum)	SNA	GNA			Hybrid, no status	Hybrid	-5	6		x		x	x
Achillea millefolium	Common Yarrow	SNA	G5			Common, Native		3			x			x
Actaea pachypoda	White Baneberry	S5	G5			Common, Native	Native, Common	5	6					x
Aegopodium podagraria	Goutweed	SNA	GNR			Rare, Introduced	Introduced, Rare	0			x			
Aesculus hippocastanum	Horse Chestnut	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	5			x			x
Agalinis tenuifolia	Slender-leaved False Foxglove	S4S5	G5			Rare, Native	Native, Rare	-3	7	x	x			
Agrimonia eupatoria	European Agrimony	SNA	GNR								x			
Agrimonia gryposepala	Hooked Agrimony	S5	G5			Common, Native	Native, Common	3	2		x			x
Agrostis gigantea	Redtop	SNA	G4G5			Common, Introduced	Introduced, Common	-3			x			x
Agrostis stolonifera	Creeping Bentgrass	SNA	G5			Common, Native	Introduced, Common	-3		x				x
Alisma triviale	Northern Water-plantain	S5	G5			Data Deficient	Native, status unknown or not specified	-5	1		x			
Alliaria petiolata	Garlic Mustard	SNA	GNR			Common, Introduced	Introduced, Common	0			x			x
Allium canadense var. canadense	Canada Garlic	S5	G5T5				Native, Uncommon	3	8					x
Ambrosia artemisiifolia	Common Ragweed	S5	G5			Common, Native	Native, Common	3	0		x			x
Ambrosia trifida	Great Ragweed	S5	G5			Common, Native	Native, Common	0	0					x
Amelanchier arborea	Downy Serviceberry	S5	G5			Common, Native	Native, Common	3	5		x			x
Amelanchier laevis	Smooth Serviceberry	S5	G5			Uncommon, Native	Native, Uncommon	5	5		x			
Amphicarpaea bracteata	American Hog-peanut	S5	G5			Common, Native	Native, Common	0	4		x			
Andropogon virginicus	Broomsedge Bluestem	S4	G5			Rare, Native	Native, Rare	3	5	x				
Anemone quinquefolia	Wood Anemone	S5	G5			Common, Native	Native, Common	0	7		x			
Anemone virginiana var. virginiana	Tall Anemone	S5?	G5T5				Native, Common	3	4					x
Antennaria neglecta	Field Pussytoes	S5	G5			Common, Native	Native, Common	5	3	x				x
Antennaria parlinii	Parlin's Pussytoes	S5	G5			Uncommon, Native		5	2		x			
Apocynum androsaemifolium	Spreading Dogbane	S5	G5			Common, Native	Native, Common	5	3					x
Apocynum cannabinum	Hemp Dogbane	S5	GNR			Common, Native		0	3		x			x
Aralia nudicaulis	Wild Sarsaparilla	S5	G5			Common, Native	Native, Common	3	4					x
Arctium minus	Common Burdock	SNA	GNR			Common, Introduced	Introduced, Common	3						x
Arisaema triphyllum	Jack-in-the-pulpit	S5	G5			Common, Native	Native, Common	-3	5	x	x			x
Aronia melanocarpa	Black Chokeberry	S5	G5			Uncommon, Native	Native, Uncommon	-3	7					x
Asclepias incarnata	Swamp Milkweed	S5	G5			Common, Native	Native, Common	-5	6		x			x
Asclepias syriaca	Common Milkweed	S5	G5			Common, Native	Native, Common	5	0		x			x
Asparagus officinalis	Garden Asparagus	SNA	G5?			Common, Introduced	Introduced, Common	3			x			x
Athyrium filix-femina	Common Lady Fern	S5	G5			Common, Native		0	4		x			
Atriplex patula	Spear Saltbush	SNA	G5			Uncommon, Introduced	Introduced, Uncommon	-3						x
Berberis thunbergii	Japanese Barberry	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Betula alleghaniensis	Yellow Birch	S5	G5			Common, Native	Native, Common	0	6		x			x
Betula papyrifera	Paper Birch	S5	G5			Common, Native	Native, Common	3	2					x
Betula pendula	Weeping Birch	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	0						x
Bidens cernua	Nodding Beggarticks	S5	G5			Common, Native	Native, Common	-5	2					x
Bidens connata	Purple-stemmed Beggarticks	S4?	G5			Data Deficient	Native, status unknown or not specified	-3	5		x			
Bidens frondosa	Devil's Beggarticks	S5	G5			Common, Native	Native, Common	-3	3		x			x
Bidens tripartita	Three-parted Beggarticks	S5?	G5			Data Deficient	Native, status unknown or not specified	-3	5					x

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Niagara Status from NAI	Niagara County Status from Oldham Carolinian List	Coefficient of Wetness	Coefficient of Conservatism	iNaturalist Study Area	Wood ELC (Appendix C-3)	NHIC	NAI	Port Robinson SWS
Boehmeria cylindrica	Small-spike False Nettle	S5	G5			Common, Native	Native, Common	-5	4		x			x
Bromus inermis	Smooth Brome	SNA	G5			Common, Introduced	Introduced, Common	5			x			
Calamagrostis canadensis	Bluejoint Reedgrass	S5	G5			Common, Native	Native, Common	-5	4					x
Cardamine douglassii	Limestone Bittercress	S4	G5			Rare, Native	Native, Rare	-3	7		x			
Carduus nutans ssp. leiophyllus	Smooth-leaved Nodding Thistle	SNA	NRT					3						x
Carex arctata	Drooping Woodland Sedge	S5	G5			Rare, Native	Native, Rare	5	5		x			x
Carex bebbii	Bebb's Sedge	S5	G5			Common, Native	Native, Common	-5	3					x
Carex blanda	Woodland Sedge	S5	G5			Common, Native	Native, Common	0	3		x			x
Carex bromoides	Brome-like Sedge	S5	G5			Common, Native	Native, Common	-3	7		x			
Carex crinita	Fringed Sedge	S5	G5			Common, Native	Native, Common	-5	6	x	x			x
Carex cristatella	Crested Sedge	S5	G5			Uncommon, Native	Native, Uncommon	-3	3		x			
Carex gracillima	Graceful Sedge	S5	G5			Common, Native	Native, Common	3	4		x			x
Carex granularis	Limestone Meadow Sedge	S5	G5			Common, Native	Native, Common	-3	3	x	x			x
Carex hystericina	Porcupine Sedge	S5	G5			Common, Native	Native, Common	-5	5		x			x
Carex intumescens	Bladder Sedge	S5	G5			Common, Native	Native, Common	-3	6		x			x
Carex lupulina	Hop Sedge	S5	G5			Common, Native	Native, Common	-5	6		x			x
Carex pedunculata	Long-stalked Sedge	S5	G5			Common, Native	Native, Common	3	5		x			
Carex pensylvanica	Pennsylvania Sedge	S5	G5			Common, Native	Native, Common	5	5		x			x
Carex plantaginea	Plantain-leaved Sedge	S5	G5			Uncommon, Native	Native, Uncommon	5	7					x
Carex projecta	Necklace Sedge	S5	G5			Rare, Native	Native, Rare	-3	5		x			x
Carex rosea	Rosy Sedge	S5	G5			Common, Native	Native, Common	5	2					x
Carex scoparia	Pointed Broom Sedge	S5	G5			Uncommon, Native	Native, Uncommon	-3	5		x			
Carex spicata	Spiked Sedge	SNA	GNR			Common, Introduced	Introduced, Common	3			x			
Carex stipata	Awl-fruited Sedge	S5	G5			Common, Native	Native, Common	-5	3					x
Carex tribuloides	Blunt Broom Sedge	S4	G5			Uncommon, Native	Native, Uncommon	-3	5		x			
Carex vulpinoidea	Fox Sedge	S5	G5			Common, Native	Native, Common	-5	3		x			x
Carpinus caroliniana	Blue-beech	S5	G5			Common, Native	Native, Common	0	6		x			x
Carya cordiformis	Bitternut Hickory	S5	G5			Common, Native	Native, Common	0	6		x			x
Carya ovata	Shagbark Hickory	S5	G5			Common, Native	Native, Common	3	6		x			x
Castanea dentata	American Chestnut	S1S2	G4	END	END	Uncommon, Native	Native, Uncommon	5	8				x	x
Catalpa speciosa	Northern Catalpa	SNA	G4?			Rare, Introduced	Introduced, Rare	3		x				x
Caulophyllum thalictroides	Blue Cohosh	S5	G5			Data Deficient	Native, status unknown or not specified	5	5	x				
Centaurea jacea	Brown Knapweed	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	5			x			
Centaurea sp.											x			
Cephalanthus occidentalis	Eastern Buttonbush	S5	G5			Common, Native	Native, Common	-5	7		x			x
Cerastium fontanum	Common Mouse-ear Chickweed	SNA	GNR			Common, Introduced	Introduced, Common	3						x
Chelone glabra	White Turtlehead	S5	G5			Common, Native	Native, Common	-5	7		x			x
Chenopodium album	Common Lamb's-quarters	SNA	G5			Common, Introduced	Introduced, Common	3						x
Cichorium intybus	Wild Chicory	SNA	GNR			Common, Introduced	Introduced, Common	5			x			x
Cicuta maculata	Spotted Water-hemlock	S5	G5			Common, Native		-5	6		x			x
Cinna arundinacea	Stout Woodreed	S4	G5			Common, Native	Native, Common	-3	7		x			x
Circaea canadensis	Broad-leaved Enchanter's Nightshade	S5	G5			Common, Native	Native, Common	3	2		x			
Cirsium arvense	Canada Thistle	SNA	G5			Common, Introduced	Introduced, Common	3						x
Cirsium vulgare	Bull Thistle	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Claytonia virginica	Eastern Spring Beauty	S5	G5			Common, Native	Native, Common	3	5		x			
Convolvulus arvensis	Field Bindweed	SNA	GNR			Common, Introduced	Introduced, Common	5						x
Coreopsis tripteris	Tall Tickseed	S1S2	G5					0	9		x			
Cornus florida	Eastern Flowering Dogwood	S2?	G5	END	END	Uncommon, Native	Native, Uncommon	3	7	x	x		x	x
Cornus obliqua	Silky Dogwood	S5	G5			Common, Native	Native, Common	-3	2		x			

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Niagara Status from NAI	Niagara County Status from Oldham Carolinian List	Coefficient of Wetness	Coefficient of Conservatism	iNaturalist Study Area	Wood ELC (Appendix C-3)	NHIC	NAI	Port Robinson SWS
Cornus racemosa	Grey Dogwood	S5	G5			Common, Native	Native, Common	0	2		x			
Cornus sericea	Red-osier Dogwood	S5	G5			Uncommon, Native	Native, Uncommon	-3	2		x			
Crataegus calpodendron	Pear Hawthorn	S4	G5			Uncommon, Native	Native, Uncommon	5	4					x
Crataegus chrysocarpa	Fireberry Hawthorn	S5	G5			Rare, Native		5	4					x
Crataegus macrosperma	Big-fruited Hawthorn	S5	G5			Uncommon, Native	Native, Uncommon	5	4					x
Crataegus monogyna	English Hawthorn	SNA	G5			Common, Introduced	Introduced, Common	3						x
Crataegus punctata	Dotted Hawthorn	S5	G5			Common, Native	Native, Common	5	4					x
Crataegus sp.											x			
Cyperus esculentus	Perennial Yellow Flatsedge	S5	G5			Uncommon, Native	Native, Uncommon	-3	1					x
Cyperus strigosus	Straw-coloured Flatsedge	S5	G5			Uncommon, Native	Native, Uncommon	-3	5		x			
Dactylis glomerata	Orchard Grass	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Danthonia spicata	Poverty Oatgrass	S5	G5			Common, Native	Native, Common	5	5					x
Daucus carota	Wild Carrot	SNA	GNR			Common, Introduced	Introduced, Common	5			x			x
Dendrolycopodium obscurum	Flat-branched Tree-clubmoss	S4	G5			Uncommon, Native	Native, Uncommon	3	6		x			
Dianthus armeria	Deptford Pink	SNA	GNR			Common, Introduced	Introduced, Common	5		x				x
Dichanthelium implicatum	Slender-stemmed Panicgrass	S5	G5			Common, Native	Native, Common	0	3		x			
Dioscorea villosa	Wild Yam	S4	G4G5			Uncommon, Native	Native, Uncommon	0	5		x			
Dipsacus fullonum	Common Teasel	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Draba verna	Spring Draba	SNA	GNR			Common, Introduced	Introduced, Common	5			x			
Dryopteris carthusiana	Spinulose Wood Fern	S5	G5			Common, Native	Native, Common	-3	5		x			x
Dryopteris cristata	Crested Wood Fern	S5	G5			Uncommon, Native	Native, Uncommon	-5	7					x
Dryopteris filix-mas	Male Fern	S4	G5					5	9					x
Echinochloa muricata	Rough Barnyard Grass	S5	G5			Rare, Native		-5	4	x				
Echinocystis lobata	Wild Cucumber	S5	G5			Common, Native	Native, Common	-3	3					x
Echium vulgare	Common Viper's Bugloss	SNA	GNR			Common, Introduced	Introduced, Common	5			x			
Elaeagnus angustifolia	Russian Olive	SNA	GNR			Rare, Introduced	Introduced, Rare	3			x			
Elaeagnus umbellata	Autumn Olive	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	3			x			
Eleocharis obtusa	Blunt Spikerush	S5	G5			Common, Native	Native, Common	-5	5	x				
Eleocharis sp.											x			
Elymus repens	Quackgrass	SNA	GNR			Common, Introduced	Introduced, Common	3						x
Endotropis alnifolia	Alder-leaved Buckthorn	S5	G5			Rare, Native	Native, Rare	-5	7	x				
Epifagus virginiana	Beechdrops	S5	G5			Common, Native	Native, Common	5	6		x			x
Epilobium coloratum	Purple-veined Willowherb	S5	G5			Common, Native	Native, Common	-5	3		x			
Epilobium parviflorum	Small-flowered Hairy Willowherb	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	3						x
Epipactis helleborine	Broad-leaved Helleborine	SNA	GNR			Common, Introduced	Introduced, Common	3						x
Equisetum arvense	Field Horsetail	S5	G5			Common, Native	Native, Common	0	0		x			x
Equisetum palustre	Marsh Horsetail	S5	G5				Unconfirmed Report	-3	10					x
Erechtites hieraciifolius	Eastern Burnweed	S5	G5			Common, Native	Native, Common	3	2		x			
Erigeron annuus	Annual Fleabane	S5	G5			Common, Native	Native, Common	3	0	x	x			x
Erigeron philadelphicus	Philadelphia Fleabane	S5	G5			Common, Native	Native, Common	-3	1		x			
Erigeron pulchellus	Robin's-plantain Fleabane	S5	G5			Rare, Native	Native, Rare	3	7					x
Erigeron strigosus	Rough Fleabane	S5	G5			Rare, Native	Native, Rare	3	4		x			
Erythronium americanum	Yellow Trout-lily	S5	G5			Common, Native	Native, Common	5	5	x	x			
Eupatorium perfoliatum	Common Boneset	S5	G5			Common, Native	Native, Common	-3	2		x			x
Euphorbia helioscopia	Sun Spurge	SNA	G5			Rare, Introduced	Introduced, Rare	5						x
Euphrasia stricta	Stiff Eyebright	SNA	GNR					0						x
Eurybia divaricata	White Wood Aster	S3	G5	THR	THR	Uncommon, Native	Native, Uncommon	5	10		x	x		x
Eurybia macrophylla	Large-leaved Aster	S5	G5			Common, Native	Native, Common	5	5		x			
Eurybia schreberi	Schreber's Aster	S2	G4			Rare, Native	Native, Rare	5	8	x				

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Euthamia graminifolia	Grass-leaved Goldenrod	S5	G5			Common, Native	Native, Common	0	2		x			x
Eutrochium maculatum	Spotted Joe Pye Weed	S5	G5			Common, Native		-5	3		x			
Fagus grandifolia	American Beech	S4	G5			Common, Native	Native, Common	3	6		x			x
Festuca rubra	Red Fescue	S5	G5			Common, Introduced		3			x			
Fragaria vesca ssp. americana	American Woodland Strawberry	S5	G5T5				Native, Common	3	4					x
Fragaria virginiana	Wild Strawberry	S5	G5			Common, Native	Native, Common	3	2	x	x			x
Frangula alnus	Glossy Buckthorn	SNA	GNR			Common, Introduced	Introduced, Common	0			x		x	
Fraxinus americana	White Ash	S4	G5			Common, Native	Native, Common	3	4		x			x
Fraxinus nigra	Black Ash	S3	G5			Uncommon, Native	Native, Uncommon	-3	7					x
Fraxinus pennsylvanica	Red Ash	S4	G5			Common, Native	Native, Common	-3	3		x		x	x
Galium mollugo	Smooth Bedstraw	SNA	GNR			Common, Introduced	Introduced, Common	5						x
Galium palustre	Common Marsh Bedstraw	S5	G5			Common, Native	Native, Common	-5	5		x			x
Galium tinctorium	Dyer's Bedstraw	S5	G5			Rare, Native	Native, Rare	-5	5		x			
Galium triflorum	Three-flowered Bedstraw	S5	G5			Common, Native	Native, Common	3	4		x			
Gaultheria procumbens	Eastern Teaberry	S5	G5			Uncommon, Native	Native, Uncommon	3	6					x
Gentiana andrewsii	Andrews' Bottle Gentian	S4	G5?			Uncommon, Native	Native, Uncommon	-3	6					x
Geranium maculatum	Spotted Geranium	S5	G5			Common, Native	Native, Common	3	6		x			x
Geum aleppicum	Yellow Avens	S5	G5			Common, Native	Native, Common	0	2		x			x
Geum canadense	Canada Avens	S5	G5			Common, Native	Native, Common	0	3		x			x
Glechoma hederacea	Ground-ivy	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Glyceria grandis	Tall Mannagrass	S5	G5			Common, Native	Native, Common	-5	5					x
Glyceria septentrionalis	Eastern Mannagrass	S4	G5			Common, Native	Native, Common	-5	7		x			
Glyceria striata	Fowl Mannagrass	S5	G5			Common, Native	Native, Common	-5	3		x			x
Hamamelis virginiana	American Witch-hazel	S4S5	G5			Common, Native	Native, Common	3	6		x			x
Hemerocallis fulva	Orange Daylily	SNA	GNA			Common, Introduced	Introduced, Status unknown or not specifie	5						x
Hibiscus moscheutos	Swamp Rose-mallow	S3	G5	SC	SC	Rare, Native	Native, Rare	-5	9			x		
Hordeum jubatum ssp. jubatum	Foxtail Barley	S5?	G5T5				Introduced, Status unknown or not specifie	0	0					x
Hypericum perforatum	Common St. John's-wort	SNA	GNR			Common, Introduced	Introduced, Common	5			x			x
Hypericum punctatum	Spotted St. John's-wort	S5	G5			Common, Native	Native, Common	0	5		x			x
Ilex verticillata	Common Winterberry	S5	G5			Common, Native	Native, Common	-3	5		x			
Impatiens capensis	Spotted Jewelweed	S5	G5			Common, Native	Native, Common	-3	4		x		x	x
Iris versicolor	Harlequin Blue Flag	S5	G5			Common, Native	Native, Common	-5	5		x			x
Jeffersonia diphylla	Twinleaf	S4	G5			Rare, Native	Native, Rare	3	10	x				
Juglans cinerea	Butternut	S2?	G3	END	END	Uncommon, Native	Native, Uncommon	3	6			x		x
Juglans nigra	Black Walnut	S4?	G5			Common, Native	Native, Common	3	5	x				x
Juncus alpinoarticulatus	Alpine Rush	S5	G5			Rare, Native	Rare, Native	-5	5				x	
Juncus articulatus	Jointed Rush	S5	G5			Uncommon, Native	Native, Uncommon	-5	5	x				
Juncus canadensis	Canada Rush	S5	G5			Rare, Native	Native, Rare	-5	6					x
Juncus dudleyi	Dudley's Rush	S5	G5			Common, Native	Native, Common	-3	1		x			
Juncus effusus	Soft Rush	S5	G5			Common, Native		-5	4		x		x	
Juncus tenuis	Path Rush	S5	G5			Common, Native	Native, Common	0	0		x			x
Juncus torreyi	Torrey's Rush	S5	G5			Uncommon, Native	Native, Uncommon	-3	3		x			x
Juniperus virginiana	Eastern Red Cedar	S5	G5			Common, Native	Native, Common	3	4					x
Lactuca biennis	Tall Blue Lettuce	S5	G5			Uncommon, Native	Native, Uncommon	0	6		x			
Lactuca serriola	Prickly Lettuce	SNA	GNR			Common, Introduced	Introduced, Common	3			x			
Laportea canadensis	Canada Wood Nettle	S5	G5			Common, Native	Native, Common	-3	6					x
Lapsana communis	Common Nipplewort	SNA	GNR			Common, Introduced	Introduced, Common	3						x
Larix laricina	Tamarack	S5	G5			Rare, Native	Native, Rare	-3	7	x				
Lathyrus latifolius	Everlasting Pea	SNA	GNR			Rare, Introduced	Introduced, Rare	5			x			

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Leersia oryzoides	Rice Cutgrass	S5	G5			Common, Native	Native, Common	-5	3		x			x
Lemna minor	Small Duckweed	S5?	G5			Common, Native	Native, Common	-5	5		x			x
Lepidium campestre	Field Peppergrass	SNA	GNR			Common, Introduced	Introduced, Common	5						x
Leucanthemum vulgare	Oxeye Daisy	SNA	GNR			Common, Introduced	Introduced, Common	5			x			
Ligustrum vulgare	European Privet	SNA	GNR			Common, Introduced	Introduced, Common	3		x	x			x
Lilium michiganense	Michigan Lily	S4	G5			Common, Native	Native, Common	-3	7					x
Lindera benzoin	Northern Spicebush	S4	G5			Common, Native	Native, Common	-3	6		x		x	x
Liriodendron tulipifera	Tulip Tree	S4	G5			Common, Native	Native, Common	3	8		x			x
Lobelia inflata	Indian-tobacco	S5	G5			Common, Native	Native, Common	3	3		x			x
Lobelia siphilitica	Great Blue Lobelia	S5	G5			Rare, Native	Native, status unknown or not specified	-3	6		x			
Lolium arundinaceum	Tall Ryegrass	SNA	GNR			Common, Introduced	Introduced, Common	3			x			
Lolium perenne	Perennial Ryegrass	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	3						x
Lonicera dioica	Limber Honeysuckle	S5	G5			Common, Native	Native, Common	3	5		x			
Lonicera morrowii	Morrow's Honeysuckle	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	3						x
Lonicera tatarica	Tatarian Honeysuckle	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Lotus corniculatus	Garden Bird's-foot Trefoil	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Luzula acuminata	Hairy Woodrush	S5	G5			Uncommon, Native	Native, Uncommon	3	6					x
Lycopus americanus	American Water-horehound	S5	G5			Common, Native	Native, Common	-5	4		x			x
Lycopus uniflorus	Northern Water-horehound	S5	G5			Common, Native	Native, Common	-5	5		x			
Lycopus virginicus	Virginia Water-horehound	S3	G5			Rare, Native	Native, Rare	-5	8					x
Lysimachia ciliata	Fringed Yellow Loosestrife	S5	G5			Common, Native	Native, Common	-3	4		x			x
Lysimachia nummularia	Creeping Yellow Loosestrife	SNA	GNR			Common, Introduced	Introduced, Common	-3			x			x
Lysimachia vulgaris	Garden Yellow Loosestrife	SNA	GNR					-3						x
Lythrum salicaria	Purple Loosestrife	SNA	G5			Common, Introduced	Introduced, Common	-5			x		x	x
Maianthemum canadense	Wild Lily-of-the-valley	S5	G5			Common, Native	Native, Common	3	5		x			x
Maianthemum racemosum	Large False Solomon's Seal	S5	G5			Common, Native	Native, Common	3	4					x
Malus coronaria	Sweet Crabapple	S4	G5			Uncommon, Native	Native, Uncommon	5	5					x
Malus pumila	Common Apple	SNA	G5			Common, Introduced	Introduced, Common	5			x			x
Medicago lupulina	Black Medick	SNA	GNR			Common, Introduced	Introduced, Common	3			x			
Medicago sativa	Alfalfa	SNA	GNR			Common, Introduced		5			x			
Melilotus albus	White Sweet-clover	SNA	G5			Common, Introduced	Introduced, Common	3			x			
Menispermum canadense	Canada Moonseed	S4	G5			Uncommon, Native	Native, Uncommon	0	7		x			
Mimulus ringens	Square-stemmed Monkeyflower	S5	G5			Common, Native	Native, Common	-5	6					x
Mitchella repens	Partridgeberry	S5	G5			Common, Native	Native, Common	3	6		x			x
Morus alba	White Mulberry	SNA	GNR			Common, Introduced	Introduced, Common	0						x
Myosotis laxa	Small Forget-me-not	S5	G5			Common, Native	Native, Common	-5	6		x			
Nabalus altissimus	Tall Rattlesnakeroot	S5	G5			Common, Native	Native, Common	3	5		x			
Nabalus sp.											x			
Nyssa sylvatica	Black Gum	S3	G5			Uncommon, Native	Native, Uncommon	-3	9		x			
Oenothera biennis	Common Evening-primrose	S5	G5			Common, Native	Native, Common	3	0		x			x
Oenothera fruticosa	Narrow-leaved Evening-primrose	SX	G5			Historical, Native	Native, Historical	3						x
Onoclea sensibilis	Sensitive Fern	S5	G5			Common, Native	Native, Common	-3	4		x		x	x
Osmundastrum cinnamomeum	Cinnamon Fern	S5	G5			Common, Native	Native, Common	-3	7		x			
Ostrya virginiana	Eastern Hop-hornbeam	S5	G5			Common, Native	Native, Common	3	4		x			x
Oxalis stricta	Upright Yellow Wood-sorrel	S5	G5			Common, Native	Native, Common	3	0		x			x
Panicum capillare	Common Panicgrass	S5	G5			Common, Native	Native, Common	0	0					x
Parathelypteris noveboracensis	New York Fern	S4S5	G5			Common, Native	Native, Common	0	7		x			
Parthenocissus quinquefolia	Virginia Creeper	S4?	G5			Uncommon, Native	Native, Uncommon	3	6		x			
Parthenocissus vitacea	Thicket Creeper	S5	G5			Common, Native	Native, Common	3	4		x			

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Penstemon digitalis	Foxglove Beardtongue	S4	G5			Uncommon, Native	Native, Uncommon	0	6		x		x	x
Penthorum sedoides	Ditch Stonecrop	S5	G5			Common, Native	Native, Common	-5	4		x			x
Persicaria arifolia	Halberd-leaved Tearthumb	S3	G5			Uncommon, Native	Native, Uncommon	-5	8			x		
Persicaria hydropiperoides	False Waterpepper	S5	G5			Rare, Native	Native, Rare	-5	4		x			
Persicaria longiseta	Long-bristled Smartweed	SNA	GNR					0			x			
Persicaria maculosa	Spotted Lady's-thumb	SNA	G3G5			Common, Introduced	Introduced, Common	-3			x			
Persicaria pensylvanica	Pennsylvania Smartweed	S5	G5			Common, Native	Native, Common	-3	3		x			
Persicaria punctata	Dotted Smartweed	S5	G5			Common, Native	Native, Common	-5	4		x			
Persicaria sagittata	Arrow-leaved Smartweed	S4S5	G5			Common, Native	Native, Common	-5	5		x			
Persicaria virginiana	Virginia Smartweed	S4	G5			Common, Native	Native, Common	0	6		x			
Phalaris arundinacea	Reed Canarygrass	S5	G5			Common, Native	Native, Common	-3	0		x			x
Phegopteris hexagonoptera	Broad Beech Fern	S3	G5	SC		Rare, Native	Native, Rare	3	9			x		
Phleum pratense	Common Timothy	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Phlox paniculata	Garden Phlox	SNA	G5			Rare, Introduced	Introduced, Rare	3						x
Phragmites australis	Common Reed	S4?	G5					-3	0	x	x			x
Phragmites australis ssp. australis	European Reed	SNA	G5T5			Common, Introduced	Introduced, Common	-3			x			
Physalis heterophylla	Clammy Ground-cherry	S4	G5			Rare, Native	Native, Rare	5	3					x
Picea abies	Norway Spruce	SNA	G5			Common, Introduced	Introduced, Common	5			x			x
Picea glauca	White Spruce	S5	G5			Uncommon, Introduced	Introduced, Uncommon	3	6					x
Picea pungens	Blue Spruce	SNA	G5					3						x
Pilea pumila	Dwarf Clearweed	S5	G5			Common, Native	Native, Common	-3	5		x			x
Pilosella aurantiaca	Orange Hawkweed	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	5		x				
Pinus resinosa	Red Pine	S5	G5			Rare, Introduced	Introduced, Rare	3	8					x
Pinus strobus	Eastern White Pine	S5	G5			Common, Native	Native, Common	3	4		x			x
Pinus sylvestris	Scots Pine	SNA	GNR			Common, Introduced	Introduced, Common	3						x
Plantago lanceolata	English Plantain	SNA	G5			Common, Introduced	Introduced, Common	3			x			x
Plantago major	Common Plantain	SNA	G5			Common, Introduced	Introduced, Common	3			x			x
Plantago rugelii	Rugel's Plantain	S5	G5			Common, Native	Native, Common	0	1		x			
Platanus occidentalis	Sycamore	S4	G5			Uncommon, Native	Native, Uncommon	-3	8		x			
Poa compressa	Canada Bluegrass	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Poa palustris	Fowl Bluegrass	S5	G5			Common, Native	Native, Common	-3	5		x		x	x
Poa pratensis	Kentucky Bluegrass	S5	G5			Common, Introduced		3	0		x			
Podophyllum peltatum	May-apple	S5	G5			Common, Native	Native, Common	3	5	x	x			
Polygala verticillata	Whorled Milkwort	S3?	G5			Rare, Native	Native, Rare	5	7			x		
Polygonatum pubescens	Hairy Solomon's Seal	S5	G5			Common, Native	Native, Common	5	5		x			x
Polystichum acrostichoides	Christmas Fern	S5	G5			Common, Native	Native, Common	3	5	x	x			x
Populus balsamifera	Balsam Poplar	S5	G5			Rare, Native	Native, Rare	-3	4					x
Populus deltoides	Eastern Cottonwood	S5	G5			Common, Native		0	4		x			x
Populus grandidentata	Large-toothed Aspen	S5	G5			Common, Native	Native, Common	5	5		x			x
Populus tremuloides	Trembling Aspen	S5	G5			Common, Native	Native, Common	0	2		x			x
Potentilla recta	Sulphur Cinquefoil	SNA	GNR			Common, Introduced	Introduced, Common	5			x			x
Potentilla simplex	Old-field Cinquefoil	S5	G5			Common, Native	Native, Common	3	3		x			x
Prunella vulgaris	Common Self-heal	S5	G5			Common, Native		0	0		x			x
Prunus avium	Sweet Cherry	SNA	GNR			Common, Introduced	Introduced, Common	5			x			x
Prunus nigra	Canada Plum	S4	G4G5			Rare, Native	Native, Rare	3	4		x			
Prunus pensylvanica	Pin Cherry	S5	G5			Rare, Native	Native, Rare	3	3					x
Prunus serotina	Black Cherry	S5	G5			Common, Native	Native, Common	3	3		x			x
Prunus virginiana	Chokecherry	S5	G5			Common, Native	Native, Common	3	2		x			x
Pteridium aquilinum	Bracken Fern	S5	G5			Common, Native	Native, Common	3	2		x			x

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Pyrus communis	Common Pear	SNA	G5			Common, Introduced	Introduced, Common	5			x			x
Quercus alba	White Oak	S5	G5			Common, Native	Native, Common	3	6		x			
Quercus bicolor	Swamp White Oak	S4	G5			Common, Native	Native, Common	-3	8		x			x
Quercus macrocarpa	Bur Oak	S5	G5			Uncommon, Native	Native, Uncommon	3	5		x			
Quercus palustris	Swamp Pin Oak	S4	G5			Common, Native	Native, Common	-3	9		x			x
Quercus rubra	Northern Red Oak	S5	G5			Common, Native	Native, Common	3	6	x	x		x	x
Ranunculus abortivus	Kidney-leaved Buttercup	S5	G5			Common, Native	Native, Common	0	2		x			
Ranunculus acris	Common Buttercup	SNA	G5			Common, Introduced	Introduced, Common	0			x			x
Ranunculus recurvatus	Hooked Buttercup	S5	G5			Common, Native	Native, Common	-3	4		x			
Ranunculus sceleratus	Cursed Buttercup	S5	G5			Common, Native		-5	2		x			x
Rhamnus cathartica	European Buckthorn	SNA	GNR			Common, Introduced	Introduced, Common	0			x			x
Rhus typhina	Staghorn Sumac	S5	G5			Common, Native	Native, Common	3	1		x			x
Ribes americanum	American Black Currant	S5	G5			Common, Native	Native, Common	-3	4		x			x
Ribes cynosbati	Eastern Prickly Gooseberry	S5	G5			Common, Native	Native, Common	3	4		x			x
Rorippa sylvestris	Creeping Yellowcress	SNA	G5			Rare, Introduced	Introduced, Rare	-5			x			
Rosa blanda	Smooth Rose	S5	G5			Common, Native	Native, Common	3	3					x
Rosa canina	Dog Rose	SNA	GNR			Rare, Introduced	Introduced, Rare	5						x
Rosa multiflora	Multiflora Rose	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Rubus allegheniensis	Allegheny Blackberry	S5	G5			Common, Native	Native, Common	3	2		x			x
Rubus hispidus	Bristly Dewberry	S4	G5			Common, Native	Native, Common	-3	6		x			x
Rubus idaeus ssp. idaeus	European Red Raspberry	SNA	G5T5				Introduced, Rare	3						x
Rubus occidentalis	Black Raspberry	S5	G5			Common, Native	Native, Common	5	2		x			
Rudbeckia hirta	Black-eyed Susan	S5	G5			Common, Native	Native, Common	3	0		x		x	x
Rumex britannica	Greater Water Dock	S5	G5			Rare, Native	Native, Rare	-5	6					x
Rumex crispus	Curled Dock	SNA	GNR			Common, Introduced	Introduced, Common	0			x			x
Rumex obtusifolius	Bitter Dock	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	-3			x			
Salix alba	White Willow	SNA	G5			Uncommon, Introduced	Introduced, Uncommon	-3			x			
Salix bebbiana	Bebb's Willow	S5	G5			Common, Native	Native, Common	-3	4		x		x	x
Salix discolor	Pussy Willow	S5	G5			Common, Native	Native, Common	-3	3		x			x
Salix eriocephala	Cottony Willow	S5	G5			Common, Native	Native, Common	-3	4		x			
Salix interior	Sandbar Willow	S5	G5			Common, Native	Native, Common	-3	1		x			
Salix nigra	Black Willow	S4	G5			Common, Native	Native, Common	-5	6					x
Salix petiolaris	Meadow Willow	S5	G5			Uncommon, Native	Native, Uncommon	-3	3		x			x
Salix x fragilis	(Salix alba X Salix euxina)	SNA	GNA			Hybrid, no status	Hybrid				x			
Sambucus canadensis	Common Elderberry	S5	G5			Common, Native	Native, Common	-3	5		x			x
Sarracenia purpurea	Northern Pitcher Plant	S5	G5			Historical, Native	Native, Historical	-5	10		x			
Sassafras albidum	Sassafras	S4	G5			Common, Native	Native, Common	3	6	x	x			x
Schizachyrium scoparium	Little Bluestem	S4	G5			Rare, Native	Native, Rare	3	7				x	x
Schoenoplectus pungens	Common Three-square Bulrush	S5	G5			Rare, Native	Native, Rare	-5	6		x			
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	S5	G5			Common, Native	Native, Common	-5	5		x			
Scirpus atrovirens	Dark-green Bulrush	S5	G5			Common, Native	Native, Common	-5	3		x			x
Scirpus cyperinus	Common Woolly Bulrush	S5	G5			Common, Native	Native, Common	-5	4		x			x
Scirpus hattorianus	Mosquito Bulrush	S4	G5			Rare, Native	Native, Rare	-3	6		x			
Scirpus pendulus	Hanging Bulrush	S5	G5			Uncommon, Native	Native, Uncommon	-5	3		x			
Scutellaria lateriflora	Mad-dog Skullcap	S5	G5			Common, Native	Native, Common	-5	5		x			
Securigera varia	Purple Crown-vetch	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	5			x			
Sinapis arvensis	Corn Mustard	SNA	GNR			Rare, Introduced	Introduced, Rare	5			x			
Sisyrinchium montanum	Strict Blue-eyed-grass	S5	G5			Common, Native	Native, Common	0	4		x			x
Sium suave	Common Water-parsnip	S5	G5			Common, Native	Native, Common	-5	4		x			x

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Smilax herbacea	Herbaceous Carrionflower	S4?	G5			Common, Native	Native, Common	0	5		x			x
Smilax rotundifolia	Round-leaved Greenbrier	S2	G5	THR	THR	Rare, Native	Native, Rare	0	8		x			
Smilax tamnoides	Bristly Greenbriar	S5	G5			Common, Native	Native, Common	0	6		x			
Solanum dulcamara	Bittersweet Nightshade	SNA	GNR			Common, Introduced	Introduced, Common	0			x			x
Solanum nigrum	Black Nightshade	SNA	GNR				Introduced, Status unknown or not specifie	0						x
Solidago altissima	Tall Goldenrod	S5	G5			Common, Native		3	1		x			x
Solidago caesia	Blue-stemmed Goldenrod	S5	G5			Common, Native	Native, Common	3	5		x			x
Solidago canadensis	Canada Goldenrod	S5	G5			Common, Native		3	1		x			
Solidago juncea	Early Goldenrod	S5	G5			Common, Native	Native, Common	5	3		x		x	x
Solidago nemoralis	Grey-stemmed Goldenrod	S5	G5			Common, Native		5	2		x			x
Solidago rugosa	Rough-stemmed Goldenrod	S5	G5			Common, Native	Native, Common	0	4		x		x	x
Sonchus arvensis	Field Sow-thistle	SNA	GNR			Common, Introduced	Introduced, Common	3			x			
Sonchus arvensis ssp. arvensis	Glandular Sow-thistle	SNA	NRTN				Introduced, Common	3						x
Sonchus asper	Prickly Sow-thistle	SNA	GNR			Common, Introduced	Introduced, Common	3						x
Sparganium emersum	Green-fruited Burreed	SU	G5					-5	6		x			
Sparganium eurycarpum	Broad-fruited Burreed	S5	G5			Common, Native	Native, Common	-5	3		x			x
Spiraea alba	White Meadowsweet	S5	G5			Common, Native	Native, Common	-3	3		x			x
Spiranthes incurva	Sphinx Ladies'-tresses	S5	GNR			Rare, Native	Native, Rare	-3	5	x				
Spirodela polyrhiza	Great Duckweed	S5	G5			Rare, Native	Native, Rare	-5	4					x
Sporobolus vaginiflorus	Sheathed Dropseed	S5	G5			Uncommon, Native		5	1		x			
Symphyotrichum cordifolium	Heart-leaved Aster	S5	G5			Common, Native	Native, Common	5	5		x			
Symphyotrichum ericoides	White Heath Aster	S5	G5			Common, Native		3	4		x			
Symphyotrichum lanceolatum	Panicled Aster	S5	G5			Common, Native	Native, Common	-3	3		x			
Symphyotrichum lateriflorum	Calico Aster	S5	G5			Common, Native	Native, Common	0	3		x			
Symphyotrichum novae-angliae	New England Aster	S5	G5			Common, Native	Native, Common	-3	2		x			
Symphyotrichum pilosum	Old Field Aster	S5	G5			Common, Native		3			x			
Symphyotrichum puniceum	Purple-stemmed Aster	S5	G5			Common, Native	Native, Common	-5	6		x			
Syringa vulgaris	Common Lilac	SNA	GNR			Common, Introduced	Introduced, Common	5						x
Taraxacum erythrospermum	Red-seeded Dandelion	SNA	GNR			Rare, Introduced	Introduced, Rare	5						x
Taraxacum officinale	Common Dandelion	SNA	G5			Common, Introduced	Introduced, Common	3			x			x
Taraxacum palustre	Marsh Dandelion	SNA	GNR			Rare, Introduced	Introduced, Rare	-3			x			
Thelypteris palustris	Marsh Fern	S5	G5			Common, Native	Native, Common	-3	5		x			
Thelypteris palustris var. pubescens	Eastern Marsh Fern	S5	G5T5				Native, Common	-3	5					x
Thuja occidentalis	Eastern White Cedar	S5	G5			Uncommon, Native	Native, Uncommon	-3	4		x			x
Tiarella cordifolia	Heart-leaved Foamflower	S5	G5			Common, Native	Native, Common	3	6					x
Tilia americana	Basswood	S5	G5			Common, Native	Native, Common	3	4		x			x
Toxicodendron radicans	Poison Ivy	S5	G5					0	2	x			x	
Toxicodendron radicans var. radicans	Eastern Poison Ivy	S5	G5T5			Common, Native	Native, Common	0	2		x			
Toxicodendron radicans var. rydbergii	Western Poison Ivy	S5	G--T5			Common, Native	Native, Common	0	2		x			
Trifolium hybridum	Alsike Clover	SNA	GNR			Common, Introduced	Introduced, Common	3			x			
Trifolium pratense	Red Clover	SNA	GNR			Common, Introduced	Introduced, Status unknown or not specifie	3			x			x
Trifolium repens	White Clover	SNA	GNR			Common, Introduced	Introduced, Status unknown or not specifie	3			x			x
Trillium erectum	Red Trillium	S5	G5			Common, Native	Native, Common	3	6	x				
Trillium grandiflorum	White Trillium	S5	G5			Common, Native	Native, Common	3	5		x			
Tussilago farfara	Coltsfoot	SNA	GNR			Common, Introduced	Introduced, Common	3			x			x
Typha angustifolia	Narrow-leaved Cattail	SNA	G5			Common, Native	Introduced, Common	-5			x		x	x
Typha latifolia	Broad-leaved Cattail	S5	G5			Common, Native	Native, Common	-5	1		x			
Ulmus americana	White Elm	S5	G4			Common, Native	Native, Common	-3	3		x		x	x
Ulmus rubra	Slippery Elm	S5	G5			Uncommon, Native	Native, Uncommon	0	6					x

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Niagara Status from NAI	Niagara County Status from Oldham Carolinian List	Coefficient of Wetness	Coefficient of Conservatism	iNaturalist Study Area	Wood ELC (Appendix C-3)	NHIC	NAI	Port Robinson SWS
Uvularia sessilifolia	Sessile-leaved Bellwort	S4	G5			Common, Native	Native, Common	3	7		x			
Vaccinium corymbosum	Highbush Blueberry	S4	G5			Common, Native	Native, Common	-3	8		x			
Vaccinium pallidum	Pale Blueberry	S4	G5			Uncommon, Native	Native, Uncommon	5	9		x			
Verbascum thapsus	Common Mullein	SNA	GNR			Common, Introduced	Introduced, Common	5			x			x
Verbena hastata	Blue Vervain	S5	G5			Common, Native	Native, Common	-3	4		x			x
Verbena stricta	Hoary Vervain	S4	G5			Rare, Native	Native, Rare	5	7					x
Verbena urticifolia	White Vervain	S5	G5			Common, Native	Native, Common	0	4		x			x
Veronica anagallis-aquatica	Water Speedwell	SNA	G5			Rare, Introduced	Introduced, Rare	-5			x			
Veronica officinalis	Common Speedwell	SNA	G5			Common, Introduced	Introduced, Common	5			x			x
Veronica persica	Bird's-eye Speedwell	SNA	GNR			Rare, Introduced	Introduced, Rare	5		x				
Viburnum acerifolium	Maple-leaved Viburnum	S5	G5			Common, Native	Native, Common	5	6		x			x
Viburnum lentago	Nannyberry	S5	G5			Common, Native	Native, Common	0	4		x			x
Viburnum opulus	Cranberry Viburnum	S5	G5					-3	5		x			x
Viburnum rafinesqueanum	Downy Arrowwood	S5	G5			Uncommon, Native	Native, Uncommon	5	7		x			
Vicia cracca	Tufted Vetch	SNA	GNR			Common, Introduced	Introduced, Common	5			x			x
Vinca minor	Lesser Periwinkle	SNA	GNR			Uncommon, Introduced	Introduced, Uncommon	5						x
Viola canadensis	Canada Violet	S5	G5			Uncommon, Native		3	6					x
Viola labradorica	Labrador Violet	S5	G5			Uncommon, Native	Native, Uncommon	0	3		x			
Viola pubescens	Yellow Violet	S5	G5			Common, Native	Native, Common	3	5		x			
Viola rostrata	Long-spurred Violet	S5	G5			Uncommon, Native	Native, Uncommon	3	6		x			
Viola sororia	Woolly Blue Violet	S5	G5			Common, Native	Native, Common	0	4		x			x
Viola Sp.											x			
Vitis aestivalis	Summer Grape	S4	G5			Common, Native	Native, Common	3	7		x			x
Vitis labrusca	Northern Fox Grape	S1	G5			Uncommon, Introduced	Introduced, Uncommon	3	3					x
Vitis riparia	Riverbank Grape	S5	G5			Common, Native	Native, Common	0	0		x			
Xanthium strumarium	Rough Cockleburr	S5	G5			Common, Native	Native, Common	0	2		x			x

APPENDIX

C-3 *FLORA BY ELC COMMUNITY*

Scientific Name	English Name	Meadow (ME)	Dry Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3)	Inclusion - Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2)	Inclusion - Dry – Fresh Forb meadow Ecosite (MEFM1)	Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3)	Native Shrub Deciduous Hedgerow Thicket Type (THDM3)	Meadows East of Highway	Graminoid Mineral Meadow Marsh (MAM2)	Manicured	Dry – Fresh Deciduous Woodland (WODM4)	Roadside/ Edge/ Hedgerow
Acer negundo	Manitoba Maple		×									
Acer rubrum	Red Maple								×			
Acer saccharinum	Silver Maple					×	×	×				
Acer saccharum	Sugar Maple		×									
Acer x freemanii	(Acer rubrum X Acer saccharinum)					×			×			
Achillea millefolium	Common Yarrow											×
Aegopodium podagraria	Goutweed		×									
Aesculus hippocastanum	Horse Chestnut										×	
Agalinis tenuifolia	Slender-leaved False Foxglove											×
Agrimonia eupatoria	European Agrimony						×					
Agrimonia gryposepala	Hooked Agrimony					×						×
Agrostis gigantea	Redtop											×
Alisma triviale	Northern Water-plantain			×		×			×			×
Alliaria petiolata	Garlic Mustard		×									
Ambrosia artemisiifolia	Common Ragweed			×	×							×
Amelanchier arborea	Downy Serviceberry					×						
Amelanchier laevis	Smooth Serviceberry		×									
Amphicarpaea bracteata	American Hog-peanut				×							
Anemone quinquefolia	Wood Anemone		×									
Antennaria parlinii	Parlin's Pussytoes											×
Apocynum cannabinum	Hemp Dogbane					×						
Arisaema triphyllum	Jack-in-the-pulpit		×									
Asclepias incarnata	Swamp Milkweed	×		×	×	×			×			
Asclepias syriaca	Common Milkweed	×		×	×							×
Asparagus officinalis	Garden Asparagus											×
Athyrium filix-femina	Common Lady Fern		×			×						
Berberis thunbergii	Japanese Barberry		×			×						
Betula alleghaniensis	Yellow Birch											
Bidens connata	Purple-stemmed Beggarticks					×						
Bidens frondosa	Devil's Beggarticks					×						
Boehmeria cylindrica	Small-spike False Nettle					×					×	
Bromus inermis	Smooth Brome											×
Cardamine douglassii	Limestone Bittercress					×						
Carex arctata	Drooping Woodland Sedge											×
Carex blanda	Woodland Sedge		×									
Carex bromoides	Brome-like Sedge					×						
Carex crinita	Fringed Sedge					×						
Carex cristatella	Crested Sedge					×						
Carex gracillima	Graceful Sedge					×						
Carex granularis	Limestone Meadow Sedge	×			×							
Carex hystericina	Porcupine Sedge					×						×
Carex intumescens	Bladder Sedge					×						
Carex lupulina	Hop Sedge					×					×	×
Carex pedunculata	Long-stalked Sedge		×									
Carex pensylvanica	Pennsylvania Sedge		×									
Carex projecta	Necklace Sedge		×									
Carex scoparia	Pointed Broom Sedge								×			
Carex spicata	Spiked Sedge											×
Carex tribuloides	Blunt Broom Sedge					×						
Carex vulpinoidea	Fox Sedge	×			×	×						
Carpinus caroliniana	Blue-beech											
Carya cordiformis	Bitternut Hickory		×									
Carya ovata	Shagbark Hickory		×			×	×				×	
Centaurea jacea	Brown Knapweed											×
Centaurea sp.				×								
Cephalanthus occidentalis	Eastern Buttonbush					×						
Chelone glabra	White Turtlehead					×						
Cichorium intybus	Wild Chicory	×			×			×				×
Cicuta maculata	Spotted Water-hemlock											
Cinna arundinacea	Stout Woodreed					×						
Circaea canadensis	Broad-leaved Enchanter's Nightshade		×		×						×	
Cirsium vulgare	Bull Thistle					×						×
Claytonia virginica	Eastern Spring Beauty		×									
Coreopsis tripteris	Tall Tickseed								×			
Cornus florida	Eastern Flowering Dogwood		×									
Cornus obliqua	Silky Dogwood					×						
Cornus racemosa	Grey Dogwood				×		×				×	×
Cornus sericea	Red-osier Dogwood				×	×	×		×			
Crataegus sp.			×	×	×		×					
Cyperus strigosus	Straw-coloured Flatsedge											×
Dactylis glomerata	Orchard Grass							×				×
Daucus carota	Wild Carrot	×			×			×		×		×
Dendrolycopodium obscurum	Flat-branched Tree-clubmoss		×									
Dichanthelium implicatum	Slender-stemmed Panicgrass								×			×
Dioscorea villosa	Wild Yam		×									
Dipsacus fullonum	Common Teasel	×			×			×				×
Draba verna	Spring Draba											×
Dryopteris carthusiana	Spinulose Wood Fern											
Echium vulgare	Common Viper's Bugloss											
Elaeagnus angustifolia	Russian Olive						×					
Elaeagnus umbellata	Autumn Olive					×						
Eleocharis sp.		×			×							
Epifagus virginiana	Beechdrops		×									

Scientific Name	English Name	Meadow (ME)	Dry Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3)	Inclusion - Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2)	Inclusion - Dry – Fresh Forb meadow Ecosite (MEFM1)	Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3)	Native Shrub Deciduous Hedgerow Thicket Type (THDM3)	Meadows East of Highway	Graminoid Mineral Meadow Marsh (MAM2)	Manicured	Dry – Fresh Deciduous Woodland (WODM4)	Roadside/ Edge/ Hedgerow
Epilobium coloratum	Purple-veined Willowherb	×			×	×						
Equisetum arvense	Field Horsetail	×			×							×
Erechtites hieraciifolius	Eastern Burnweed		×									
Erigeron annuus	Annual Fleabane											×
Erigeron philadelphicus	Philadelphia Fleabane											
Erigeron strigosus	Rough Fleabane	×			×							
Erythronium americanum	Yellow Trout-lily		×			×						
Eupatorium perfoliatum	Common Boneset				×				×			×
Eurybia divaricata	White Wood Aster		×			×					×	
Eurybia macrophylla	Large-leaved Aster				×							×
Euthamia graminifolia	Grass-leaved Goldenrod	×			×							×
Eutrochium maculatum	Spotted Joe Pye Weed			×		×			×			
Fagus grandifolia	American Beech		×									
Festuca rubra	Red Fescue											×
Fragaria virginiana	Wild Strawberry	×			×							
Frangula alnus	Glossy Buckthorn		×			×	×	×				×
Fraxinus americana	White Ash		×		×		×					
Fraxinus pennsylvanica	Red Ash	×	×		×	×			×		×	×
Galium palustre	Common Marsh Bedstraw					×						
Galium tinctorium	Dyer's Bedstraw								×			
Galium triflorum	Three-flowered Bedstraw					×						
Geranium maculatum	Spotted Geranium					×						
Geum aleppicum	Yellow Avens											×
Geum canadense	Canada Avens					×					×	
Glechoma hederacea	Ground-ivy		×									
Glyceria septentrionalis	Eastern Mannagrass											
Glyceria striata	Fowl Mannagrass					×						
Hamamelis virginiana	American Witch-hazel		×									
Hypericum perforatum	Common St. John's-wort											×
Hypericum punctatum	Spotted St. John's-wort								×			×
Ilex verticillata	Common Winterberry											×
Impatiens capensis	Spotted Jewelweed					×					×	
Iris versicolor	Harlequin Blue Flag					×						
Juncus dudleyi	Dudley's Rush		×						×			×
Juncus effusus	Soft Rush					×			×			×
Juncus tenuis	Path Rush											
Juncus torreyi	Torrey's Rush	×			×							
Lactuca biennis	Tall Blue Lettuce											×
Lactuca serriola	Prickly Lettuce											×
Lathyrus latifolius	Everlasting Pea											×
Leersia oryzoides	Rice Cutgrass					×						
Lemna minor	Small Duckweed					×						
Leucanthemum vulgare	Oxeye Daisy											×
Ligustrum vulgare	European Privet											×
Lindera benzoin	Northern Spicebush		×			×						
Liriodendron tulipifera	Tulip Tree		×									
Lobelia inflata	Indian-tobacco											
Lobelia siphilitica	Great Blue Lobelia					×						
Lolium arundinaceum	Tall Ryegrass											×
Lonicera dioica	Limber Honeysuckle		×									
Lonicera tatarica	Tatarian Honeysuckle											×
Lotus corniculatus	Garden Bird's-foot Trefoil	×			×							×
Lycopus americanus	American Water-horehound					×						
Lycopus uniflorus	Northern Water-horehound	×			×				×			
Lysimachia ciliata	Fringed Yellow Loosestrife											
Lysimachia nummularia	Creeping Yellow Loosestrife											×
Lythrum salicaria	Purple Loosestrife	×			×				×			×
Maianthemum canadense	Wild Lily-of-the-valley		×									
Malus pumila	Common Apple	×			×							
Medicago lupulina	Black Medick											×
Medicago sativa	Alfalfa	×			×							
Melilotus albus	White Sweet-clover	×			×							×
Menispermum canadense	Canada Moonseed				×							
Mitchella repens	Partridgeberry		×									
Myosotis laxa	Small Forget-me-not					×						
Nabalus altissimus	Tall Rattlesnakeroot		×									
Nabalus sp.												
Nyssa sylvatica	Black Gum					×						
Oenothera biennis	Common Evening-primrose											×
Onoclea sensibilis	Sensitive Fern					×			×			×
Osmundastrum cinnamomeum	Cinnamon Fern		×									
Ostrya virginiana	Eastern Hop-hornbeam		×									
Oxalis stricta	Upright Yellow Wood-sorrel										×	×
Parathelypteris noveboracensis	New York Fern		×									
Parthenocissus quinquefolia	Virginia Creeper				×							
Parthenocissus vitacea	Thicket Creeper					×					×	×
Penstemon digitalis	Foxglove Beardtongue	×			×							
Penthorum sedoides	Ditch Stonecrop					×						
Persicaria hydropiperoides	False Waterpepper					×						
Persicaria longiseta	Long-bristled Smartweed											×
Persicaria maculosa	Spotted Lady's-thumb								×			
Persicaria pensylvanica	Pennsylvania Smartweed								×			
Persicaria punctata	Dotted Smartweed					×						

Scientific Name	English Name	Meadow (ME)	Dry Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3)	Inclusion - Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2)	Inclusion - Dry – Fresh Forb meadow Ecosite (MEFM1)	Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3)	Native Shrub Deciduous Hedgerow Thicket Type (THDM3)	Meadows East of Highway	Graminoid Mineral Meadow Marsh (MAM2)	Manicured	Dry – Fresh Deciduous Woodland (WODM4)	Roadside/ Edge/ Hedgerow
Persicaria sagittata	Arrow-leaved Smartweed					×			×			×
Persicaria virginiana	Virginia Smartweed		×			×						×
Phalaris arundinacea	Reed Canarygrass				×	×			×	×		×
Phleum pratense	Common Timothy	×		×	×	×						×
Phragmites australis	Common Reed	×			×			×	×			×
Phragmites australis ssp. australis	European Reed			×		×						
Picea abies	Norway Spruce									×		×
Pilea pumila	Dwarf Clearweed					×						
Pinus strobus	Eastern White Pine		×							×		
Plantago lanceolata	English Plantain							×				×
Plantago major	Common Plantain											×
Plantago rugelii	Rugel's Plantain											×
Platanus occidentalis	Sycamore	×			×							
Poa compressa	Canada Bluegrass	×			×					×	×	
Poa palustris	Fowl Bluegrass					×			×			
Poa pratensis	Kentucky Bluegrass							×				×
Podophyllum peltatum	May-apple		×									×
Polygonatum pubescens	Hairy Solomon's Seal											
Polystichum acrostichoides	Christmas Fern		×									
Populus deltoides	Eastern Cottonwood	×			×			×				
Populus grandidentata	Large-toothed Aspen		×									
Populus tremuloides	Trembling Aspen	×			×	×			×		×	
Potentilla recta	Sulphur Cinquefoil											
Potentilla simplex	Old-field Cinquefoil											
Prunella vulgaris	Common Self-heal	×				×					×	×
Prunus avium	Sweet Cherry		×									
Prunus nigra	Canada Plum		×									
Prunus serotina	Black Cherry		×								×	
Prunus virginiana	Chokecherry					×	×					×
Pteridium aquilinum	Bracken Fern		×									
Pyrus communis	Common Pear	×			×							
Quercus alba	White Oak		×									
Quercus bicolor	Swamp White Oak					×						
Quercus macrocarpa	Bur Oak				×	×						×
Quercus palustris	Swamp Pin Oak					×					×	×
Quercus rubra	Northern Red Oak		×		×	×					×	
Ranunculus abortivus	Kidney-leaved Buttercup					×						
Ranunculus acris	Common Buttercup											×
Ranunculus recurvatus	Hooked Buttercup											
Ranunculus sceleratus	Cursed Buttercup					×						
Rhamnus cathartica	European Buckthorn					×					×	×
Rhus typhina	Staghorn Sumac				×							×
Ribes americanum	American Black Currant					×						
Ribes cynosbati	Eastern Prickly Gooseberry		×									
Rorippa sylvestris	Creeping Yellowcress											×
Rosa multiflora	Multiflora Rose					×	×					×
Rubus allegheniensis	Allegheny Blackberry											×
Rubus hispidus	Bristly Dewberry		×						×			
Rubus occidentalis	Black Raspberry				×	×					×	
Rudbeckia hirta	Black-eyed Susan	×										
Rumex crispus	Curled Dock				×							×
Rumex obtusifolius	Bitter Dock											×
Salix alba	White Willow	×			×					×		
Salix bebbiana	Bebb's Willow				×		×					
Salix discolor	Pussy Willow											×
Salix eriocephala	Cottony Willow	×			×	×						
Salix interior	Sandbar Willow	×			×							
Salix petiolaris	Meadow Willow	×			×							
Salix x fragilis	(Salix alba X Salix euxina)										×	
Sambucus canadensis	Common Elderberry					×						
Sarracenia purpurea	Northern Pitcher Plant					×						
Sassafras albidum	Sassafras		×									
Schoenoplectus pungens	Common Three-square Bulrush											×
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush											×
Scirpus atrovirens	Dark-green Bulrush								×			×
Scirpus cyperinus	Common Woolly Bulrush					×						
Scirpus hattorianus	Mosquito Bulrush											×
Scirpus pendulus	Hanging Bulrush					×						
Scutellaria lateriflora	Mad-dog Skullcap					×						
Securigera varia	Purple Crown-vetch											×
Sinapis arvensis	Corn Mustard											×
Sisyrinchium montanum	Strict Blue-eyed-grass											×
Sium suave	Common Water-parsnip					×						
Smilax herbacea	Herbaceous Carrionflower		×									
Smilax rotundifolia	Round-leaved Greenbrier		×									
Smilax tamnoides	Bristly Greenbriar					×						
Solanum dulcamara	Bittersweet Nightshade					×					×	
Solidago altissima	Tall Goldenrod	×			×			×			×	×
Solidago caesia	Blue-stemmed Goldenrod		×									
Solidago canadensis	Canada Goldenrod				×							
Solidago juncea	Early Goldenrod	×			×							×
Solidago nemoralis	Grey-stemmed Goldenrod											×
Solidago rugosa	Rough-stemmed Goldenrod		×		×	×			×		×	×

Scientific Name	English Name	Meadow (ME)	Dry Fresh Sugar Maple - Oak Deciduous Forest (FODM5-3)	Inclusion - Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2)	Inclusion - Dry – Fresh Forb meadow Ecosite (MEFM1)	Swamp Maple Mineral Deciduous Swamp Type (SWDM3-3)	Native Shrub Deciduous Hedgerow Thicket Type (THDM3)	Meadows East of Highway	Graminoid Mineral Meadow Marsh (MAM2)	Manicured	Dry – Fresh Deciduous Woodland (WODM4)	Roadside/ Edge/ Hedgerow
Sonchus arvensis	Field Sow-thistle	×			×			×				×
Sparganium emersum	Green-fruited Burreed					×						
Sparganium eurycarpum	Broad-fruited Burreed											
Spiraea alba	White Meadowsweet					×			×			
Sporobolus vaginiflorus	Sheathed Dropseed											×
Symphyotrichum cordifolium	Heart-leaved Aster											
Symphyotrichum ericoides	White Heath Aster							×				×
Symphyotrichum lanceolatum	Panicled Aster					×		×				×
Symphyotrichum lateriflorum	Calico Aster		×			×					×	
Symphyotrichum novae-angliae	New England Aster	×			×	×		×				×
Symphyotrichum pilosum	Old Field Aster				×							×
Symphyotrichum puniceum	Purple-stemmed Aster								×			
Taraxacum officinale	Common Dandelion											×
Taraxacum palustre	Marsh Dandelion											×
Thelypteris palustris	Marsh Fern					×						
Thuja occidentalis	Eastern White Cedar									×		
Tilia americana	Basswood		×			×						
Toxicodendron radicans var. radicans	Eastern Poison Ivy					×						
Toxicodendron radicans var. rydbergii	Western Poison Ivy		×			×	×					
Trifolium hybridum	Alsike Clover											
Trifolium pratense	Red Clover	×		×	×							
Trifolium repens	White Clover	×			×							×
Trillium grandiflorum	White Trillium		×									
Tussilago farfara	Coltsfoot											×
Typha angustifolia	Narrow-leaved Cattail	×			×				×			
Typha latifolia	Broad-leaved Cattail					×						
Ulmus americana	White Elm		×		×	×	×	×				×
Uvularia sessilifolia	Sessile-leaved Bellwort		×									
Vaccinium corymbosum	Highbush Blueberry					×						
Vaccinium pallidum	Pale Blueberry		×									
Verbascum thapsus	Common Mullein			×	×							×
Verbena hastata	Blue Vervain			×		×			×			
Verbena urticifolia	White Vervain											×
Veronica anagallis-aquatica	Water Speedwell					×						
Veronica officinalis	Common Speedwell										×	
Viburnum acerifolium	Maple-leaved Viburnum											
Viburnum lentago	Nannyberry		×	×	×	×	×					×
Viburnum opulus	Cranberry Viburnum				×		×					
Viburnum rafinesqueanum	Downy Arrowwood				×							
Vicia cracca	Tufted Vetch	×			×							×
Viola labradorica	Labrador Violet		×									
Viola pubescens	Yellow Violet		×									
Viola rostrata	Long-spurred Violet		×									
Viola sororia	Woolly Blue Violet		×									
Viola Sp.						×						
Vitis aestivalis	Summer Grape											
Vitis riparia	Riverbank Grape		×		×	×	×				×	×
Xanthium strumarium	Rough Cockleburr				×				×			×

C-4 BIRD LIST

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Coefficient of Wetness	iNaturalist Study Area	OBBA (17PH46)	NHIC	Port Robinson SWS	Wood Incidentals	Breeding Bird Survey (Appendix C-5)
Accipiter cooperii	Cooper's Hawk	S4	G5	NAR			x	x				
Accipiter striatus	Sharp-shinned Hawk	S5	G5	NAR				x				
Actitis macularius	Spotted Sandpiper	S5	G5					x		x	x	
Agelaius phoeniceus	Red-winged Blackbird	S4	G5					x		x	x	x
Aix sponsa	Wood Duck	S5	G5			W		x		x		
Ammodramus savannarum	Grasshopper Sparrow	S4B	G5	SC	SC			x				
Anas americana	American Wigeon	S4	G5			W		x				
Anas clypeata	Northern Shoveler	S4	G5			W		x				
Anas crecca	Green-winged Teal	S4	G5			W		x				
Anas discors	Blue-winged Teal	S4	G5					x				
Anas platyrhynchos	Mallard	S5	G5					x		x	x	x
Anas rubripes	American Black Duck	S4	G5			W		x				
Anas strepera	Gadwall	S4	G5			W						
Antrostomus carolinensis	Chuck-will's-widow	SNA	G5					x				
Archilochus colubris	Ruby-throated Hummingbird	S5B	G5					x				
Ardea alba	Great Egret	S2B	G5			W		x				
Ardea herodias	Great Blue Heron	S4	G5					x		x	x	
Asio flammeus	Short-eared Owl	S2N,S4B	G5	SC	SC	W		x				
Asio otus	Long-eared Owl	S4	G5					x				
Aythya americana	Redhead	S2B,S4N	G5			W		x				
Baeolophus bicolor	Tufted Titmouse	S4	G5					x			x	
Bombycilla cedrorum	Cedar Waxwing	S5B	G5				x	x				x
Botaurus lentiginosus	American Bittern	S4B	G5			W		x				
Branta canadensis	Canada Goose	S5	G5					x			x	
Bubo virginianus	Great Horned Owl	S4	G5					x				
Buteo jamaicensis	Red-tailed Hawk	S5	G5	NAR			x	x		x	x	x
Buteo platypterus	Broad-winged Hawk	S5B	G5					x				
Butorides virescens	Green Heron	S4B	G5					x		x		
Cardellina pusilla	Wilson's Warbler	S4B	G5								X	
Cardellina pusilla	Wilson's Warbler	S4B	G5								x	
Cardinalis cardinalis	Northern Cardinal	S5	G5					x		x	x	x
Cathartes aura	Turkey Vulture	S5B	G5					x		x	x	x
Catharus fuscescens	Veery	S4B	G5					x			x	
Certhia americana	Brown Creeper	S5B	G5								x	
Chaetura pelagica	Chimney Swift	S4B,S4N	G4G5	THR	THR			x				
Charadrius vociferus	Killdeer	S5B,S5N	G5					x		x	x	x
Chlidonias niger	Black Tern	S3B	G4G5	SC		W		x				
Chordeiles minor	Common Nighthawk	S4B	G5	SC	THR			x				

	Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Coefficient of Wetness	iNaturalist Study Area	OBBA (17PH46)	NHIC	Port Robinson SWS	Wood Incidentals	Breeding Bird Survey (Appendix C-5)
	Circus hudsonius	Northern Harrier	S4B	G5	NAR				x				
	Cistothorus palustris	Marsh Wren	S4B	G5			W		x				
	Cistothorus platensis	Sedge Wren	S4B	G5	NAR		W		x				
	Coccyzus americanus	Yellow-billed Cuckoo	S4B	G5					x				
	Coccyzus erythropthalmus	Black-billed Cuckoo	S5B	G5					x				
	Colaptes auratus	Northern Flicker	S4B	G5				x	x			x	x
	Colinus virginianus	Northern Bobwhite	S1	G4G5	END	END			x	x			
*	*Columba livia*	Rock Pigeon	SNA	G5					x				
	Contopus virens	Eastern Wood-pewee	S4B	G5	SC	SC			x		x	x	x
	Corvus brachyrhynchos	American Crow	S5B	G5					x		x	x	x
	Cyanocitta cristata	Blue Jay	S5	G5					x		x	x	x
*	*Cygnus olor*	Mute Swan	SNA	G5			W		x				
	Dolichonyx oryzivorus	Bobolink	S4B	G5	THR	THR			x	x			
	Dryocopus pileatus	Pileated Woodpecker	S5	G5					x				
	Dumetella carolinensis	Gray Catbird	S4B	G5					x		x	x	x
	Empidonax alnorum	Alder Flycatcher	S5B	G5			W		x				
	Empidonax minimus	Least Flycatcher	S4B	G5					x			x	
	Empidonax traillii	Willow Flycatcher	S5B	G5					x				x
	Empidonax virescens	Acadian Flycatcher	S2S3B	G5	END	END			x				
	Eremophila alpestris	Horned Lark	S5B	G5					x		x		
	Euphagus carolinus	Rusty Blackbird	S4B	G4	NAR	SC						x	
	Falco columbarius	Merlin	S5B	G5	NAR				x				
	Falco peregrinus	Peregrine Falcon	S3B	G4	SC	SC			x			x	
	Falco sparverius	American Kestrel	S4	G5					x				
	Fulica americana	American Coot	S4B	G5	NAR		W		x				
	Gallinago delicata	Wilson's Snipe	S5B	G5					x			x	
	Gallinula galeata	Common Gallinule	S4B	G5			W		x				
	Geothlypis formosa	Kentucky Warbler	SNA	G5					x				
	Geothlypis philadelphia	Mourning Warbler	S4B	G5					x				
	Geothlypis trichas	Common Yellowthroat	S5B	G5					x		x	x	x
*	*Haemorhous mexicanus*	House Finch	SNA	G5					x			x	x
	Haliaeetus leucocephalus	Bald Eagle	S2N,S4B	G5	SC		W		x				
	Hirundo rustica	Barn Swallow	S5B	G5	THR	THR			x		x		x
	Hydroprogne caspia	Caspian Tern	S3B	G5	NAR		W		x				
	Hylocichla mustelina	Wood Thrush	S4B	G4	SC	THR			x	x	x	x	x
	Icteria virens	Yellow-breasted Chat	S1B	G5	END	END			x				
	Icterus galbula	Baltimore Oriole	S4B	G5					x			x	x
	Icterus spurius	Orchard Oriole	S4B	G5					x				
	Ixobrychus exilis	Least Bittern	S4B	G4G5	THR	THR	W		x				

	Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Coefficient of Wetness	iNaturalist Study Area	OBBA (17PH46)	NHIC	Port Robinson SWS	Wood Incidentals	Breeding Bird Survey (Appendix C-5)
	Larus argentatus	Herring Gull	S5B,S5N	G5					x				x
	Larus delawarensis	Ring-billed Gull	S5B,S4N	G5					x			x	x
	Megaceryle alcyon	Belted Kingfisher	S4B	G5					x				
	Megascops asio	Eastern Screech-Owl	S4	G5	NAR				x				
	Melanerpes carolinus	Red-bellied Woodpecker	S4	G5					x			x	x
	Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	G5	SC	THR			x				
	Meleagris gallopavo	Wild Turkey	S5	G5				x	x		x	x	x
	Melospiza georgiana	Swamp Sparrow	S5B	G5					x			x	x
	Melospiza melodia	Song Sparrow	S5B	G5					x		x	x	x
	Mimus polyglottos	Northern Mockingbird	S4	G5				x	x				
	Mniotilta varia	Black-and-white Warbler	S5B	G5					x			x	
	Molothrus ater	Brown-headed Cowbird	S4B	G5				x	x		x	x	x
	Myiarchus crinitus	Great Crested Flycatcher	S4B	G5					x			x	x
	Nycticorax nycticorax	Black-crowned Night-Heron	S3B,S3N	G5			W		x				
	Oreothlypis ruficapilla	Nashville Warbler	S5B	G5								x	
	Oxyura jamaicensis	Ruddy Duck	S4B,S4N	G5			W		x				
	Parkesia noveboracensis	Northern Waterthrush	S5B	G5								x	
*	*Passer domesticus*	House Sparrow	SNA	G5					x		x		x
	Passerculus sandwichensis	Savannah Sparrow	S4B	G5					x		x		x
	Passerina cyanea	Indigo Bunting	S4B	G5					x		x		x
	Petrochelidon pyrrhonota	Cliff Swallow	S4B	G5					x				x
	Phalacrocorax auritus	Double-crested Cormorant	S5B	G5	NAR				x				x
*	*Phasianus colchicus*	Ring-necked Pheasant	SNA	G5				x	x				
	Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B	G5					x		x	x	x
	Picoides pubescens	Downy Woodpecker	S5	G5					x		x	x	x
	Picoides villosus	Hairy Woodpecker	S5	G5					x			x	x
	Pipilo erythrophthalmus	Eastern Towhee	S4B	G5					x				
	Piranga olivacea	Scarlet Tanager	S4B	G5					x			x	
	Podilymbus podiceps	Pied-billed Grebe	S4B,S4N	G5			W		x				
	Poecile atricapillus	Black-capped Chickadee	S5	G5					x		x	x	x
	Polioptila caerulea	Blue-gray Gnatcatcher	S4B	G5					x				
	Pooecetes gramineus	Vesper Sparrow	S4B	G5					x				
	Porzana carolina	Sora	S4B	G5			W		x				
	Progne subis	Purple Martin	S3S4B	G5					x				
	Protonotaria citrea	Prothonotary Warbler	S1B	G5	END	END	W		x				
	Quiscalus quiscula	Common Grackle	S5B	G5					x		x	x	x
	Rallus elegans	King Rail	S2B	G4	END	END	W		x				
	Rallus limicola	Virginia Rail	S5B	G5			W		x				
	Regulus calendula	Ruby-crowned Kinglet	S4B	G5								x	

	Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Coefficient of Wetness	iNaturalist Study Area	OBBA (17PH46)	NHIC	Port Robinson SWS	Wood Incidentals	Breeding Bird Survey (Appendix C-5)
	Riparia riparia	Bank Swallow	S4B	G5	THR	THR			x				
	Sayornis phoebe	Eastern Phoebe	S5B	G5					x				
	Scolopax minor	American Woodcock	S4B	G5					x			x	
	Seiurus aurocapilla	Ovenbird	S4B	G5					x			x	
	Setophaga caerulescens	Black-throated Blue Warbler	S5B	G5								x	
	Setophaga citrina	Hooded Warbler	S4B	G5	NAR				x				
	Setophaga coronata	Yellow-rumped Warbler	S5B	G5								x	
	Setophaga magnolia	Magnolia Warbler	S5B	G5					x			x	
	Setophaga pensylvanica	Chestnut-sided Warbler	S5B	G5					x			x	
	Setophaga petechia	Yellow Warbler	S5B	G5				x	x			x	x
	Setophaga ruticilla	American Redstart	S5B	G5					x				
	Setophaga virens	Black-throated Green Warbler	S5B	G5					x			x	
	Sialia sialis	Eastern Bluebird	S5B	G5	NAR				x		x		
	Sitta carolinensis	White-breasted Nuthatch	S5	G5					x				x
	Spinus tristis	American Goldfinch	S5B	G5				x	x		x	x	x
	Spiza americana	Dickcissel	SNA	G5					x				
	Spizella passerina	Chipping Sparrow	S5B	G5					x		x	x	x
	Spizella pusilla	Field Sparrow	S4B	G5					x		x		
	Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B	G5					x				x
	Sterna forsteri	Forster's Tern	S2B	G5	DD		W		x				
	Sterna hirundo	Common Tern	S4B	G5	NAR		W		x				
	Sturnella magna	Eastern Meadowlark	S4B	G5	THR	THR			x	x	x		
*	*Sturnus vulgaris*	European Starling	SNA	G5					x			x	x
	Tachycineta bicolor	Tree Swallow	S4B	G5					x		x		
	Thryothorus ludovicianus	Carolina Wren	S4	G5					x				x
	Toxostoma rufum	Brown Thrasher	S4B	G5					x		x		
	Troglodytes aedon	House Wren	S5B	G5					x		x	x	x
	Turdus migratorius	American Robin	S5B	G5					x		x	x	x
	Tyrannus tyrannus	Eastern Kingbird	S4B	G5				x	x				x
	Vermivora chrysoptera	Golden-winged Warbler	S4B	G4	SC	THR			x				
	Vermivora cyanoptera	Blue-winged Warbler	S4B	G5					x				
	Vireo flavifrons	Yellow-throated Vireo	S4B	G5					x				
	Vireo gilvus	Warbling Vireo	S5B	G5					x				x
	Vireo griseus	White-eyed Vireo	S2B	G5						x			
	Vireo olivaceus	Red-eyed Vireo	S5B	G5					x			x	x
	Zenaida macroura	Mourning Dove	S5	G5					x		x	x	x
	Zonotrichia albicollis	White-throated Sparrow	S5B	G5								x	

APPENDIX

C-5 BIRD LIST BY BREEDING BIRD STATION

		Survey Point																	
Scientific Name	**English Name**	**BB1**	**BB2**	**BB3**	**BB4**	**BB5**	**BB6**	**BB7**	**BB8**	**BB9**	**BB10**	**BB11**	**BB12**	**BB13**	**BB14**	**BB15**	**BB16**	**BB17**	**Highest Breeding Evidence**
Corvus brachyrhynchos	American Crow	x													x	x		x	PR
Spinus tristis	American Goldfinch	x		x		x	x		x			x	x	x		x		x	PR
Turdus migratorius	American Robin		x		x	x	x		x	x	x	x	x	x	x	x	x	x	CO
Icterus galbula	Baltimore Oriole					x								x					PO
Hirundo rustica	Barn Swallow	x					x									x	x	x	OB
Poecile atricapillus	Black-capped Chickadee							x			x	x	x		x	x			PR
Cyanocitta cristata	Blue Jay			x	x		x	x	x		x	x	x	x	x			x	PR
Molothrus ater	Brown-headed Cowbird		x	x		x					x	x	x		x		x		PR
Thryothorus ludovicianus	Carolina Wren	x																	PO
Bombycilla cedrorum	Cedar Waxwing			x													x		PO
Spizella passerina	Chipping Sparrow										x								PR
Quiscalus quiscula	Common Grackle	x	x	x	x	x		x		x		x			x		x		PR
Geothlypis trichas	Common Yellowthroat												x						PO
Phalacrocorax auritus	Double-crested Cormorant				x		x												OB
Picoides pubescens	Downy Woodpecker										x				x				PO
Tyrannus tyrannus	Eastern Kingbird		x																OB
Contopus virens	Eastern Wood-pewee			x					x				x	x					PR
Sturnus vulgaris	European Starling	x	x		x			x	x		x	x			x	x		x	CO
Dumetella carolinensis	Gray Catbird				x			x				x		x					PO
Myiarchus crinitus	Great Crested Flycatcher					x				x	x		x	x					PR
Picoides villosus	Hairy Woodpecker										x								PO
Larus argentatus	Herring Gull	x	x	x	x	x		x							x	x	x	x	OB
Haemorhous mexicanus	House Finch							x									x		PO
Passer domesticus	House Sparrow	x	x						x								x	x	PR
Troglodytes aedon	House Wren										x	x	x					x	PO
Passerina cyanea	Indigo Bunting							x		x									PO

Scientific Name	English Name	BB1	BB2	BB3	BB4	BB5	BB6	BB7	BB8	BB9	BB10	BB11	BB12	BB13	BB14	BB15	BB16	BB17	Highest Breeding Evidence
Charadrius vociferus	Killdeer	x								x		x		x		x	x	x	PR
Anas platyrhynchos	Mallard															x			PO
Zenaida macroura	Mourning Dove	x	x	x	x	x				x	x	x			x	x		x	PR
Cardinalis cardinalis	Northern Cardinal	x				x		x		x	x	x	x	x	x	x		x	PR
Colaptes auratus	Northern Flicker															x			PO
Stelgidopteryx serripennis	Northern Rough-winged Swallow	x																	OB
Melanerpes carolinus	Red-bellied Woodpecker										x			x					PO
Vireo olivaceus	Red-eyed Vireo								x	x	x								PR
Buteo jamaicensis	Red-tailed Hawk						x												PO
Agelaius phoeniceus	Red-winged Blackbird	x	x	x	x	x	x		x	x	x	x		x			x	x	PR
Larus delawarensis	Ring-billed Gull															x			OB
Pheucticus ludovicianus	Rose-breasted Grosbeak							x											PO
Passerculus sandwichensis	Savannah Sparrow	x														x	x		PR
Melospiza melodia	Song Sparrow	x	x	x	x	x	x	x	x	x		x	x	x	x		x	x	PR
Melospiza georgiana	Swamp Sparrow												x	x					PR
Cathartes aura	Turkey Vulture	x	x		x														PO
Vireo gilvus	Warbling Vireo	x															x		PO
Sitta carolinensis	White-breasted Nuthatch													x					PO
Meleagris gallopavo	Wild Turkey													x	x	x			CO
Empidonax traillii	Willow Flycatcher																	x	PR
Hylocichla mustelina	Wood Thrush										x		x	x					PO
Setophaga petechia	Yellow Warbler			x															PO

C-6 HERPTILE LIST

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	NHIC	iNatrualist Study Area	ORAA	Port Robinson SWS	Niagara Status from NAI	Wood Incidental	Wood Anuran Call Survey
Anaxyrus americanus	American Toad	S5	G5				x		x	Widespread		x
Lithobates pipiens	Northern Leopard Frog	S5	G5	NAR			x			Widespread		x
Pseudacris triseriata pop. 2	Western Chorus Frog - Carolinian Population	S4	G5TNR	NAR				x		Widespread	x	x
Necturus maculosus	Mudpuppy	S4	G5	NAR				x		Localized		
Anaxyrus americanus	American Toad	S5	G5					x		Widespread		x
Lithobates pipiens	Northern Leopard Frog	S5	G5	NAR				x	x	Widespread	x	x
Pseudacris crucifer	Spring Peeper	S5	G5					x		Widespread	x	x
Hyla versicolor	Gray Treefrog	S5	G5					x		Widespread		x
Lithobates clamitans	Green Frog	S5	G5					x	x	Widespread	x	x
Lithobates palustris	Pickerel Frog	S4	G5	NAR						Localized, Regionally Significant		x
Lithobates catesbeianus	American Bullfrog	S4	G5					x		Widespread, Regionally Significant		x
Ambystoma laterale	Blue-spotted Salamander	S4	G5					x	x	Localized, Regionally Significant		
Lithobates sylvaticus	Wood Frog	S5	G5					x	x	Widespread		
Lampropeltis triangulum	Eastern Milksnake	S4	G5	NAR	SC			x		Localized		
Storeria dekayi	DeKay's Brownsnake	S5	G5	NAR				x	x	Widespread		
Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5	G5T5					x	x	Widespread	x	
Thamnophis sauritus	Eastern Ribbonsnake	S4	G5	SC	SC				x	Localized		
Nerodia sipedon sipedon	Northern Watersnake	S5	G5T5	NAR				x		Widespread		
Storeria occipitomaculata	Red-bellied Snake	S5	G5					x		Localized, Regionally Significant		
Graptemys geographica	Northern Map Turtle	S3	G5	SC	SC		x	x		Localized, SAR		
Chelydra serpentina	Snapping Turtle	S4	G5	SC	SC	x		x		Widespread, SAR		
Chrysemys picta marginata	Midland Painted Turtle	S4	G5T5			x		x	x	Widespread	x	

APPENDIX

C-7 ANURAN CALL SURVEYS

		Survey Point																								
Scientific Name	**English Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Lithobates catesbeianus	American Bullfrog					1-3	1-3										1-2									
Anaxyrus americanus	American Toad		1-1					1-1 >100			1-1 >100				1-1									3	
Hyla versicolor	Gray Treefrog			1-1			1-1>100	1-2			1-1			1-1	3					2-6	1-1	1-2	1-2	1-1>100	1-2	1-1
Lithobates clamitans	Green Frog	1-2	1-2			1-3	1-3	1-2	1-1	1-1							1-2					1-1	1-1		1-1	1-1>100
Lithobates pipiens	Northern Leopard Frog					3 >100	1																			
Lithobates palustris	Pickerel Frog																									1
Pseudacris crucifer	Spring Peeper	3	2		2-4	2	2	2	2	2	2	2	1	1-1	2	1					1	2	1-3	1-1		1
Pseudacris triseriata pop. 2	Western Chorus Frog - Carolinian Population	2	1-1		1-1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	1-1	1	1

APPENDIX

C-8 *MAMMAL LIST*

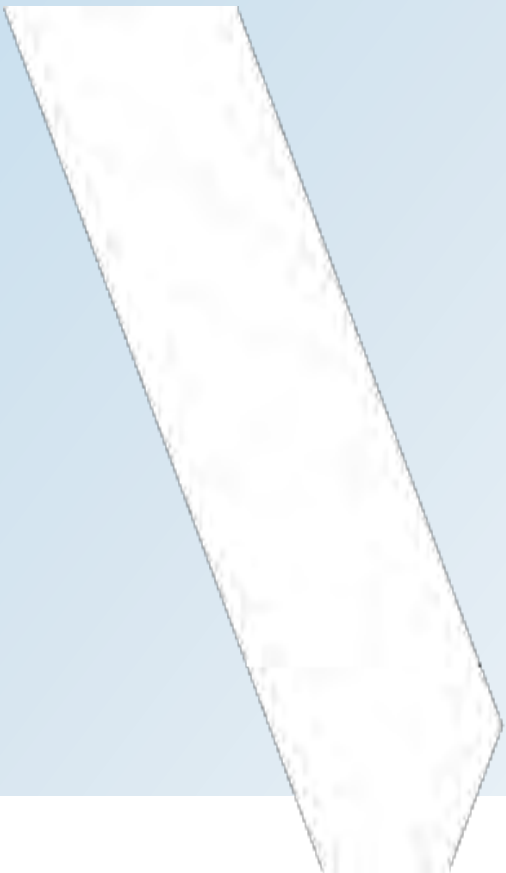
Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	Ontario Mammal Atlas	iNaturalist Study Area	Port Robinson SWS	Wood Incidental
Neovison vison	American Mink	S4	G5			x			
Castor canadensis	Beaver	S5	G5			x		x	
Eptesicus fuscus	Big Brown Bat	S4	G5			x			
Canis latrans	Coyote	S5	G5			x		x	x
Peromyscus maniculatus	Deer Mouse	S5	G5			x			
Tamias striatus	Eastern Chipmunk	S5	G5			x			x
Sylvilagus floridanus	Eastern Cottontail	S5	G5			x	x		
Sciurus carolinensis	Eastern Gray Squirrel	S5	G5			x		x	x
Lasiurus borealis	Eastern Red Bat	S4	G3G4			x			
Myotis leibii	Eastern Small-footed Myotis	S2S3	G4	END		x			
Mustela erminea	Ermine	S5	G5			x			
Lepus europaeus	European Hare	SNA	G5			x		x	
Parascalops breweri	Hairy-tailed Mole	S4	G5			x			
Lasiurus cinereus	Hoary Bat	S4	G3G4			x			
Mus musculus	House Mouse	SNA	G5			x			
Myotis lucifugus	Little Brown Myotis	S3	G3	END	END	x			
Mustela frenata	Long-tailed Weasel	S4	G5			x			
Zapus hudsonius	Meadow Jumping Mouse	S5	G5			x			
Microtus pennsylvanicus	Meadow Vole	S5	G5			x		x	
Ondatra zibethicus	Muskrat	S5	G5			x			
Glaucomys sabrinus	Northern Flying Squirrel	S5	G5			x			
Myotis septentrionalis	Northern Myotis	S3	G1G2	END	END	x			
Procyon lotor	Northern Raccoon	S5	G5			x		x	x
Blarina brevicauda	Northern Short-tailed Shrew	S5	G5			x			
Rattus norvegicus	Norway Rat	SNA	G5			x			
Erethizon dorsatum	Porcupine	S5	G5			x			
Vulpes vulpes	Red Fox	S5	G5			x		x	
Tamiasciurus hudsonicus	Red Squirrel	S5	G5			x		x	x
Lasionycteris noctivagans	Silver-haired Bat	S4	G3G4			x			
Sorex fumeus	Smoky Shrew	S5	G5			x			
Lepus americanus	Snowshoe Hare	S5	G5			x			
Synaptomys cooperi	Southern Bog Lemming	S4	G5			x			
Glaucomys volans	Southern Flying Squirrel	S4	G5	NAR		x			
Condylura cristata	Star-nosed Mole	S5	G5			x			
Mephitis mephitis	Striped Skunk	S5	G5			x		x	
Perimyotis subflavus	Tricolored Bat	S3?	G2G3	END	END	x			
Didelphis virginiana	Virginia Opossum	S4	G5			x			x
Peromyscus leucopus	White-footed Mouse	S5	G5			x			
Odocoileus virginianus	White-tailed Deer	S5	G5			x		x	x
Marmota monax	Woodchuck	S5	G5			x		x	

C-9 INSECT LIST

Scientific Name	English Name	S Rank (Provincial)	G Rank (Global)	ESA	SARA	iNatrualist Study Area	Ontairo Butterfly Atlas	Port Robinson SWS	Wood Incidental
Vanessa virginiensis	American Lady	S5	G5				x		
Euphydryas phaeton	Baltimore Checkerspot	S4	G5			x			
Satyrium calanus	Banded Hairstreak	S4	G5				x		
Papilio polyxenes	Black Swallowtail	S5	G5				x	x	
Orchelimum nigripes	Black-legged Meadow Katydid	S4	GNR			x			
Pachydiplax longipennis	Blue Dasher	S5	G5			x			
Poanes viator	Broad-winged Skipper	S4	G5				x		
Lycaena hyllus	Bronze Copper	S5	G5				x		
Pieris rapae	Cabbage White	SNA	G5				x	x	
Colias philodice	Clouded Sulphur	S5	G5				x		
Bombus impatiens	Common Eastern Bumble Bee	S5	G5			x			
Coenonympha tullia	Common Ringlet	S5	G5				x		
Cercyonis pegala	Common Wood-Nymph	S5	G5			x	x		x
Polygonia comma	Eastern Comma	S5	G5				x		
Cupido comyntas	Eastern Tailed Blue	S5	G5				x		
Thymelicus lineola	European Skipper	SNA	G5			x	x		
Polygonia progne	Gray Comma	S5	G5				x		
Lophocampa caryae	Hickory Tussock Moth	SNR	G5			x			
Ancyloxypha numitor	Least Skipper	S5	G5				x		
Megisto cymela	Little Wood-Satyr	S5	G5			x	x		
Danaus plexippus	Monarch	S2N,S4B	G4	SC			x	x	
Nymphalis antiopa	Mourning Cloak	S5	G5				x	x	
Wallengrenia egeremet	Northern Broken-Dash	S5	G5				x		
Thorybes pylades	Northern Cloudywing	S5	G5				x		x
Lethe anthedon	Northern Pearly-Eye	S5	G5				x		
Colias eurytheme	Orange Sulphur	S5	G5				x		
Phyciodes tharos	Pearl Crescent	S4	G5				x		
Polites peckius	Peck's Skipper	S5	G5			x	x		
Polygonia interrogationis	Question Mark	S5	G5				x	x	
Vanessa atalanta	Red Admiral	S5	G5			x	x		
Limenitis arthemis astyanax	Red-spotted Purple	S5	G5T5			x	x		
Limenitis archippus	Viceroy	S5	G5				x		
Limenitis arthemis arthemis	White Admiral	S5	G5T5				x		
Erynnis baptisiae	Wild Indigo Duskywing	S4	G5				x		

APPENDIX

D FIELD DATA SHEETS



70

Location Merritt Rd.

Date May 6 2022

Project / Client

Forest	Swamp	Birds	Other Species
VIOLSOR	CARDOU	RUBL	Chorus Frog
Yellow Trout Lily	RANUABO	HOWR	Deer
CLAYVIR		RLBL	RBLU
~~CAR~~PODOPEL		YELWA	NOFL
Wood Anem		COGR	BLJA
VIOLROS		AMGO	LWOTH
ARISTRI		NOCA	CSLA
~~RANUACRFD~~		YRWA	BALW
AMELLAE		BTNW	BTBW
TRILGRA		SOSP	VEER
VIOLPUB		RCKT	NOWA
		CHSP	OVEN
		AMRO	LTSP
		BHCO	DOWO
		RBGU	SLSP
		BLOR	RBGR
		LEFL	MALL
		SPSA	Pai. Turtle

Location

Project / Client

Flag	Soil Stamp	Soil Stamp
ANTBAR	0643833	0641294
DRABVER	4765837	4765801
TARAPAL	Org. ~2 cm	Org. ~3 cm
STNAARV	Clay	Clay
	Mottles ~30 cm	Mottles ~30 cm

Soil First	Soil First
0641474	0643494
4765741	4765858
Org ~1 cm	~no org.
Sandy day?	→ same as day
Mottles ~60	mottles ~5

ESSO

2022-05-26

TRANS #:

STATION#: 00322654

EST #: R8447247?3

74685

$ 40.35

-o/L

Not full list just new species

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Nursh Rd. POLYGON: Boreal/Fen

SURVEYOR(S): ROM, DATE: Sept 15 2021 TIME: start: finish:

UTMZ: UTME: UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN. G ACIDIC BEDRK. G BASIC BEDRK. G CARB. BEDRK.	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL. UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G CULTURAL	G PLANKTON G SUBMERGED G FLOATING-LVD G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SAVANNAH G WOODLAND G FOREST G PLANTATION
SITE G OPEN WATER G SHALLOW WATER G DUFFICIAL DEP G BEDROCK			**COVER** G OPEN G SHRUB G TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN, > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT<1 m 6 = 0.2<HT<0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR < 10% 2 = 10 < CVR < 25% 3 = 25 < CVR < 60% 4 = CVR > 60%

STAND COMPOSITION: BA:

		< 10		10 - 24		25 - 50		> 50
SIZE CLASS ANALYSIS:								
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE		
INCLUSION		
COMPLEX		

Notes:

ELC
PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
SIMPPIL					
RUMECRI					
LACSER					
ECHINUR					
CIPESTR					
SALIXS					
SISYMON					
SPORVAG					
AGALTEN					WRST(1,2,3)
SCHOPUN					
RUBUALL					
LACTSE					
ASPAOFF					
Rd Sand Spurrey					

SPECIES CODE	LAYER 1	2	3	4	COL.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Rd		POLYGON: Median of highway	
SURVEYOR(S): KP	DATE: Sept 2021	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL	G ORGANIC	G LACUSTRINE	G NATURAL	G PLANKTON	G LAKE
G WETLAND	G MINERAL SOIL	G RIVERINE	G CULTURAL	G SUBMERGED	G POND
G AQUATIC	G PARENT MIN.	G BOTTOMLAND		G FLOATING-LVD.	G RIVER
	G ACIDIC BEDRK.	G TERRACE		G GRAMINOID	G STREAM
	G BASIC BEDRK.	G VALLEY SLOPE		G FORB	G MARSH
SITE	G CARB. BEDRK.	G TABLELAND		G LICHEN	G SWAMP
		G ROLL. UPLAND		G BRYOPHYTE	G FEN
G OPEN WATER		G CLIFF		G DECIDUOUS	G BOG
G SHALLOW WATER		G TALUS	COVER	G CONIFEROUS	G BARREN
G SURFICIAL DEP.		G CREVICE / CAVE		G MIXED	G MEADOW
G BEDROCK		G ALVAR	G OPEN		G PRAIRIE
		G ROCKLAND	G SHRUB		G THICKET
		G BEACH / BAR	G TREED		G SAVANNAH
		G SAND DUNE			G WOODLAND
		G BLUFF			G FOREST
					G PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY		1	ACERSACC
3	UNDERSTOREY		2	FRANALN > POPUDEL
4	GRD. LAYER		4	Symphytrichum) Grasses > SOLIALT) DRYSFUL

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT<1 m 6 = 0.2<HT<0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR < 10% 2= 10 < CVR < 25% 3= 25 < CVR < 60% 4= CVR > 60%

STAND COMPOSITION:	BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50	> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50	> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION ..		
COMPLEX		

Notes:

ELC · PLANT SPECIES LIST

SITE:

POLYGON:

DATE:

SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
SOLIALT				O	
SYMPLAN				O	
SYMPERI				O	
SYMPNOV				O	
SONCARV				O	
PHRAAUS				O	
TRIFPRA				O	
SECUVAR				O	
PHALARU				O	
DACTGLO				O	
PLANLAN				R	
POA_PRA				O	
DRYSFUL				O	
CICHINT				O	
POPUDEL			O	O	
FRANALN			O	O	
ULMAME			O	O	
ACERSACC		R			
DAUCCAR				R	
~~ECHIVUL~~					

SPECIES CODE	LAYER 1	2	3	4	COL.

Page ..... of .....

Merritt Rd. | POLYGON: fwes2

SURVEYOR(S): RDM | DATE: Aug 31 24.31 | TIME: start / finish

...IPTION & CLASSIFICATION | UTMZ | UTME | UTMN

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN. G ACIDIC BEDRK. G BASIC BEDRK. G CARB. BEDRK.	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL. UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G CULTURAL	G PLANKTON G SUBMERGED G FLOATING-LVD G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SAVANNAH G WOODLAND G FOREST G PLANTATION

SITE	COVER
G OPEN WATER G SHALLOW WATER G SURFICIAL DEP. G BEDROCK	G OPEN G SHRUB G TREED

STAND DESCRIPTION

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY		4	ACERSACH >(QUERUBS) FAGUGRA > PRUNSER
2	SUB-CANOPY		2	ACERSACH > OSTRVIR > FRAXPEN
3	UNDERSTOREY		2	FRAXPEN > (ACERSACH > VITTRIP >
4	GRD. LAYER		3+	EURYMAC > Carex > ACERSACH > FRAXPEN

very dense, with pertinently dominant

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:	A	< 10	A	10 - 24	A	25 - 50	A	> 50
STANDING SNAGS:	A	< 10	G	10 - 24	O	25 - 50	R	> 50
DEADFALL / LOGS:	A	< 10	A	10 - 24	A	25 - 50	R	> 50

...ANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

...L AGE		PIONEER		YOUNG		MID-AGE	X	MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:	Dry-fresh Sugar Maple - Oak	FOMS3
COMMUNITY SERIES:	Deciduous Forest	
ECOSITE:		
VEGETATION TYPE:	Very variable due to topography	
INCLUSION		
COMPLEX	wetland (Swamp) throughout	

Notes:

ULMAMER
Todd's UP058

VIBLEN R LONINT R PRUNAVI R

ELC PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ACERSACH	A	O	O	O	
FRAXPEN		O	O	O	
SASSALB				R	
FAGUGRA	O	O	O	O	
OSTRVIR		O	O	O	
ULMAME	R	R	R	R	
QUERRUB	O	O	R	R	
TILIAME	O	R	R	R	
PRUNSER	O	R	R	R	
CARYOVA	R	R	R	R	
QUERALB	R				
ACERNEG	R	R	R	R	
CARYCOR	R	R	R	R	
ACERRUB	R	R	R	R	
CARPCAR			R	R	
FRAXAME		R	R	R	
POPUGRA	R	R	R	R	
PINUSTR	R	R	R	R	
LIRIPOP	R	R	R	R	
Crataegus			R	R	
LUNIDIO			R	R	
DISCVIL			R	R	
PRUNVIG			R		
SMILROT		R	R	R	
RIBECYN			R	R	
BERTHUN			R	R	
VITRIP		O	O	O	
TOXIRYD				O	
ADOPEL				O	
FRAXNLN			O	O	
LINDBEN			O	O	
BETUALL	R	R			
~~ALNINC~~					
TILICOR	R				
PRUNAVI	R				

SPECIES CODE	LAYER 1	2	3	4	COL.
SOLTRUG				O	
JUNEDUD				O	(-edge)
CAREPENasy				O	
SMIRHER				O	
PERSVIR				R	
EURYMAC				O	
ELYMVIR				O	
ARISTRI				O	
SYMPLAT				O	
MAIACAN				O	
Nabalus				O	
SOLIDAE				O	
CAREBLAN				R	
VIOLLAB				R	
POPUTRE				O	
ATHYFIL				R	
PARNGV				O	
EPIPVIR				O	
POLYACR				R	
GLECHED				R	
AEGOPOD				R	
CAREPEN				R	
DENDDIS				R	
OSMUCIN				R	
VACCPAL				R	
MITCREP				R	
RUBUHIS				R	
CIRCCAN				O	
ERECHIR				R	
ALLIPET				R	
HAMAMVIR			R	R	
CAREBLA				R	
UVULAES				R	
NABAALT				R	
PTERAQU				R	
SYMPLAT				R	

ELC
MANAGEMENT / DISTURBANCE

SITE:
POLYGON: FurOL
DATE:
SURVEYOR(S):

DISTURBANCE / EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 30 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKS OR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

Some woodlots

Flowers Observed
1 plant, 2 stems
50-80% Ind (buds, leaves dropped)
~6 Ind. OBS 6/7
43.03112772, -79.24362177

Eur.div. Scs. Ps
~40 stems within 15 m, some within 3 m of cleared ROW
of 43.03159915, -79.24326394

ELC
WILDLIFE

SITE:
POLYGON:
DATE:
SURVEYOR(S):
START TIME: END TIME:

TEMP (°C):	CLOUD (10th):	WIND:	PRECIPITATION:

CONDITIONS:

POTENTIAL WILDLIFE HABITAT:

X	VERNAL POOLS	X	SNAGS
	HIBERNACULA	X	FALLEN LOGS

SPECIES LIST

TY	SP. CODE	EV	NOTES	#	TY	SP. CODE	EV	NOTES	#
	HAVO								
	TUTI								

Notes:

Eurydiv

500+ plants (clones) within ~8 m of this location
43.03191978 -79.24449142

Widespread in forest SW of Merritt and Niagara St.

Sept 15

WP197 ~5 stems
198 ~3 stems
199 ~15 stems
200 ~6
201 ~5
202 ~5
203 ~$20
204 ~20

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Mont Rd		POLYGON: (illegible)	
SURVEYOR(S): ROM	DATE: Jul 29 2021	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL	G ORGANIC	G LACUSTRINE	G NATURAL	G PLANKTON	G LAKE
G WETLAND	G MINERAL SOIL	G RIVERINE	G CULTURAL	G SUBMERGED	G POND
G AQUATIC	G PARENT MIN.	G BOTTOMLAND		G FLOATING-LVD.	G RIVER
	G ACIDIC BEDRK.	G TERRACE		G GRAMINOID	G STREAM
	G BASIC BEDRK.	G VALLEY SLOPE		G FORB	G MARSH
SITE	G CARB. BEDRK.	G TABLELAND		G LICHEN	G SWAMP
G OPEN WATER		G ROLL UPLAND	COVER	G BRYOPHYTE	G FEN
G SHALLOW WATER		G CLIFF		G DECIDUOUS	G BOG
G SURFICIAL DEP.		G TALUS	G TREED	G CONIFEROUS	G BARREN
G BEDROCK		G CREVICE / CAVE	G SHRUB	G MIXED	G MEADOW
		G ALVAR	G OPEN		G PRAIRIE
		G ROCKLAND			G THICKET
		G BEACH / BAR			G SAVANNAH
		G SAND DUNE			G WOODLAND
		G BLUFF			G FOREST
					G PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY		1	POPDEL
2	SUB-CANOPY		1	POPDEL
3	UNDERSTOREY		1	POPDEL > Salix
4	GRD. LAYER		4	LOTCOR > POA_com = SOLIALT > DIPSFUL

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT<1 m 6 = 0.2<HT<0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR < 10% 2= 10 < CVR < 25% 3= 25 < CVR < 60% 4= CVR > 60%

STAND COMPOSITION:	BA:

		< 10		10 - 24		25 - 50		> 50
SIZE CLASS ANALYSIS:								
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:	ME Meadow	
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION	Marshes	
COMPLEX		

Notes: highly variable, some thicket areas and lots of small wetlands

ELC — PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
POPDEL	O	O	O	O	
POPTRE			R	R	
SALALB		R	R	R	
MALPUM			R	R	
FRAXPEN		R	R	R	
PLATOCC			R	R	
SALINT			O	O	
SALPET			O	O	
PYRCOM			R	R	
SALERI			O	O	
FRAGUIR				R	
MEDISAT				R	

SPECIES CODE	LAYER 1	2	3	4	COL.
POA_COM				A	
LOTCOR				A	
DAUCCAR				A	
SOLIALT				A	
EUTHGRA				O	
LYTHSAL				O	
PHRAAUS				O	
$PHLEPRA				O	
SYMNOV				O	
DIPSFUL				A	
TRIFPRA				O	
VICICRA				O	
ERIGSTR				O	
MELIALB				O	
EPILCOL				R	
RUDHIR				O	
CAREVUL				O	
PRUNVUL				O	
SONCARV				R	
PENSDIG				R	
JUNCTOR				R	
ASCLSYR				O	
ASCLINC				O	
SOLJUN				O	
CAREGRA				O	
TYPHANG				O	
TRIFREP				O	
Eleocharis				R	
LYCOUNI				R	
EQUIARV				O	
CICHINT				O	

ELC
MANAGEMENT / DISTURBANCE

SITE:
POLYGON: 1 (cont.)
DATE:
SURVEYOR(S):

DISTURBANCE / EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 30 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKS OR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

ELC
WILDLIFE

SITE:
POLYGON:
DATE:
SURVEYOR(S):
START TIME: END TIME:

TEMP (°C):	CLOUD (10th):	WIND:	PRECIPITATION:

CONDITIONS:

POTENTIAL WILDLIFE HABITAT:

	VERNAL POOLS		SNAGS
	HIBERNACULA		FALLEN LOGS

SPECIES LIST:

TY	SP. CODE	EV	NOTES	#	TY	SP. CODE	EV	NOTES	#

Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Marsh Rd | POLYGON: Marshes

SURVEYOR(S): ROM | DATE: 5/30/2021 | TIME: start / finish

UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN. G ACIDIC BEDRK. G BASIC BEDRK. G CARB. BEDRK.	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G CULTURAL	G PLANKTON G SUBMERGED G FLOATING-LVD. G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SAVANNAH G WOODLAND G FOREST G PLANTATION
SITE G OPEN WATER G SHALLOW WATER G SURFICIAL DEP. G BEDROCK			**COVER** G OPEN G SHRUB G TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY		1	ACER
2	SUB-CANOPY		1	ACER
3	UNDERSTOREY		1	SPIRALB = CORNSER
4	GRD. LAYER		4	CAREX > SCIRUG > SPIRALB = PHALARU

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50		> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Interspersed with treed swamp areas
Patchy and variable -> some parts more dominated by Scirpus and Phalaris

ELC PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
SPIRALB			D	O	
CORNSER			O	O	
FRAXPEN			O	O	
POPTRE			R	R	
ACERRUB	R	R	R		
ACERSPI	R	R	R		

SPECIES CODE	LAYER 1	2	3	4	COL.
ASCLINC					O
SOLIRUG					O
POA-PAL					O
LYCOUNI					R
EUPPER					R
TYPEPUN					R
JUNCEF					O
DICHIMP					R
CARESCO					A
JUNCPUD					O
SYMPPUN					O
PHALARU					O
SCIRATR					O
GALITIN					O
ONOCSEN					O
LYTHSAL					O
CAREX sp.					A
RUBUSCS					O
Sphagnum					

ELC
MANAGEMENT / DISTURBANCE

SITE: marshes
POLYGON:
DATE: 10 July 2021
SURVEYOR(S):

DISTURBANCE / EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 30 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKS OR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

ELC
WILDLIFE

SITE:
POLYGON:
DATE:
SURVEYOR(S):
START TIME: END TIME:

TEMP (°C): CLOUD (10th): WIND: PRECIPITATION:
CONDITIONS:

POTENTIAL WILDLIFE HABITAT:

	VERNAL POOLS		SNAGS
	HIBERNACULA		FALLEN LOGS

SPECIES LIST:

TY	SP. CODE	EV	NOTES	#	TY	SP. CODE	EV	NOTES	#

Notes:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Arnott Rd | POLYGON: wetland

SURVEYOR(S): RDM | DATE: Jun 30 2021 | TIME: start / finish

UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN. G ACIDIC BEDRK. G BASIC BEDRK. G CARB. BEDRK.	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G CULTURAL	G PLANKTON G SUBMERGED G FLOATING-LVD. G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SAVANNAH G WOODLAND G FOREST G PLANTATION
SITE G OPEN WATER G SHALLOW WATER G SURFICIAL DEP. G BEDROCK			**COVER** G OPEN G SHRUB G TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY		3	PORTRE > CARYOVA > QUERPAL > SALIX FRA
2	SUB-CANOPY		3	"
3	UNDERSTOREY		3	CORNRAC = FRAMALN > RHAMCAT > FRAPEN
4	GRD. LAYER		4	SOLERUG > PARVIT > CIRCAN > IMPACAP

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT<1 m 6 = 0.2<HT<0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR < 10% 2= 10 < CVR < 25% 3= 25 < CVR < 60% 4= CVR > 60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:	A	< 10	A	10 - 24	O	25 - 50		> 50
STANDING SNAGS:	A	< 10	A	10 - 24	O	25 - 50		> 50
DEADFALL / LOGS:	A	< 10	A	10 - 24	O	25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER	X	YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION	wetlands / pools	
COMPLEX		

Notes:

ELC PLANT SPECIES LIST

SITE:

POLYGON:

DATE:

SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
CARYOVA	O	O	O	G	
PORTRE	G	G	O	O	
QUERPAL	O	O	G	O	
QUERRUB	R	R	R	R	
FRAPEN	R	O	O	O	
SALIXFRA	O	G	O	G	
PRUNSER	O	O	O	G	

ELC
MANAGEMENT / DISTURBANCE

SITE:
POLYGON: Wetland
DATE:
SURVEYOR(S):

DISTURBANCE / EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 20 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKS OR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

ELC
WILDLIFE

SITE:
POLYGON:
DATE:
SURVEYOR(S):
START TIME: END TIME:

TEMP (°C): CLOUD (10th): WIND: PRECIPITATION:
CONDITIONS:

POTENTIAL WILDLIFE HABITAT:

	VERNAL POOLS		SNAGS
	HIBERNACULA		FALLEN LOGS

SPECIES LIST:

TY	SP. CODE	EV	NOTES	#
	BTNU			

TY	SP. CODE	EV	NOTES	#

Notes:
EVRYDIV sgt. IS, additional points for first polygons
~60 stems within 5m of 43.0316564, -79.2434044
~6 stems at 430318338, -79.243357 S
Bdj is off sgt 16

† ~30 stems for dense in this area
WP032 ~30 stem
WP033 ~4 stem
WP034 ~25 stem
WP035 ~30 stems
WP036 ~50
WP037 ~70
WP038 ~15
WP039 ~40 within 5m

WP040 ~2 stems
WP041 ~8 stems
WP042 ~10 stems
WP043 ~6 stems
WP044 ~60
WP045 ~40
WP046 ~040
WP048 ~20
WP049 ~30
WP050 ~80

WP051 ~50
WP052 ~6
WP056 ~25
WP057 ~5
WP059 ~3
WP060 ~20
WP061 ~5
WP062 ~5
WP063 ~15
WP064 ~2

ELC — COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Rd		POLYGON: SWAMP
SURVEYOR(S): RDm	DATE: Jul 24-30 2021	TIME: start / finish
UTMZ:	UTME:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN. G ACIDIC BEDRK. G BASIC BEDRK. G CARB. BEDRK.	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G CULTURAL	G PLANKTON G SUBMERGED G FLOATING-LVD. G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SAVANNAH G WOODLAND G FOREST G PLANTATION
SITE G OPEN WATER G SHALLOW WATER G SURFICIAL DEP. G BEDROCK			**COVER** G OPEN G SHRUB G TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	1	4	ACERXFR>> ULMAME > QUERMAC = CARYOVA
2	SUB-CANOPY	2	2	ACERXFR > ULMAME > FRAXPEN
3	UNDERSTOREY	4	2	ACERXFR > LINDBEN > FRAXPEN > FRANALN
4	GRD. LAYER	6	4	SYMPLAN > TOXIRYD > carex > grass

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR ≤ 25% 3= 25 < CVR ≤ 60% 4= CVR > 60%

STAND COMPOSITION:							BA:	
SIZE CLASS ANALYSIS:	A	< 10	A	10 - 24	A	25 - 50	A	> 50
STANDING SNAGS:	O	< 10	O	10 - 24	R	25 - 50	R	> 50
DEADFALL / LOGS:	A	< 10	A	10 - 24	O	25 - 50	O	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER		YOUNG		MID-AGE	X	MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:	SWDM3-3 Swamp Maple Mineral Deciduous Swamp	
COMMUNITY SERIES:	No soil samples taken → ~~Bog~~ likely portions are	
ECOSITE:	More Organic	
VEGETATION TYPE:		
INCLUSION		
COMPLEX	Complex with forest other sheet	

Notes:

ELC — PLANT SPECIES LIST

SITE:
POLYGON:
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ACERXFR	A	A	A	A	
ULMAME	O	O	O	O	
QUERRUB	R	R	R	R	
FRAXPEN	R	O	O	O	
CARYOVA	R	R	R	R	
QUERMAC	R	R	R	R	
TILCOR	R	R	R	R	
POA_PAL				R	
PARTUIT				O	
ELEAUMB			R	R	
RHAMCAT			O	O	
ERIGPHI				R	
CEPHOCC			R	R	
SIAMSUA				R	
PERSSAG				R	
CARECRI stabilis				R	
PERSPUN				R	
EUTMAC				R	
SPAREME				R	
LEERORY				O	
TYPHLAT				R	
MYOSLAX				R	
TOXIRYD				O	
ROSAMUL			R	R	
TOXIRAD		R	R	R	
VACCCOR			R	R	
VITRIP		R	R	R	
BERBTHU			R	R	
FRANALN			O	O	
LINDBEN			O	O	
RUBUOCC			O	O	
PHRAAUS				R	
PHALARU				R	
JUNCEFU				R	
CAREHAY'S				R	
LYCOAME				R	

SPECIES CODE	LAYER 1	2	3	4	COL.
IMPACAP				O	
CICUMAC				O	
EUPAPER				O	
CIRSVUL				R	
BOEHCYL				O	
ASCLINC				R	
SYMPLAN				O	
CARECUR.inc				O	
SOLIRUC				O	
GALITR				O	
PERSVIR				O	
RUBIDRO				R	
ATHYFIL				R	
~~CAR~~ CARETRT				R	
GLYCSTR				O	
CYTHSAL				O	
GLYCSEP				O	
ONOCSEN				O	
SOLADUL				O	
CARECRI sta				O	
PILEPUM				R	
LYCOAME				R	
AGRYGRY				R	
CAREINTum				O	
CAREVUL				O	
SYMPLAT				R	
COREINF				R	
Viola				R	
GEUMCAN				O	
GALIPAL				R	
ALISTRE				R	
SYMPNOV				R	
APOCCAN				R	
QUERRIC	R	R	R	R	
PHLEPRA				R	

ELC
MANAGEMENT / DISTURBANCE

SITE:
POLYGON: 8
DATE:
SURVEYOR(S):

DISTURBANCE / EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 30 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKSOR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

NYSSSYL
4 trees
TODD's WPOSS

ELC
WILDLIFE

SITE:
POLYGON:
DATE:
SURVEYOR(S):
START TIME: END TIME:

TEMP (°C): CLOUD (10th): WIND: PRECIPITATION:
CONDITIONS:

POTENTIAL WILDLIFE HABITAT:

X	VERNAL POOLS	X	SNAGS
	HIBERNACULA	X	FALLEN LOGS

SPECIES LIST:

TY	SP. CODE	EV	NOTES	#	TY	SP. CODE	EV	NOTES	#
	VOFR								

ash bours clm + disease

Notes:

RIBEAME RR PRUNVUL ---R
CAREGRA R SALEPE ---R
CHELGLA R LEMINMIN ---R
FRILCOL R SCIRPEN ---R
CORNOBL RR QUERPAL RRRR
SCUTCAL R VERBHAS R
PERSPU IRISVER R
R CAREBR R
NYSSSYL R- THELPAL R
TODD's WPOSS PENTSED R
SPIRALB RR
SMILTAM R VERBANA R
GERANAC R
[WPOS, 4] CINNORO O
[DBH35] CAREPEL R
VIBVIDEN R

Evelyn divaricata

43.031275, -79.263182
dense patch about 4m x 1m
heavily browsed, few flowers left
small forest inclusion area, under sugar maple
Freeman maple

43.031303, -79.264792
~15 plants in 0.5 - x1m patch, less dense
similar habitat, upland on edge of wetland
+ several hobbled more within 10-15 m

PERSPUN R BIDECON R
LOBESIP R
SCIRCYP R
AMELARB -R--

Meet at Rd.

Edges/Roadside/Ditches

LEUCVUL	CARSUUL	ROSAMUL	PLANMAJ
CICHINT	VERBOFU	SYMPPIL	AGROGIG
DAUCCAR	PASTSAT	CARELAS	SCIRHAT
PLANLAN	VITRIP	CAREARC	XANTSTR
DACTGLO	CENTSAC	ASCLSYR	LYSINUM
MEDILUP	ERIGANU	POPUDEL	RORRSYL
TRIREP	AMBRART	QUERPAL	PERSLON
CORNRAC	CIRSVUL	EUPAPER	VERBURT
TRIHYB	SCIRATR	CARELUP	GEUMALE
TRIPRA	LIGUVUL	PERSSAG	EUTHMAC
TARAOFF	RHUSTP	JUNCEFF	DICHMP
EQUIARV	RHAMCAT	CYPESTR	SOLIMEM
MELIALB	POA_PRA	ONOCSEN	SYMPERT
VICICRA	SONCARV	PHALARU	BROMSUB
SOLIACT	DIPSFUL	SOLIJUN	LACTSER
VIBULEN	SOLIRUG	LOTUCOR	PICEABI
PHLEPRA	HYPEPER	SECUVAR	CARESPI
LATHLAT	PLANRUG	PRAGAUS	ILEXVER
FRANALN	PRUNVIR	RUBUALL	VERBTHA
ACHIMIL	JUNCDUD	ALISPLA	LONITAT
ULMUAME	RUMECRI	HYPEPUN	
LYTHSAL	EUTHGRA	FESTRUB	
FRAXPEN	SYMPNOV	OXALSTR	
SYMPLAN	LOLIARU	OENOBIE	
PRUNVUL	AGRIGRA	SCHOTAB	
	PERSVIR	TUSSFAR	
	RANUACR	QUERMAC	

* species noted in hedgerows, roadside etc.

29-30 July 2021

Rite in the Rain

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Road | POLYGON: A
SURVEYOR(S): TRH | DATE: Sept 30 2020 | TIME: start / finish
UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL	G ORGANIC	G LACUSTRINE	G NATURAL	G PLANKTON	G LAKE
G WETLAND	G MINERAL SOIL	G RIVERINE	G CULTURAL	G SUBMERGED	G POND
G AQUATIC	G PARENT MIN.	G BOTTOMLAND		G FLOATING-LVD.	G RIVER
	G ACIDIC BEDRK.	G TERRACE		G GRAMINOID	G STREAM
SITE	G BASIC BEDRK.	G VALLEY SLOPE		G FORB	G MARSH
G OPEN WATER	G CARB. BEDRK.	G TABLELAND		G LICHEN	G SWAMP
G SHALLOW WATER		G ROLL. UPLAND		G BRYOPHYTE	G FEN
G SURFICIAL DEP.		G CLIFF		G DECIDUOUS	G BOG
G BEDROCK		G TALUS	COVER	G CONIFEROUS	G BARREN
		G CREVICE / CAVE		G MIXED	G MEADOW
		G ALVAR	G OPEN		G PRAIRIE
		G ROCKLAND	G SHRUB		G THICKET
		G BEACH / BAR	G TREED		G SAVANNAH
		G SAND DUNE			G WOODLAND
		G BLUFF			G FOREST
					G PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			W
2	SUB-CANOPY			White Ash > Gray Dog wood > Bebb's willow
3	UNDERSTOREY			Canada goldenrod > Lance Leaved Goldenrod
4	GRD. LAYER			Pig ~~nut~~ peanut > wild Raspberry > Reed Canary

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT<1 m 6 = 0.2<HT<0.5 m 7 = HT<0.2 m

CVR CODES: 0 = NONE 1 = 0% < CVR < 10% 2 = 10 < CVR < 25% 3 = 25 < CVR < 60% 4 = CVR > 60%

STAND COMPOSITION: | BA:

		< 10		10 - 24		25 - 50		> 50
SIZE CLASS ANALYSIS:								
STANDING SNAGS:								
DEADFALL / LOGS:								

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: Sandy	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE: Dry-Fresh	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

SOSP
BLJA

ELC
PLANT SPECIES LIST

Forb Meadow Dry-Fresh Forb

SITE:
POLYGON: A Meadow ECOSITE MEFM1
DATE:
SURVEYOR(S): TRH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.
ASTE NOV				O	
SOLI RUG				O	
ASTEPEL				O	

SPECIES CODE	LAYER 1	2	3	4	COL.

Full Sp. List in Todd's Field notebook

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Road | POLYGON:
SURVEYOR(S): TR+J | DATE: Sept. 2020 | TIME: start / finish
UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN. G ACIDIC BEDRK. G BASIC BEDRK. G CARB. BEDRK.	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL. UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G CULTURAL	G PLANKTON G SUBMERGED G FLOATING-LVD. G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SAVANNAH G WOODLAND G FOREST G PLANTATION

SITE	COVER
G OPEN WATER G SHALLOW WATER G SURFICIAL DEP. G BEDROCK	G OPEN G SHRUB G TREED

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY	5	3	Narrow leaved cattail > cuckoo > spotted Joe-pye
4	GRD. LAYER	6	2	Lady's thumb > sensitive fern

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR ≤ 25% 3= 25 < CVR ≤ 60% 4= CVR > 60%

STAND COMPOSITION:	BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50		> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: Sandy loam	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE: Moist	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Narrow leave cattail Meadow Marsh

ELC
PLANT SPECIES LIST

SITE:
POLYGON: C
DATE:
SURVEYOR(S):

Cattail Graminoid Mineral Meadow Marsh TYPE MAM1-2

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.

SPECIES CODE	LAYER 1	2	3	4	COL.

Page 2 of 7

Plant list in Todd's Note Book

ELC
COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: | POLYGON:

SURVEYOR(S): TRM | DATE: Sept 30, 20 | TIME: start / finish

UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL G WETLAND G AQUATIC	G ORGANIC G MINERAL SOIL G PARENT MIN. G ACIDIC BEDRK. G BASIC BEDRK. G CARB. BEDRK.	G LACUSTRINE G RIVERINE G BOTTOMLAND G TERRACE G VALLEY SLOPE G TABLELAND G ROLL UPLAND G CLIFF G TALUS G CREVICE / CAVE G ALVAR G ROCKLAND G BEACH / BAR G SAND DUNE G BLUFF	G NATURAL G CULTURAL	G PLANKTON G SUBMERGED G FLOATING-LVD. G GRAMINOID G FORB G LICHEN G BRYOPHYTE G DECIDUOUS G CONIFEROUS G MIXED	G LAKE G POND G RIVER G STREAM G MARSH G SWAMP G FEN G BOG G BARREN G MEADOW G PRAIRIE G THICKET G SAVANNAH G WOODLAND G FOREST G PLANTATION
SITE G OPEN WATER G SHALLOW WATER G SURFICIAL DEP. G BEDROCK			**COVER** G OPEN G SHRUB G TREED		

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY	H	4	Phrag
4	GRD. LAYER	5	4	Phrag

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50		> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH
	X									

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE: moist	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Phrag Meadow Marsh

ELC
PLANT SPECIES LIST

SITE:
POLYGON: #C
DATE:
SURVEYOR(S):

Common Reed Graminoid Mineral Meadow Marsh Type MAMM1-12

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.

SPECIES CODE	LAYER 1	2	3	4	COL.

Same plant list as #C but phrag is

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Road		POLYGON: B	
SURVEYOR(S): TRH	DATE: Sept. 30, 200	TIME: start	
		finish	
UTMZ:	UTME:	UTMN:	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL	G ORGANIC	G LACUSTRINE	G NATURAL	G PLANKTON	G LAKE
G WETLAND	G MINERAL SOIL	G RIVERINE	G CULTURAL	G SUBMERGED	G POND
G AQUATIC	G PARENT MIN.	G BOTTOMLAND		G FLOATING-LVD.	G RIVER
	G ACIDIC BEDRK.	G TERRACE		G GRAMINOID	G STREAM
SITE	G BASIC BEDRK.	G VALLEY SLOPE		G FORB	G MARSH
G OPEN WATER	G CARB. BEDRK.	G TABLELAND	COVER	G LICHEN	G SWAMP
G SHALLOW WATER		G ROLL UPLAND	G OPEN	G BRYOPHYTE	G FEN
G SURFICIAL DEP.		G CLIFF	G SHRUB	G DECIDUOUS	G BOG
G BEDROCK		G TALUS	G TREED	G CONIFEROUS	G BARREN
		G CREVICE / CAVE		G MIXED	G MEADOW
		G ALVAR			G PRAIRIE
		G ROCKLAND			G THICKET
		G BEACH / BAR			G SAVANNAH
		G SAND DUNE			G WOODLAND
		G BLUFF			G FOREST
					G PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	4	Silver Maple > Red Oak > Black Ash
2	SUB-CANOPY	4	2	Glossy Buckthorn > Red Osier > Common Elderberry
3	UNDERSTOREY			Not much / couldn't see
4	GRD. LAYER			

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR ≤ 25% 3= 25 < CVR ≤ 60% 4= CVR > 60%

STAND COMPOSITION: BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50	> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50	> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50	> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER		YOUNG	X	MID-AGE		MATURE	OLD GROWTH

SOIL ANALYSIS:

TEXTURE: Minero	DEPTH TO MOTTLES / GLEY	g =	G=	
MOISTURE: Moist	DEPTH OF ORGANICS:			(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:			(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Silver Maple Swap

ELC PLANT SPECIES LIST

SITE: Silver Maple Mineral Deciduous Swamp type SWD3-2

POLYGON: B

DATE:

SURVEYOR(S): TRH

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.

SPECIES CODE	LAYER 1	2	3	4	COL.

See TRH Note Book for Sp List

Dumping & trails, cutting of dead Ash

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Road | POLYGON: D
SURVEYOR(S): TRH | DATE: Sept 29 2020 | TIME: start / finish
UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL (T)	G ORGANIC	G LACUSTRINE	G NATURAL	G PLANKTON	G LAKE
G WETLAND	G MINERAL SOIL (M)	G RIVERINE	G CULTURAL (C)	G SUBMERGED	G POND
G AQUATIC	G PARENT MIN.	G BOTTOMLAND		G FLOATING-LVD.	G RIVER
	G ACIDIC BEDRK.	G TERRACE		G GRAMINOID (G)	G STREAM
SITE	G BASIC BEDRK.	G VALLEY SLOPE	**COVER**	G FORB	G MARSH
	G CARB. BEDRK.	G TABLELAND		G LICHEN	G SWAMP
G OPEN WATER		G ROLL. UPLAND	G OPEN (O)	G BRYOPHYTE	G FEN
G SHALLOW WATER (S)		G CLIFF	G SHRUB	G DECIDUOUS	G BOG
G SURFICIAL DEP. (S)		G TALUS	G TREED	G CONIFEROUS	G BARREN,
G BEDROCK		G CREVICE / CAVE		G MIXED	G MEADOW (M)
		G ALVAR			G PRAIRIE
		G ROCKLAND			G THICKET
		G BEACH / BAR			G SAVANNAH
		G SAND DUNE			G WOODLAND
		G BLUFF			G FOREST
					G PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	2	E.W. Pine > N. Spruce > E.W. Cedar
2	SUB-CANOPY			None
3	UNDERSTOREY	6	4	Red Cone Grass > Queen-ane Lace
4	GRD. LAYER	9	6	Kentucky Blue grass

HT CODES: 1 = >25 m 2 = 10<HT<25 m 3 = 2<HT<10 m 4 = 1<HT<2 m 5 = 0.5<HT<1 m 6 = 0.2<HT<0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR < 10% 2= 10 < CVR < 25% 3= 25 < CVR < 60% 4= CVR > 60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50		> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :	X	PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE: Dry	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes: Mowed, Some Dumping @ edge of Swamp

Manicured

ELC PLANT SPECIES LIST

SITE:
POLYGON: D
DATE:
SURVEYOR(S):

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.

SPECIES CODE	LAYER 1	2	3	4	COL.

See TRH field notes for SR List

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Road | POLYGON: F

SURVEYOR(S): TRH | DATE: Sept 30, 2020 | TIME: start / finish

UTMZ: | UTME: | UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL (7)	G ORGANIC	G LACUSTRINE	G NATURAL (7)	G PLANKTON	G LAKE
G WETLAND	G MINERAL SOIL (7)	G RIVERINE	G CULTURAL	G SUBMERGED	G POND
G AQUATIC	G PARENT MIN.	G BOTTOMLAND		G FLOATING-LVD.	G RIVER
	G ACIDIC BEDRK.	G TERRACE		G GRAMINOID	G STREAM
SITE	G BASIC BEDRK.	G VALLEY SLOPE	**COVER**	G FORB	G MARSH
	G CARB. BEDRK.	G TABLELAND		G LICHEN	G SWAMP
G OPEN WATER		G ROLL UPLAND	G OPEN	G BRYOPHYTE	G FEN
G SHALLOW WATER		G CLIFF	G SHRUB	G DECIDUOUS (7)	G BOG
G SURFICIAL DEP. (9)		G TALUS	G TREED (9)	G CONIFEROUS	G BARREN
G BEDROCK		G CREVICE / CAVE		G MIXED	G MEADOW
		G ALVAR			G PRAIRIE
		G ROCKLAND			G THICKET
		G BEACH / BAR			G SAVANNAH
		G SAND DUNE			G WOODLAND
		G BLUFF			G FOREST (7)
					G PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	6	Sugar Maple > AM. Beech > Blackcherry
2	SUB-CANOPY	3	3	Spice Bush
3	UNDERSTOREY	4	1	Cinnimon Fer
4	GRD. LAYER			Not Much / couldn't see

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50		> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:		PIONEER		YOUNG	X	MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: Fine Loam	DEPTH TO MOTTLES / GLEY	g =	G=
MOISTURE: Fresh	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

Sugar Maple Deciduous forest

ELC PLANT SPECIES LIST

SITE: Fresh – Moist Sugar Maple – Hardwood Deciduous Forest Type

POLYGON: F

DATE:

SURVEYOR(S): TRH FOD6-5

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.	SPECIES CODE	LAYER 1	2	3	4	COL.

Sp. Notes → in TRH Note Book

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Merritt Road		POLYGON: E	
SURVEYOR(S): TRH	DATE: Sept. 30, 20	TIME: start	
UTMZ:	UTME:	UTMN:	finish

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
G TERRESTRIAL	G ORGANIC	G LACUSTRINE	G NATURAL	G PLANKTON	G LAKE
G WETLAND	G MINERAL SOIL	G RIVERINE	G CULTURAL	G SUBMERGED	G POND
G AQUATIC	G PARENT MIN.	G BOTTOMLAND		G FLOATING-LVD.	G RIVER
	G ACIDIC BEDRK.	G TERRACE		G GRAMINOID	G STREAM
SITE	G BASIC BEDRK.	G VALLEY SLOPE	**COVER**	G FORB	G MARSH
	G CARB. BEDRK.	G TABLELAND		G LICHEN	G SWAMP
G OPEN WATER		G ROLL UPLAND	G OPEN	G BRYOPHYTE	G FEN
G SHALLOW WATER		G CLIFF	G SHRUB	G DECIDUOUS	G BOG
G SURFICIAL DEP.		G TALUS	G TREED	G CONIFEROUS	G BARREN
G BEDROCK		G CREVICE / CAVE		G MIXED	G MEADOW
		G ALVAR			G PRAIRIE
		G ROCKLAND			G THICKET
		G BEACH / BAR			G SAVANNAH
		G SAND DUNE			G WOODLAND
		G BLUFF			G FOREST
					G PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	White Ash > American Elm
2	SUB-CANOPY	4	4	Choke Cherry > Glossy Buckthorn > Red Osier Dogwood
3	UNDERSTOREY	5	3	Rough Agrimony, Riverbank Grape
4	GRD. LAYER			None but couldn't see.

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0= NONE 1= 0% < CVR ≤ 10% 2= 10 < CVR ≤ 25% 3= 25 < CVR ≤ 60% 4= CVR > 60%

STAND COMPOSITION:	BA:

SIZE CLASS ANALYSIS:		< 10		10 - 24		25 - 50		> 50
STANDING SNAGS:		< 10		10 - 24		25 - 50		> 50
DEADFALL / LOGS:		< 10		10 - 24		25 - 50		> 50

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :		PIONEER	X	YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: Mineral	DEPTH TO MOTTLES / GLEY	g =	G=	
MOISTURE: Dry	DEPTH OF ORGANICS:			(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:			(cm)

COMMUNITY CLASSIFICATION:

		ELC CODE
COMMUNITY CLASS:		
COMMUNITY SERIES:		
ECOSITE:		
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC PLANT SPECIES LIST

SITE: E Native Shrub Deciduous Hedgerow Thicket Type	
POLYGON:	
DATE:	THIDM3
SURVEYOR(S): TRH	

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER

ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COL.

SPECIES CODE	LAYER 1	2	3	4	COL.

See TRH field Notes for Sp. List

TRM Sept 30, 2020 Merritt Road

TRH Sept. 30, 2020
Merritt Road

TRH

Sept 30, 2020

Merritt Road

TRH Sept. 30, 2020 Merritt Road

Meadow
Parking Lot
Soccer Field
Soybean
Pasture
Pasture
Pasture

Location Merritt Road Date Sept 30 1 of 6

Project / Client

A

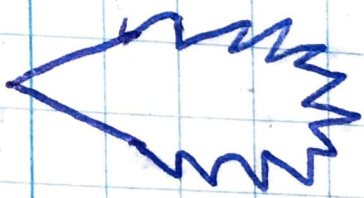
ELC Meadow

Bur Cocklebur
High Bush Cranberry
Canada Golden Rod
River Bank grape
White Ash
Bebb's willow
wild Raspberry
Virginia Creeper
Red osier Dogwood
Arrowwood?
Stag horn Sumac
Moon Seed
American ELM
Grey Dogwood
Burdock
Blackoak
PINoak?
Curly Dock

Seen White tailed Deer

BCCH
Swsp
Shell Bark Hickory
~~Pignut~~ Hickory
@ Edge (N)

Reed Canary Grass
Purple loosestrife
Fig wort
Boneset
Ladies-Legged golden Rod



wetland inclusion (LEC)

Sensitive fern
Narrow leaved cattail
Buckthorn
Lady's thumb
Tall Tickseed → Yellow Flowers

Counter
But likely has some

Bull Rush sp.

→ Expands into wetland might get water from there

Location Merrit Road Date Sept 30, 21

Project / Client

Swamp (B) 20c6

~~Wetland~~ N Side of Low

RBWO
4MRO
WTSP

Trembling Aspen
Silver Maple Dominant
w/ FD Shrub very Red and
leaves
Choke Cherry
→ Deadish trees
Glossy Buckthorn
Multiflora Rose
Poison Ivy, Climbing
Am. Bass
Common ~~Red~~ Elderberry
Southside
Blackoak
→ Much Rot cavity habitat in
Red Sil. Maple / Ash
→ ATV US on trail
Red Osier dogwood

Still Bankchickow
Red oak

Location Merritt Road Date Sept 30, 20

Project / Client

Meadow cont: 3 of 6 HOSP

wetland ⓒ PEFA

→ sedge sp MAWA

Common Reed WIWA

Spotted Joe pie weed GBHE

Swamp Milkweed KILL

Blue Vervain RTHA

old culvert found @ WPISS1

17T 0641145111 4765776

South side ~ 1.5m wide, following

apron, ~~trees~~ one end (S) covered

by stems → Good for Amerans

~~spotted Joe pie weed~~

American water plantain

→ vernal pools

WP1552 17T 0641424

4765772

Enchoters Nightshade

Common Milkweed high Bush cranberry

common mullein Red clover

Hawthorn sp. Mannyberry

Knopweed sp.

Timothy

Flat top / like goldenrod

Ragweed

Rite in the Rain

Location Merritt Road

Date Sept. 30 '12

Project / Client Niagara

4 of 6

(F) Barred Owl Sp.

Maple forest

Sugar Maple

Spice Bush

Black Cherry

Cinimen fer ?

Sassafras

Am. Beech

Ash Sp.

/GH

NAWA

BLJA

BRCR

MODO

DOWO

A in SE side

Manicured (D)

Reed Canary Grass Dom.

Queen Anns Lace

Ash & Cotton Near NW side

Private Property

Hunting Blind in pond @ Back of property

E.w. cedar

E.w. Pine

N. Spruce

White willow

Some Dumping in Natural Area

Kentucky Bluegrass around Pond

Pond at N of WP 153

0641196 4765770

Location Merritt Road Date 30 Sept 23

Project / Client 5 of 6

Thicket (E)

River Bank Grape
Redosier Dogwood
Chokecherry
White Ash
High Bush cran.
Glossy Buckthorn
Silver Maple
Rough Agrimony
Multiflora Rose
Bebb's willow
Shell Bark Hickory
American Elm
Poison Ivy (climbing
Russian olive
Nanny Berry
Hawthorn Sp.
Large Oak with Long Lobe leaf
Gray Dogwood

Pointed

Another spot for cherry Survey 5
WP 1554 0641672 4765771

Epidemic Fly
Cotoneaster
AMGO
NOCA
Sp. Keeper
Eastern Chipmunk
Frog Sp.

104 Location Merrith Road Date Sept. 30, 2020
6 of 6

Project / Client

Annvon Survey location @ wp
1555 17T 0641328 4765774

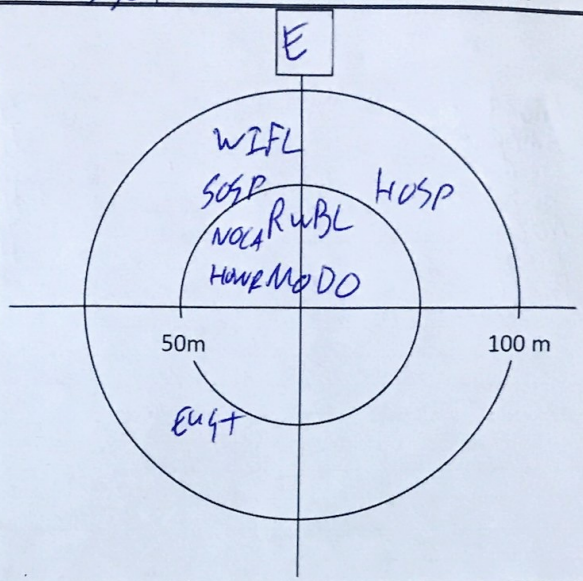
Start: 9:15 Tuva
End
weather: Rainy @ times
thunderstorm T5°C
Looks like there could be
flowing water Between the 2
Sides of the swamp.

Mink & Eastern Gartersnake Deadon
Road BTWN meadowview & cascade

Breeding Bird Survey Form

Project Name: Merritt Rd		Project Number:		Observers: TRH	Date: June 10, 21	Round: 1	
Point Count #: BB17		UTM:	17N 2010306		Primary Habitat: Shrub	Modifier:	
Cloud: 0	Temp (°C): 16	Wind: 0	Precip: None	Start (24hr): 5:30	Secondary Habitat:	Modifier:	

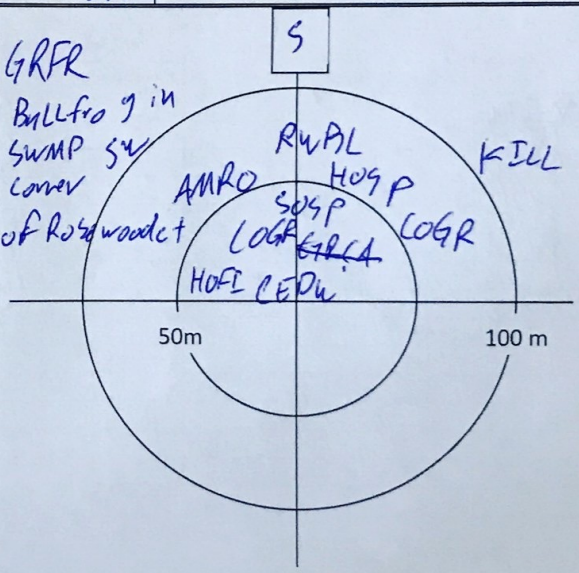
Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	2									S
NOCA	1									S
SOSP	1									S
HOSP				1						H
MODO	1									F
WIFL				1						S
EUST				2	2					S
AMRO					1					S
HOWR			1							S



Project Name: Merritt Rd		Project Number:		Observers: TRH	Date: June 10, 21	Round: 1	
Point Count #: BB16		UTM:	17N 2010306		Primary Habitat: Swamp	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 5:46	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	2									S
SOSP	1									S
~~COGR~~ GRCA	1									S
KILL							1			H
COGR	1		1	1						H
~~KILL~~										
AMRO				1						A
HOSP	1									H
~~GRCA~~ CEDW	2									H
HOFI			1							H

GRFR
Bullfrog in swamp w/ cover of Rosa woodcf



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar-Birch Forest	7. Jack Pine-Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar-Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar-Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch-Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

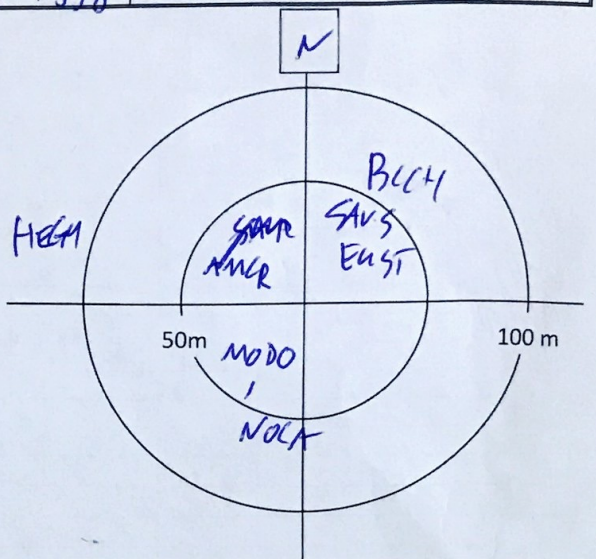
Breeding Evidence

Observed (OB)		Probable (PR)			Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

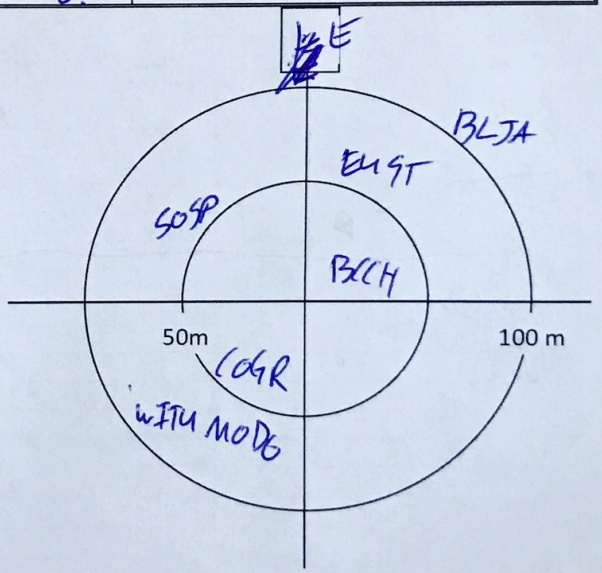
Project Name:	Merr. Tr Rd	Project Number:		Observers: TRH	Date: June 10/21	Round: 1
Point Count #:	15	UTM:	1M2010 3036		Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 558	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
SAVS	1									S
AMCR	1									H
HEGH							1			F
MODO	1									H
NOCA				1						S
EUST	2									H
BLCH				1						S



Project Name:	Merr. Tr Rd	Project Number:		Observers: TRH	Date: June 10, 21	Round: 1
Point Count #:	14	UTM:	1M2010 3036		Primary Habitat: Hedgerow	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 6:00	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
WITH				1						S
BCH	1									S
AMRO	1									S
SOSP				2						S
EUST				1						F
BLJA							1			F
COGR					1					H
MODO			1							S



Weather:

Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale:	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

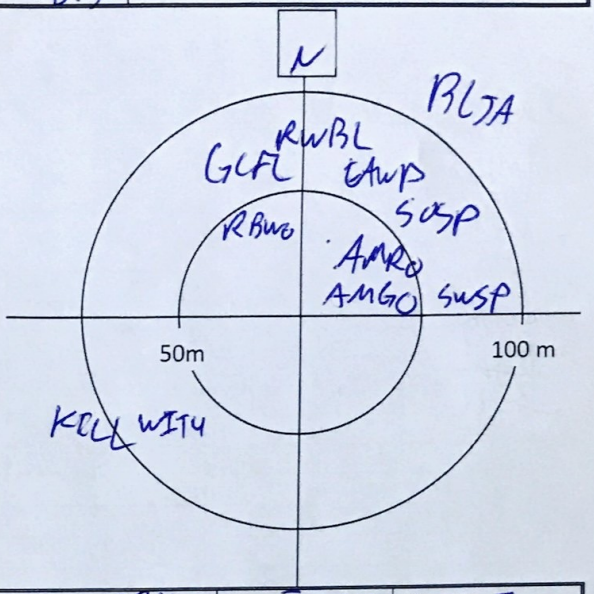
Breeding Evidence

Observed (OB)		Probable (PR)			Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

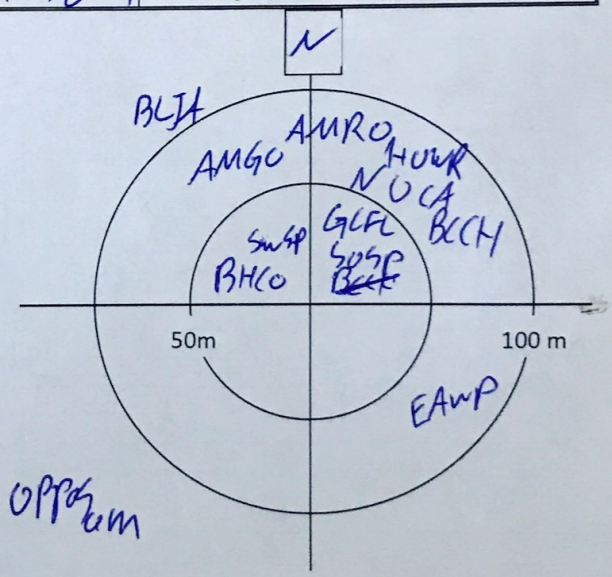
Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 10, 21	Round: 2
Point Count #: 3	UTM: 1M2010303G		Primary Habitat: Swamp	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 6:30	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
WITG				1						D
EAWP				1						S
RBWO	1									S
AMRO				1						S
BLJA							1			H
SOSP				1						H
SWSP				1						S
AMGO		1								H
RWBL				1						F
GCFL						1				S
KILL									1	F



Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 6,21	Round: 1
Point Count #: 12	UTM: 1M2063036		Primary Habitat: Swamp	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 6:43	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
GCFL	1									S
SOSP	1									S
AMGO				1						F
NOCA				1						S
EAWP				1						S
SWSP	1									S
HOWR				1						S
BLJA							1			H
BCCH				1						H/F
AMRO			1							A
BHCO			1							F
COYE						1				S



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

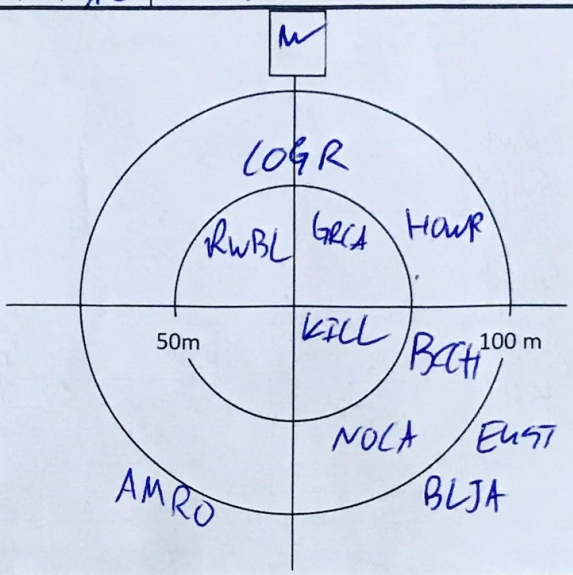
Breeding Evidence

Observed (OB)		Probable (PR)			Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

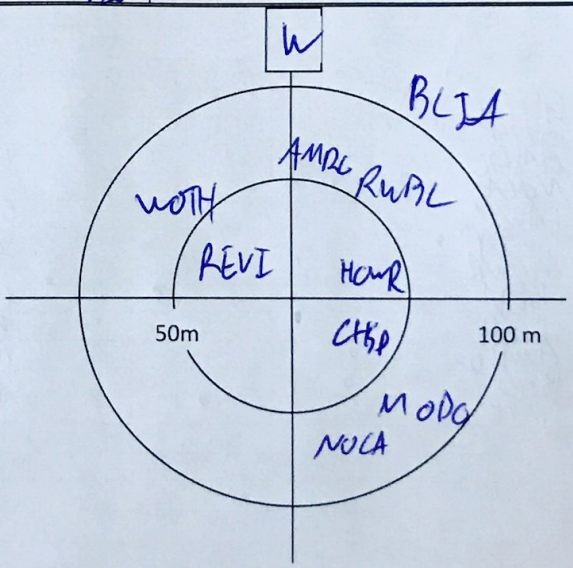
Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 2021	Round: 1
Point Count #: 11	UTM: 1M20	03036	Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 710	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	1									S
GRCA	1									H
AMRO							1			S
HOWR				1						S
NOCA				1						S
EUST							1			H
BLJA							1			H
COGR					1					F/H
BCCH						1				S
~~RAVE~~										
KILL			1							F



Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 2021	Round: 1
Point Count #: 10	UTM:	1M20103036	Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 720	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
REVI	1									S
HOWR	1									S
CHSP										S
EUST							2			P
NOCA							1			S
RWBL				1						S
AMRO				1						H
BLJA							1			H
WOTH					2	1				S
MODO						1				S
BHCO			1							H



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar-Birch Forest	7. Jack Pine-Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar-Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar-Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch-Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

Breeding Evidence

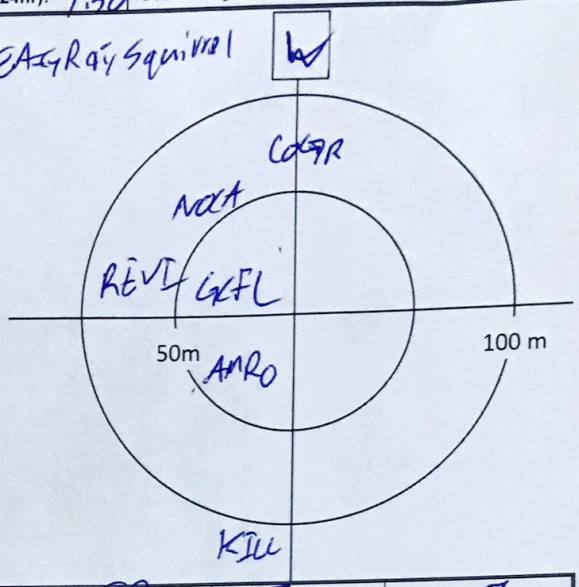
Observed (OB)		Probable (PR)		Confirmed (CO)	
X Species Observed	P Pair Observed	A Aggressive Behaviour	DD Distraction Display	FS Carrying Fecal Sac
Possible (PO)	T Territory	N Nest	NU Used Nest	CF Carrying Food
H Suitable Habitat	D Courtship or Display	V Visiting Probable Nest Site	FY Feeding Young	NE Nest With Eggs
S Male Singing			AE Adults Entering or Leaving Nest	NY Nest With Young

Breeding Bird Survey Form

Project Name: Merritt Rd		Project Number:		Observers: TRH		Date: June 10, 21	Round: 1
Point Count #: 9		UTM:	1N2010 3036			Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 7:30		Secondary Habitat:	Modifier:

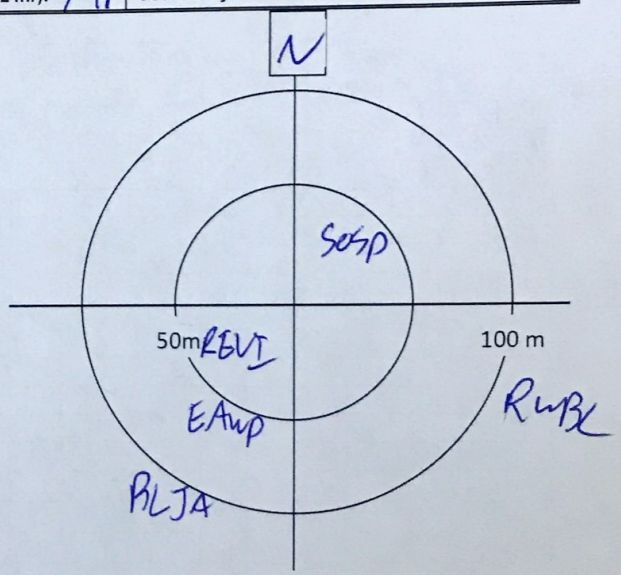
Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
NOCA				1						S
AMRO	1	1	1							S
COGR				1						H
KILL							1			F
REVI				1			1			NE S
GCFL		1								

EAGRSq



Project Name: Merritt Rd		Project Number:		Observers: TRH		Date: June 10, 21	Round: 1
Point Count #: 8		UTM:	1N2010 3036			Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind: 2	Precip:	Start (24hr): 7:41		Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
REVI	1									S
SOSP	1									S
BLJA							1			H
RWBL							1			S
EAWP					1					



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

Breeding Evidence

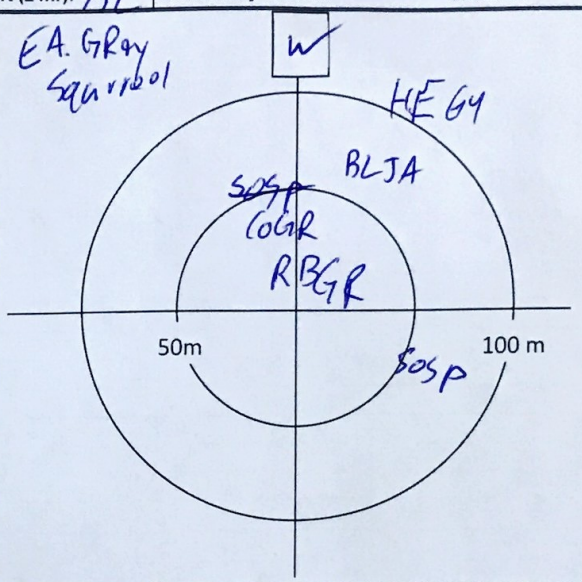
Observed (OB)		Probable (PR)			Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

Project Name: Merritt Rd		Project Number:		Observers: TRH	Date: June 10, 21	Round: 1	
Point Count #: 7		UTM: 17N 0201036			Primary Habitat:	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 757	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
BLJA				1						S
RBGR	0	1								H
CoGR	1									H
SOSP		0								S
HEGR							1			F

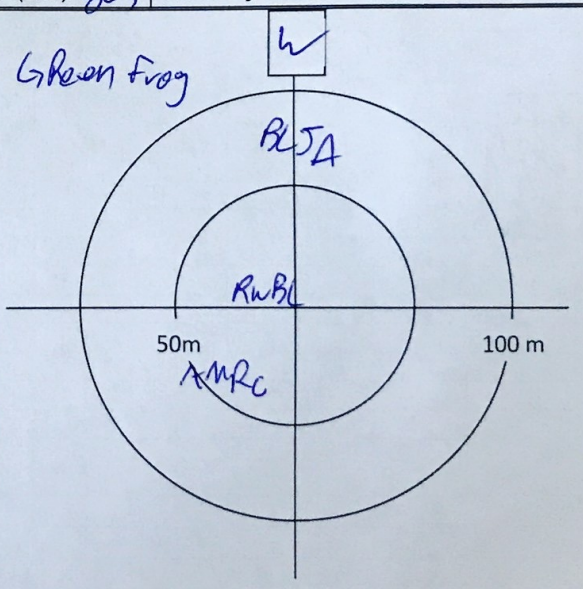
EA. Gray Squirrel



Project Name: Merritt Rd		Project Number:		Observers: TRH	Date: June 10, 21	Round: 2	
Point Count #: 6		UTM: 17N 0201036			Primary Habitat:	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 803	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	2									A
BLJA	1		1	1						H
AMRO	1									S

Green Frog



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

					Modifiers:
1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	1. Plantation
2. Poplar-Birch Forest	7. Jack Pine-Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	2. Regenerating/Young
3. Poplar-Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	3. Mid-aged
4. Poplar-Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	4. Mature
5. Birch-Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	

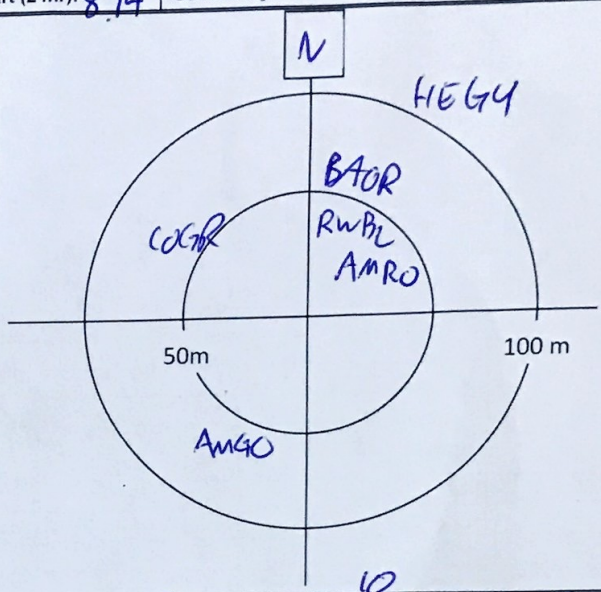
Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)	
X Species Observed	P Pair Observed	A Aggressive Behaviour	DD Distraction Display	FS Carrying Fecal Sac	
Possible (PO)	T Territory	N Nest	NU Used Nest	CF Carrying Food	
H Suitable Habitat	D Courtship or Display	V Visiting Probable Nest Site	FY Feeding Young	NE Nest With Eggs	
S Male Singing			AE Adults Entering or Leaving Nest	NY Nest With Young	

Breeding Bird Survey Form

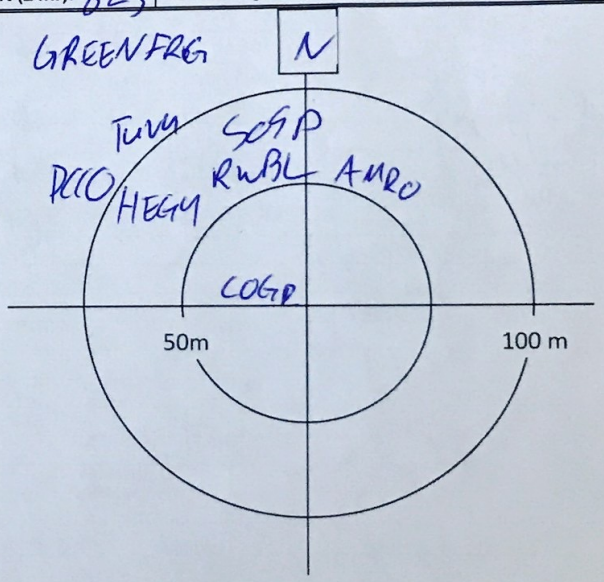
Project Name: Merritt Road	Project Number: IM20103036	Observers: TRH	Date: June 10, 2021	Round: 1	
Point Count #: 5	UTM:		Primary Habitat:	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 8:14	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
AMRO	0									H
RWBL	0									S
BAOR				0						H
AMGO				0						H
SOSP					0					S
COGR					0					H
HEGY									0	F



Project Name: Merritt Road	Project Number:	Observers: TRH	Date: June 10, 2021	Round: 1	
Point Count #: 4	UTM: IM20103036		Primary Habitat:	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 8:25	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
TUVU							0			F
COGR	0						H			H
DCCO							H			F
RWBL				0						S
AMRO		0		0						S/CF
SOSP				0						S
HEGY					0					F



Weather:

Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale:	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

Breeding Evidence

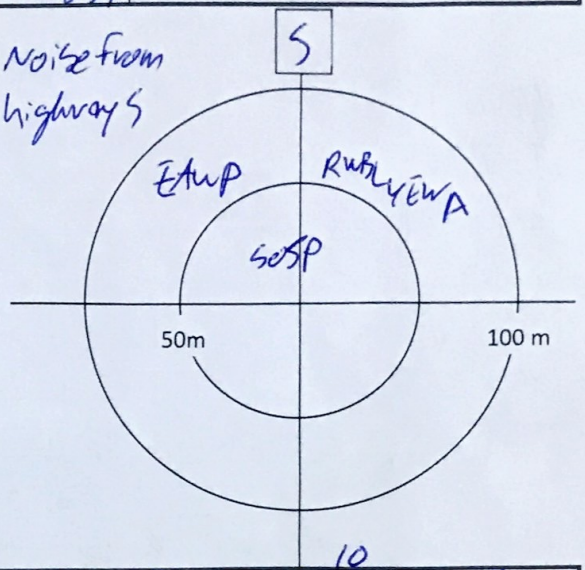
Observed (OB)		Probable (PR)			Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 10, 21	Round: 1
Point Count #: 3	UTM: 17N 2010303 6		Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 837	Secondary Habitat:	Modifier:

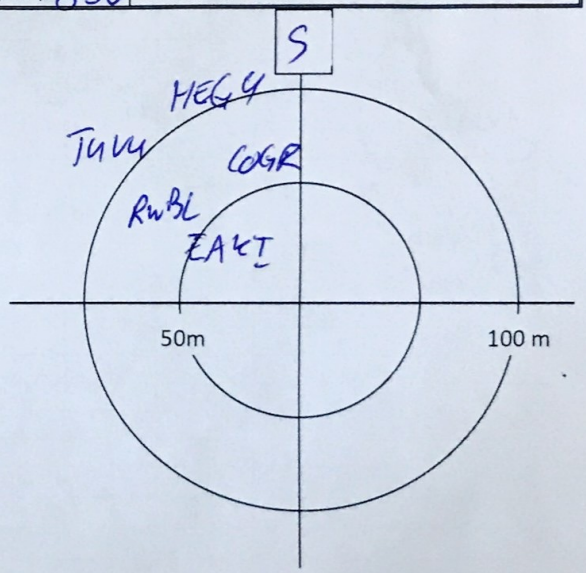
Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
SOSP	•									S
RWBL				•						S
YEWA				•						S
BHCO				•						H
BLJA		•								H
AMRO		•								H
EAKI						•				S

Noise from highway S



Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 10, 21	Round: 1
Point Count #: 2	UTM: 17N 2010303 6		Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 850	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	•									S
COGR	•									H
HEGU				•						F
TUVU					•	•	•			S 4
EAKI										S



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

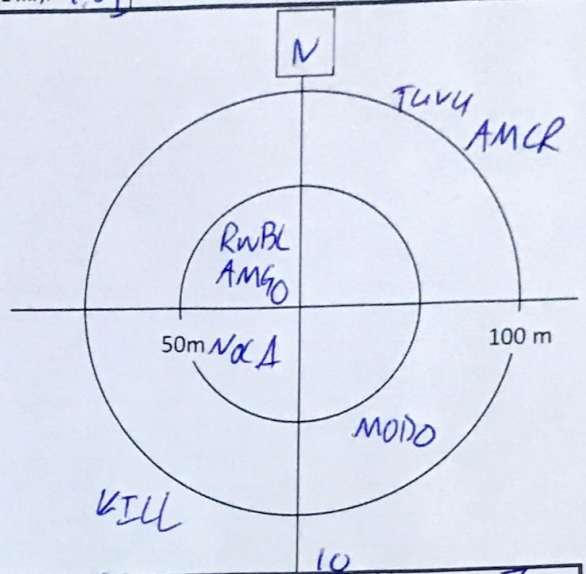
Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

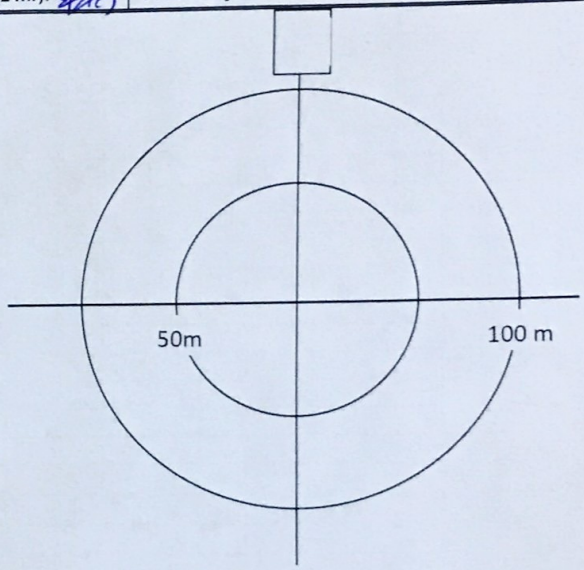
Project Name: Merritt Rd		Project Number:		Observers: TRH	Date: June 10, 21	Round: 1	
Point Count #: 1		UTM:	17N 0103036		Primary Habitat:	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 9:07	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	2									S
TUVU				1			1			H
MODO				1						S
~~COGR~~ AMGO	1									H
NOCA	1									S
KILL							1			F
AMCR							2			H
SAVS										



Project Name: Merritt Rd		Project Number:		Observers: TRH	Date: June 10, 21	Round: 1	
Point Count #:		UTM:	17N 0103036		Primary Habitat:	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): ~~9:13~~	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

7

Merritt Road BB1
Merritt Road BB2
Merritt Road BB3
Merritt Road BB4
Merritt Road BB5
Merritt Road BB6
Hansler Rd
Kotmeier Rd
Grisdale Rd
© 2021 Google
Google E

2

Merritt Road BB12
Merritt Road BB11
Merritt Road BB10
Merritt Rd
Merritt Road BB9
Merritt Road BB8
Merritt Road BB7
Cataract Rd
First Ave
Merritville Hwy
Niagara St
50

3

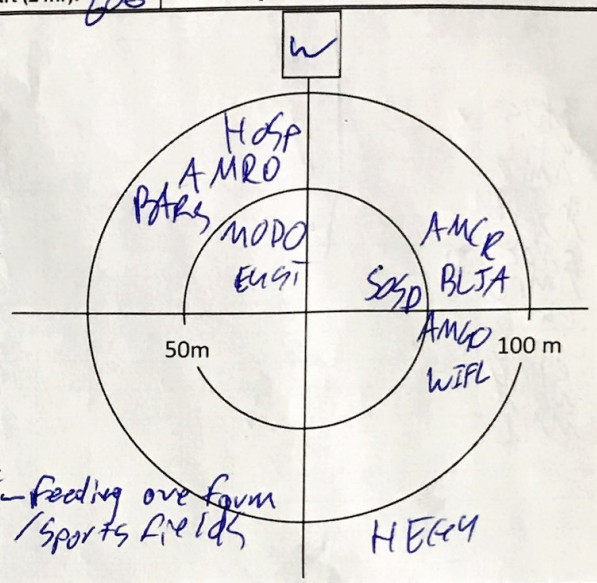
NLFR
NOFL on walk to site

5:10

Breeding Bird Survey Form

Project Name: Merritt Road		Project Number: ~~EM220~~ TMZ01030303		Observers: TRH	Date: June 30, 21	Round: 2	
Point Count #: BB17		UTM:			Primary Habitat:	Modifier:	
Cloud: 70	Temp (°C): 27	Wind:	Precip: None	Start (24hr): 606	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
SOSP										S
MODO										S
AWIL										S
AMGO										S
BLJA										H
HEGU										~~H~~ F
AMRO										S
HOSP										H
EUST										CF
AMCR										H
KILL										S
RWBL										H
NOFA										S
BARS										~~H~~ F

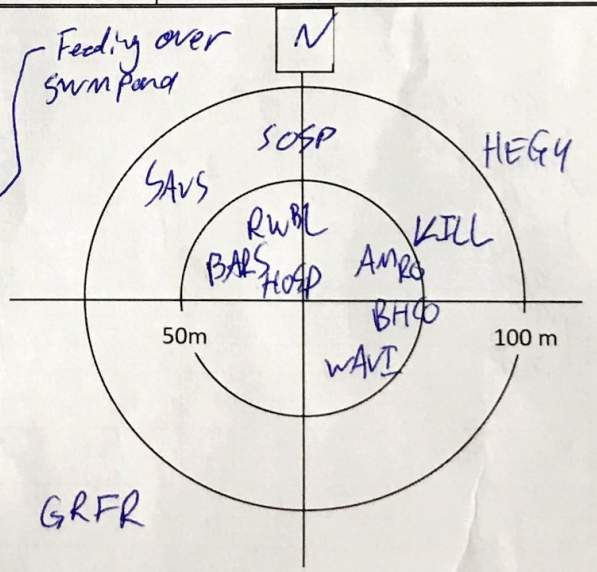


Feeding over farm / sports fields

Project Name: Merritt Road		Project Number:		Observers: TRH	Date: June 30, 21	Round: 2	
Point Count #: BB16		UTM:			Primary Habitat:	Modifier:	
Cloud:	Temp (°C):	Wind:	Precip: None	Start (24hr):	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
KILL										S
AMRO										
BHCO										H
HEGU										F
BARS										F
RWBL										A
SAVS										A
HOSP										A
WAVI										S
SOSP										S

Feeding over swamp pond



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

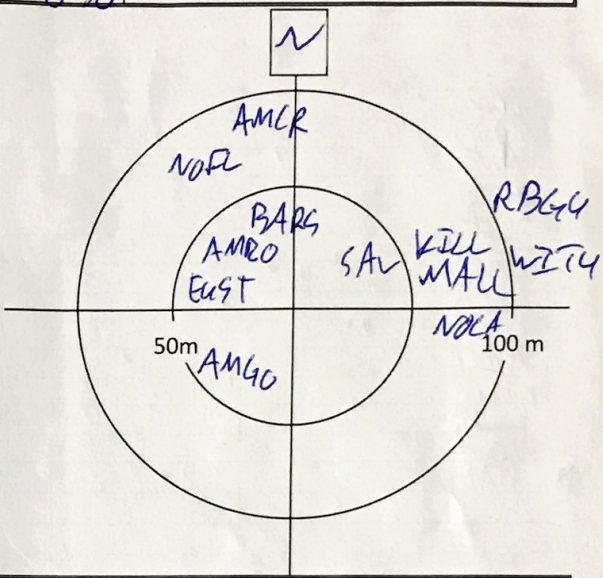
Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

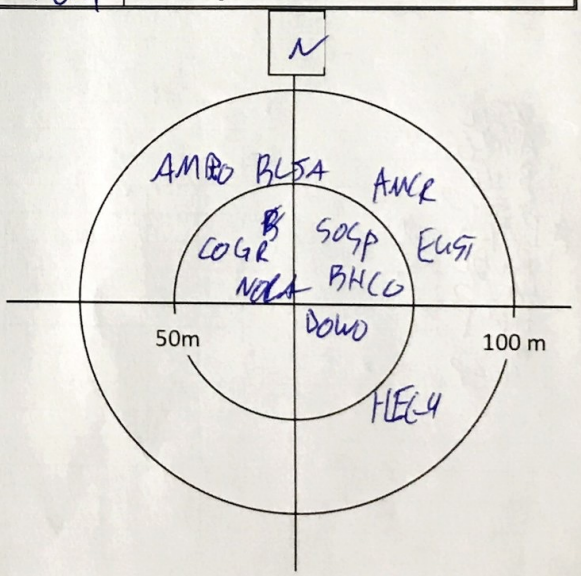
Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 30, 24	Round: 2
Point Count #: BB15	UTM: 17N 201030		Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 6:30	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
SAVS	1									S
KILL				2						S
AMCR				1						H
WITH							1			D
NOFL				1						S
BARS	2									F
AMRO	1									S
EUST	1									H
AMGO		2								S
RBGU								1		F
NOCA					1					S
MALL					1					H



Project Name: Merritt Rd	Project Number:	Observers: TRH	Date: June 30, 24	Round: 2
Point Count #: BB14	UTM:		Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 6:41	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
SOSP	1									S
EUST	1									H
AMRO	1									S
AMCR				2						H
BLJA				1						H
HEGU					1					F
DOWO	1									H
NOCA		1								H
BHCO		1								H
COGR			1							H



Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale: 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

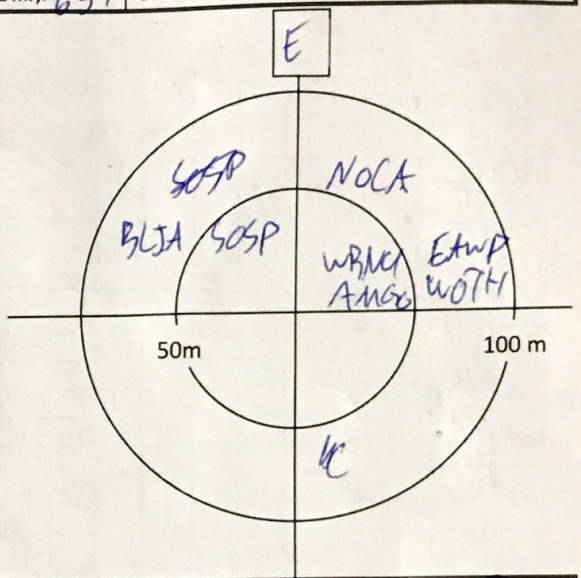
Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

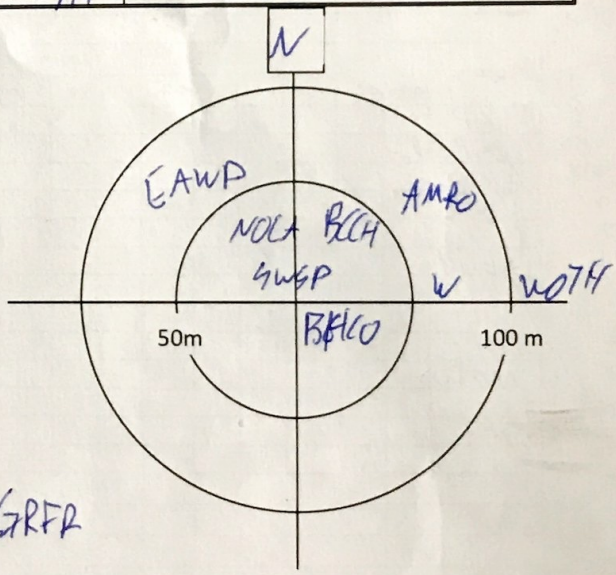
Project Name: Merritt Road	Project Number:	Observers: TRH	Date: June 30, 21	Round: 2			
Point Count #: BB13	UTM: 14 201030			Primary Habitat:	Modifier:		
Cloud: 100	Temp (°C):	Wind: 2	Precip: 0	Start (24hr): 659	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
GRCA	2									S
SOSP	2									S
BAOR	2									H
BLJA				1						H
AMRO	1									H
WBNU	1									S
WOTH				1						S
NOCA				1						S
[illegible]										
EAWP				1						S
RWBL					1					H



Project Name: Merritt Road	Project Number:	Observers: TRH	Date: June 30, 21	Round: 2			
Point Count #: BB13	UTM:			Primary Habitat:	Modifier:		
Cloud: 100	Temp (°C):	Wind:	Precip:	Start (24hr): 711	Secondary Habitat:	Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
EAWP	1									S
NOCA	2									S
BLJA	2									S
SOSP										S
SWSP	1									H
AMRO				1	1					S
WOTH							1			S
BHCO		1								H



GRFR

Weather:

Wind Scale: 0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	**Precipitation Scale:** 0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

Breeding Evidence

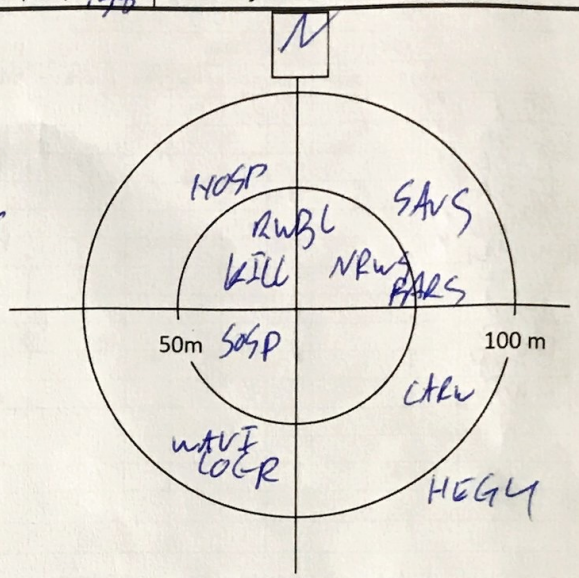
Observed (OB)		Probable (PR)		Confirmed (CO)	
X Species Observed	P Pair Observed	A Aggressive Behaviour	DD Distraction Display	FS Carrying Fecal Sac	
Possible (PO)	T Territory	N Nest	NU Used Nest	CF Carrying Food	
H Suitable Habitat	D Courtship or Display	V Visiting Probable Nest Site	FY Feeding Young	NE Nest With Eggs	
S Male Singing			AE Adults Entering or Leaving Nest	NY Nest With Young	

Breeding Bird Survey Form

Project Name:	Merritt Road	Project Number:		Observers:	TRH	Date:	Round:
Point Count #:	BB7	UTM:				Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr):		Secondary Habitat:	Modifier:

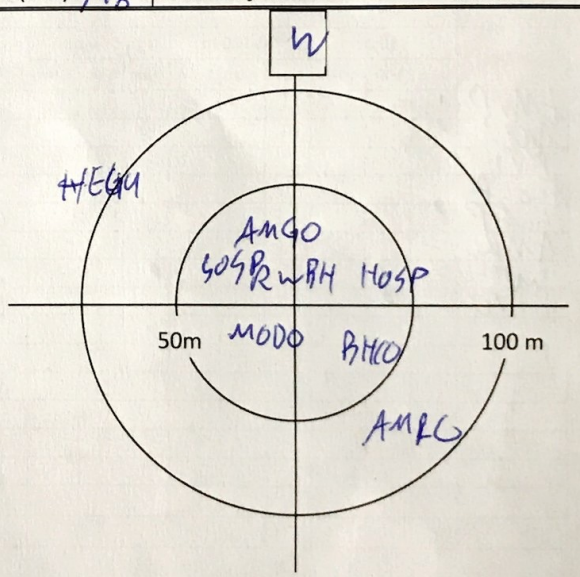
Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
SOSP										S
KILL										H
RWBL										H
SAVS										S
~~NRWS~~										~~H~~ F
BARS										F
SOSP										S
HOSP										H
WAVI										S
COGR										H
HEGU										F
MOLA										S
EAST										H
SAVS										S

CARW
NRWS



Project Name:	Merritt Road	Project Number:		Observers:	TRH	Date:	Round:
Point Count #:	BB2	UTM:				Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr):		Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
HOSP										H
SOSP										S
AMCO										H
RWBL										S
BHCO										H
HEGU										F
AMRO										H
EAST										H
COGR										H
MODO										H



Weather:

Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale:	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

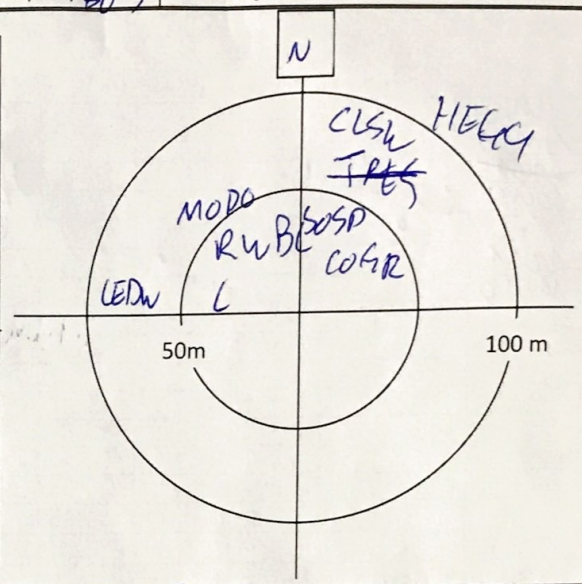
Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

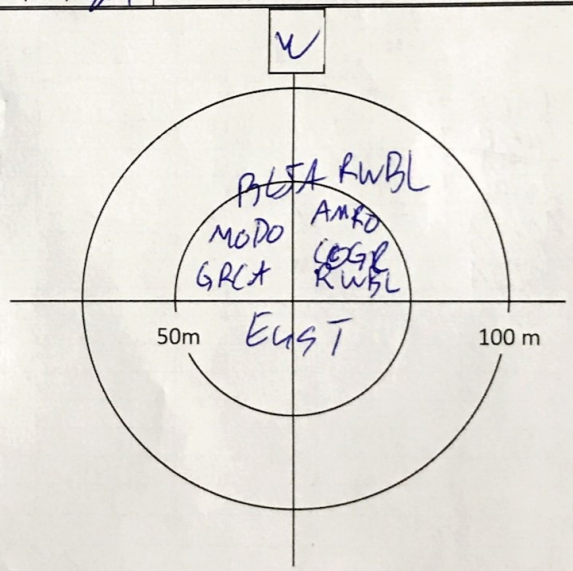
Project Name:	Merritt Rd	Project Number:		Observers:	TRM	Date:	June 30, 21	Round: 2
Point Count #:	BB 3	UTM:	17N 201035			Primary Habitat:		Modifier:
Cloud:	Temp (°C):	Wind: 3	Precip:	Start (24hr):	603	Secondary Habitat:		Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	•									S
SOSP	•									S
COGR	•									M
CLSW FREG							•			H
MODO				•						H
CEDW				•						H
HEGU							•			F



Project Name:	Merritt Rd	Project Number:		Observers:	TRM	Date:	June 30, 21	Round: 2
Point Count #:	BB4	UTM:				Primary Habitat:		Modifier:
Cloud:	Temp (°C):	Wind: 3	Precip:	Start (24hr):	614	Secondary Habitat:		Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
COGR	•									H
MODO	•									H
AMRO	•									H
RWBL	•			•						A
GRCA	•									S
BLJA		•								H
SOSP		•								S
EAST			•							H
HEGU				•						F



Weather:

Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale:	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar-Birch Forest	7. Jack Pine-Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar-Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar-Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch-Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

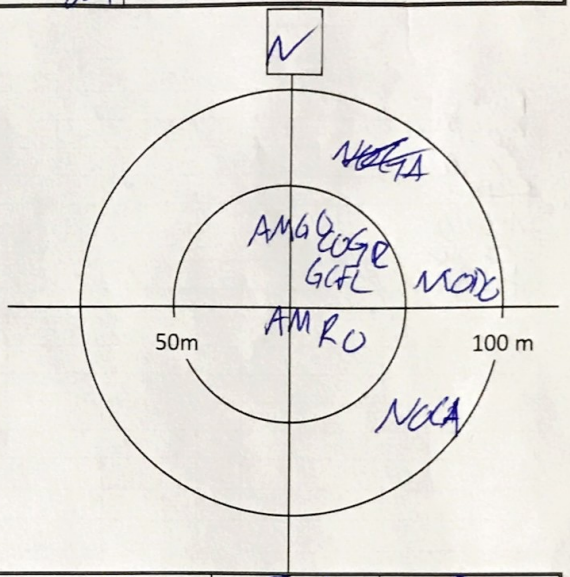
Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

Project Name:	Merritt Rd	Project Number:		Observers:	TRH	Date:	June 30, 21	Round:	2
Point Count #:	BB5	UTM:	1M 2016303			Primary Habitat:		Modifier:	
Cloud:	Temp (°C):	Wind:	Precip: None	Start (24hr):	624	Secondary Habitat:		Modifier:	

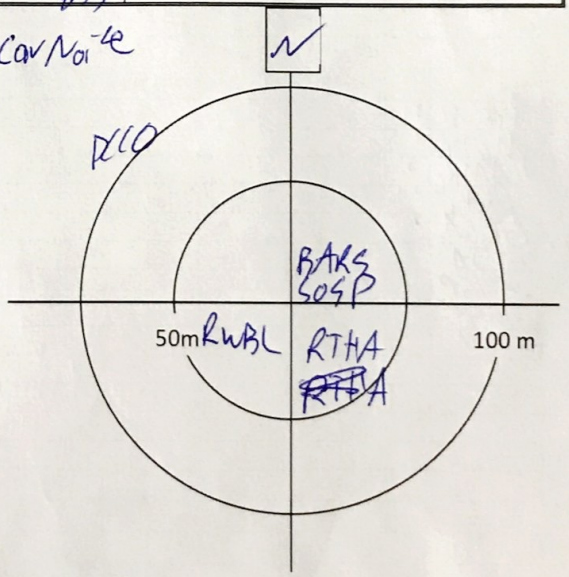
Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
AMRO	4									S
AMGO	4									H
~~RWBL~~ BHCO				1						H
COGR	2									H
GCFL		1								S
NOCA							2			H
MOPO						1				H



Project Name:	Merritt Rd	Project Number:		Observers:	TRH	Date:	June 30, 21	Round:	2
Point Count #:	BB6	UTM:				Primary Habitat:		Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr):	635	Secondary Habitat:		Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
BARS	2	1								F
SOSP	4									S
~~RTHA~~ RTHA	2									S ~~S~~
RWBL	1									H
AMGO				1						H
DCCO							1			H
BCSA				1			1			S

Cav Noise



Weather:

Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale:	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

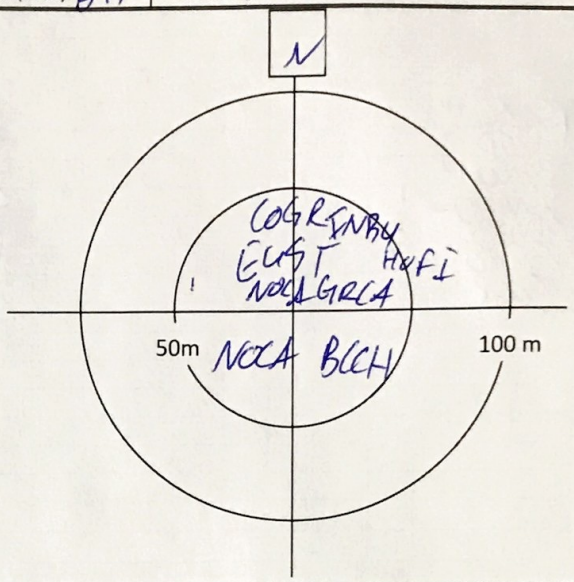
Breeding Evidence

Observed (OB)		Probable (PR)		Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

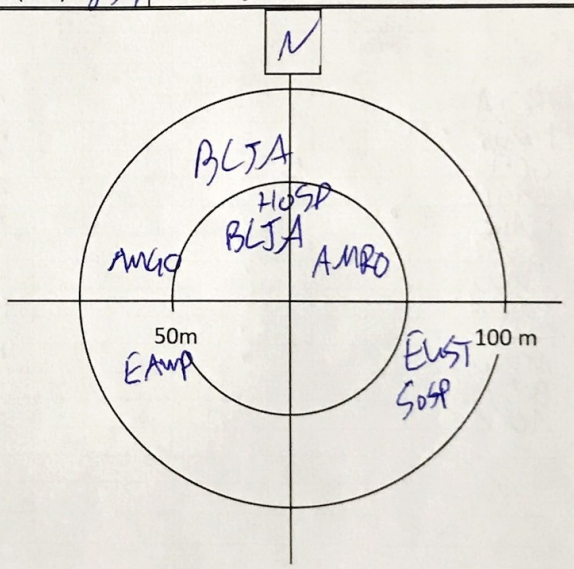
Project Name: Merritt Rd		Project Number:		Observers: TRM		Date: June 30/24	Round: 2
Point Count #: BB7		UTM: 17N 2010303				Primary Habitat:	Modifier:
Cloud:	Temp (°C): 27	Wind: 2	Precip: 0	Start (24hr): 647		Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
INBU	1									S
AMCR	1									S
GRCA	1									S
BLJA				1						H
EUST	1									H
COGR				1						H
NOCA		1								P
HOFI			1							S
BCCH			1							S



Project Name: Merritt Rd		Project Number:		Observers: TRM		Date: June 30/24	Round: 2
Point Count #: BB8		UTM:				Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr): 457		Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
BLJA				1						H
HOSP	1									H
AMRO	1									H
EUST				1						S
SOSP				1						S
AMGO					1					S
EAWP					1					S



Weather:

Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale:	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

Breeding Evidence

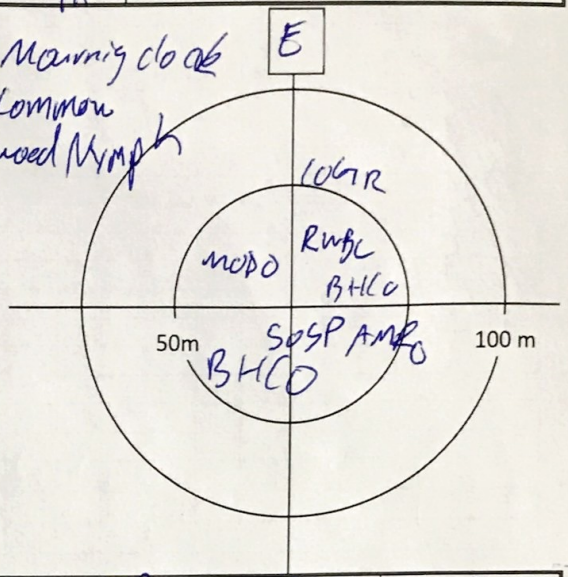
Observed (OB)		Probable (PR)			Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

Project Name:	Merritt Rd	Project Number:		Observers:	TRH	Date:	June 30, 24	Round:	2
Point Count #:	BB11	UTM:	17N 201303			Primary Habitat:		Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr):	911	Secondary Habitat:		Modifier:	

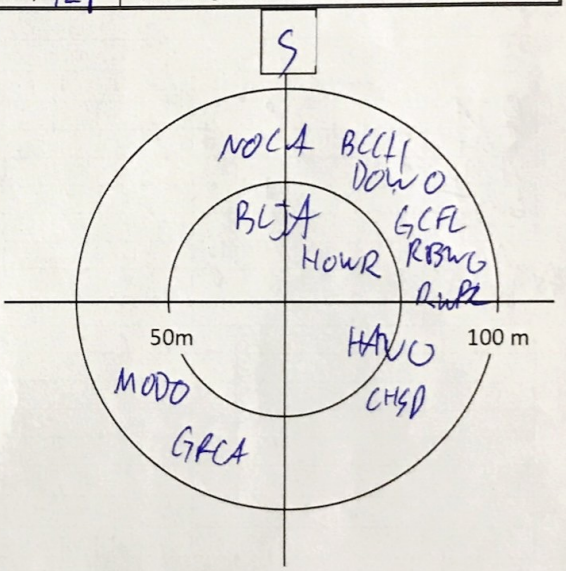
Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
RWBL	0									S
SOSP	0									S
BHCO	0									H
AMGO		1								H
MODO		0								S
AMRO		0								S
COGR				0						H

Morning cloak
Common wood Nymph



Project Name:	Merritt Rd	Project Number:		Observers:	TRH	Date:	June 30, 24	Round:	2
Point Count #:	BB10	UTM:				Primary Habitat:		Modifier:	
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr):	924	Secondary Habitat:		Modifier:	

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
BLJA	0									S
HOWR	0									S
GCFL				0						S
CHSP				0						S
HAWO		0								H
RWBL					0					S
DOWO					0					S
GRCA		0								S
RBWO					0					S
MODO					0					S
BCCH						0				S
NOCA						0				S



Weather:

Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	Precipitation Scale:	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	**Modifiers:**
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	1. Plantation
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	2. Regenerating/Young
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	3. Mid-aged
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	4. Mature

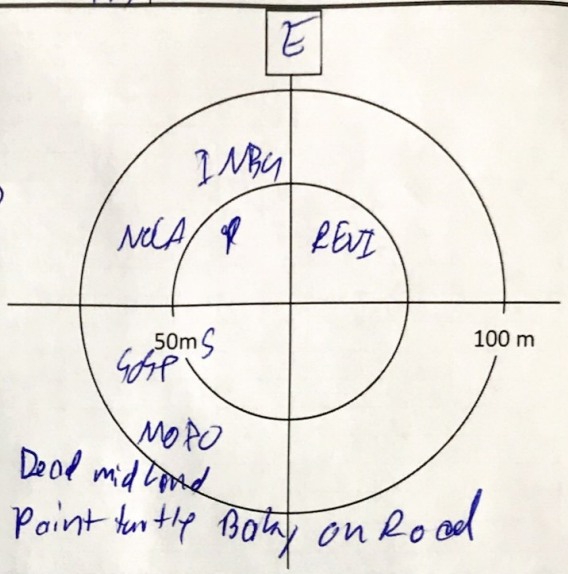
Breeding Evidence

Observed (OB)		Probable (PR)				Confirmed (CO)			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young

Breeding Bird Survey Form

Project Name:	Myers Rd	Project Number:		Observers: TRH	Date: June 30, 21	Round: TRH
Point Count #:	BB 2	UTM:	15N 201023		Primary Habitat:	Modifier:
Cloud: 100	Temp (°C): 30	Wind: 2	Precip: 0	Start (24hr): 937	Secondary Habitat:	Modifier:

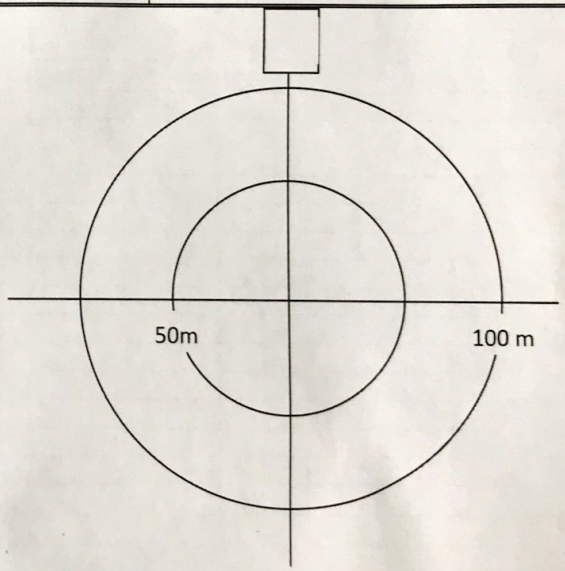
Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	
~~RB~~ INBU										S
NOCA										S
SOSP										S
MOPO										S, FD
REVI										S
RWBL										S



Dead mid Lane
Paint turtle Baby on Road

Project Name:		Project Number:		Observers:	Date:	Round:
Point Count #:		UTM:			Primary Habitat:	Modifier:
Cloud:	Temp (°C):	Wind:	Precip:	Start (24hr):	Secondary Habitat:	Modifier:

Species	<50 m			50-100 m			>100 m			Breeding Evidence
	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	0-3m	3-5m	5-10m	



Weather:

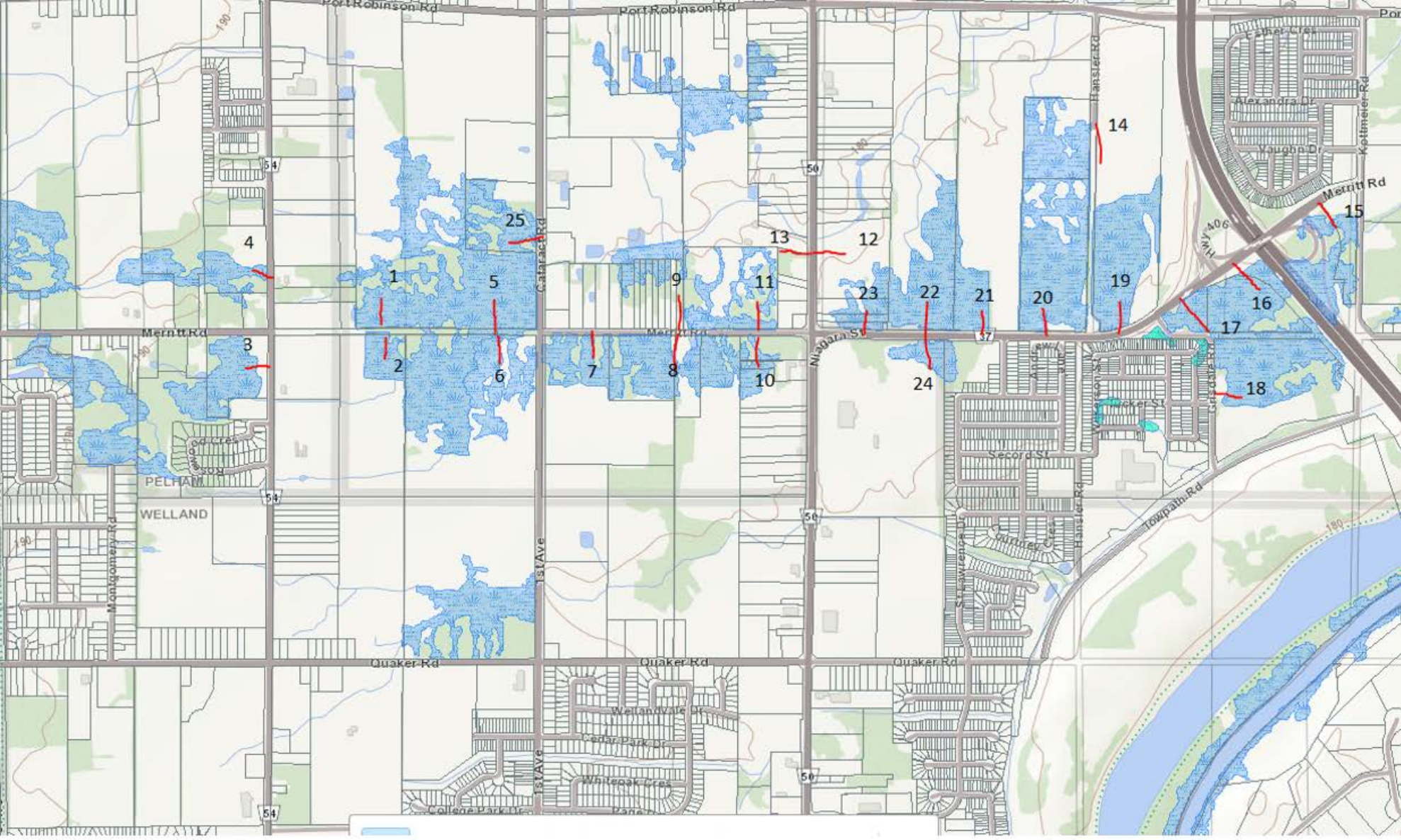
Wind Scale:	0 – Calm, 1 – Light Air, 2 – Light Breeze, 3 – Gentle Breeze	**Precipitation Scale:**	0 – None, 1 – Haze/Fog, 2 – Drizzle, 3 - Rain

Habitat:

					Modifiers:
1. Poplar Forest	6. Spruce Forest	11. Coniferous Treed Swamp	16. Shrub Bog/Poor Fen	21. Hay Crop	1. Plantation
2. Poplar–Birch Forest	7. Jack Pine–Spruce Forest	12. Shrub/Thicket Swamp	17. Open Bog/Fen	22. Clearcut	2. Regenerating/Young
3. Poplar–Spruce Forest	8. Jack Pine Forest	13. Sedge/Meadow Marsh	18. Open Shrubland	23. Roadside	3. Mid-aged
4. Poplar–Jack Pine Forest	9. Deciduous Treed Swamp	14. Cattail/Open Water Marsh	19. Dense Shrubland	24. Open Cut-Line	4. Mature
5. Birch–Spruce Forest	10. Mixed Treed Swamp	15. Treed Bog/Fen	20. Pasture	25. Cultural	

Breeding Evidence

Observed (OB)		**Probable (PR)**		**Confirmed (CO)**			
X	Species Observed	P	Pair Observed	A	Aggressive Behaviour	DD	Distraction Display	FS	Carrying Fecal Sac
Possible (PO)		T	Territory	N	Nest	NU	Used Nest	CF	Carrying Food
H	Suitable Habitat	D	Courtship or Display	V	Visiting Probable Nest Site	FY	Feeding Young	NE	Nest With Eggs
S	Male Singing					AE	Adults Entering or Leaving Nest	NY	Nest With Young


Port Robinson Rd
Merritt Rd
Quaker Rd
Niagara St
Canal Rd
1st Ave
Hansler Rd
Griffith St
Second St
Towpath Rd
Merritt Rd
Hwy 406
PELHAM
WELLAND
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Canada
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Frog Call Survey

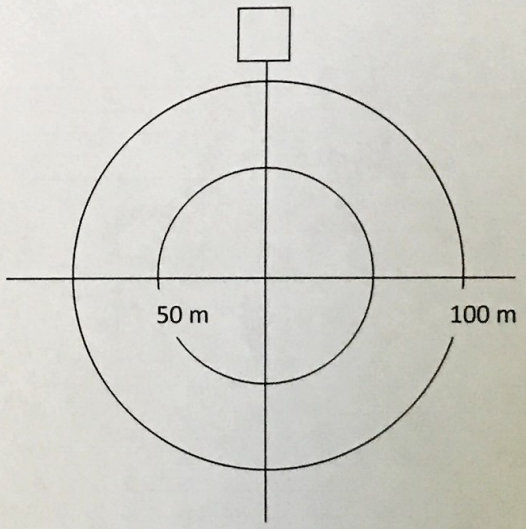
Project Name: Merritt Road		**Project Number:** IM2010336	
Observers: WB			
Date: Apr. 13, 2021	**Start Time (24hr):** 9:15	**End Time (24hr):** 11:18	**Survey Round:** 1
Weather:	**Temperature:** 6.3	**Wind:** 1	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6)
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3)

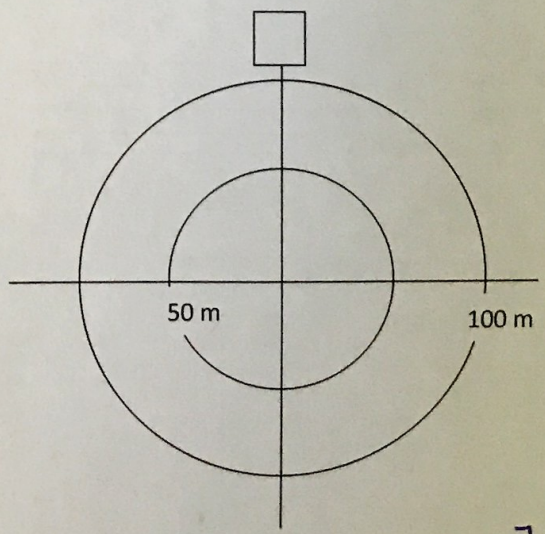
Point Count Name: 1
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 9:15
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		3	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 2
Waypoint/Unit Number:
UTM:
Start Time (24 hr)
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		7	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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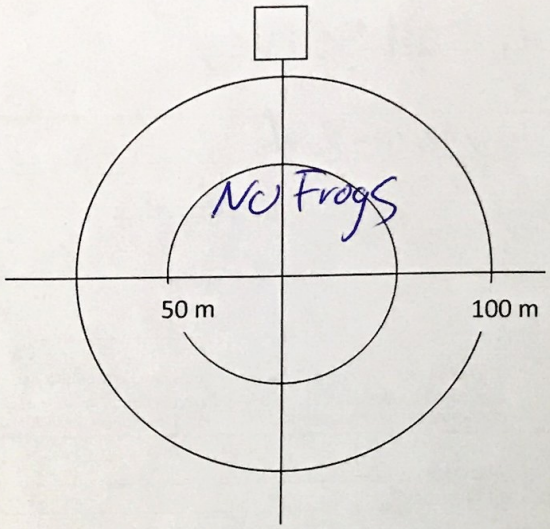
Project Number: TM20103036
Survey Date: Apr. 13, 2021

Point Count Name: 3
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 933
Habitat: Swamp

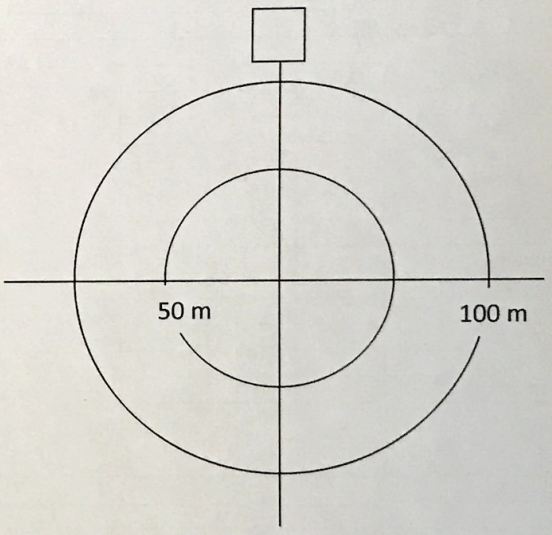
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

No Frogs



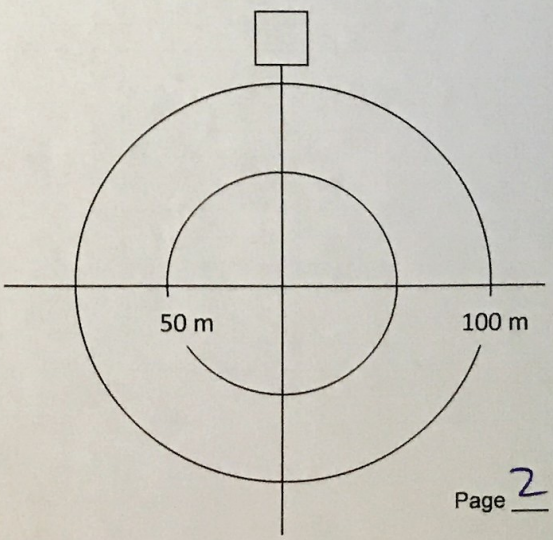
Point Count Name: 4
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 940
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1	
Spring Peeper		1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 5
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 948
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			3



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Frog Call Survey

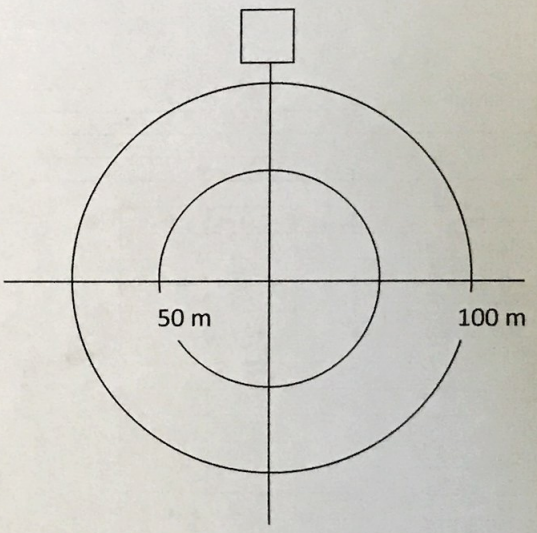
Project Name: Merritt Road		**Project Number:** IM20103036	
Observers: WB			
Date: Apr. 13, 2021	**Start Time (24hr):** See First Page	**End Time (24hr):**	**Survey Round:** 1
Weather:	**Temperature:** 5, 4	**Wind:** 1	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

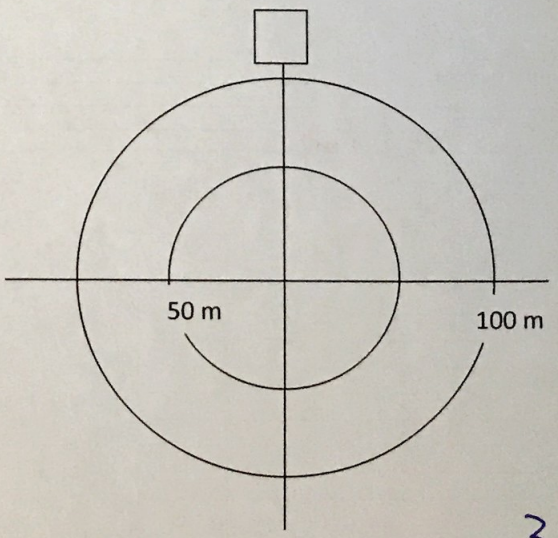
Point Count Name: 6
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 9'52
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog		1	



Point Count Name: 7
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 10'02
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		3	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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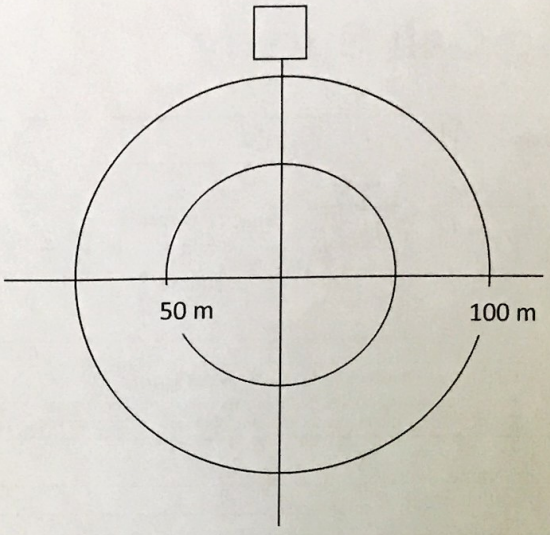
Project Number: TM20103036
Survey Date: April 13, 2021

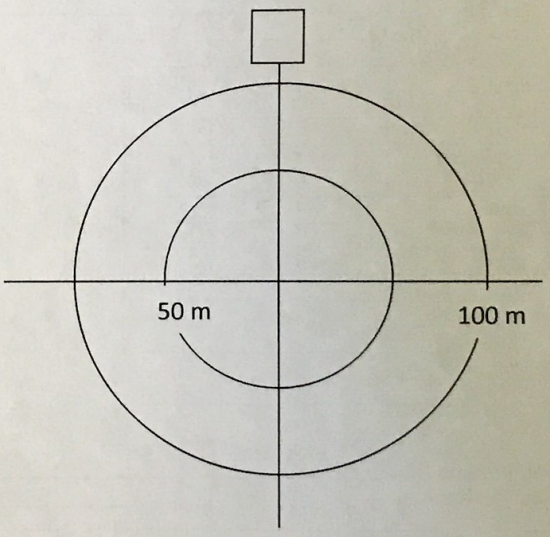
Point Count Name: 8
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1009
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



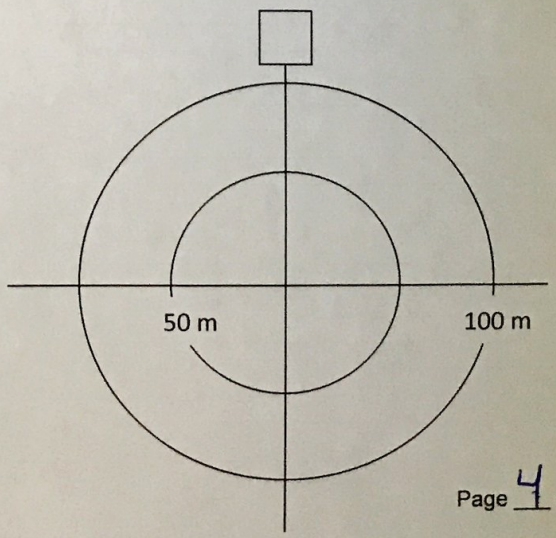
Point Count Name: 9
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1013
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 10
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1016
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

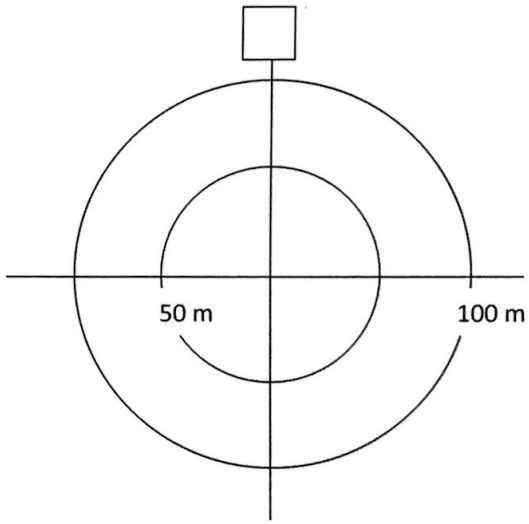
Project Name: Merritt Road		**Project Number:** IM20103036	
Observers: WB			
Date: April 13, 2021	**Start Time (24hr):** See First Page	**End Time (24hr):**	**Survey Round:** 1
Weather:	**Temperature:** 5	**Wind:** 1	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

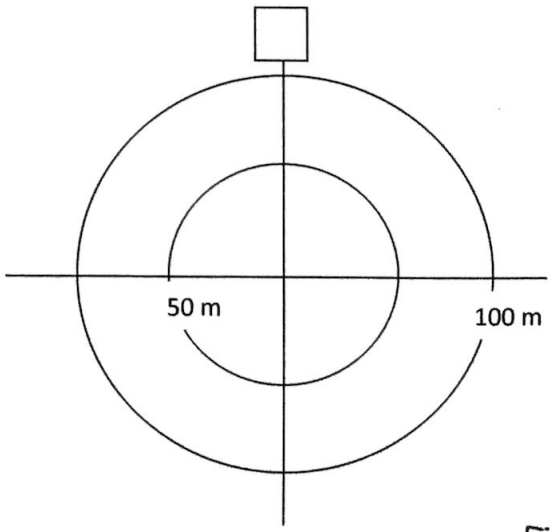
Point Count Name: 11
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1023
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 12
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1029
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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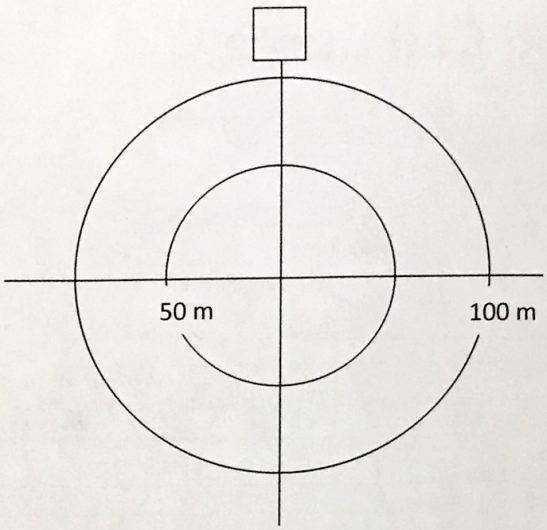
Project Number: IM20103036
Survey Date: April 13, 2021

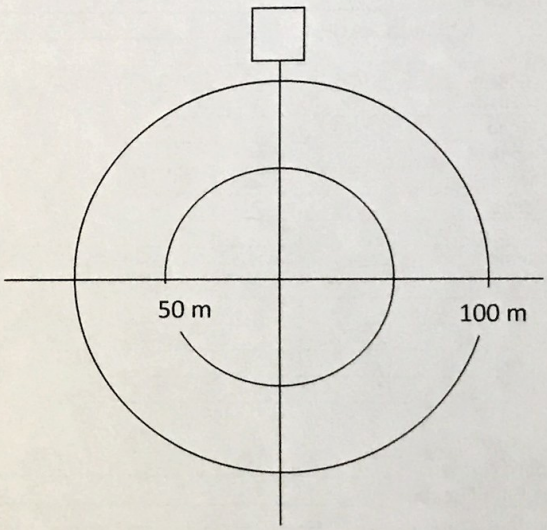
Point Count Name: 13
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1032
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		7	
Spring Peeper		1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



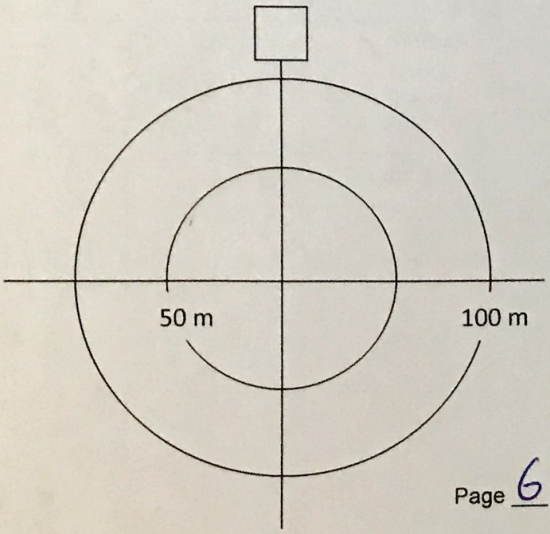
Point Count Name: 14
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1040
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 15
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1047
Habitat: Meadow

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		3	
Spring Peeper		1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

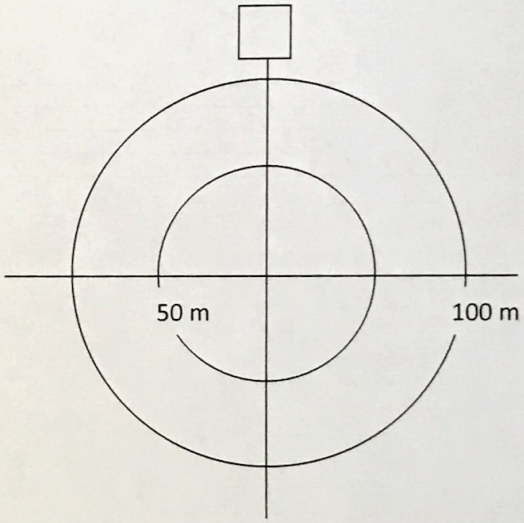
Project Name: Merritt Road		**Project Number:** TM20103036	
Observers: ~~TM~~ WB			
Date: Apr. 13, 2021	**Start Time (24hr):** See first Page	**End Time (24hr):**	**Survey Round:** 1
Weather:	**Temperature:** 4.6	**Wind:** 1	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

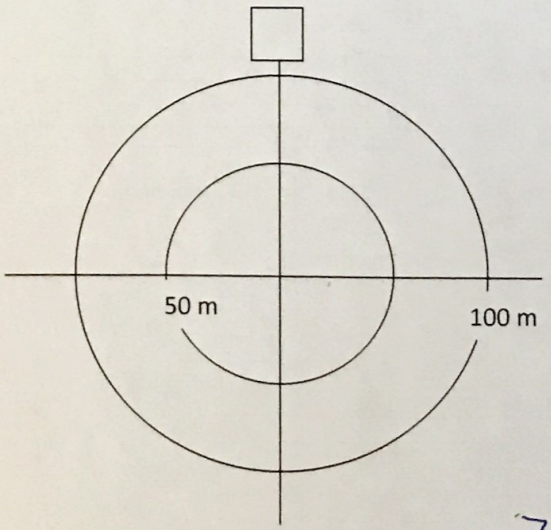
Point Count Name: 16
Waypoint/Unit Number:
UTM:
Start Time (24 hr), 1125
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 17
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1130
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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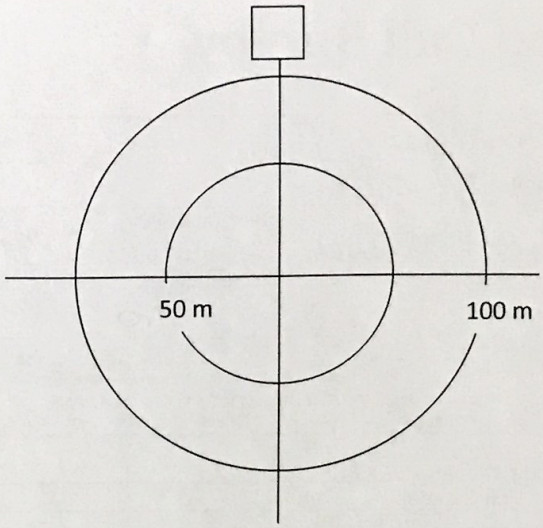
Project Number: IM2010396
Survey Date: April 13, 2021

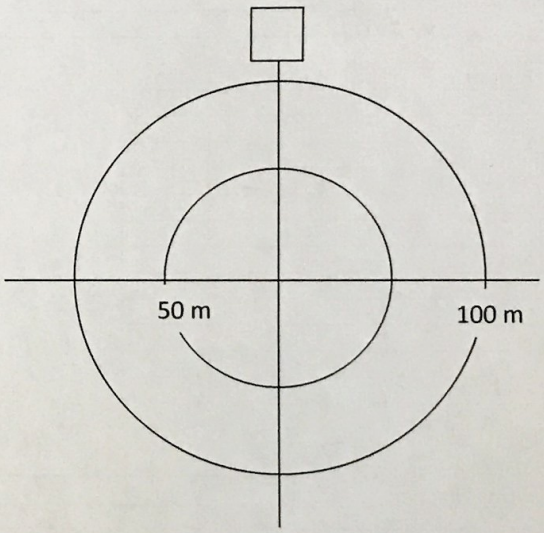
Point Count Name: 18
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1120
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



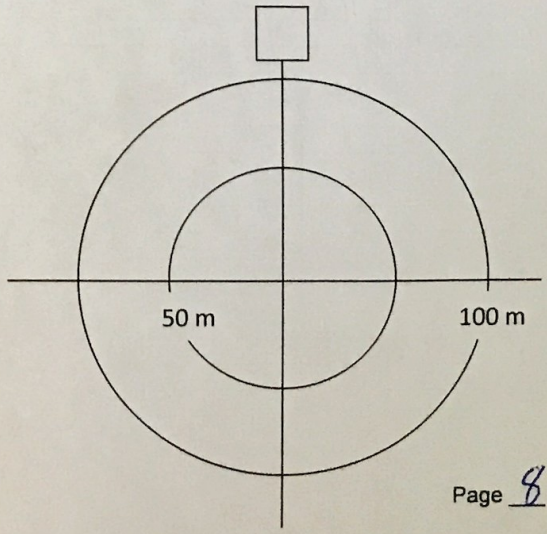
Point Count Name: 19
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1052
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 20
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1057
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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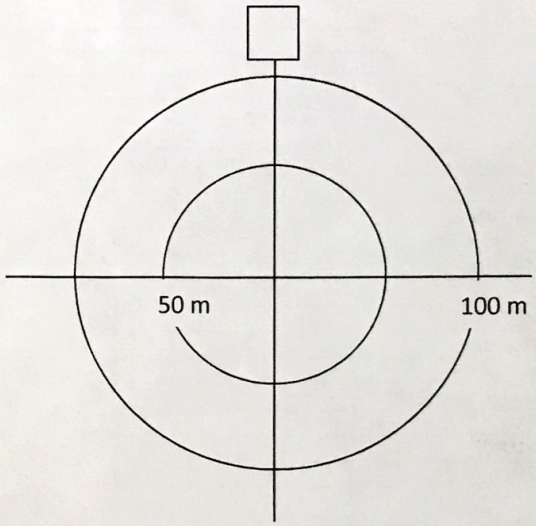
Project Number: EM2010303G
Survey Date: April 13, 2021

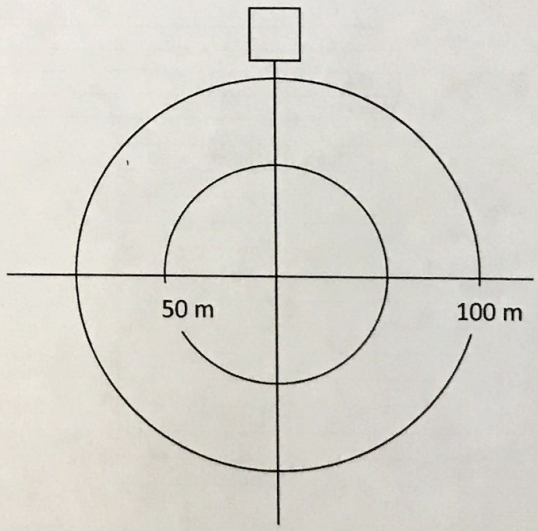
Point Count Name: 21
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1107
Habitat: Swamp

Species	Quad	<100 m	>100
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper		2	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



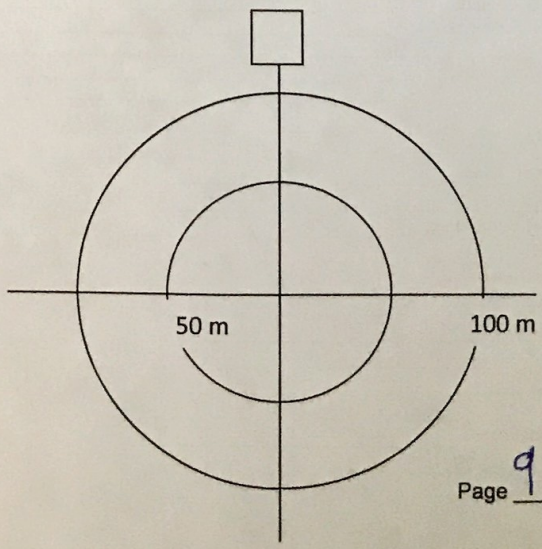
Point Count Name: 22
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1105
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		2	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 23
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1110
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Project Number: IM20103036
Survey Date: April 13, 2021

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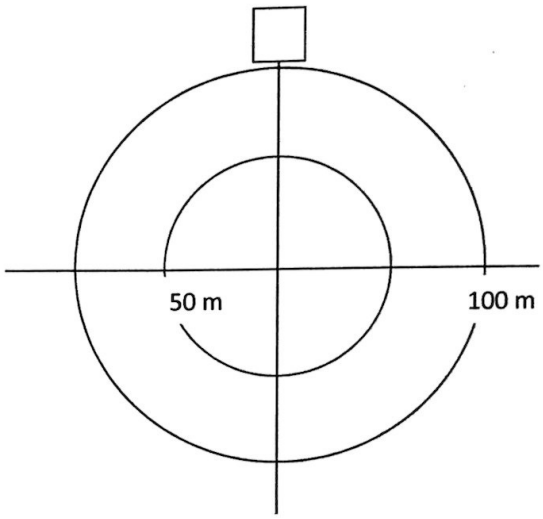
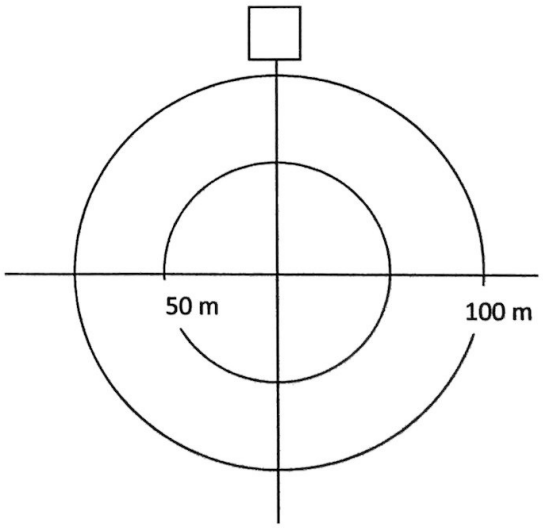
Point Count Name: 24
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 1115
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		7	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



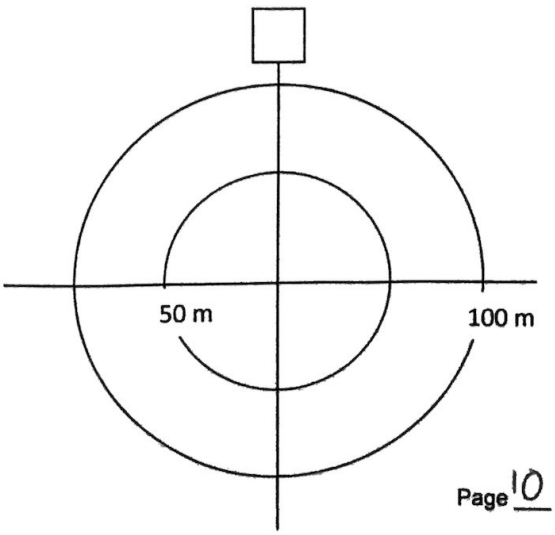
Point Count Name: 25
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 951
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		7	
Spring Peeper		1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog		1	
N. Leopard Frog			



Point Count Name:
Waypoint/Unit Number:
UTM:
Start Time (24 hr)
Habitat:

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

Project Name: Merritt Road		**Project Number:** IM20103036	
Observers: TRH			
Date: May 13, 2021	**Start Time (24hr):** ~~4:00~~ 21:00	**End Time (24hr):** 24:00	**Survey Round:** 2
Weather: clear	**Temperature:** 12	**Wind:** 2	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

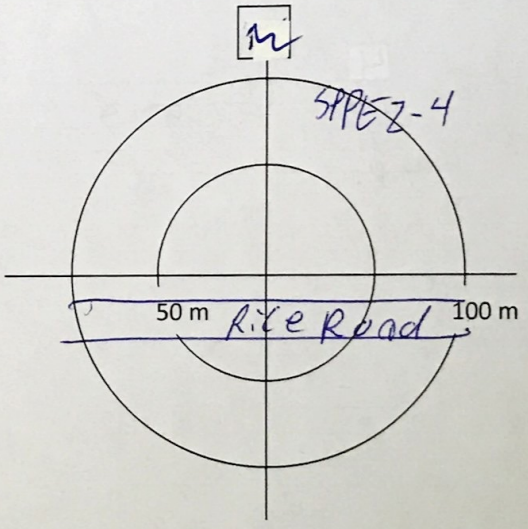
Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

Point Count Name: ~~#~~ 4
Waypoint/Unit Number: 1793
UTM: 17T 640923 4766011
Start Time (24 hr) ~~4:00~~ 21:00
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper		24	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

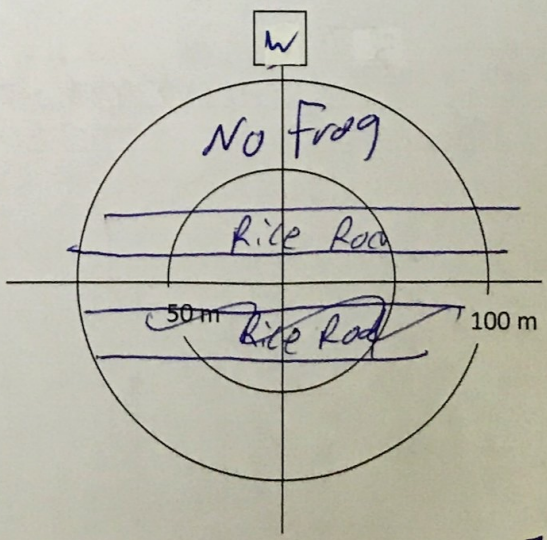
AMWO S



Point Count Name: ~~#~~ 3
Waypoint/Unit Number: 1793
UTM: 17T 640947 4765686
Start Time (24 hr) 21:14
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper	NO Frogs		
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

AMWO



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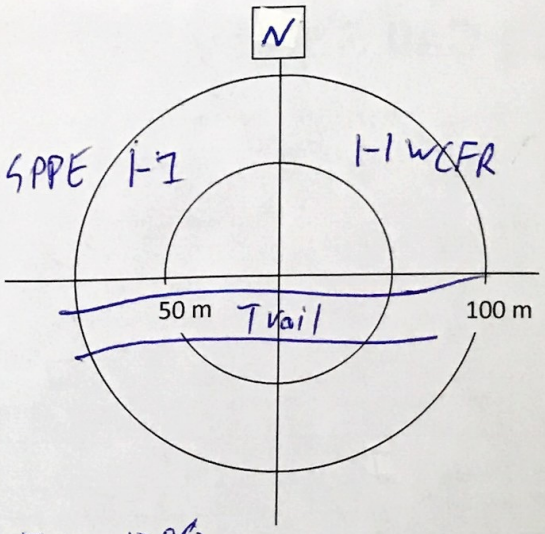
Project Number: IM20103036
Survey Date: May 13, 2024

Point Count Name: ~~1~~ 5
Waypoint/Unit Number: 1796
UTM: 641530 4765784
Start Time (24 hr) 2137
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1-1	
Spring Peeper		1-1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

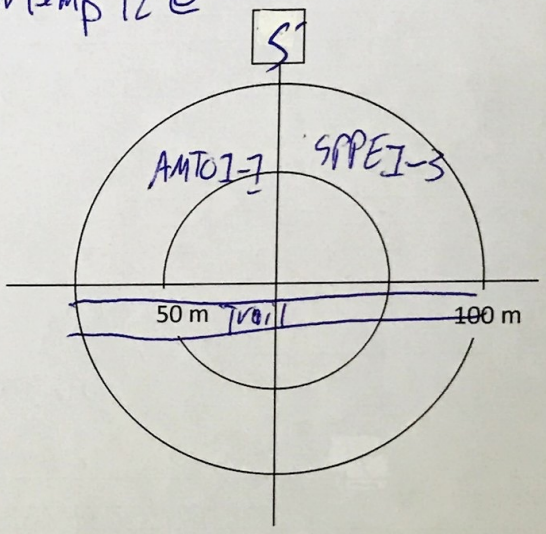
CANG



Point Count Name: 2
Waypoint/Unit Number: 1794
UTM: 641335 4765765
Start Time (24 hr) 2129
Habitat: swamp

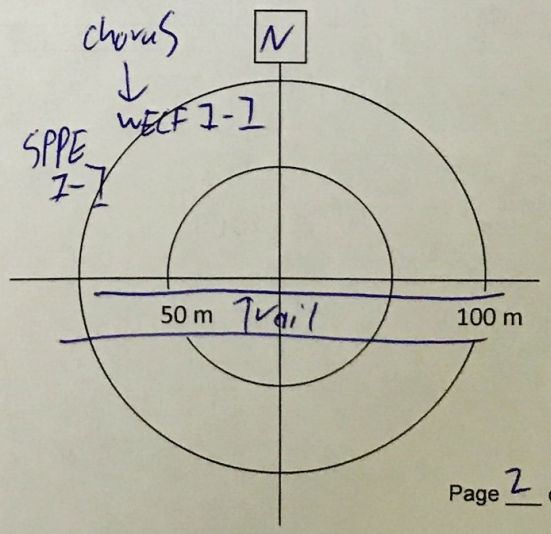
water Temp 12°C

Species	Quad	<100 m	>100 m
American Toad		1-1	
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper		1-3	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: ~~3~~ 7
Waypoint/Unit Number: 1795
UTM: 641387 4765782
Start Time (24 hr) 2129
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1-1	
Spring Peeper			1-1
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

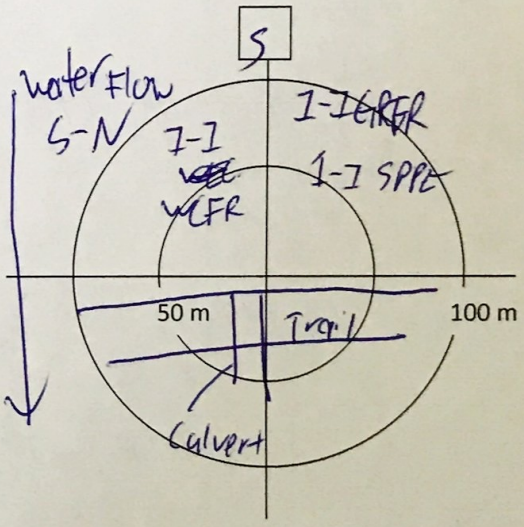
Project Name: Merritt Road		**Project Number:** IM20103036	
Observers: TRM			
Date: May 13, 2021	**Start Time (24hr):**	**End Time (24hr):**	**Survey Round:** 2
Weather:	**Temperature:** See First Page	**Wind:**	**Precipitation (Circle):** (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1:	Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2:	Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6)
Code 3:	Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

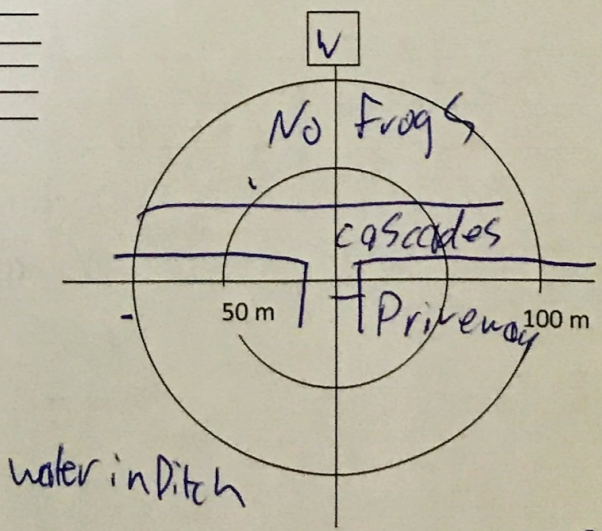
Point Count Name: 6
Waypoint/Unit Number: 1797
UTM: 641507 4765773
Start Time (24 hr) 21:41
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1-2	
Spring Peeper		2-2	
Bullfrog			
Gray Treefrog			
Green Frog		1-1	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 25
Waypoint/Unit Number: 1798
UTM: 641763 4766096
Start Time (24 hr) 22:02
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog		No Frogs	
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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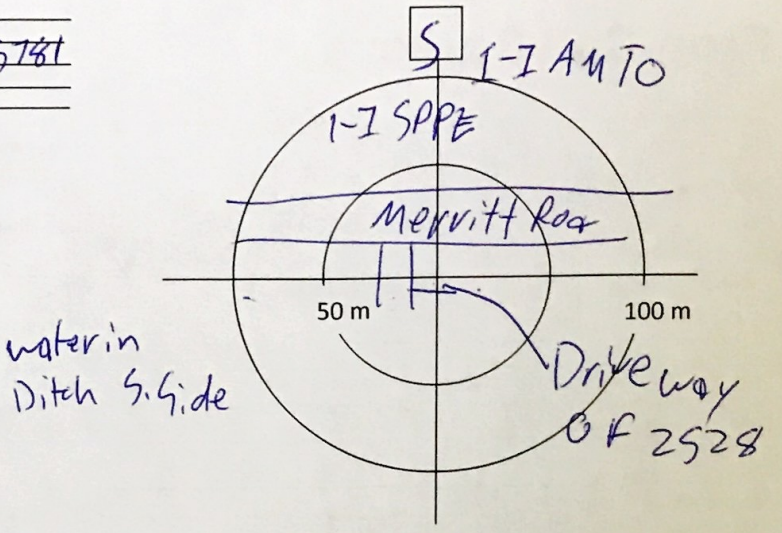
Project Number: IM20103036
Survey Date: May 13, 2021

Point Count Name: 7
Waypoint/Unit Number: 1799
UTM: 641916 4765781
Start Time (24 hr): 22:09
Habitat: Swamp

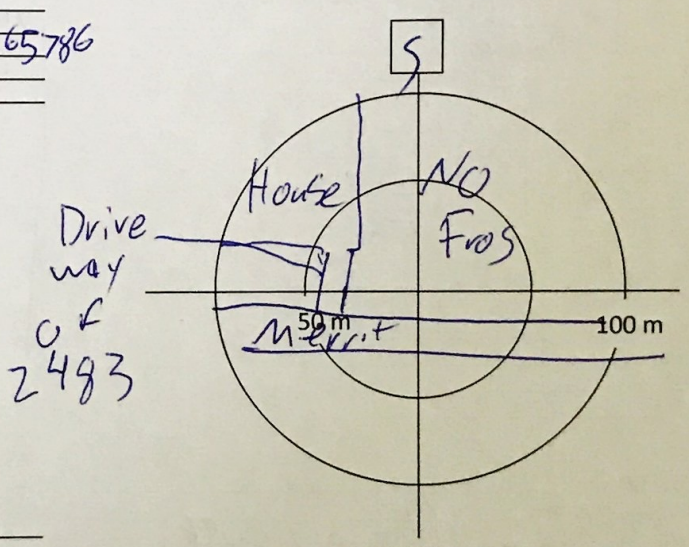
Species	Quad	<100 m	>100 m
American Toad			1-I
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper		1-I	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



water in Ditch S. Side

Point Count Name: 8
Waypoint/Unit Number: 1800
UTM: 642464 4765786
Start Time (24 hr): 22:13
Habitat: Swamp

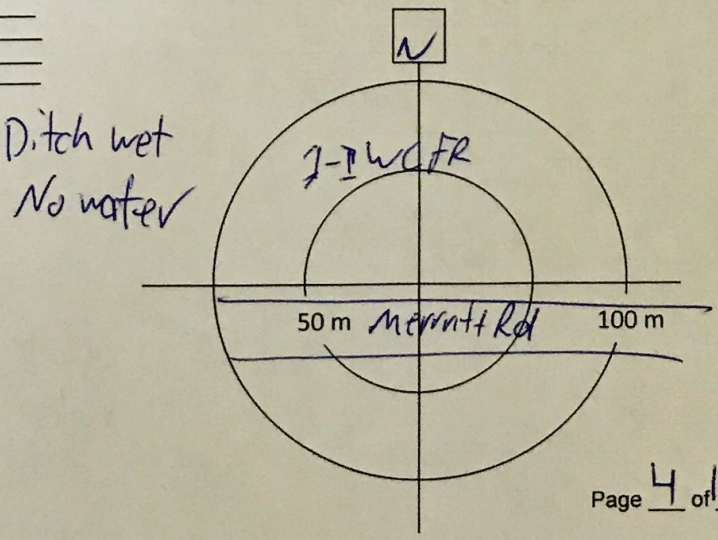
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog	NO	Frogs	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Driveway of 2483

Point Count Name: 9
Waypoint/Unit Number: 1801
UTM: 642173 4765786
Start Time (24 hr): 22:17
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1-I	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Ditch wet
No water

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Frog Call Survey

Project Name: Merritt Road		**Project Number:** IM20103036	
Observers: TRH			
Date: May 13, 2021	**Start Time (24hr):** See First Page	**End Time (24hr):**	**Survey Round:** 2
Weather:	**Temperature:**	**Wind:**	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

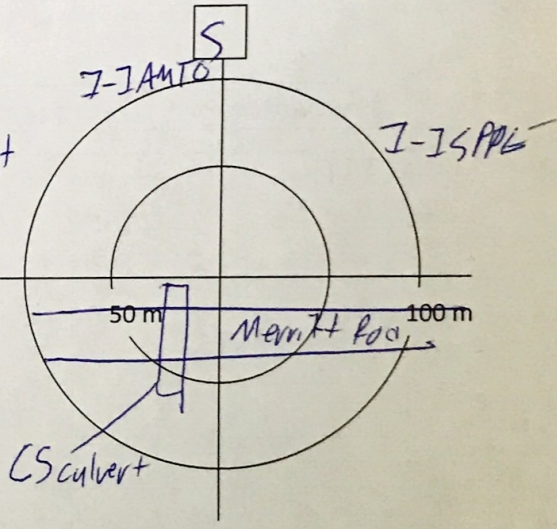
Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

Point Count Name: 10
Waypoint/Unit Number: 1807
UTM: 642478 4765478
Start Time (24 hr) 2221
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			1-1
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			1-1
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

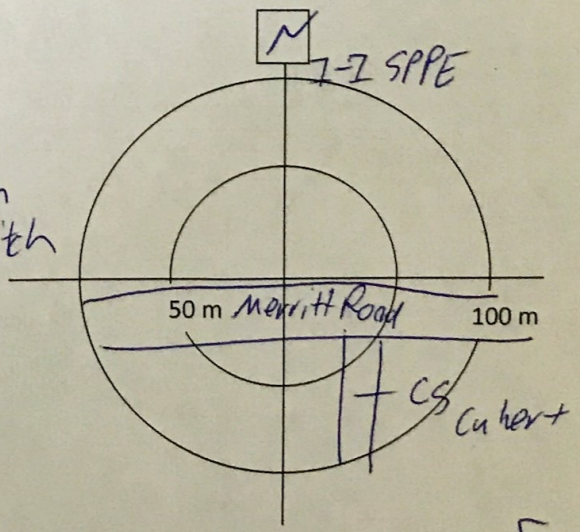
Small amount of water in ~~Culvert~~ Ditch



Point Count Name: 11
Waypoint/Unit Number: 1803
UTM: 642479 4765794
Start Time (24 hr) 22:25
Habitat: Thicket Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			1-1
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Some water in ditch



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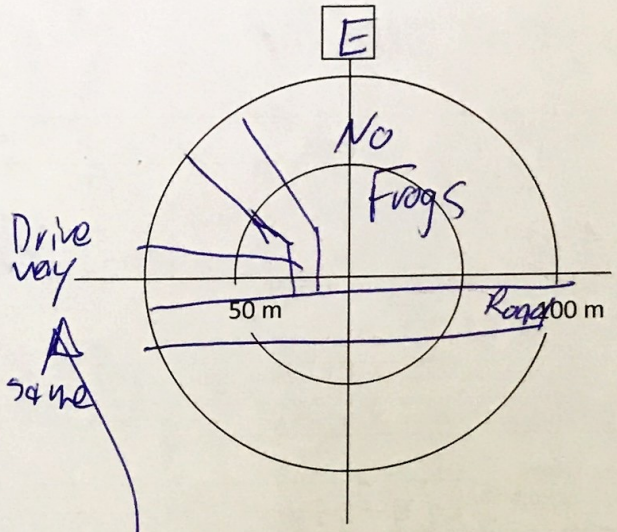
Project Number: IM20103036
Survey Date: May 13 2021

Point Count Name: 12
Waypoint/Unit Number: 1804
UTM: 642688 4765942
Start Time (24 hr): 2229
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog	NO		
West. Chorus Frog			
Spring Peeper			
Bullfrog	Frogs		
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

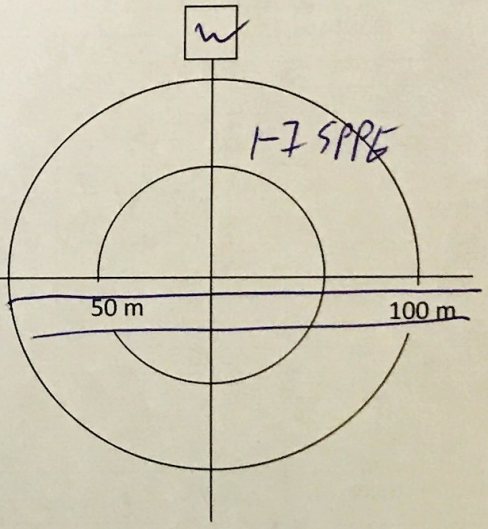


Point Count Name: 13
Waypoint/Unit Number: ~~Same~~ 60 1805
UTM: 642584 4765929
Start Time (24 hr): 22 33
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper		1-1	
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Same

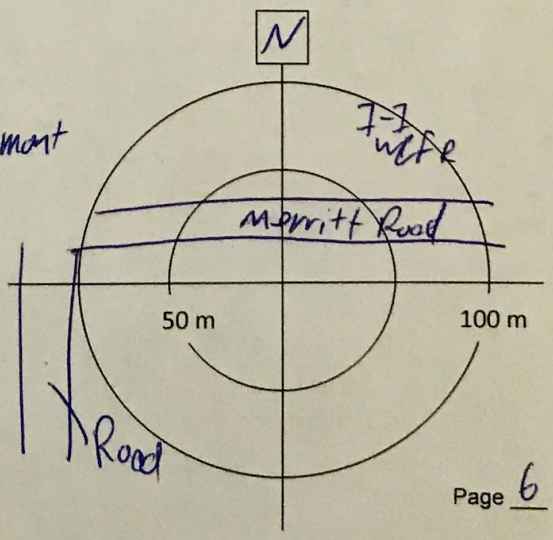
Some water in Ditch



Point Count Name: 23
Waypoint/Unit Number: 1806
UTM: 642784 4765782
Start Time (24 hr): 22 37
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		7-7	
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Small amount of water in Ditch



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Frog Call Survey

Project Name: Merritt Road		**Project Number:** IMZ0103036	
Observers: TRL			
Date: May 13, 2021	**Start Time (24hr):**	**End Time (24hr):**	**Survey Round:** 2
Weather: See First Page	**Temperature:**	**Wind:**	**Precipitation** (Circle): 0 None, 1 Haze/Fog, 2 Drizzle, 3 Rain

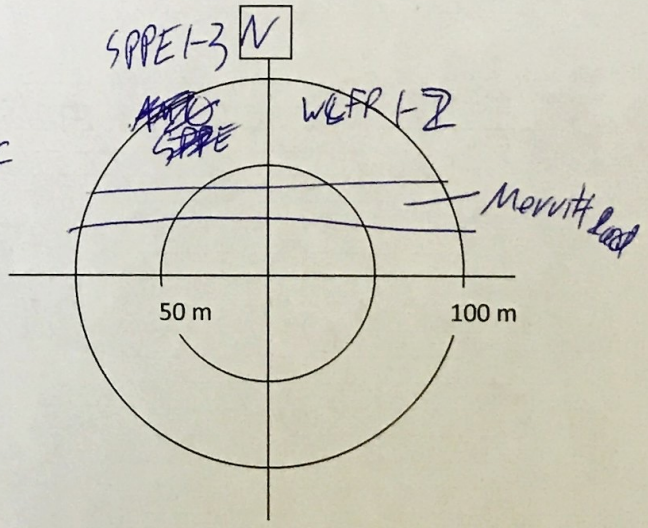
Call Level Codes

Code 1:	Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2:	Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3:	Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

Point Count Name: 22
Waypoint/Unit Number: 1407
UTM: 643049 4765795
Start Time (24 hr) 2240
Habitat: Swamp

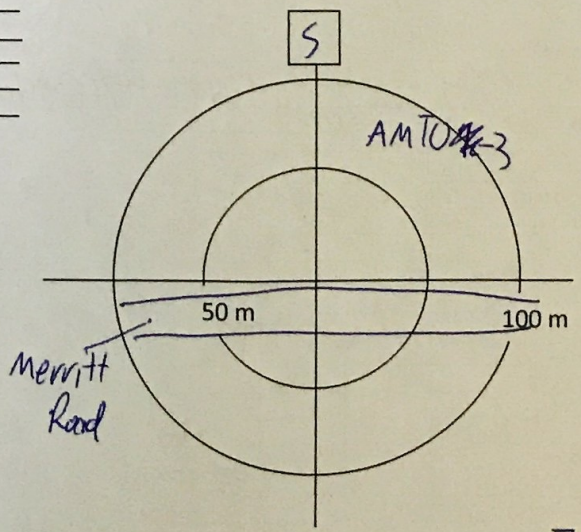
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1-3	
Spring Peeper			1-3
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Fair # of cars



Point Count Name: 24
Waypoint/Unit Number: same as 22 above
UTM:
Start Time (24 hr) 22:43
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad		3	
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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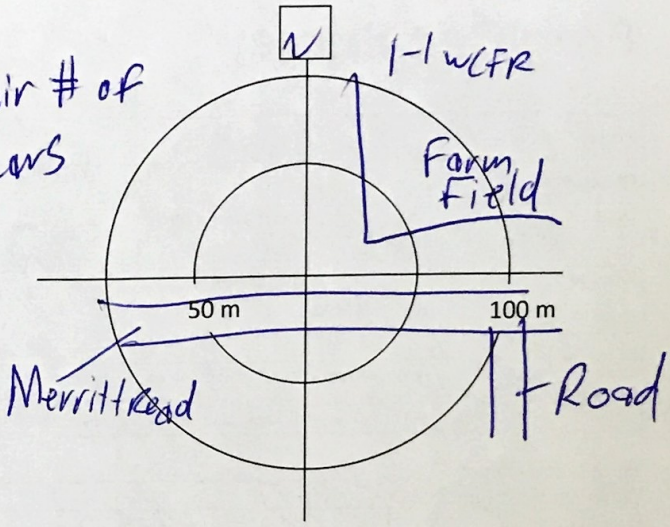
Project Number: IM20103
Survey Date: May 13, 2020

Point Count Name: 21
Waypoint/Unit Number: 1808
UTM: 643139 4765783
Start Time (24 hr) 2248
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			1-1
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

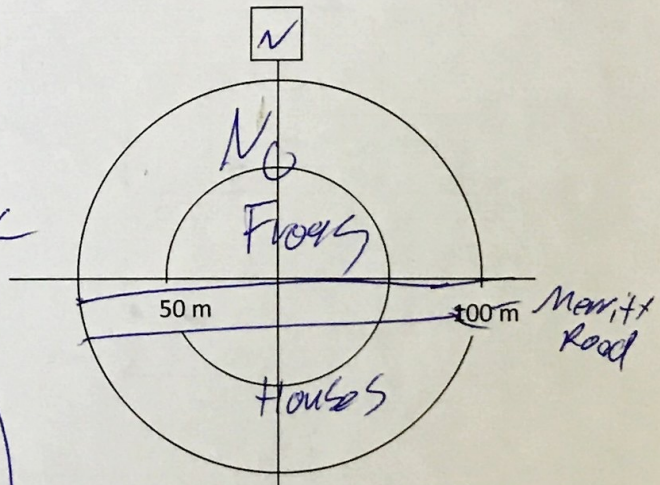
Fair # of cars



Point Count Name: 20
Waypoint/Unit Number: 1809
UTM: 643326 4765800
Start Time (24 hr) 2255
Habitat: Swamp

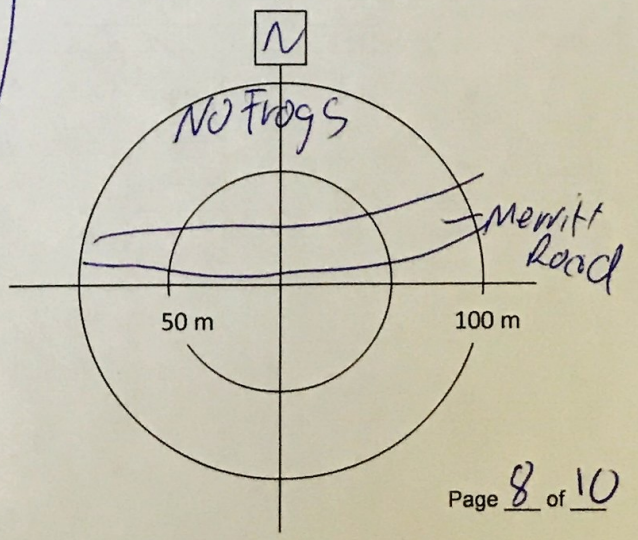
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog	NO		
Spring Peeper			
Bullfrog			
Gray Treefrog	Frogs		
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Traffic



Point Count Name: 19
Waypoint/Unit Number: 1810
UTM: 643409 4765794
Start Time (24 hr) 2300
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper	No Frogs		
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

Project Name: Merritt Road		**Project Number:** IM20103036	
Observers: TRH			
Date: May 13, 2021	**Start Time (24hr):** FIRST PAGE	**End Time (24hr):**	**Survey Round:** 2
Weather: SE	**Temperature:**	**Wind:**	**Precipitation** (Circle): 0 None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

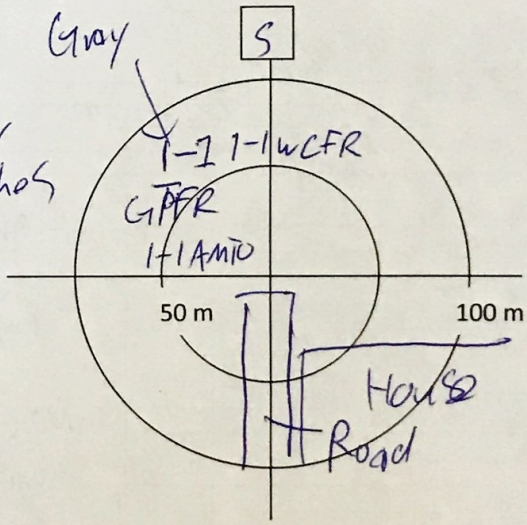
Code 1:	Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2:	Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3:	Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

Point Count Name: 14
Waypoint/Unit Number: 1811
UTM: 643450 4766472
Start Time (24 hr) 2311
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad		1-1	
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		1-1	
Spring Peeper			
Bullfrog			
Gray Treefrog		1-1	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

water in ditches

Coyote calling

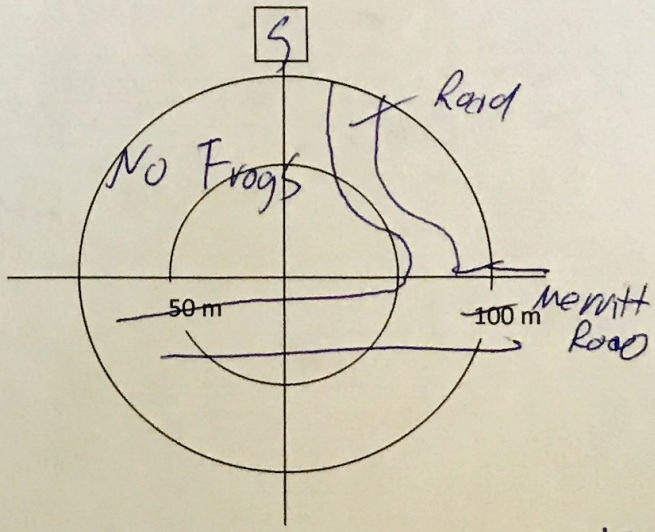


Point Count Name: 17
Waypoint/Unit Number: 1812
UTM: 643274 4765901
Start Time (24 hr) 2321
Habitat: Forest

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

NO Frogs

Traffic



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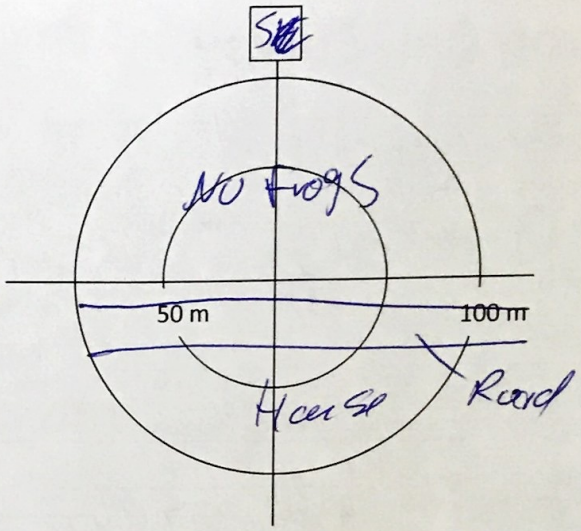
Project Number: IM20103036
Survey Date: May 13 2024

Point Count Name: 16
Waypoint/Unit Number: 1813
UTM: 643832 4765689
Start Time (24 hr): 2327
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog	NO		
Spring Peeper			
Bullfrog	Frogs		
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

No water in Ditch

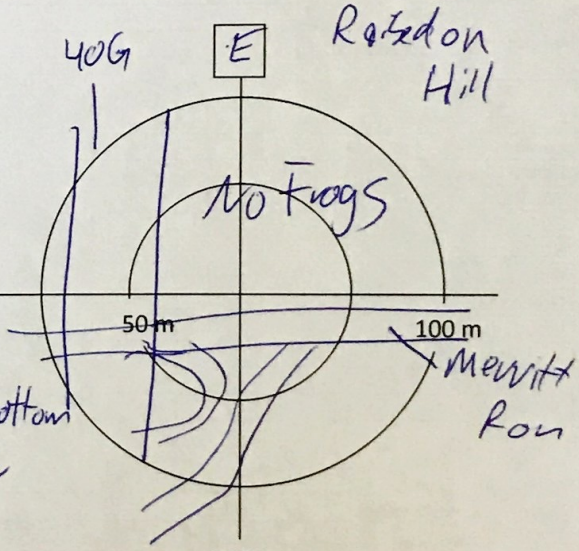


Point Count Name: 16
Waypoint/Unit Number: 1814
UTM: 643899 4766039
Start Time (24 hr): 2333
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper	NO		
Bullfrog	Frogs		
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Highway Traffic Noise

No visible water @ bottom of slope

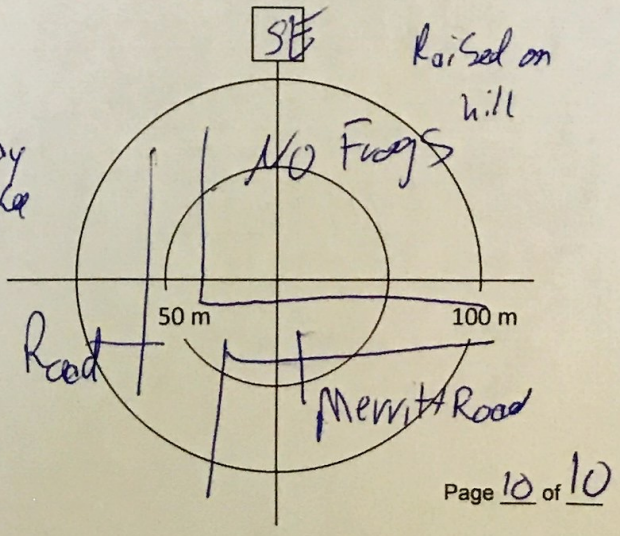


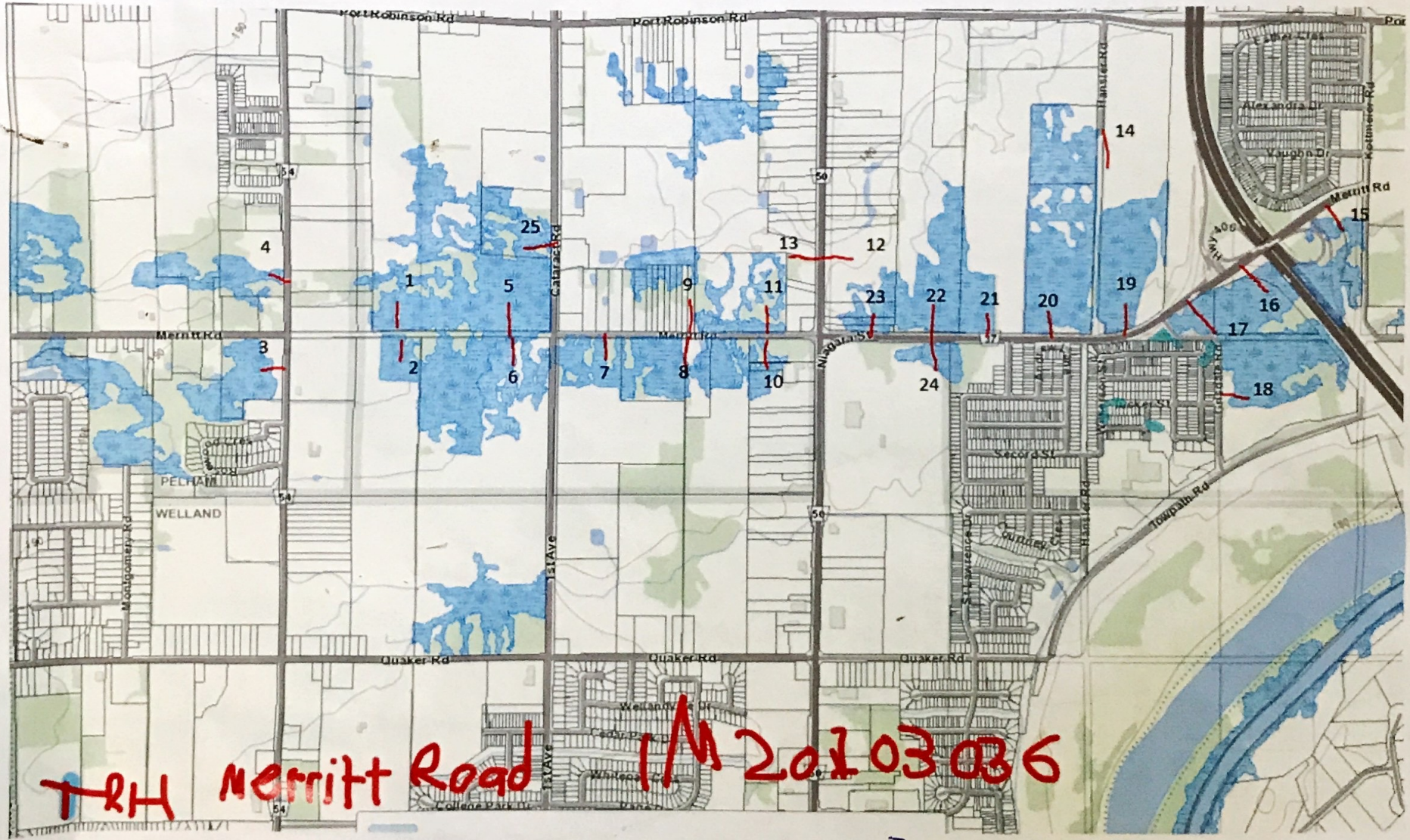
Point Count Name: 15
Waypoint/Unit Number: 1815
UTM: 644174 4766248
Start Time (24 hr): 2334
Habitat: Meadow

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog	NO		
Spring Peeper			
Bullfrog	Frogs		
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Highway Noise

No water in ditch





TRH Merritt Road (M20103036

May 13, 2021

Plants in swamp

Pitcher plant
Spotted Jewelweed
Marshfern
Trout Lily
Cursed water crowfoot

Elderberry Sp.
American waterplantain

Low water levels

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Frog Call Survey

Project Name: Merritt Rd		**Project Number:** TM2010303036	
Observers: TRH			
Date: June 9, 2021	**Start Time (24hr):** 2125	**End Time (24hr):** ~~2128~~	**Survey Round:** 3
Weather: No cloud, No precip. might have storm Earlier	**Temperature:** 27	**Wind:** 0	**Precipitation** (Circle): 0 None, 1 Haze/Fog, 2 Drizzle, 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6)
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3)

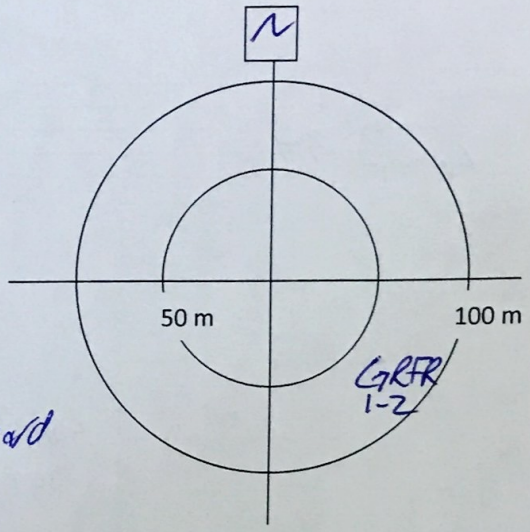
1

Point Count Name:
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2125
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog		1-2	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

EAWP
Singing

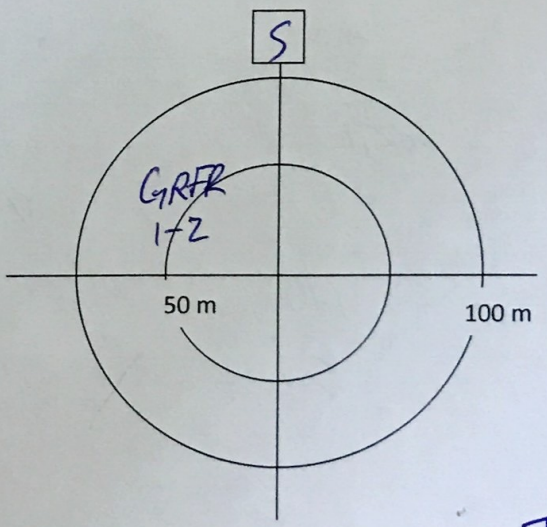
Saw a Leopard Frog



2

Point Count Name:
Waypoint/Unit Number:
UTM:
Start Time (24 hr) ~~2128~~ 2128
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog		1-2	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Some frogs as above

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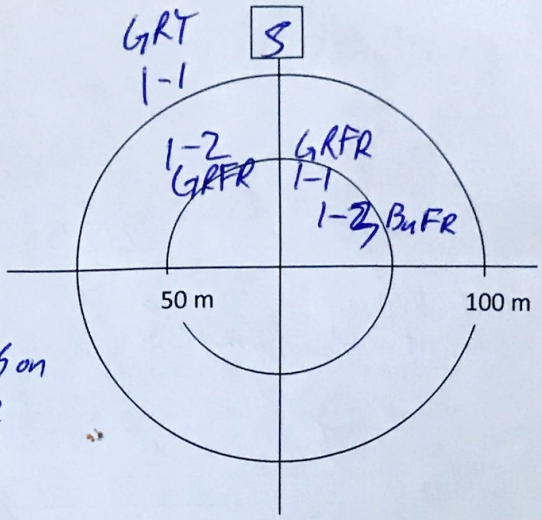
Project Number: [illegible]M20103036
Survey Date: June 9, 2021

Point Count Name: 6
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2134
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog		1-3	
Gray Treefrog		[illegible]	1-1
Green Frog		1-3	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

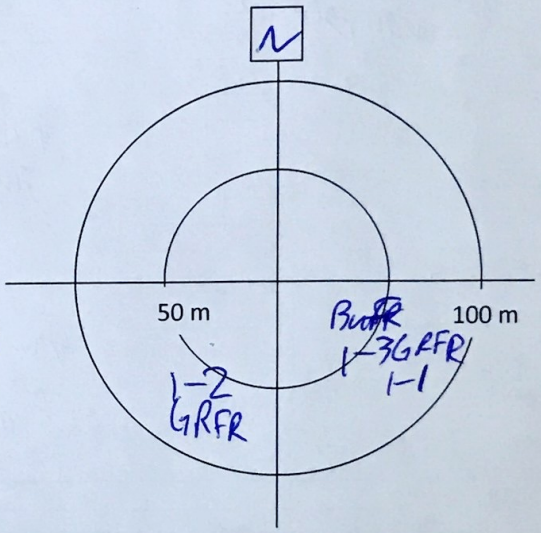
Most frogs on S side



Point Count Name: 5
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2137
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog		1-3	
Gray Treefrog			
Green Frog		1-3	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

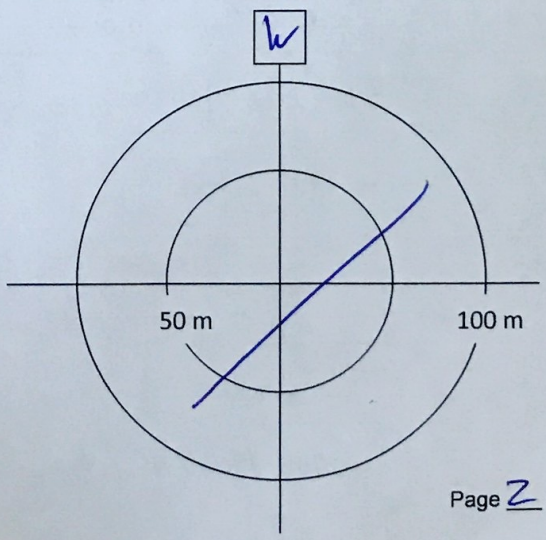
some frogs as above



Point Count Name: 4
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2154
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog		NO	
Spring Peeper			
Bullfrog			
Gray Treefrog		Frogs	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Kill



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Frog Call Survey

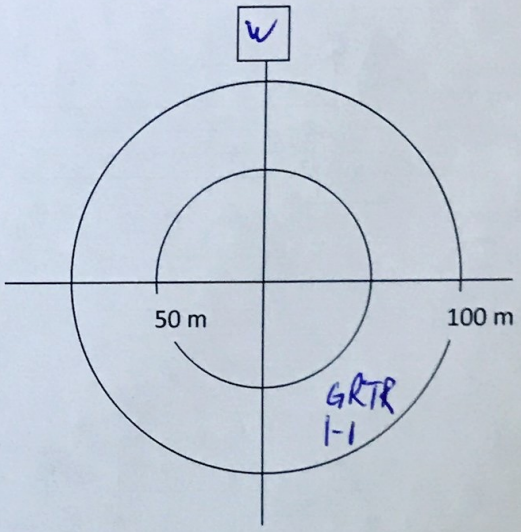
Project Name: Merritt Rd		**Project Number:** IM20103036	
Observers: TRH			
Date: June 9, 2021	**Start Time (24hr):**	**End Time (24hr):**	**Survey Round:** 3
Weather: Sleet	**Temperature:**	**Wind:**	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6)
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3)

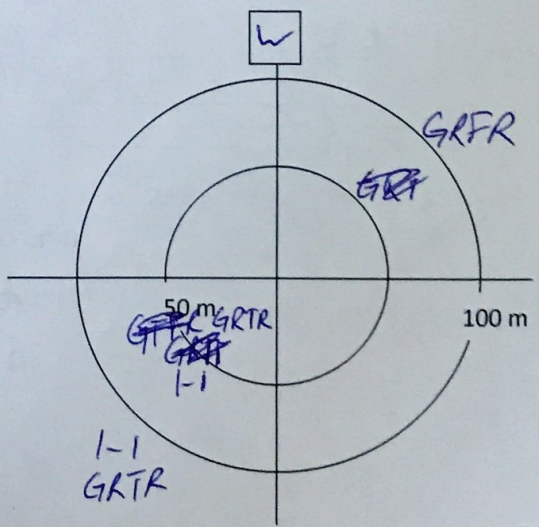
Point Count Name: 3
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 22:00
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-1	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 25
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2204
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-1	1-1
Green Frog			1-1
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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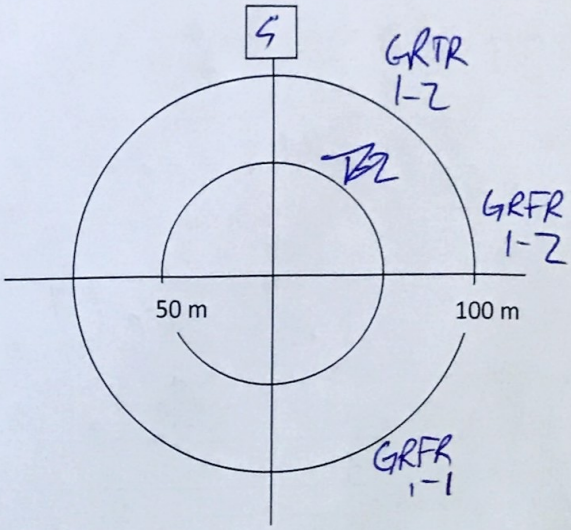
Project Number: IM20103036
Survey Date: June 9, 2021

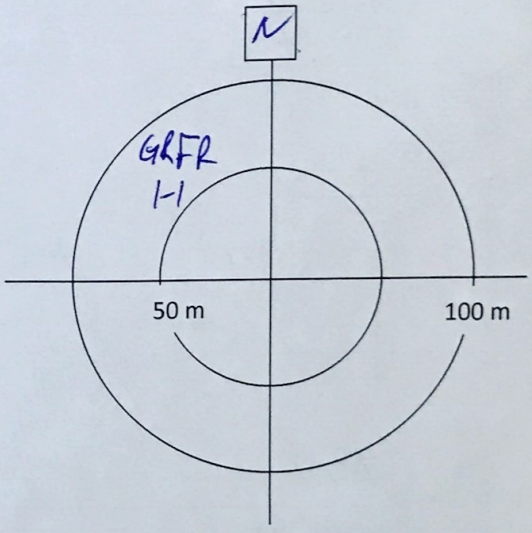
Point Count Name: 7
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2213
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			1-2
Green Frog			1-2
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: ~~8~~ 9
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2219
Habitat: Swamp

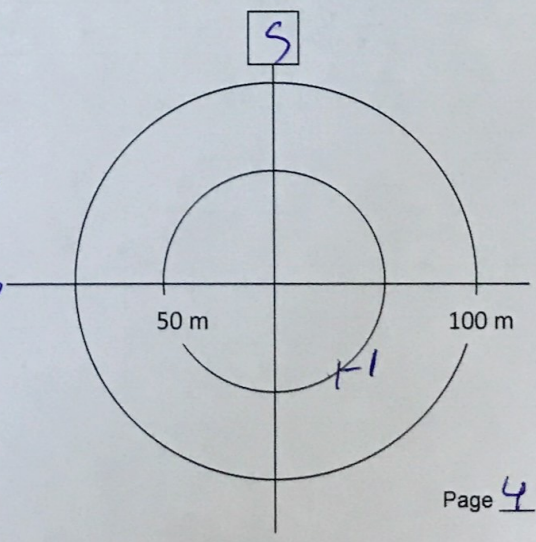
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog		1-1	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: ~~9~~ 8
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2222
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog		1-1	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Some frog ~~of~~ above



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Frog Call Survey

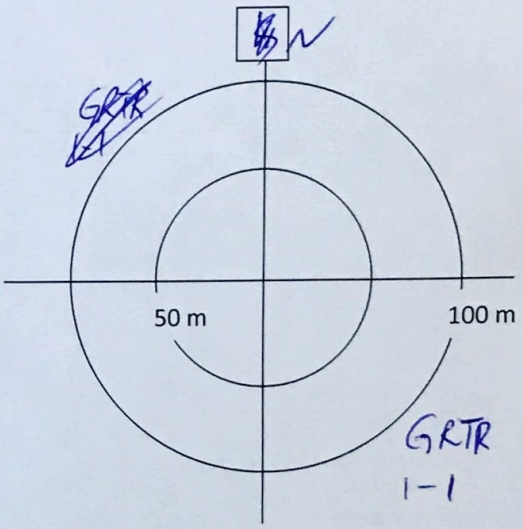
Project Name: Merritt Rd		**Project Number:** TM20163086	
Observers: TRH			
Date: June 9, 2021	**Start Time (24hr):**	**End Time (24hr):**	**Survey Round:** 3
Weather: Clear	**Temperature:** Cool	**Wind:**	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

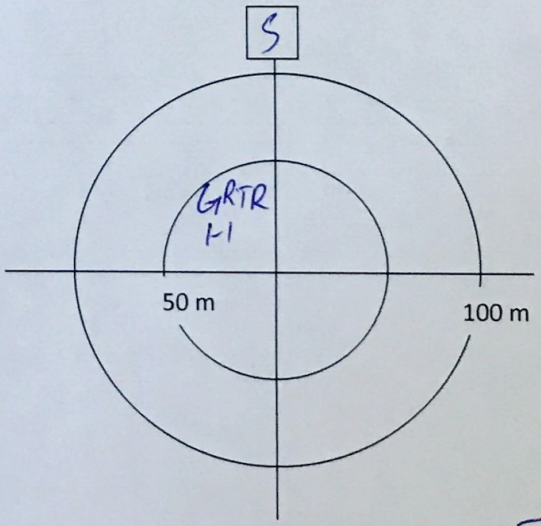
Point Count Name: #9
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) 2224
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			1-1
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: #10
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) 2231
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-1	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

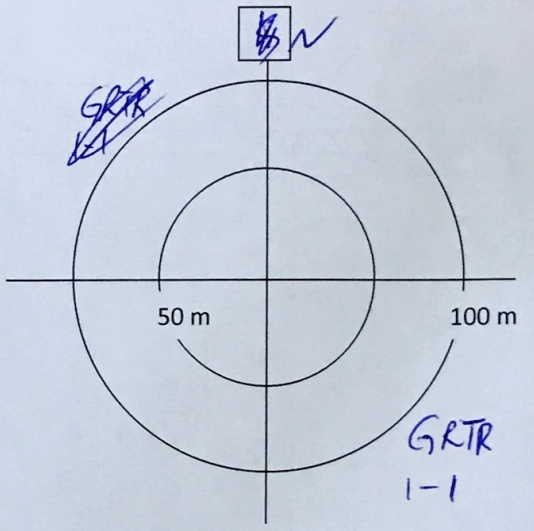
Project Name: Merritt Rd		**Project Number:** TM20163036	
Observers: TRH			
Date: June 9, 2021	**Start Time (24hr):**	**End Time (24hr):**	**Survey Round:** 3
Weather: See Field	**Temperature:**	**Wind:**	**Precipitation** (Circle): (0) None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1:	Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2:	Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3:	Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

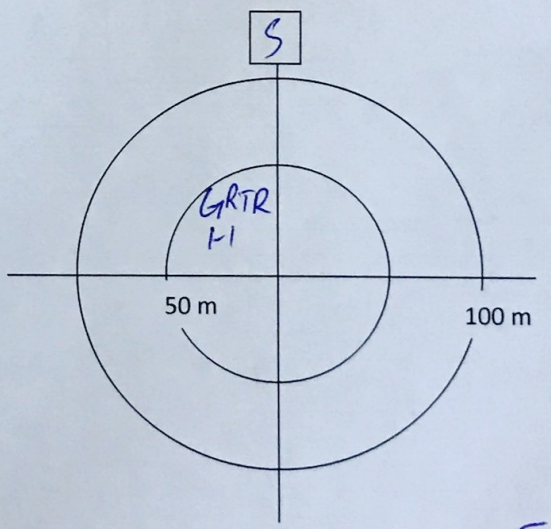
Point Count Name: #9
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) 2224
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			1-1
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: #10
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) 2231
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-1	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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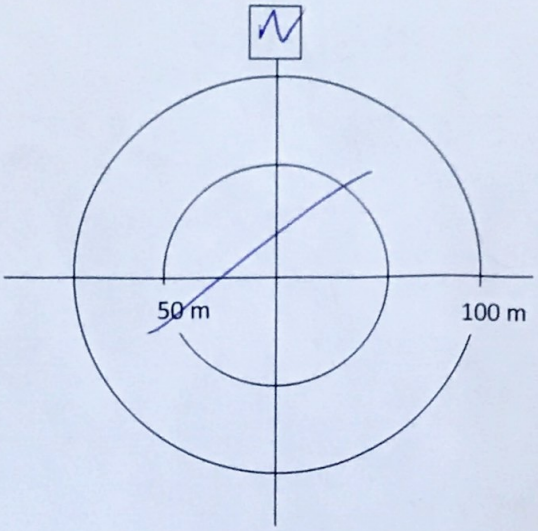
Project Number: IM2010 3036
Survey Date: June 9, 2021

Point Count Name: 11
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2234
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

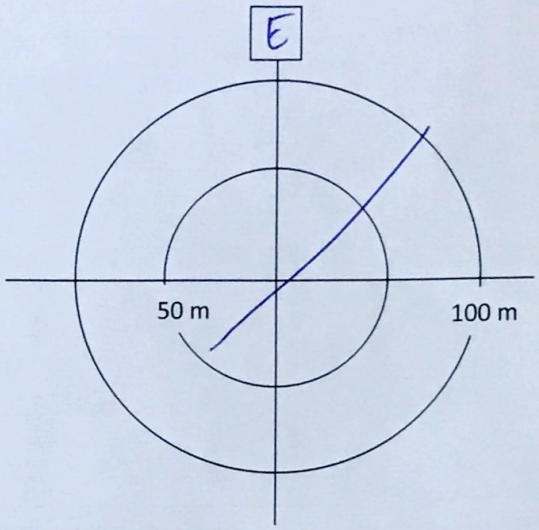
NO Frogs



Point Count Name: 12
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2237
Habitat: Swamp

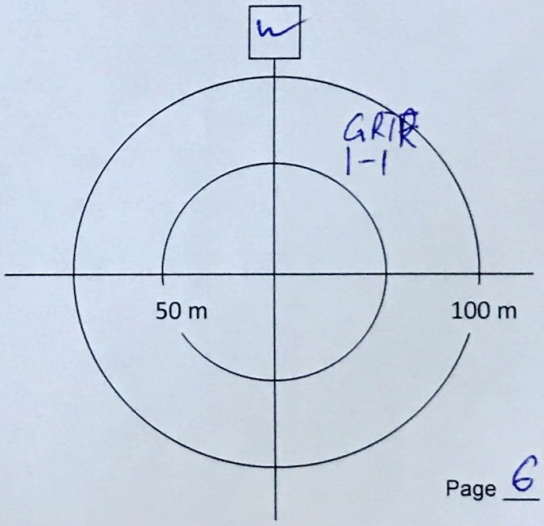
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

NO Frogs



Point Count Name: 13
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2240
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-1	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

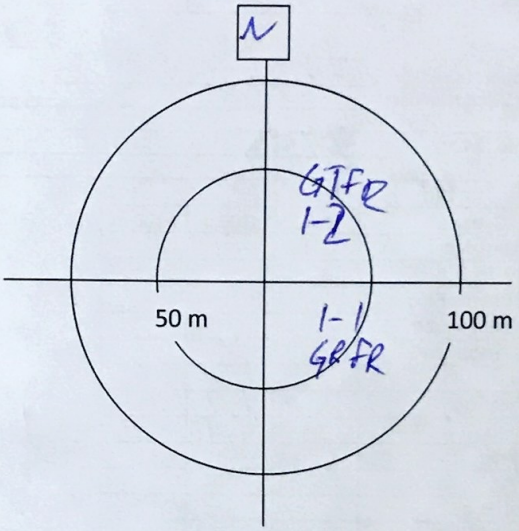
Project Name: Merritt Rd		**Project Number:** IM2010303 6	
Observers: TRH			
Date: June 9, 2021	**Start Time (24hr):**	**End Time (24hr):**	**Survey Round:** 3
Weather:	**Temperature:** See Sheet 1	**Wind:**	**Precipitation** (Circle): 0 None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

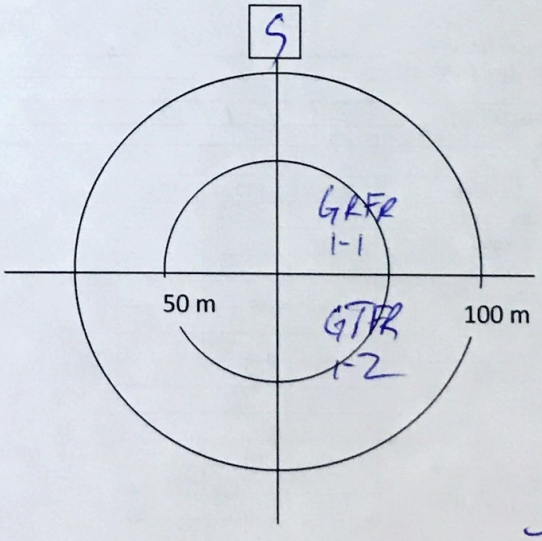
Point Count Name: 22
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) 7243
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-2	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 24
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) 2246
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-2	
Green Frog		1-1	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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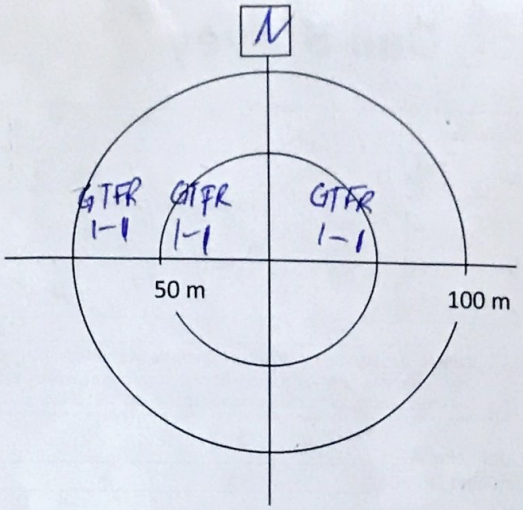
Project Number: IM20103036
Survey Date: June 9, 2021

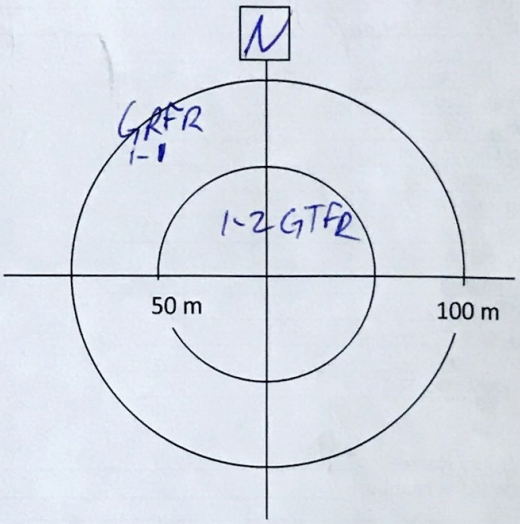
Point Count Name: 20
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2248
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-1	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



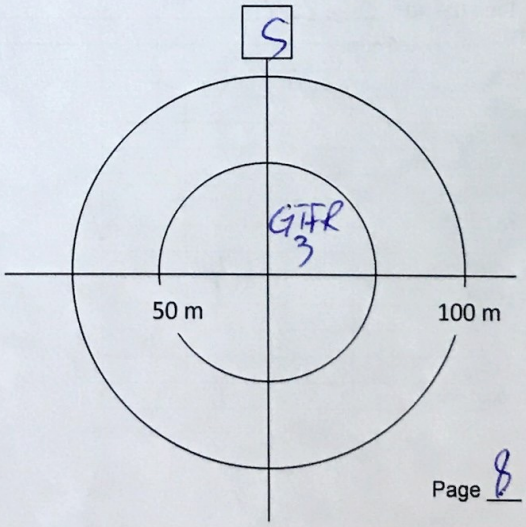
Point Count Name: 21
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2253
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		1-2	
Green Frog		1-1	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 14
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 23:01
Habitat: swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		3	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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Frog Call Survey

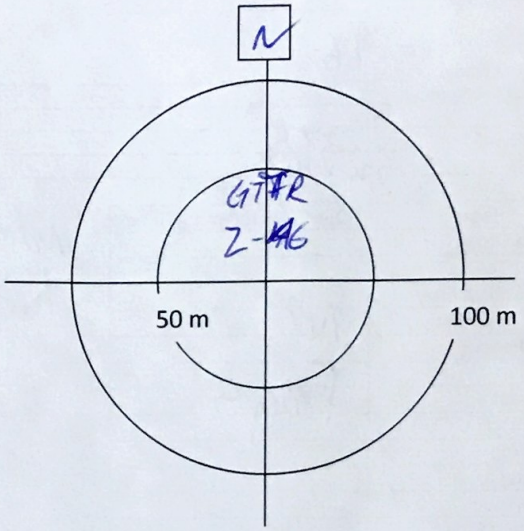
Project Name: Merritt Rd		**Project Number:** IM20103036	
Observers: TRH			
Date: June 9, 2021	**Start Time (24hr):**	**End Time (24hr):**	**Survey Round:** 3
Weather:	**Temperature:** See Sheet 1	**Wind:**	**Precipitation** (Circle): 0 None 1 Haze/Fog 2 Drizzle 3 Rain

Call Level Codes

Code 1: Calls not simultaneous, number of individuals can be accurately counted. Record species, code, and count of individuals (e.g., SPPE 1-1)
Code 2: Some calls simultaneous, number of individuals can be reliably estimated. Record species, code, and count of individuals, if possible (e.g., SPPE 2-6).
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated. Record species and code only (e.g., SPPE 3).

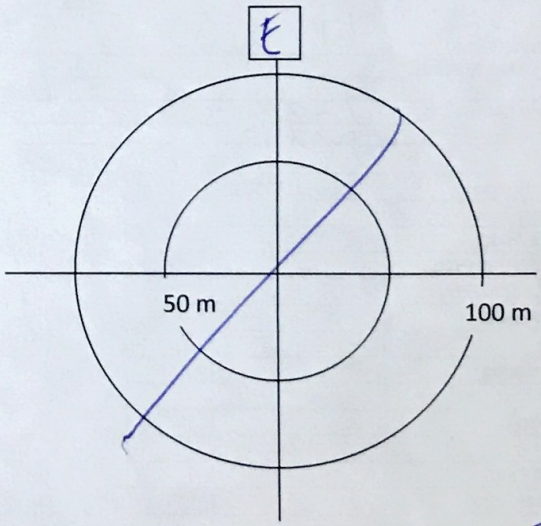
Point Count Name: 19
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) ~~2109~~ 2316
Habitat: ~~Swamp~~

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog			
Gray Treefrog		2-~~AG~~	
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 18
Waypoint/Unit Number: _____
UTM: _____
Start Time (24 hr) ~~2113~~ 2316
Habitat: ~~Swamp~~

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog	NO		
Spring Peeper			
Bullfrog	FROGS		
Gray Treefrog			
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



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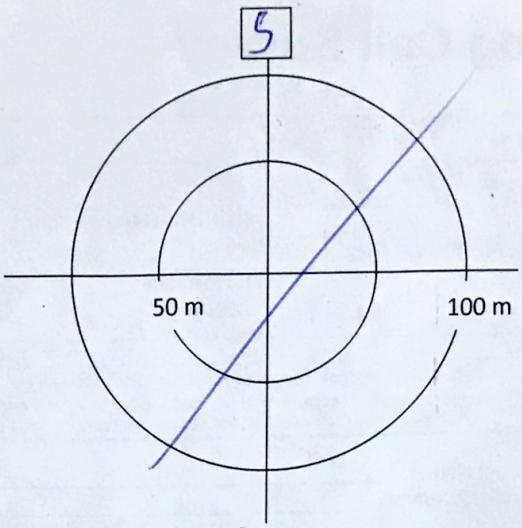
Project Number: IM2101 03036
Survey Date: June 9, 2021

Point Count Name: 17
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2319
Habitat: Swamp

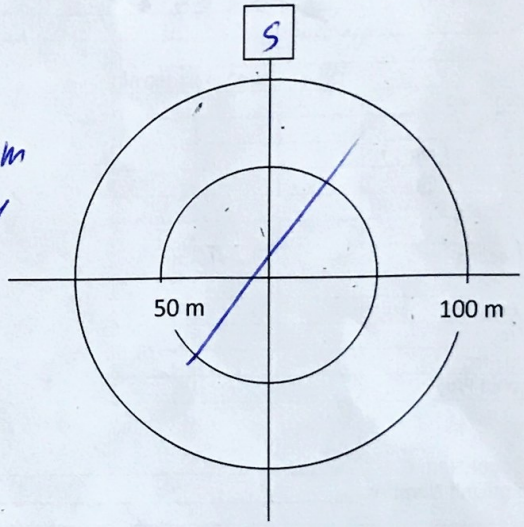
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog	NO		
Spring Peeper			
Bullfrog			
Gray Treefrog	Frogs		
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Point Count Name: 16
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2325
Habitat: Swamp

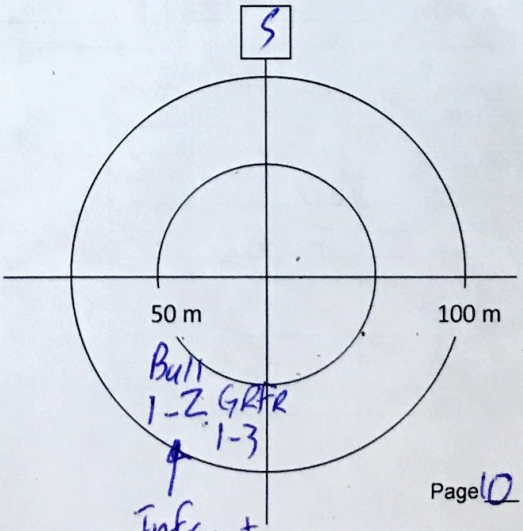
Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog	NO		
Spring Peeper			
Bullfrog			
Gray Treefrog	Frogs		
Green Frog			
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			

Noise from highway



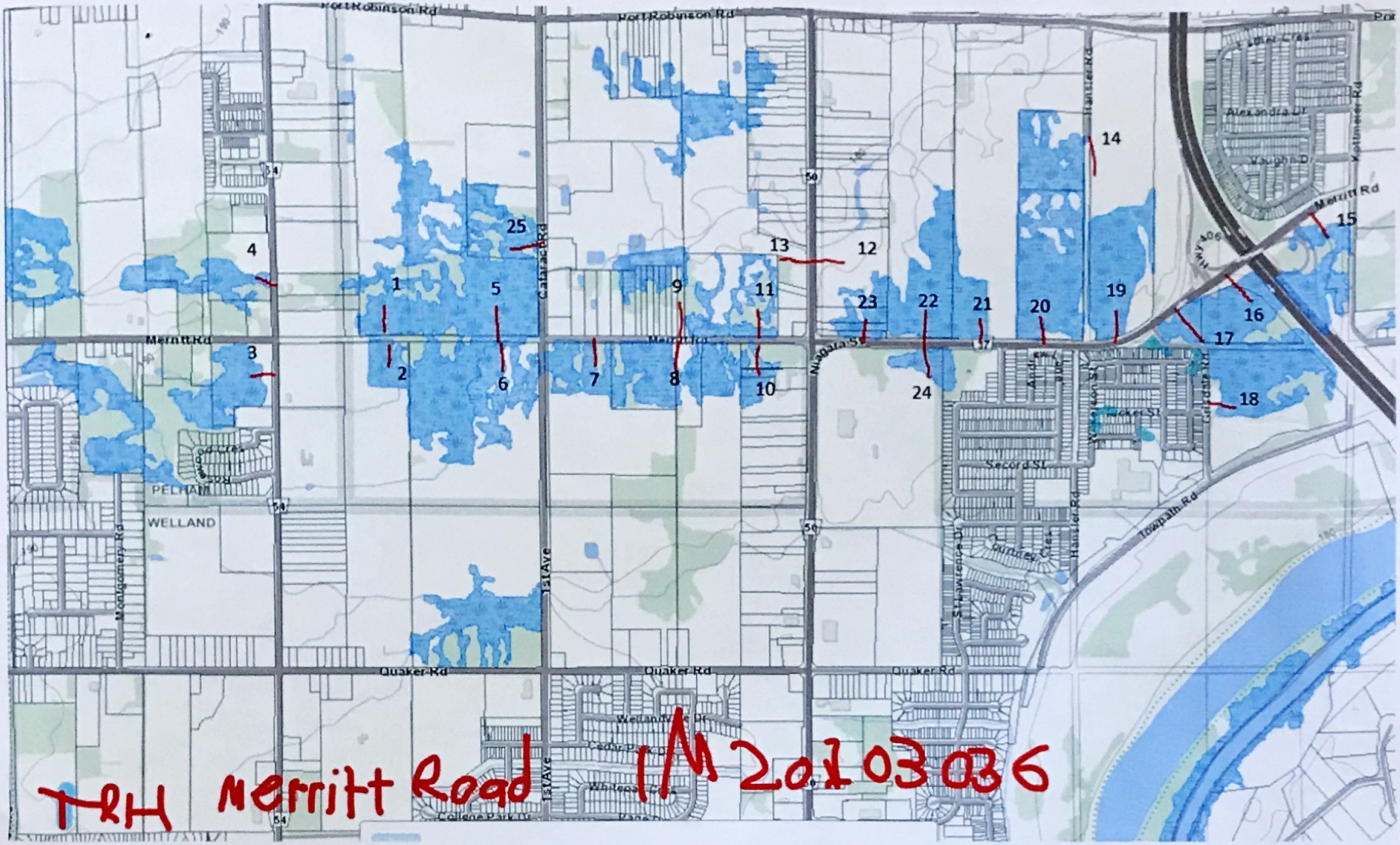
Point Count Name: 17
Waypoint/Unit Number:
UTM:
Start Time (24 hr) 2328
Habitat: Swamp

Species	Quad	<100 m	>100 m
American Toad			
Fowler's Toad			
Boreal Chorus Frog			
West. Chorus Frog			
Spring Peeper			
Bullfrog		12	
Gray Treefrog			
Green Frog		1-2	
Wood Frog			
Mink Frog			
Pickerel Frog			
N. Leopard Frog			



Bull 1-2 GRFR 1-3

Infront of Empire Presentation Gallery



TRH Merritt Road (M20103036

APPENDIX

E FIELD PHOTOS

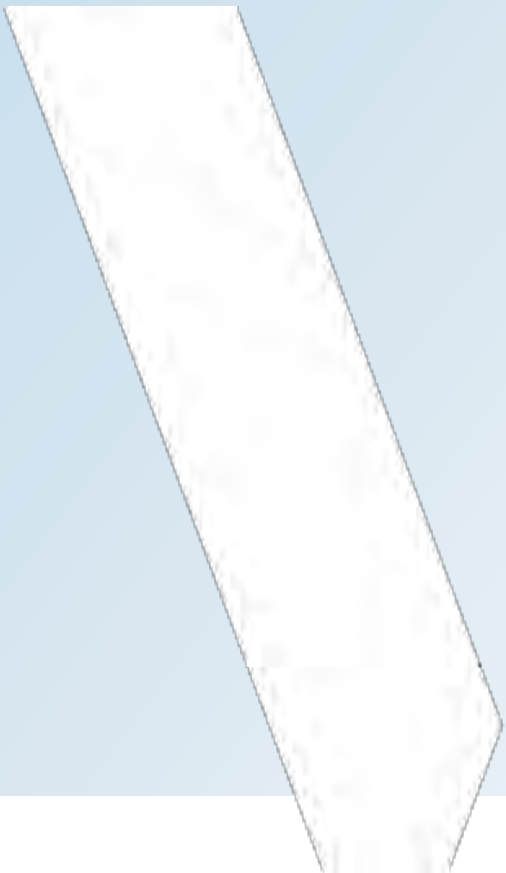


Photo 1: Crossing 1 - Upstream overview, facing west.

Photo 2: Crossing 1 – SWM outlet structure

Photo 3:. Crossing 2 - Downstream overview, facing east.

Photo 4: Crossing 2 – Downstream mowed ROW, facing south.

Photo 5: Crossing 2 – upstream overview, facing west.

Photo 6: Crossing 2 – downstream overview, facing east.

Photo 7: Crossing 3 – upstream overview, facing west.

Photo 8: Crossing 3 – downstream overview, facing east.

Photo 9: Crossing 4 – upstream at NPCA mapped confluence with Crossing 1, facing south.

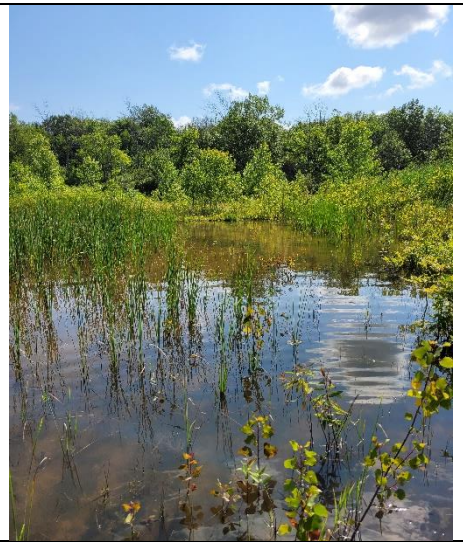


Photo 10: Crossing 4 upstream – low lying depression/pond, facing north.

Photo 11: Fish within the upstream Crossing 4 pond.

Photo 12: Crossing 4 upstream overview, facing north.

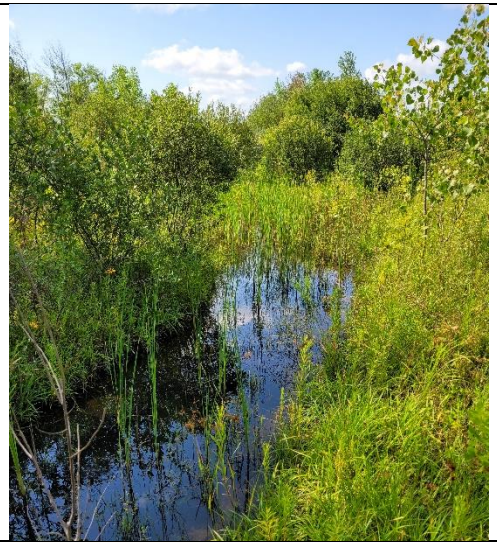


Photo 13: Crossing 4 side channel facing west.

Photo 14: Crossing 4 at Merrit Road ROW, facing west.

Photo 15: Crossing 4 downstream within the 0-50 m assessed reach, facing north.

Photo 16: Crossing 4 downstream within the 0-50 m assessed reach, facing west.

Photo 17: Crossing 5 - Upstream overview, facing south.

Photo 18: Crossing 5 - Upstream overview, facing north.

Photo 19: Crossing 5 concrete culvert structure at Merrit Road ROW

Photo 20: Crossing 5 downstream within the 50-100 m assessed reach, facing east.

Photo 21: Crossing 6 – Pond on private property overview, facing south.

Photo 22: Crossing 6 overview, facing north.

Photo 23: Crossing 7– upstream overview, facing west.

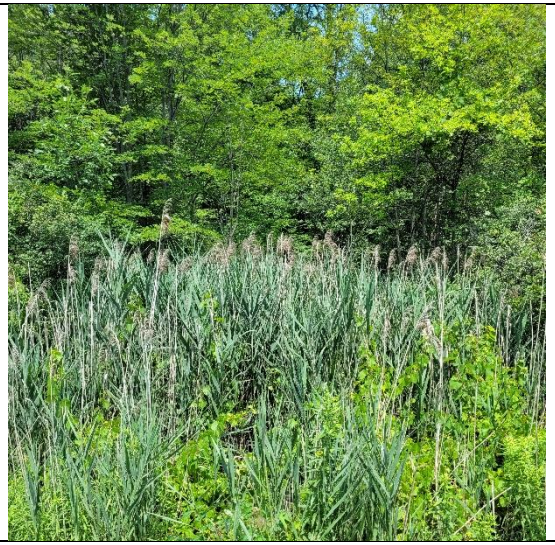
Photo 24: Crossing 7 – downstream overview, facing east.

Photo 25: Crossing 8 upstream overview facing west.

Photo 26: Crossing 8 upstream, mowed ROW facing south.

Photo 27: Crossing 8 downstream overview facing east.

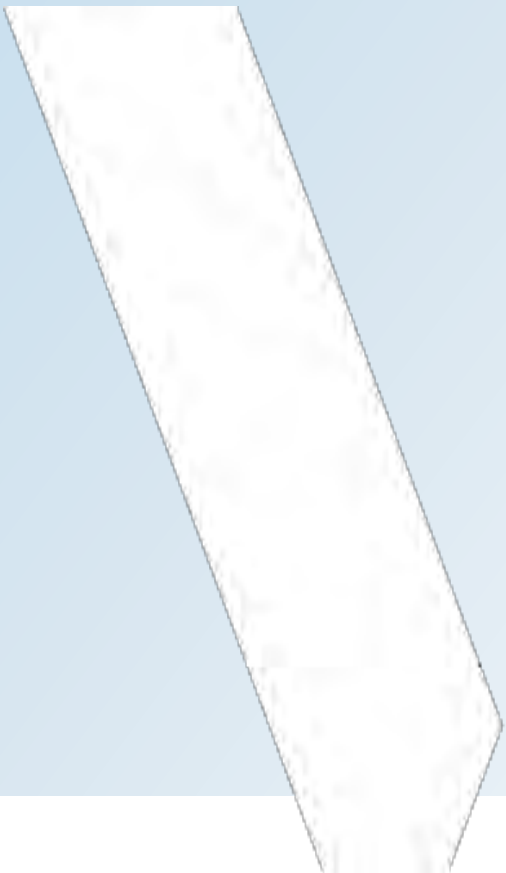
Photo 28: Crossing 8 downstream overview of cattail rootwads.

		
Photo 29: Crossing 9 upstream overview facing south.		**Photo 30:** Crossing 9 downstream overview facing north.
Photo 31:		**Photo 32:**

APPENDIX

F

SPECIES LISTS FOR WETLAND ASSESSMENT



APPENDIX

F-1 BREEDING BIRD STATIONS AND SPECIES DOCUMENTED IN SEGMENT 1

SPECIES	BB11	BB12	BB13	SENSITIVITY
American Goldfinch	x	x	x	
American Robin	x	x	x	
Black-capped Chickadee	x	x		
Blue Jay	x	x	x	
Brown-headed Cowbird	x	x		
Common Grackle	x			
European Starling	x			
Gray Catbird	x		x	
House Wren	x	x		
Killdeer	x		x	
Mourning Dove	x			
Northern Cardinal	x	x	x	
Red-winged Blackbird	x		x	
Song Sparrow	x	x	x	
Baltimore Oriole			x	
Common Yellowthroat		x		
Eastern Wood-pewee		x	x	
Great Crested Flycatcher		x	x	
Red-bellied Woodpecker			x	
Swamp Sparrow		x	x	Low
White-breasted Nuthatch			x	

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SPECIES	BB11	BB12	BB13	SENSITIVITY
Wild Turkey			x	
Wood Thrush		x	x	

APPENDIX

F-2 ANURAN CALL STATIONS AND SPECIES DOCUMENTED IN SEGMENT 1

SPECIES	1	2	5	6	25	SENSITIVITY
American Bullfrog			x	x		High
American Toad		x				Medium
Gray Treefrog				x	x	High
Green Frog	x	x	x	x	x	High
Northern Leopard Frog			x	x		High
Pickerel Frog					x	High
Spring Peeper	x	x	x	x	x	High
Western Chorus Frog - Carolinian Population	x	x	x	x	x	Medium

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F-3 FLORA SPECIES DOCUMENTED IN SEGMENT 1 VEGETATION COMMUNITIES

SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
Alfalfa		x			
American Beech	x				
American Black Currant			x		Medium
American Hog-peanut		x			
American Water-horehound			x		Medium
American Witch-hazel	x				
Arrow-leaved Smartweed			x		Medium
Autumn Olive			x		
Basswood	x		x		
Bebb's Willow		x		x	Medium
Beechdrops	x				
Bitternut Hickory	x				
Bittersweet Nightshade			x		
Black Cherry	x				
Black Gum			x		High
Black Raspberry		x	x		

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SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
Bladder Sedge			x		Medium
Blue Vervain			x		Medium
Blue-stemmed Goldenrod	x				
Blunt Broom Sedge			x		Medium
Bracken Fern	x				
Bristly Dewberry	x				Medium
Bristly Greenbriar			x		
Broad-leaved Cattail			x		Low
Broad-leaved Enchanter's Nightshade	x	x			
Brome-like Sedge			x		Medium
Bull Thistle			x		
Bur Oak		x	x		
Calico Aster	x		x		
Canada Avens			x		
Canada Bluegrass		x			
Canada Goldenrod		x			
Canada Moonseed		x			
Canada Plum	x				
Chokecherry			x	x	
Christmas Fern	x				
Cinnamon Fern	x				Medium
Common Apple		x			
Common Boneset		x			Low
Common Elderberry			x		Medium
Common Lady Fern	x		x		
Common Marsh Bedstraw			x		Medium
Common Milkweed		x			
Common Mullein		x			
Common Pear		x			

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SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
Common Ragweed		x			
Common Reed		x			Low
Common Self-heal			x		
Common Teasel		x			
Common Timothy		x	x		
Common Water-parsnip			x		Medium
Common Woolly Bulrush			x		Medium
Cottony Willow		x	x		Medium
Cranberry Viburnum		x		x	Medium
Crataegus sp.	x	x		x	
Crested Sedge			x		Low
Curled Dock		x			
Cursed Buttercup			x		Low
Devil's Beggarticks			x		Low
Ditch Stonecrop			x		Medium
Dotted Smartweed			x		Medium
Downy Arrowwood		x			
Downy Serviceberry			x		
Dudley's Rush	x				Low
Dwarf Clearweed			x		Medium
Early Goldenrod		x			
Eastern Burnweed	x				
Eastern Buttonbush			x		Medium
Eastern Cottonwood		x			
Eastern Flowering Dogwood	x				
Eastern Hop-hornbeam	x				
Eastern Poison Ivy			x		
Eastern Prickly Gooseberry	x				
Eastern Spring Beauty	x				

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SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
Eastern White Pine	x				
Eleocharis sp.		x			
European Agrimony				x	
European Buckthorn			x		
European Reed			x		Low
False Waterpepper			x		Medium
Field Horsetail		x			
Field Sow-thistle		x			
Flat-branched Tree-clubmoss	x				
Fowl Bluegrass			x		Medium
Fowl Mannagrass			x		Low
Fox Sedge		x	x		Low
Foxglove Beardtongue		x			
Freeman's Maple			x		Medium
Fringed Sedge			x		Medium
Garden Bird's-foot Trefoil		x			
Garlic Mustard	x				
Glossy Buckthorn	x		x	x	
Goutweed	x				
Graceful Sedge			x		
Grass-leaved Goldenrod		x			
Great Blue Lobelia			x		Medium
Green-fruited Burreed			x		Medium
Grey Dogwood		x		x	
Ground-ivy	x				
Hanging Bulrush			x		Low
Harlequin Blue Flag			x		Medium
Hemp Dogbane			x		
Herbaceous Carrionflower	x				

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SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
Highbush Blueberry			x		High
Hooked Agrimony			x		
Hop Sedge			x		Medium
Jack-in-the-pulpit	x				Medium
Japanese Barberry	x		x		
Kidney-leaved Buttercup			x		
Labrador Violet	x				
Large-leaved Aster		x			
Large-toothed Aspen	x				
Limber Honeysuckle	x				
Limestone Bittercress			x		Medium
Limestone Meadow Sedge		x			Low
Long-spurred Violet	x				
Long-stalked Sedge	x				
Mad-dog Skullcap			x		Medium
Manitoba Maple	x				
Marsh Fern			x		Medium
May-apple	x				
Meadow Willow		x			Low
Multiflora Rose			x	x	
Nannyberry	x	x	x	x	
Narrow-leaved Cattail		x			Low
Necklace Sedge	x				Medium
New England Aster		x	x		Low
New York Fern	x				
Northern Pitcher Plant			x		High
Northern Red Oak	x	x	x		
Northern Spicebush	x		x		Medium
Northern Water-horehound		x			Medium

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SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
Northern Water-plantain			x		Low
Old Field Aster		x			
Pale Blueberry	x				
Panicled Aster			x		Low
Partridgeberry	x				
Pennsylvania Sedge	x				
Porcupine Sedge			x		Medium
Purple Loosestrife		x			Low
Purple-stemmed Beggarticks			x		Medium
Purple-veined Willowherb		x	x		Low
Red Ash	x	x	x		Low
Red Clover		x			
Red-osier Dogwood		x	x	x	Low
Reed Canarygrass		x	x		Low
Rice Cutgrass			x		Low
Riverbank Grape	x	x	x	x	
Rough Cockleburr		x			
Rough Fleabane		x			
Rough-stemmed Goldenrod	x	x	x		
Round-leaved Greenbrier	x				
Russian Olive				x	
Sandbar Willow		x			Low
Sassafras	x				
Sensitive Fern			x		Medium
Sessile-leaved Bellwort	x				
Shagbark Hickory	x		x	x	
Silky Dogwood			x		Low
Silver Maple			x	x	Medium
Small Duckweed			x		Medium

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SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
Small Forget-me-not			x		Medium
Small-spike False Nettle			x		Medium
Smooth Serviceberry	x				
Soft Rush			x		Medium
Spotted Geranium			x		
Spotted Jewelweed			x		Medium
Spotted Joe Pye Weed			x		Low
Staghorn Sumac		x			
Stout Woodreed			x		Medium
Sugar Maple	x				
Swamp Milkweed		x	x		Medium
Swamp Pin Oak			x		High
Swamp White Oak			x		High
Sweet Cherry	x				
Sycamore		x			High
Tall Goldenrod		x			
Tall Rattlesnakeroot	x				
Thicket Creeper			x		
Three-flowered Bedstraw			x		
Torrey's Rush		x			Low
Trembling Aspen		x	x		
Tufted Vetch		x			
Tulip Tree	x				
Viola Sp.			x		
Virginia Creeper		x			
Virginia Smartweed	x		x		
Water Speedwell			x		Low
Western Poison Ivy	x		x	x	
White Ash	x	x		x	

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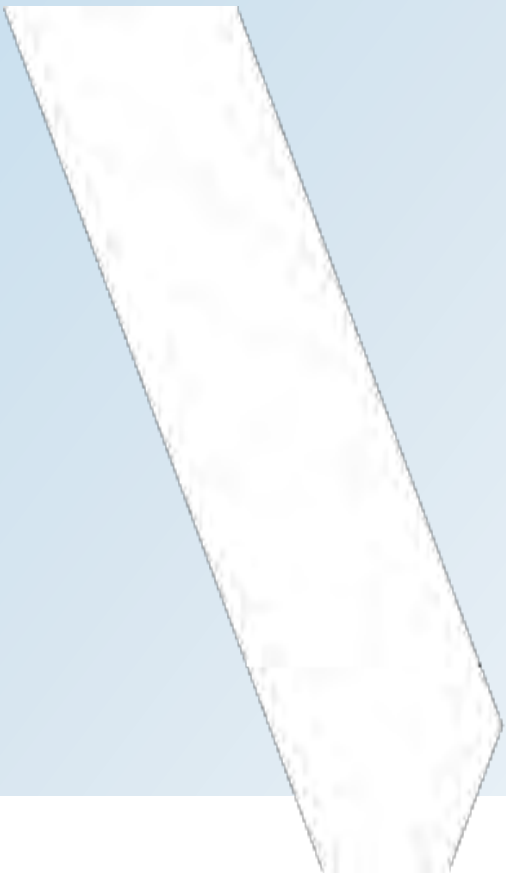
SPECIES	FODM5-3	MEFM1	SWD3-3	THDM3	SENSITIVITY
White Clover		x			
White Elm	x	x	x	x	Low
White Meadowsweet			x		Low
White Oak	x				
White Sweet-clover		x			
White Trillium	x				
White Turtlehead			x		Medium
White Willow		x			Low
White Wood Aster	x		x		
Wild Carrot		x			
Wild Chicory		x			
Wild Lily-of-the-valley	x				
Wild Strawberry		x			
Wild Yam	x				
Wood Anemone	x				
Woodland Sedge	x				
Woolly Blue Violet	x				
Yellow Trout-lily	x		x		
Yellow Violet	x				

APPENDIX

G SWH SCREENING



- Confirmed: Documented through Ministry mapping or other secondary sources or though fieldwork confirming 'Defining Criteria';
- Candidate: Vegetation communities and indicator species documented on site through secondary sources or fieldwork but 'Defining Criteria' has not been met (e.g., field surveys to confirm have not been undertaken); and
- Not Present: Either vegetation communities and/or indictor species are not documented on site through secondary sources or field surveys. Or field surveys have been conducted and "Not Present" has been confirmed.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
Seasonal Concentration Areas					
Waterfowl Stopover and Staging Areas: Terrestrial (Rationale – Habitat important to migrating waterfowl)	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 Plus evidence of annual spring flooding from meltwater or run-off within these Ecosites.	•Fields with sheet water during Spring (mid-March to May) •Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl •Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available •Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. •Reports and other information available from Conservation Authorities •Sites documented through waterfowl planning processes (*e.g.,* EHJV implementation plan) •Field Naturalist Clubs •Ducks Unlimited Canada •Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • Any mixed species aggregations of 100 or more individuals required • The flooded field ecosite habitat plus a 100-300m radius, dependent on local site conditions and adjacent land use is the significant wildlife habitat • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates) • SWH MIST Index #7 provides development effects and mitigation measures.	**Not Present** No ponds, marshes, lakes, bays, coastal inlets, watercourses (aquatic), or fields (terrestrial) with evidence of standing water in spring and concentrations of waterfowl.
Waterfowl Stopover and Staging Areas:	Canada Goose Cackling Goose	MAS1 MAS2	•Ponds, marshes, lakes, bays, coastal inlets and watercourses used during	Studies carried out and verified presence	

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
Aquatic (Rationale – Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district)	Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck	MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify •These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). •Environment Canada •Naturalist clubs often are aware of staging/stopover areas. •OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. •Sites documented through waterfowl planning processes (*e.g.,* EHJV implementation plan) •Ducks Unlimited projects •Element occurrence specification by Nature Serve: http://www.natureserve.org •Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	of: • Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use days • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH • The combined area of the ELC ecosites and a 100m radius area is the SWH • Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWH MIST Index #7 provides development effects and mitigation measures.	
Shorebird Migratory Stopover Area (Rationale: High	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit	BBO1 BBO2 BBS1	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and	Studies confirming: • Presence of 3 or more of listed species	**Not Present** No shorelines of lakes, rivers, wetlands, beach areas, bars, seasonally flooded muddy and un-vegetated habitats.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
quality shorebird stopover habitat is extremely rare and typically has a long history of use.)	Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area	and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area cxlviii • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects' • SWHMiST Index #8 provides development effects and mitigation measures.	
Raptor Wintering (Rationale: Sites used by multiple species, a high number of individuals and used annually are most significant)	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl **Special Concern:** Short-eared Owl Bald Eagle	HAWKS/OWLS: Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM, CUT, CUS, CUW. BALD EAGLE Forest Community	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors • Raptor wintering (hawk/owl) sites need to be >20 ha with a combination of forest and upland • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands • Field area of the habitat is to be wind swept with limited snow depth	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; one of more Bald Eagles or; at least 10 individuals and two of the listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years)	**Candidate** Red-tailed Hawk, Northern Harrier, and American Kestrel are documented in the secondary source information, and Red-tailed Hawk was documented during surveys. The habitat for this type of SWH is >20 ha with a combination of forest and upland communities. Based on potential species occurrences and vegetation communities present, Raptor Wintering SWH is considered candidate in all the forest and swamp communities in the Study Area until studies can confirm the presence/absence of one or more Short-eared Owls, or one or more Bald Eagles, or at least 10 individuals of two indicator species. The site is considered

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
		Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	or accumulation. • Eagle sites have open water and large trees and snags available for roosting INFORMATION SOURCES • OMNRF Ecologist or Biologist • Naturalist clubs • Natural Heritage Information Centre (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Results of Christmas Bird Counts • Reports and other information available from Conservation Authorities	for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #10 and #11 provides development effects and mitigation measures.	significant if it is used three years out of five for a minimum of 20 days.
Bat Hibernacula (Rationale; Bat hibernacula are rare habitats in all Ontario landscapes.)	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR3 CCA1 CCA2 (Note: buildings are not considered SWH)	•Hibernacula may be found in caves, mine shafts, underground foundations and Karsts •Active mine sites should not be considered as SWH •The locations of Bat Hibernacula are relatively poorly known. INFORMATION SOURCES •OMNRF for possible locations and contact for local experts •Natural Heritage Information Centre (NHIC) Bat Hibernaculum •Ministry of Northern Development and Mines for location of mine shafts. •Clubs that explore caves (*e.g.,* Sierra Club) •University Biology Departments with bat experts.	•All sites with confirmed hibernating bats are SWH •The area includes 200 m radius around the entrance of the hibernaculum for most development types and 1000 m for wind farms •Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects" •SWH MIST Index #1 provides development effects and mitigation measures.	**Not Present** No caves, mine shafts, underground formations/foundations, crevices, or Karst observed or reported on in background information.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
Bat Maternity Colonies (Rationale: Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.)	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD, FOM, SWD, SWM	•Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). •Maternity roosts are not found in caves and mines in Ontario •Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees •Female bats prefer wildlife trees (snags) in early stages if decay, class 1-3 or class 1 or 2 •Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred INFORMATION SOURCES •OMNRF for possible locations and contact for local experts •University Biology Departments with bat experts.	•Maternity colonies with confirmed use by: o>10 Big Brown Bats (EPFU) o>5 adult female Silver-haired (LANO) Bats •The area of habitat includes the entire woodland or a forest stand ELC Ecosite or an Eco element containing the maternity colonies •Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects" •SWH MIST Index #12 provides the development effects and mitigation measures.	**Candidate** It is assumed both indicator species, Big Brown Bat and Silver-haired Bat, occur in the Study Area. It is thought that the Study Area represents an important foraging site and contains maternity habitat. The required habitat type, mature deciduous forest, occurs. To qualify as suitable habitat, the forest must have >10 large diameter (>25cm DBH) wildlife trees per hectare. Wildlife trees were not inventoried as it was assumed the density of trees would fit the criteria. This SWH type is considered Candidate SWH as the presence of >10 Big Brown Bats or >5 adult female Silver-haired Bats were not confirmed in the Study Area.
Turtle Wintering Areas (Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.)	Midland Painted Turtle **Special Concern:** Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles: SW, MA, OA and SA; FEO and BOO. Northern Map Turtle: Open water areas such as deeper rivers or streams and lakes with current can also be used as overwintering habitat.	•For most turtles, wintering areas are in the same general areas as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. •Overwintering sites are permanent water bodies, large wetlands and bots or fens with adequate dissolved oxygen. •Manmade ponds such as sewage lagoons or storm water ponds should not be considered SWH. INFORMATION SOURCES •EIS studies carried out by conservation authorities. •Field naturalists clubs.	•Presence of five overwintering Midland Painted Turtles is significant. •One or more Northern Map Turtle or Snapping Turtle overwintering within a wetland is significant. •The mapped ELC ecosite area with the overwintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles	**Not Present** Open Water present in Study Area is likely not suitable for overwintering. The open water would likely not freeze, however, the open water areas are human made.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
			•OMNRF ecologist or biologist •NHIC	are overwintering is the SWH. •Overwintering areas may be identified by searching for congregations (basking areas) of turtles on warm, sunny days during the fall (September to October) or spring (March to May). Congregation of turtles is more common where wintering areas are limited and therefore significant. •SWH MIST Index #28 provides development effects and mitigation measures for turtle wintering habitat.	
Reptile Hibernaculum (Rationale: Generally, sites are the only known sites in the area. Sites with the highest number of individuals are most significant.)	SNAKES Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake SPECIAL CONCERN Milksnake Eastern Ribbonsnake LIZARD SPECIAL CONCERN (Southern Shield population): Five-lined Skink	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	•For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. •Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line •Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. •Five-lined skink prefer mixed forests with rock outcrop openings	Studies confirming: •Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. •Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (*e.g.,* foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct) •NOTE: If there are Special Concern	**Candidate** Eastern Gartersnake, Northern Watersnake, Northern Red-bellied Snake, DeKay's Brownsnake, Eastern Milksnake, and Eastern Ribbonsnake have been documented in the general area in the secondary source information. Eastern Gartersnake has been documented during field surveys. The area has a history of agriculture, and rock and debris piles may provide access to areas below the frost line. It is also noted that small mammal burrows and cavities within root structures of large trees could be potentially suitable hibernacula. Studies confirming a minimum of five individuals of a snake species or individuals of two of more species near suitable habitats on appropriate weather days during spring and fall are required to confirm this type.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
			providing cover rock overlaying granite bedrock with fissures. INFORMATION SOURCES •In spring, local residents or landowners may have observed the emergence of snakes on their property (*e.g.,* old dug wells). •Reports and other information available from Conservation Authorities. •Field Naturalist Clubs •University herpetologists •Natural Heritage Information Centre (NHIC) •OMNRF ecologist or biologist may be aware of locations of wintering skinks	Species present, then site is SWH •NOTE: Sites for hibernation possess specific habitat parameters (*e.g.,* temperature, humidity, *etc.*) and consequently are used annually, often by many of the same individuals of a local population (*i.e.,* strong hibernation site fidelity). Other critical life processes (*e.g.,* mating) often take place in close proximity to hibernacula. •The feature in which the hibernacula is located plus a 30 m radius area is the SWH •SWH MIS Index #13 provides development effects and mitigation measures for snake hibernacula. •Presence of any active hibernaculum for skink is significant. •SWHMiST Index #37 provides development effects and mitigation measures for fivelined skink wintering habitat.	
Colonially Nesting Bird Breeding Habitat: cliff/bank (Rationale: Historical use and number of nests in a colony make this habitat	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns. Habitat found in the	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil	Studies confirming: • Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during	**Not Present** Indicator species and no suitable habitat document in Study Area.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario.)		following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. INFORMATION SOURCES • Reports and other information available from Conservation Authorities • Ontario Breeding Bird Atlas • Bird Studies Canada; http://www.birdscanada.org/birdmon • Field Naturalist Clubs.	the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #4 provides development effects and mitigation measures.	
Colonially Nesting Bird Breeding Habitat: tree/shrub (Rationale: Large colonies are important to local bird populations, typically sites are only known colony in area and are used annually.)	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. INFORMATION SOURCES • Ontario Breeding Bird Atlas colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • Natural Heritage Information Centre (NHIC) Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from Conservation Authorities. • MNRF District Offices • Field Naturalist Clubs.	Studies confirming: • Presence of 5 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15 ha with a colony is the SWH • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells	**Not Present** Habitat present but no nests documented

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
				• SWH MIST Index #5 provides development effects and mitigation measures.	
Colonially Nesting Bird Breeding Habitat: ground (Rationale: Colonies are important to local bird populations, typically sites are only known colony in area and are used annually.)	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. INFORMATION SOURCES • Ontario Breeding Bird Atlas, rare/colonial species records. • Canadian Wildlife Service • Reports and other information available from Conservation Authorities. • Natural Heritage Information Centre (NHIC) Colonial Waterbird Nesting Area • MNRF District Offices. • Field Naturalist Clubs	Studies confirming: • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern • Presence of 5 or more pairs for Brewer's Blackbird • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant • The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3 ha with a colony is the SWH • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #6 provides development effects and mitigation measures.	**Not Present** Habitat not present
Migratory Butterfly Stopover Areas (Rationale: Butterfly	Painted Lady Red Admiral	Combination of ELC Community Series; need to have present	• A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest	Studies confirm: • The presence of Monarch Use Days	**Not Present** Not within 5km of Lake Ontario

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.)	SPECIAL CONCERN Monarch	one Community Series from each landclass: FIELD: CUM, CUT, CUS FOREST: FOC, FOD, FOM, CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	habitat present, and will be located within 5 km of Lake Erie or Lake Ontario • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes INFORMATION SOURCES • MNRF District Offices • Natural Heritage Information Centre (NHIC) • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs • Toronto Entomologists Association • Conservation Authorities	(MUD) during fall migration (Aug/Oct). MUD is based on the number of days the site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. • SWH MIST Index #16 provides development effects and mitigation measures.	
Landbird Migratory Stopover Areas (Rationale: Sites with a high diversity of species as well as high numbers are most significant.)	All migratory songbirds Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptor species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Woodlots >10 ha in size and within 5 km of Lake Ontario. • If multiple woodlands are located along the shoreline those woodlands <2 km from and Lake Ontario are more significant • Sites have a variety of habitats: forest, grassland and wetland complexes • The largest sites are more significant	Studies confirm: • Use of the habitat by >200 birds/day and with >35 species and with at least 10 bird species recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is	**Not Present** Not within 5km of Lake Ontario

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
			• Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and within 5 km of and Lake Ontario are Candidate SWH. INFORMATION SOURCES • Bird Studies Canada • Ontario Nature • Local birders and field naturalist clubs • Ontario Important Bird Areas (IBA) Program	considered above average and significant • Studies should be completed during spring (Mar.-May) and fall (Aug.-Oct.) migration using standardized assessment techniques. Evaluation to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #9 provides development effects and mitigation measures.	
Deer Winter Congregation Areas (Rationale: Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions.)	White-tailed Deer	All forested Ecosites with these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment • Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands • If deer are constrained by snow death refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule • Large woodlots >100 ha and up to 1,500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha • Woodlots with high densities of deer due to artificial feeding are not significant. INFORMATION SOURCES • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF • Studies should be completed during winter (Jan./Feb.) when >20 cm of snow is on the ground using aerial survey techniques, ground road surveys, or a pellet count deer	**Confirmed** Delineated by MNRF

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
				survey If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule • SWH MIST Index #2 provides development effects and mitigation measures	
Rare Vegetation Communities or Specialized Habitat for Wildlife					
Rare Vegetation Communities					
Cliffs and Talus Slopes (Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.)		Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	• Most cliff and talus slopes occur along the Niagara Escarpment INFORMATION SOURCES • The Niagara Escarpment Commission has detailed information on location of these habitats • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes • SWH MIST Index #21 provides development effects and mitigation measures	**Not Present**
Sand Barren (Rationale: Sand barrens are rare in Ontario and support rare species. Most sand barrens have been lost due to cottage development and forestry.)		ELC Ecosites: SBO1, SBS1, SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%	• A sand barren area >0.5 ha in size INFORMATION SOURCES • The Niagara Escarpment Commission has detailed information on location of these habitats • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website	• Confirm any ELC Vegetation Type for Sand Barrens • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic spp.) • SWH MIST Index #20 provides development effects	**Not Present**

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
		Sand barrens typically are exposed sand, generally sparsely vegetated and caused by a lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	• Field Naturalist Clubs • Conservation Authorities	and mitigation measures	
Alvar (Rationale: Alvars are extremely rare habitats in Ecoregion 6E.)	FIVE ALVAR INDICATOR SPECIES *Carex crawei* *Panicum philadelphicum* *Eleocharis compressa* *Scutellaria parvula* *Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 6E	ALO1, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2 An Alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or	• An Alvar site >0.5 ha in size • Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie INFORMATION SOURCES • Alvars of Ontario (Federation of Ontario Naturalists, 2000) • Conserving Great Lakes Alvars (Ontario Nature) • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field Naturalist Clubs • Conservation Authorities	• Field studies identify that four of the five ALVAR INDICATOR SPECIES at a Candidate Alvar Site is significant • Site must not be dominated by exotic of introduced species (<50% vegetative cover are exotic spp.) • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses • SWH MIST Index #17 provides development effects and mitigation measures	**Not Present**

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
		are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover			
Old Growth Forest (Rationale: Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 6E.)		Forest Community Series: FOD, FOC, FOM, SWD, SWC, SWM Old Growth Forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	• Woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest INFORMATION SOURCES • OMNRF Forest Resource Inventory mapping • OMNRF Districts • Field Naturalist Clubs • Conservation Authorities • Sustainable Forestry License (SFL) companies will possibly know locations through field operations • Municipal forestry departments	Field studies will determine: • If dominant tree species of the forest are >140 years old, then the area containing these trees is SWH • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present) • The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH • Determine ELC vegetation types for the forest area containing the old growth characteristics • SWH MIST Index #23 provides development effects and mitigation measures	**Candidate** Old Growth Forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage the development of a multi-layered canopy and an abundance of snags and downed woody debris. The criteria state that the woodland area must be over 0.5 ha, dominant trees are >140 years old, and the forested area containing the old-growth characteristics will have experienced no recognizable forestry activities. Based on aerial imagery from 1934 (88 years ago; Figure 5 1), some wooded areas occur, look mature, and are larger than 0.5 ha. These wooded areas still occur today, so core sections of the wooded areas may be classified as old growth.
Savannah (Rationale: Savannahs are extremely rare habitats in Ontario.)		TPS1, TPS2, TPW1, TPW2, CUS2 A Savannah is a tallgrass prairie habitat that has tree	• No minimum size to site • Site must be restored or a natural site. Remnant sites such as railway right-of-ways are not considered SWH	Field studies confirm: • One or more of the Savannah indicator species listed in Appendix N should be present. Note:	**Not Present**

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
		cover between 25-60%.	INFORMATION SOURCES • Natural Heritage Information Centre (NHIC) has location information available on their website • Field Naturalist Clubs • Conservation Authorities	savannah plant spp. List from Ecoregion 6E should be used. • Area of the ELC Ecosite is the SWH • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic spp.) • SWH MIST Index #18 provides development effects and mitigation measures.	
Tallgrass Prairie (Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.)		TPO1, TPO2 A tallgrass prairie has ground cover dominated by prairie grasses. An open tallgrass prairie habitat has <25% tree cover.	• No minimum size to site • Site must be restored or a natural site. Remnant sites such as railway right-of-ways are not considered SWH INFORMATION SOURCES • Natural Heritage Information Centre (NHIC) has location information available on their website • Field Naturalist Clubs • Conservation Authorities	Field studies confirm: • One or more of the Prairie indicator species listed in Appendix N should be present. Note: savannah plant spp. List from Ecoregion 6E should be used. • Area of the ELC Ecosite is the SWH • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic spp.) • SWH MIST Index #19 provides development effects and mitigation measures.	**Not Present**
Other Rare Vegetation Communities (Rationale: Plant communities that often contain rare species which depend on the habitat for survival.)		Provincially rare (S1, S2, S3) vegetation communities are listed in Appendix M of the Significant Wildlife Habitat Technical Guide (MNRF, 2000). Any ELC Ecosite Code that	• ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M of the Significant Wildlife Habitat Technical Guide (MNRF, 2000). • OMNRF/NHIC will have up to date listing for rare vegetation communities.	• Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of the Significant Wildlife Habitat Technical	**Candidate** This SWH includes plant communities that often contain rare species which depend on the habitat for survival. It is noted that Aquafor Beech (2014) found Pin Oak Mineral Deciduous Swamp (SWD1-3) as occasional among vernal pools. Pin Oak Mineral Deciduous Swamp is a rare vegetation community (S2S3) but was not documented by botanists during fieldwork in the Terrestrial Study Area.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
		has a possible ELC Vegetation Type that is provincially rare is candidate SWH. Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	INFORMATION SOURCES • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Districts • Field Naturalist Clubs • Conservation Authorities	Guide (MNRF, 2000). • Area of the ELC Vegetation Type polygon is the SWH. • SWH MIST Index #37 provides development effects and mitigation measures.	
Specialized Habitat for Wildlife					
Waterfowl Nesting Area (Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant)	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 NOTE Includes adjacency to Provincially Significant Wetlands	• A waterfowl nesting area extends 120 m from a wetland (>0.5 ha) or a wetland (>0.5 ha) and any small wetlands (0.5 ha) within 120 m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur • Upland areas should be at least 120 m wide so that predators such as raccoons, skunks and foxes have difficulty finding nests • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites. INFORMATION SOURCES • Ducks Unlimited staff may know the locations of particularly productive nesting sites • MNRF Wetland Evaluations for indication of significant waterfowl nesting habitat • Reports and other information available from Conservation Authorities	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • A field study confirming waterfowl nesting habitat will determine boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough	**Candidate** Important to local waterfowl populations, upland habitats (120 m) adjacent to wetlands are considered. The presence of three or more nesting pairs of indicator species or ten or more pairs of indicator species, including Mallards confirms SWH. Mallard was documented during field surveys, and other indicator species were documented in secondary sources. To confirm this habitat type, nesting surveys completed April-June could confirm the presence/absence of this type.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
				habitat for waterfowl to successfully nest • SWH MIST Index #25 provides development effects and mitigation measures.	
Bald Eagle and Osprey nesting, foraging and Perching Habitat (Rationale: Nest sites are fairly uncommon in Ecoregion 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.)	Osprey SPECIAL CONCERN Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (*e.g.,* telephone poles and constructed nesting platforms) INFORMATION SOURCES • NHIC compiles all known nesting sites for Bald Eagles in Ontario • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat • Nature Counts, Ontario Nest Records Scheme data. • OMNRF District. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented • Reports and other information available from Conservation Authorities. • Field Naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800 m is dependent on sight lines from the nest to the development and inclusion of perching and foraging habitat • To be significant a site must be used annually. When found	**Not Present** Species not present

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
				inactive, the site must be known to be inactive for > 3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid-August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #26 provides development effects and mitigation measures	
Woodland Raptor Nesting Habitat (Rationale: Nest sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.)	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	• All natural or conifer plantation woodland/forest stands >30 ha with > 4 ha of interior habitat. Interior habitat determined with a 200 m buffer. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests, within tops or crotches of trees. Species such as Cooper's Hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest INFORMATION SOURCES • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in	Studies confirm: • Presence of one or more active nests from species list is considered significant • Red-shouldered Hawk and Northern Goshawk – A 400 m radius around the nest or 28 ha area of habitat is the SWH. The 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest. • Barred Owl – A 200m radius around the nest is the SWH • Broad-winged Hawk	**Candidate** Woodland raptor nesting sites are rarely identified but are sensitive habitats that are often used annually. Cooper's Hawk and Sharp-shinned Hawk have been documented in the general area in secondary sources. All natural or conifer plantations and woodland/forest stands > 30 ha with > 4 ha of interior habitat (interior habitat is defined as a 200 m buffer in this instance) are considered suitable habitats. Habitat is present, however, no nests were confirmed during field studies in the Terrestrial Study Area. Sharp-shinned Hawk nests almost exclusively in coniferous forests (OMNRF, 2014) and is unlikely to nest in the Study Area. However, Cooper's Hawk tends to nest in intermediate-aged and mature upland deciduous forests. Cooper's Hawk hunt at the edge of forests and in forest openings and is common in urban areas (OMNRF, 2014). This habitat type is confirmed with one active nest from an indicator species. Nesting surveys can be completed from early March to the end of May, and call broadcasts can help locate territorial raptors.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
			Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities.	and Coopers Hawk, – A 100m radius around the nest is the SWH • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWH MIST Index #27 provides development effects and mitigation measures	
Turtle Nesting Habitat (Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles.)	Midland Painted Turtle SPECIAL CONCERN Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, BOO1, FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and is located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes and rivers are most frequently used. INFORMATION SOURCES • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles. • One ore more Northern Map Turtles or Snapping Turtles nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30 to 100 m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. • Travel routes from wetland to nesting	**Not Present** Habitat not present

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
			sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Centre (NHIC). • Field naturalist clubs.	area are to be considered within the SWH as part of the 30 to 100 m area of habitat. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWH MIST Index #28 provides development effects and mitigation measures for turtle nesting habitat.	
Seeps and Springs (Rationale: Seeps/springs are typical of headwater areas and are often at the source of Coldwater streams.)	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamanders	Seeps/springs are areas where groundwater comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	• Any forested area (with <25% meadow/field/ pasture) within the headwaters of a stream or river system • Seeps and springs are important feeding and drinking areas. Especially in the winter will support a variety of plant and animal species. INFORMATION SOURCES • Topographical Map. • Thermography. • Hydrological surveys conducted by Conservation Authorities and MOECC. • Field Naturalists Clubs and landowners. • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped	Field studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of an ELC forest ecosite or an Eco element within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat • SWH MIST Index #30 provides development effects	**Candidate** Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams in forested areas. Wild Turkey, salamanders, and White-tailed Deer are indicator species and were documented in the Study Area. The confirmation of two or more locations with seeps/springs is SWH. Further hydrological work could help confirm its presence; however, based on the geological condition which creates surface water wetlands, it is likely seeps are present.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
				and mitigation measures	
Amphibian Breeding Habitat: Woodland (Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.)	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500 m2 (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat. INFORMATION SOURCES • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland evaluations • Field Naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or egg masses) or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys will be required during the spring (Mar.-Jun.) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands • The habitat is the wetland area plus a 230m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWH MIST Index #14 provides development effects and mitigation measures	**Confirmed** Gray Treefrog and Spring Peeper indicator species for woodland breeding were documented during fieldwork in the required amounts. Additionally, Blue-spotted Salamander is confirmed present and breeding by the NPCA. The SWH habitat is defined as the presence of a wetland, pond, or woodland pool (including vernal pools) >500 m2 within or adjacent (within 120 m) to a woodland (no minimum size).

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
Amphibian Breeding Habitat: Wetland (Rationale: Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within central Ontario landscapes.)	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120 m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (*e.g.*, Bullfrog) may be adjacent to woodlands.	• Wetlands >500m2 (about 25m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators • Bullfrogs require permanent water bodies with abundant emergent vegetation. INFORMATION SOURCES • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations. • Reports and other information available from Conservation Authorities	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3 or; Wetland with confirmed breeding Bullfrogs are significant • The ELC ecosite wetland area and the shoreline are the SWH • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWH MIST Index #15 provides development effects	**Confirmed** Blue-spotted Salamander was confirmed breeding by NPCA and is an indicator species. Additionally, several indicator frog and toad species were documented during surveys in appropriate numbers. American Toad, Gray Treefrog, Green Frog, and Northern Leopard Frog were all documented. Lastly, American Bullfrog was also documented and is assumed to be breeding. Therefore, all the wetland communities on site are confirmed SWH.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
				and mitigation measures.	
Woodland Area-Sensitive Bird Breeding Habitat (Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.)	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren SPECIAL CONCERN Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD	CRITERIA • Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30 ha • Interior forest habitat is at least 200 m from forest edge habitat INFORMATION SOURCES • Local birder clubs. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring. • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH • Conduct field investigations in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #34 provides development effects and mitigation measures	**Candidate** Indicator species have been documented in the general area through secondary sources and fieldwork documented Black-throated Blue Warbler, Black-throated Green Warbler, Ovenbird, Scarlet Tanager, and Veery migrating through the Study Area in the spring. However, none of the indicator species were documented in the Study Area during breeding bird surveys. The habitat present in the Study Area is considered to be at least 60 years old and possibly 140 years old (based on historical imagery) and contains interior woodland habitat. Subsequent years of breeding bird surveys should be completed to confirm the presence/absence of this type.
Habitats of Species of Conservation Concern					
Marsh Bird Breeding Habitat (Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.)	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan SPECIAL CONCERN	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, FEO1, BOO1 For Green Heron: all SW, MA and CUM1 sites	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water INFORMATION SOURCES	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH	**Not Present** Habitat not present.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
	Black Tern Yellow Rail		• OMNRF District and wetland evaluations. • Field Naturalist clubs • Natural Heritage Information Centre (NHIC) Records. • Reports and other information available from Conservation Authorities • Ontario Breeding Bird Atlas	• Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #35 provides development effects and mitigation measures	
Open Country Bird Breeding Habitat (Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.)	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow SPECIAL CONCERN Short-eared Owl	CUM1, CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (*i.e.,* no row cropping or intensive hay or livestock pasturing in the last 5 years) • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species INFORMATION SOURCES • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • EIS Reports and other information available from Conservation Authorities	Field studies confirm: • Presence of nesting or breeding of 2 or more of the listed species • A field with 1 or more breeding Short-eared Owls is to be considered SWH • The area of SWH is the contiguous ELC ecosite field areas • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #32 provides	**Not Present** Habitat size not present.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
				development effects and mitigation measures	
Shrub / Early Successional Breeding Bird habitat (Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.)	INDICATOR SPECIES Brown Thrasher Clay-coloured Sparrow COMMON SPECIES Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher SPECIAL CONCERN Yellow-breasted Chat Golden-winged Warbler	CUT1, CUT2, CUS1, CUS2, CUW1, CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	• Large field areas succeeding to shrub and thicket habitats >10 ha in size • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (*i.e.,* no row-cropping, haying or live-stock pasturing in the last 5 years) • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands INFORMATION SOURCES • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities	Field studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #33 provides development effects and mitigation measures	**Not Present** Habitat size not present.
Terrestrial Crayfish Habitat (Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and	Chimney or Digger Crayfish Devil Crayfish or Meadow Crayfish	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, SWD, SWT, SWM	• Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far	Studies confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow	**Not Present** Habitat and chimneys not present

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
their habitats are very rare.)		CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish	from water • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well-formed. INFORMATION SOURCES • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF, March, 1998	marsh, swamp or moist terrestrial sites • Area of ELC ecosite or an Eco element area of meadow marsh or swamp within the larger ecosite area is the SWH • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult • SWH MIST Index #36 provides development effects and mitigation measures	
Special Concern and Rare Wildlife Species (Rationale: These species are quite rare or have experienced significant population declines in Ontario.)	All Special Concern and Provincially Rare (S1, S2, S3, SH) plant and animal species. Lists of these species are tracked by the NHIC	All plant and animal element occurrences (EOs) within a 1 km or 10 km grid. Older EOs were recorded prior to GPS being available, therefore location information may lack accuracy.	• When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites INFORMATION SOURCES • Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website "Get Information": http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas • Expert advice should be sought as many of the rare spp. Have little	Studies confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies.	**Confirmed and Candidate** Confirmed species include: — Barn Swallow, — Eastern Wood-Pewee, — Wood Thrush, — Monarch, — Tall Tickseed (S1S2), — Black Gum (S3), and — Species considered Rare in the NPCA NAI but not listed above or an Endangered and Threatened species under the ESA: Slender-leaved False Foxglove, Limestone Bittercress, Drooping Woodland Sedge, Necklace Sedge, Rough Fleabane, Dyer's Bedstraw, Great Blue Lobelia, False Waterpepper, Canada Plum, Common Three-square Bulrush, and Mosquito Bulrush. Linking SWH on-site is completed by defining the habitat area to the finest ELC scale that protects the habitat form and function is the SWH. The forest and swamp habitats are confirmed SWH for Eastern Wood-pewee and Wood

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
			information available about their requirements	The habitat needs be easily mapped and cover an important life stage component for a species *e.g.*, specific nesting habitat or foraging habitat. • SWH MIST Index #37 provides development effects and mitigation measures	Thrush. Barn Swallow was documented flying overhead during breeding bird surveys, likely foraging. Monarch was also observed during surveys, but it is not confirmed if it was a breeding individual. Further survey work to confirm appropriate habitat for Barn Swallow and Monarch would be required to delineate this type. Limestone Bittercress, Great Blue Lobelia, False Waterpepper, and Black Gum were documented in swamps (SWD3-3), and Necklace Sedge and Canada Plum were documented in forests (FODM5-3). In the unopened road allowance (Inclusion - Dry – Fresh Forb meadow Ecosite (MEFM1)) and meadows (ME) in the Terrestrial Study Area, Rough Fleabane was documented. Tall Tickseed and Dyer's Bedstraw were documented in a MAM2. Along roadside and hedgerows, Sledner-leaved False Foxglove, Drooping Woodland Sedge, Common Three-square Bulrush, and Mosquito Bulrush were found. This SWH type is not mapped as this type is not limited and all ELC communities would be mapped SWH. Candidate species include: — Swamp Rose-mallow, — Broad Beech Fern, and — species considered Rare in the NPCA NAI but not listed above or an Endangered and Threatened species under the ESA: Broomsedge Bluestem, Fireberry Hawthorn, Rough Barnyard Grass, Alder-leaved Buckthorn, Robin's-plantain Fleabane, Twinleaf, Alpine Rush, Canada Rush, Tamarack, Virginia Water-horehound, Clammy Ground-cherry, Whorled Milkwort, Balsam Poplar, Pin Cherry, Greater Water Dock, Little Bluestem, Sphinx Ladies'-tresses, Great Duckweed, Hoary Vervain These candidate species must be confirmed present and further studies to delineate suitable habitats would be required.
Animal Movement Corridors					
Amphibian Movement Corridors (Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.)	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog	Corridors may be found in all ecosites associated with water. Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	• Movement corridors between breeding habitat and summer habitat • Movement corridors must be determined when amphibian breeding habitat is confirmed as SWH (Amphibian Breeding Habitat, Wetland) INFORMATION SOURCES	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites • Corridors should consist of native vegetation, with	It is likely that amphibians breeding within the Study Area are increasingly isolated and must find breeding, foraging, and wintering habitats all within the general area. Hwy 406 is likely a barrier to movement and individuals in the study area are isolated from those on the west side. Corridors are mapped in Figure 6 4b based on findings in the Terrestrial Study Area and NPCA swamp community delineations outside of the Terrestrial Study Area.

Significant Wildlife Habitat Type (7E)	Indicator Wildlife Species	Ecosites/ Habitat Description	Criteria and Information Sources	Defining Criteria	Confirmed or Candidate SWH at Project Site
	Mink Frog Bullfrog		• MNRF District Office. • Natural Heritage Information Centre (NHIC). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs	several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant • Corridors should have at least 15m of vegetation on both sides of waterway or be up to 200m wide of woodland habitat and with gaps <20m • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat • SWH MIST Index #40 provides development effects and mitigation measures	

APPENDIX

H

NPCA COMMENTS ON ENVIRONMENTAL IMPACT STUDY

Responses to Niagara Peninsula Conservation Authority (NPCA) Comments
Merritt Road/Rice Road Municipal Class Environmental Assessment

#	Section	NPCA Comments (January 17, 2024)	WSP Response (February 13, 2024)
Environmental Study Report, Draft, dated September 29, 2023			
1	3.2.6 NPCA Policy Document	This section refers to NPCA's Policy Document from September 2018, which was superseded in November 2022. As this EA started before the 2022 policies were in effect, referencing our previous policies is fine. However, please include a note that NPCA updated its policies in November 2022.	A note has been added to the ESR.
Appendix E, Environmental Impact Study, dated June 16, 2023			
2	8.2.6 Wetland Form and Function	NPCA is supportive of enhancement opportunities to increase ecological resilience and function of natural heritage features. However, NPCA does not consider enhancement as a substitute for wetland re-creation when considering compensation for the impacts of this degree of wetland removal. Please clarify how the proposed compensation clearly demonstrates conformance with NPCA's Policy, specifically 2.5.2 k. Please note that NPCA may consider areas under agricultural production AND areas that do not contain a permanent form of development as possible areas for wetland compensation.	As noted in comment 1, the NPCA allows a policy document from 2018 to be used in this EA. Comment 2 references a policy document from 2022. However, as NPCA is a public commenting body for EAs and has a Protocol for Planning Services with the Region dated January 2018, their input to the project is valued and considered. Policy 2.5.2 k) recommends that the decision to pursue compensation be subject to: i. all efforts to protect the feature being exhausted first; ii. the feature is not protected by any other applicable federal, provincial or municipal requirement(s); and iii. it taking place in consultation with the municipality or the proponent. In response: i), the Region led EA considered the options of the road alignment in this location. A background transportation master plan was completed (by others) and is the factor in selecting this location. ii) Provincial and municipal requirements protect the feature iii) The project is led by the Region, and their staff from various departments (including environmental planning) was engaged. The Region will consult with the NPCA during detailed design phase to confirm wetland compensation requirements and location. The Region will also discuss with MNRF as the wetland is a PSW.
3	8.2.6 Wetland Form and Function	Please provide the total area of wetland proposed for removal due to the proposed undertaking and the total area of wetland proposed for compensation. NPCA staff acknowledge that this area will be refined as detailed design progresses. a. As previously commented, compensation of swamps is not typically allowed by NPCA due to the lag effect between feature removal and feature recreation and the inherent challenges associated with effectively recreating swamp communities. As such NPCA recommends a compensation ratio of not less than 2:1 to be achieved to compensate for the loss of swamps within the study area and 1:1 for marsh habitats removed from the study area.	The scope of this study was limited to an EA. The detailed design will be completed under a subsequent separate phase. The EA presented a preliminary option for road design. The roadway design may be subject to further refinement during detailed design, along with the delineation of the grading limits, which may impact the area of wetland removal. As such, it was WSP's opinion that, to avoid confusion or misrepresentation, no estimates of impact area were provided. In our experience, providing numbers preemptively makes updates difficult. Therefore, WSP felt it was preemptive to provide areas of loss. The Region will undertake consultation with the NPCA during detailed design to confirm wetland compensation requirements and location. A detailed compensation plan is recommended based on the detailed design (NPCA also notes this in comment #4).
4	8.2.6 Wetland Form and Function	NPCA staff request that a Wetland Compensation Monitoring Plan be developed to demonstrate that wetland compensation has been achieved. a. This Plan must be implemented for the re-configured/re-created wetland feature(s), to accurately monitor any changes in the wetland community over time and to measure the success of the re-configuration/restoration and management actions. b. Monitoring must be conducted annually at a similar time of year (i.e., late July). c. All plants identified as part of the Wetland Compensation Monitoring Program must be categorized by the wetness index based on the Floristic Quality Assessment System for Southern Ontario. d. The results of the Wetland Compensation Monitoring Program must be submitted to NPCA annually prior to December 31, until planting of the wetland compensation area is complete. It is recommended that a monitoring plan be implemented for a minimum of 5-years upon completion of the wetland compensation plantings. e. Details regarding this Plan can be submitted at the detailed design stage for review and comment.	WSP agrees that a detailed Wetland Compensation Plan must be developed. As noted in Comment response #3, the compensation plan should be conducted after EA completion and during detailed design. NPCA seems to agree with this timeline based on comment #4e. NPCA will need to provide necessary input for the plan. It is also recommended that compensation requirements be tailored to the compensation location.
Appendix F, Stormwater Management and Hydraulic Assessment Report (Draft), dated August 2023			
5	2.2.1 Singers Drain	Singers Drain is erroneously classed as a municipal drain, please revise.	Text has been updated.

Responses to Niagara Peninsula Conservation Authority (NPCA) Comments
Merritt Road/Rice Road Municipal Class Environmental Assessment

#	Section	NPCA Comments (January 17, 2024)	WSP Response (February 13, 2024)
6	2.2.2 Towpath Drain	Towpath Drain is erroneously classed as a municipal drain, please revise.	Text has been updated.
7	6.2 Recommendations & Requirements for Future Study; HEC-RAS Model	As noted within Key Comment #3, the area of segment 1 (wetlands south of the unopened road allowance) does not have clear channels and required the use of levees, and staff note that cross sections 313 and 284 could benefit from levees on the right-hand side of the cross sections. NPCA is in support of the assessment that further 2D modeling would be beneficial.	The HEC-RAS model has been updated to incorporate levees along the right-hand side of cross sections 313 and 284. The hydraulics modelling results have remained the same.
8	HEC-RAS	Model The utilized terrain file appears to use a 2m grid, please provide clarification regarding why this was selected.	Two sets of LiDAR data have been received/sourced and reviewed accordingly. These include the 2 m resolution SWOOP DEM, which was based upon Orthophotography collected by MNRF in 2015 (ref. Land Information Ontario, 2015), and a 5 m resolution DEM provided by the NPCA in 2022. In comparing the two data sets, it was found that the SWOOP DEM had a better resolution (2 m) and had the potential to provide further detail in the areas of focus. Accordingly, SWOOP DEM was used for model development. Nonetheless, the NPCA DEM was also used to compare the findings from the SWOOP DEM and confirm the understanding of the features of interest.
9	HEC-RAS	Several cross sections have an artificially deepened channel, please clarify if surveying was completed to establish creek bed depths.	Channel elevations were determined at locations where survey data was available in proximity to cross-road culverts.
10	HEC-RAS	Cross section 1171 LOB length and cross section 65 ROB length were unexpectedly long, please provide clarification.	The cross-section 65 could not be found in the model. The HEC-Ras model has been updated accordingly. The modelling results were not impacted by the change in the model.

January 17, 2024

Via Email Only

Mir Ahsan Talpur, M.Env.Sc., EP
Senior Environmental Planner
WSP E&I Canada Limited
3450 Harvester Road, Suite 100
Burlington, Ontario L7N 3W5

NPCA File: PLEA202100316

To Mir Talpur,

Re: Niagara Peninsula Conservation Authority (NPCA) Comments
Merritt Road/Rice Road Municipal Class Environmental Assessment
Regional Municipality of Niagara
Environmental Study Report

Proposal

NPCA received and reviewed the above noted Environmental Study Report (ESR) and Appendices regarding Niagara Region's Schedule C Municipal Class Environmental Assessment for Merritt Road and Rice Road, dated September 29, 2023, prepared by WSP E&I. Staff offer the following **Key Comments** below, and **Detailed Comments** within **Appendix A** to be addressed within the next submission.

Key Comments

1. NPCA Planning Ecology staff have reviewed the *Environmental Impact Study for the Schedule C Municipal Class Environmental Assessment for Merritt Road and Rice Road*, dated June 16, 2023. At this time, NPCA requires additional information on wetland compensation to ensure that there will be no net loss to the form and function of the wetlands.

   Detailed Comments related to wetland compensation have been provided within **Appendix A**.

2. NPCA Engineering staff have reviewed the *Stormwater Management and Hydraulic Assessment Report (Draft) Merritt Road & Rice Road Schedule 'C' Municipal Class Environmental Assessment,* dated August 2023, and the accompanying HEC-RAS model files, and have no objection to:

- The revised 100-year floodplain under existing conditions;
- The utilization of the study's calibrated peak flows;
- The conclusion that the proposed road and associated culvert crossings have no negative impact on the floodplain;
- The concluded 100-year floodplain under proposed conditions; and
- The assessment that area of segment 1 (wetlands south of the unopened road allowance) would benefit from 2D modeling. The area does not have clear channels and required the use of levees, NPCA notes cross sections 313 and 284 could benefit from levees on the right-hand side of the cross sections.

3. NPCA Engineering staff require a few revisions and details to be clarified, which are specified within **Appendix A**.

Conclusion

NPCA staff hopes this information is helpful and looks forward to reviewing the next submission. We request that the next submission include a comment response matrix including the **Detailed Comments** within **Appendix A**. If you have any questions or would like to discuss further, please contact the undersigned.

Sincerely,

Colleen Bain, MES Planning
Senior Watershed Planner,
Environmental Planning and Policy, NPCA
cbain@npca.ca

cc: Leilani Lee-Yates, NPCA (email only)
David Deluce, NPCA (email only)
Amy Parks, NPCA (email only)
Theresa Bukovics, NPCA (email only)
Carly Mason, NPCA (email only)
Maged Elmadhoon, Niagara Region (email only)

Appendix A: Detailed Comments

Appendix A: Detailed Comments

NPCA staff have reviewed the Environmental Study Report (ESR) and Appendices prepared by WSP E&I regarding Niagara Region's Schedule C Municipal Class Environmental Assessment for Merritt Road and Rice Road, dated September 29, 2023, and offer the following comments to be addressed in the next submission. Please include a comment matrix using the format below.

#	Section	NPCA Comments, January 2024
***Environmental Study Report, Draft,* dated September 29, 2023**		
1.	3.2.6 NPCA Policy Document	This section refers to NPCA's Policy Document from September 2018, which was superseded in November 2022. As this EA started before the 2022 policies were in effect, referencing our previous policies is fine. However, please include a note that NPCA updated its policies in November 2022.
Appendix E, *Environmental Impact Study*, dated June 16, 2023		
2.	8.2.6 Wetland Form and Function	NPCA is supportive of enhancement opportunities to increase ecological resilience and function of natural heritage features. However, NPCA does not consider enhancement as a substitute for wetland re-creation when considering compensation for the impacts of this degree of wetland removal. Please clarify how the proposed compensation clearly demonstrates conformance with NPCA's Policy, specifically 2.5.2 k. Please note that NPCA may consider areas under agricultural production AND areas that do not contain a permanent form of development as possible areas for wetland compensation.

3.	8.2.6 Wetland Form and Function	Please provide the total area of wetland proposed for removal due to the proposed undertaking and the total area of wetland proposed for compensation. NPCA staff acknowledge that this area will be refined as detailed design progresses. a. As previously commented, compensation of swamps is not typically allowed by NPCA due to the lag effect between feature removal and feature recreation and the inherent challenges associated with effectively recreating swamp communities. As such NPCA recommends a compensation ratio of not less than 2:1 to be achieved to compensate for the loss of swamps within the study area and 1:1 for marsh habitats removed from the study area.
4.	8.2.6 Wetland Form and Function	NPCA staff request that a Wetland Compensation Monitoring Plan be developed to demonstrate that wetland compensation has been achieved. a. This Plan must be implemented for the re-configured/re-created wetland feature(s), to accurately monitor any changes in the wetland community over time and to measure the success of the re-configuration/restoration and management actions. b. Monitoring must be conducted annually at a similar time of year (i.e., late July). c. All plants identified as part of the Wetland Compensation Monitoring Program must be categorized by the wetness index based on the Floristic Quality Assessment System for Southern Ontario. d. The results of the Wetland Compensation Monitoring Program must be submitted to NPCA annually prior to December 31, until planting of the wetland compensation area is complete. It is recommended that a

		monitoring plan be implemented for a minimum of 5-years upon completion of the wetland compensation plantings. e. Details regarding this Plan can be submitted at the detailed design stage for review and comment.
Appendix F, *Stormwater Management and Hydraulic Assessment Report (Draft),* dated August 2023		
5.	2.2.1 Singers Drain	Singers Drain is erroneously classed as a municipal drain, please revise.
6.	2.2.2 Towpath Drain	Towpath Drain is erroneously classed as a municipal drain, please revise.
7.	6.2 Recommendations & Requirements for Future Study; HEC-RAS Model	As noted within **Key Comment** #3, the area of segment 1 (wetlands south of the unopened road allowance) does not have clear channels and required the use of levees, and staff note that cross sections 313 and 284 could benefit from levees on the right-hand side of the cross sections. NPCA is in support of the assessment that further 2D modeling would be beneficial.
8.	HEC-RAS Model	The utilized terrain file appears to use a 2m grid, please provide clarification regarding why this was selected.
9.	HEC-RAS Model	Several cross sections have an artificially deepened channel, please clarify if surveying was completed to establish creek bed depths.
10.	HEC-RAS Model	Cross section 1171 LOB length and cross section 65 ROB length were unexpectedly long, please provide clarification.

Talpur, Mir

From: David Deluce <ddeluce@npca.ca>
Sent: Thursday, June 15, 2023 9:20 AM
To: Talpur, Mir
Cc: Leilani Lee-Yates; Amy Parks; Elmadhoon, Maged; Hughes, Samantha; Lampman, Cara
Subject: Merritt Road/Rice Road EA: NPCA Response to Wood Comments
Attachments: Merritt Crayfish Chimney.jpg

Hi Mir,

Thank you for your comments. Our response on each item is in green font below. Please let me know if you have any questions.

Best Regards,

David Deluce, MCIP, RPP
Senior Manager, Environmental Planning & Policy
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario, L3C 3W2
905-788-3135 ext. 224
ddeluce@npca.ca

From: Talpur, Mir <mir.talpur@wsp.com>
Sent: Tuesday, June 6, 2023 4:06 PM
To: David Deluce <ddeluce@npca.ca>
Cc: Leilani Lee-Yates <Llee-yates@npca.ca>; Adam Aldworth <aaldworth@npca.ca>; Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>; Cara.Lampman@niagararegion.ca; Hughes, Samantha <samantha.hughes@wsp.com>; Godard, Michael <michael.godard@wsp.com>
Subject: RE: NPCA Comments - Draft EIS

Hi David,

We have reviewed NPCA staff's comments on the Environmental Impact Study for Merritt Rd-Rice Rd Class EA, and provided responses in *red* below. We would appreciate if you could advise if these responses are satisfactory. We can then append this email to the EIS and provide you the final copy of the report. Thank you for your continued input on this project!

Sincerely,

Mir Ahsan Talpur, M.Env.Sc., EP
Senior Environmental Planner
He/Him

M+ 1 647-545-8974
WSP E&I Canada Limited

Please be aware that, effective September 21st, 2022, Wood Environment & Infrastructure Solutions Canada Limited was acquired by WSP.

From: David Deluce <ddeluce@npca.ca>
Sent: Tuesday, May 23, 2023 2:45 PM
To: Talpur, Mir <mir.talpur@wsp.com>
Cc: Elmadhoon, Maged <Maged.Elmadhoon@niagararegion.ca>; Cara.Lampman@niagararegion.ca; Hughes, Samantha <samantha.hughes@wsp.com>; Leilani Lee-Yates <Llee-yates@npca.ca>; Adam Aldworth <aaldworth@npca.ca>
Subject: RE: NPCA Comments - Draft EIS

Hi Mir,

Thank you for the opportunity to review the Environmental Impact Study prepared by WSP E&I for the Schedule C Municipal Class Environmental Assessment for Merritt Road and Rice Road and dated March 17, 2023. The following comments are offered for your consideration on the EIS.

Comments:

1. *Figure 4-2 Aquatic Habitat Assessment Areas* identifies 3 watercourse crossings within Segment 1, consistent with available NPCA mapping. However, only 2 watercourse crossings are characterized within the EIS (Crossing 4 and Crossing 5). Please provide additional information regarding the westernmost watercourse crossing identified on Figure 4-2 and NPCA's mapping. *At the time of assessment, this crossing was not identified as being present as mapped by NPCA. Descriptions within crossings 2 and 5 attempt to describe this lack of flow/water/conveyance. Additional surveys could be completed in conjunction with the spring freshet surveys as requested in comment 2 during detailed design.*
    a. It is noted that Figure 4-2 identifies 3 watercourse crossings within Segment 1, however, Crossing 4 is not identified on all figures. Please revise the appropriate figures to accurately depict watercourses within Segment 1. *Figures have been updated to include Crossing 4.*

2. Per Table 4-1, aquatic habitat assessments were completed on July 21, 2021. The findings of these assessments noted that no flow was observed within the watercourse crossings in Segment 1. It is recommended that additional aquatic habitat characterization be completed during the spring to document flow conditions and flow paths within Segment 1 to inform avoidance and mitigation measures through the detailed design phase. Given the relatively flat topography within this region, a detailed understanding of surface hydrology is imperative to ensure post development flow paths match pre-development conditions to mitigate anticipated negative impacts to the adjacent Provincially Significant Wetlands. *Additional surveys could be completed during the spring freshet during detailed design.*
   NPCA staff look forward to the review of additional characterization of these features and incorporation of findings through detailed design.

3. NPCA staff completed a site reconnaissance of the unopened road allowance through Segment 1 on May 18, 2023. During the site walk a single crayfish chimney was observed within the study area along the unassessed watercourse crossing. It is recommended that additional targeted surveys be completed to document the extent of terrestrial crayfish habitat within the study area to delineate the extent of terrestrial crayfish habitat and inform avoidance and mitigation measures through the detailed design process.
   Targeted surveys for chimney's can occur throughout detailed design. However, the presence of 1 chimney confirms SWH. The SWH is mapped as the eco element of meadow marsh or swamp within the larger ecosite. Essentially, this finding adds to the layer of importance of the already designated PSW but additional fieldwork to confirm SWH is not required. The mitigation measures to maintain this SWH type are also already reflected in the EIS under Section 8.2.6 Wetland Form And Function.

   Is NPCA willing to share photographs of the chimney or post on iNaturalist? A terrestrial crayfish would be a unique find for the Niagara Region. The two listed species in the SWH 7e guide, Chimney or Digger Crayfish Fallicambarus fodiens (aka Creaserinus fodiens) and Devil Crayfish or Meadow Crayfish Cambarus Diogenes (aka Lacunicambarus

diogenes) are not documented in the Region on iNaturalist and have varying degrees of range mapping in publications (IUCN illustrates Digger Crayfish range in the Region but the Ontario Crayfish PDF indicates it is Devil Drayfish). Also of note the SWH guide for 7e states that "Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare." WSP acknowledges that within the GTA terrestrial crayfish occur and that within Niagara Region, Cambarus species occur. Just a note on the potential uniqueness of the find and that it could be an important find to include on iNaturalist.

A photo of the chimney has been included and has been uploaded to iNaturalist (https://www.inaturalist.org/observations/166242058)

4. The EIS has characterized a large portion of MNRF delineated Provincially Significant Wetland areas within the Study Area as upland forest (FODM5-3). Per the November 19, 2021 meeting between Wood (WSP), NPCA and Niagara Region it is understood that re-delineation of these wetlands is not proposed through the EA process. However, a joint site visit between WSP and the NPCA is requested to review Ecological Land Classifications within the Study Area to ensure consensus on wetland delineation within the Study Area.
   Section 6.2 discussed how PSWs are mapped from the provincial data as they encompass the Port Robinson SWS delineation (Aquafor Beech Limited, 2014 which was confirmed with NPCA), and the OP, and NPCA delineations/ELC are based on the PSWs. The PSWs are mapped very inclusively/encompass vast areas. As stated, a re-delineation is not proposed as changing the PSW boundaries (beyond any minor shifts) requires a resubmission and consultation with the MNRF and the exercise to eliminating small areas of upland habitat would not necessarily reduce overall wetland impacts/mitigation/recommendation. However, if the NPCA wishes, site visits could be conducted during detailed design.
   The NPCA is ok with this approach, however reserve the right to request a site visit to verify wetlands as detailed design progresses and detailed calculations for wetland removals are being completed in conjunction with Comment #8.

5. Figure 5-5 has identified 'wetland pockets' within the mapped Provincially Significant Wetland within Segment 1. Please confirm that the entirety of the mapped wetlands within Segment 1 will be considered with respect to hydrologic impacts (ie. Not just those identified on Figure 5-5) associated with the proposed development.
   In line with the response to #4 above, yes, the entirely of the mapped PSWs are considered the significant features and all impacts/mitigations/recommendations are made based on this layer. The nuances of ELC are discussed to inform the mosaic of the ecosystem located in the Study Area.

6. As identified throughout the EIS report, changes in hydrology associated with this project represent a significant risk to the wetlands adjacent to the proposed road alignment. Evidence of inadequate mitigation and consideration for anticipated impacts are documented associated with the construction at Highway 406 and Merritt. In order to mitigate anticipated impacts to the form and function of wetlands within the Study Area section 8.2.6 recommends spanning watercourses with bridges and ensuring that adequate culverts and gravel base are installed to maintain the flow of surface water and shallow groundwater. The NPCA is supportive of these design recommendations in principle and looks forward to reviewing further detailed designs which incorporate these recommendations.
   Comment noted.

7. Section 8.2.2 recommends the installation of amphibian exclusion fencing and ecopassages to direct amphibians underneath roadways to mitigate anticipated negative impacts to local populations due to road mortality and habitat fragmentation. NPCA staff are supportive of this recommendation and recommend that this be explored in all segments of the project, not just limited to Segment 1 to improve ecological function and habitat connectivity within the Study Area. The NPCA looks forward to reviewing further detailed designs which incorporate these recommendations.
   a. It is noted that a long term maintenance plan for ecopassages and fencing will be required to maintain efficacy (per section 8.2.4).

   Comment noted.

8. Section 8.2.6 recommends that the removal of wetland areas should be compensated for, with the objective of net gain within the watershed. NPCA staff are supportive of this objective, and acknowledge that avoidance of wetland removal is not possible should the works proposed in the MCEA be carried out. It is noted that compensation of swamps is not typically permitted by the NPCA due to the lag effect between feature removal and feature recreation and the inherent challenges associated with effectively recreating swamp communities. As such the NPCA recommends a compensation ratio of not less than 2:1 to be achieved to compensate for the loss of swamps within the study area and 1:1 for marsh habitats removed from the study area. While the NPCA is supportive of wetland enhancements, enhancement is not considered a substitute for wetland recreation when considering compensation for impacts of wetland removal.
    a. At this time the amount of wetland loss has not been quantified. Please provide a preliminary calculation of how much wetland loss is anticipated as a result of the proposed undertaking. NPCA staff acknowledge that this area will be refined as detailed design progresses.

   Comment noted. A) Wetland loss has not be quantified as several aspects of detailed design will contribute to it. i.e., grading impacts, stagging/storing areas, restoration on-site leading to temporary impacts (if possible), tree removals to accommodate construction, re-evaluation of the estimated post-construction conditions determine from detailed design to determine how far impacts will occur, etc. To avoid frivolous numbers wetland loss should be calculated at 90% design based on temporary and permanent impacts as well as direct removal and indirect impacts and compensated for accordingly. A dedicated SOW for wetland compensation planning is recommended to the proponent.

   Per Comment #4, the NPCA reserves the right to conduct a site visit to verify the extent of wetlands required to be removed to facilitate the construction.

9. Section 8.2.2 recommends that runoff from the road should not be allowed to run directly into wetlands, and that stormwater detention areas should be installed to intercept water prior to discharging to wetlands. NPCA staff are supportive of this recommendation and look forward to seeing potential design options at future planning stages.
    a. Additionally, splash guards are proposed to further minimize introduction of contaminants (such as salt) into the adjacent wetlands. NPCA staff are supportive of this recommendation and look forward to seeing potential design options at future planning stages.

   Comment noted.

10. As detailed design progresses, a Tree Protection Plan is recommended to be developed which inventories trees within the proposed development footprint. This plan should identify tree size, species and health, propose reasonable and implementable mitigation measures to mitigate anticipated impacts to retained trees and propose compensation for trees to be negatively impacted and/or removed from NPCA regulated areas.
    Comment noted.

11. Section 9 of the EIS has recommended comprehensive compliance monitoring (Section 9.1) and effectiveness monitoring (Section 9.2). Collectively these monitoring programs intend to demonstrate that proposed mitigation measures have been implemented as designed and function as intended in order to mitigate short and long term impacts associated with the undertaking. Further, long term monitoring is proposed to extend for a period of 15 years following completion of construction to document changes within the adjacent natural communities. NPCA staff are supportive of this monitoring program and request that a detailed monitoring plan be developed which includes regular reporting to the NPCA and other stakeholders involved in the project.
    Comment noted.

12. Section 4.7 indicates that a Wetland Water Balance Risk Evaluation is being completed under separate cover for the project with preliminary results presented in Section 5.5. Section 5.5.1 and 8.2.6 have identified that the Wetland Water Balance Risk Evaluation prescribed monitoring with an emphasis on understanding groundwater interaction, however recommendations to conduct surface water monitoring are not included. The NPCA looks forward to reviewing the Water Balance Risk Evaluation to inform additional monitoring requirements to characterize the hydrology of wetland features within Segment 1.

Comment noted.

13. NPCA staff have observed Snapping Turtles traversing from the north side of Merritt Road to the south within Segment 2 in 2011. It is recommended that detailed design consider the presence of this species of turtle.
In line with #7 the recommendation of the installation of amphibian exclusion fencing and ecopassages will be expanded to consider all fauna and explored in all segments of the project, not just limited to Segment 1 during detailed design.
In the EIS Snapping Turtle was evaluated as low potential for occurrence as no records in the last ten years have occurred in the Study Area and with the presence of roads and increased traffic it is possible that turtles have been extirpated from the area. But further road mortality and ecological connectivity work during detailed design should address this.
The NPCA looks forward to reviewing these aspects of the detailed design process.

The comments above are specific to the project titled above. Comments are informed by the available information presented to date and therefore reflect the current best understanding of the project and anticipated impacts. They are subject to change based on the submission of new information. Please let me know if you have any questions.

Best Regards,

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