



Glancaster Road Municipal Class Environmental Assessment

Natural Environment Report

City of Hamilton

60637047

February 2022

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1. Introduction

AECOM Canada Ltd. (AECOM) was retained by the City of Hamilton to complete a Natural Environment Report: Existing Conditions and Preliminary Impact Assessment (hereafter Natural Environment Report) as part of the Glancaster Road improvements for the Municipal Class Environmental Assessment Phase 3 and 4 (hereafter MCEA). The Study Area for the Glancaster Road MCEA is located along Glancaster Road between Garner Road East and Dickenson Road West in the City of Hamilton and traverses a largely rural context.

Glancaster Road is located within Hamilton's Airport Employment Growth District (hereafter AEGD) as identified under the Urban Hamilton Official Plan (City of Hamilton 2013, amended 2021; henceforth referred to as UHOP). Over the past several years, planning has been undertaken to support the future development of lands within the AEGD. This area is identified as prime industrial and commercial employment land within various planning documents, particularly the AEGD Secondary Plan which was approved in 2015. The Secondary Plan identified a multi-modal transportation network as being critical for supporting development in the AEGD. This network was further expanded on in the AEGD TMP prepared in 2011 and subsequently updated in 2016. The need and justification for widening of the Glancaster Road section between Garner Road East/Rymal Road West and Dickenson Road West from two to four lanes is rooted in future/ultimate capacity deficiencies and operational issues coming about as a result of new development in the AEGD.

This Natural Environment Report has been prepared in accordance with the Environmental Impact Statement (EIS) Guidelines (City of Hamilton, 2015a), Urban Hamilton Official Plan, Rural Hamilton Official Plan (City of Hamilton 2012, amended 2021; hereafter referred to as RHOP) and is consistent with the Provincial Policy Statement (PPS; MMAH, 2020), the Natural Heritage Reference Manual (NHRM; MNR, 2010), and other relevant Provincial and Federal legislation, policies, and regulations. For the purposes of this report, the Study Area includes Glancaster Road (from Garner Road East to Dickenson Road West) plus an additional 120 m area of investigation (**Figure 1**). This report documents the following:

- The terrestrial and aquatic existing conditions within the Study Area based on a combination of background information review and field investigations, and includes the following:
 - Designated Natural Areas and Policy Areas including but not limited to Provincially Significant Wetlands (PSWs), Area of Natural and Scientific Interest (ANSIs), significant woodlands and environmentally sensitive areas.
 - Physical features including bedrock geology, landforms, recharge areas and soil types
 - Biological features including the following:
 - Vegetation communities identified based on Ecological Land Classification (ELC) protocol for Southern Ontario (Lee *et al.*, 1998)
 - General Wildlife (e.g., breeding birds and amphibians)
 - Species at Risk (SAR) and their habitats
 - Significant Wildlife Habitat (SWH)
 - Landscape features including a Linkage Assessment

Assessment of potential impacts as result of the proposed works and identification of appropriate avoidance and mitigation measures (including setbacks), monitoring plan and anticipated permits and approvals will be provided for the City of Hamilton at the next iteration of this report once the preliminary design is available.

The Natural Environment Report has been prepared and is intended to be read in conjunction with the Glancaster Headwater Drainage Feature Assessment Report (AECOM, 2022), which identifies and assesses headwater drainage features and their influence on the downstream reaches of the watershed, as well as any aquatic and terrestrial habitat and physical functions that need to be maintained.



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\bigcirc	Study Area
Hamilt	on Water Features
\sim	Watercourse
	Pond or Lake
Base L	_ayers
	Municipal Boundary
	Parcel Boundarv



2. Legislative Requirements

The Project requires the consideration of federal, provincial, and municipal policies, legislation, and regulations. The following sections briefly outline how they relate to the natural heritage features and functions of the Study Area.

2.1 Federal

2.1.1 Fisheries Act 1985 (amended 2019)

On August 28, 2019 the new Fish and Fish Habitat Protection Provisions of the Amended Fisheries Act came into force. Changes to the Act include a return to the policies that were enforced prior to the 2012 amendments, focusing on the following key concepts:

- Protecting all fish and fish habitat (i.e., the focus is no longer on only protecting Commercial, Recreational and Aboriginal fisheries);
- Restoring the previous prohibition against 'harmful alteration, disruption or destruction of fish habitat' (HADD); and,
- Restoring a prohibition against causing 'the death of a fish by any other means than fishing'.

The Fish and Fish Habitat Protection Program ensures compliance with relevant provisions under the Fisheries Act and Species at Risk Act (SARA). Proponents are asked to submit a request for review to Fisheries and Oceans Canada (DFO) in cases where harm to fish or the harmful alteration, disruption or destruction (HADD) of fish habitat cannot be avoided and/or mitigated or the scope of work cannot be covered under a Standard or Code of Practice.

If death of a fish, or HADD is likely to result from a project, the proponent will be required to obtain an Authorization from DFO. An authorization includes terms and conditions the proponent must follow to avoid, mitigate, offset and monitor the impacts to fish and fish habitat resulting from the Project.

2.1.2 Species at Risk Act 2002

The federal SARA protects and provides recovery strategies for SAR listed as Extirpated, Endangered or Threatened species under Schedule 1 of the Act. With respect to terrestrial SAR, this legislation applies to federal lands, federally regulated projects or species with critical habitat on non-federal lands in specific circumstances unless they are aquatic species or migratory birds listed on Schedule 1. Critical habitat is identified in recovery strategies or action plans for species listed as END and THR under SARA and is defined as habitat that is vital to the survival or recovery of a species. The majority of species listed under Schedule 1 of SARA receive habitat protection on non-federal lands under the *Endangered Species Act, 2007* (ESA; refer to **Section 2.2.1**). Species that do not receive protection under the ESA and do not have critical habitat identified may be afforded protection under other legislation such as the *Migratory Birds Convention Act, 1994* (MBCA; refer to **Section 2.1.3**). In the case of aquatic Species at Risk, SARA provides protection for aquatic species and habitat on both federal and non-federal lands.

Species that are listed as Special Concern under Schedule 1 of SARA receive management initiatives to prevent them from becoming Endangered and Threatened, but do not receive individual or habitat protection under SARA.

Permits are required by those persons/organizations conducting activities that may affect species listed on Schedule 1 of SARA, as Extirpated, Endangered or Threatened and which contravene the Act's general or critical habitat prohibitions. The Act also contains a prohibition against the damage or destruction of their residences (e.g.,

nest or den). Under Section 73 of the SARA, a permit may be issued to engage in an activity affecting a listed wildlife species or any part of its critical habitat or residences.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was founded in 1977 as an independent body to assess the status of wildlife in Canada that may be at risk of becoming extinct. COSEWIC makes its assessments based on ecological, genetic, and management information, as well as systematics and Indigenous Traditional Knowledge. Under SARA, it is designated as an advisory body. COSEWIC assessments are considered by the Federal government when creating legislation and determining the list of species to be designated as At Risk.

2.1.3 Migratory Birds Convention Act, 1994

The MBCA is applied through the Regulations Respecting the Protection of Migratory Birds, which states that "no person shall disturb, destroy or take a nest, egg [...] of a migratory bird." Bird nests that are destroyed during construction and other related activities are referred to as "incidental take". Incidental take is illegal except under the authority of a permit obtained through the Canadian Wildlife Service. The MBCA applies within the Study Area.

2.2 Provincial

2.2.1 Endangered Species Act, 2007

The ESA provides protection for provincial SAR and their habitats. Species are classified into one of four levels of risk: Extirpated, Endangered, Threatened or Special Concern. These risk levels are determined through sciencebased assessment via the Committee on the Status of Species at Risk in Ontario (COSSARO); classification is based on best-available science and Indigenous traditional knowledge. Species classified as Threatened or Endangered on the Species at Risk in Ontario (SARO) list are afforded individual and habitat protection under the ESA. This includes the "killing, harming, harassing, possessing, buying, selling, trading, leasing or transporting" of protected species.

Where a proposed activity may negatively affect protected species or habitat, changes to timing, location and methods of the proposed activity should be considered, where feasible, to avoid impacts to SAR. Where impacts cannot be avoided or mitigated, a permit process may be pursued. The Ministry of the Environment, Conservation and Parks (MECP) may grant a permit or other authorization for activities that would otherwise contravene the ESA. Several permit types are available, depending on the nature of the proposed work and may include conditions to provide an overall benefit to the targeted SAR.

Although listed as SAR under the ESA, species with a Special Concern status are not afforded species or habitat protection under the Act but receive protection under other acts such as the MBCA and Fish and Wildlife Conservation Act, 1997, and as Significant Wildlife Habitat (refer to **Section 2.2.3**) under the Provincial Policy Statement, 2000 (PPS), and other planning documents (e.g., municipal official plans).

2.2.2 Conservation Authorities Act, 1990

Wetlands or watercourses are regulated by the *Conservation Authorities Act* Ontario Regulation (O. Reg.) 97/04, with regional implementation for the Study Area falling under O. Reg 161/06, the Hamilton Conservation Authority (HCA) and O.Reg. 155/06, the Niagara Peninsula Conservation Authority (NPCA). Development in proximity to protected watercourses or wetlands would require review by the HCA or NPCA and the submission of an "Application for Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses" and

may also require other technical studies or plans at the request of Conservation Authority. Regulated limits of watercourses are present within the Study Area.

2.2.3 **Provincial Policy Statement, 2020**

The PPS provides direction on provincial matters of interest related to land use planning and development and sets the policy framework for regulating development and use of land, issued under the *Planning Act*. It came into effect May 1, 2020 and Sections 2.1.1 to 2.1.2 outline policies that provide legislative protection of natural heritage features for the long term including that the ecological function, biodiversity and connectivity of natural heritage systems should be maintained, restored or, where possible, improved recognizing linkages between and among natural heritage features and areas, surface water features and ground water features. Section 2.1.3 outlines that natural heritage systems shall be identified in Ecoregions 6E and 7E and will vary in size and form in settlement areas, rural areas, and prime agricultural areas. Legislative protection is included for the following natural heritage features:

- Significant habitat of Endangered or Threatened species;
- Provincially Significant Wetlands (PSW);
- Coastal wetlands;
- Fish habitat;
- Significant woodlands in Ecoregions 6E and 7E;
- Significant valley lands in Ecoregions 6E and 7E;
- Significant Wildlife Habitat (SWH), including habitat of Species of Conservation Concern (SOCC); and
- Significant Areas of Natural and Scientific Interest (ANSI).

Section 2.1.4 prohibits development or site alteration within PSWs in Ecoregions 5E, 6E and 7E as well as significant coastal wetlands. Meanwhile Section 2.1.5, prohibits development and site alteration in PSWs in the Canadian Shield north of Ecoregion 5E, SWH, Significant Woodlands and valleylands in Ecoregions 6E and 7E, coastal wetlands not subject to the policies of Section 2.1.4 and ANSIs unless it has been demonstrated that there will be "no negative impacts on the natural features or their ecological functions". Planning authorities shall also protect, improve or restore the quality and quantity of water as outlined in Section 2.2. Development and site alteration may occur within fish habitat and habitat for Endangered or Threatened SAR provided that appropriate authorizations and permits are obtained and conditions therein are carried through in accordance with provincial and federal legislation such as the ESA (refer to **Section 2.2.1**), SARA (refer to **Section 2.1.2**) and the Fisheries Act. The following reference materials provide guidance for implementing the natural heritage policies of the PPS:

- Natural Heritage Reference Manual (MNRF, 2010);
- SWH Technical Guide (MNRF, 2000); and,
- SWH Criteria Schedules For Ecoregion 7E (MNRF, 2015).

The SWH Criteria Schedules for Ecoregion 7E (MNRF, 2015) contains information and criteria for identifying SWH, which are defined as areas that have important ecological features and functions, and which support sustainable populations of plants, wildlife and other organisms within this Ecoregion. The Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF) generally SWH into the following five categories:

Seasonal Concentration Areas;

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- Rare Vegetation Communities with a Provincial S-Rank¹ of S1-S3;
- Specialized Habitats for Wildlife;
- Habitats of Species of Conservation Concern; and
- Animal Movement Corridors.

Candidate SWH refers to potential habitats that meet the habitat criteria as defined in the SWH Criteria Schedules for Ecoregion 7E (MNRF, 2015) but have not been confirmed as significant through additional detailed studies or as mapped by NDMNRF. According to the Natural Heritage Reference Manual (MNRF, 2010), SWH includes the habitat of SOCC, which is defined as the following:

- Species with Provincial S-rank assigned by the Natural Heritage Information Centre (NHIC) as S1 (critically imperiled), S2 (imperiled) or S3 (vulnerable);
- Species listed as Special Concern under the ESA; and
- Species identified as nationally Endangered or Threatened by the COSEWIC, which are not protected under the ESA.

Although SOCC do not receive legal protection under the ESA, their habitat is protected under the PPS and they may also be afforded protection under the MBCA, Ontario Fish and Wildlife Conservation Act or other planning documents such as municipal official plans and policies.

2.3 Municipal

2.3.1 Hamilton Official Plans

The UHOP is the land use planning document that guides development within the designated urban portions of the City. The UHOP identifies natural heritage features and their functions that are important to the City and outlines how development must be undertaken to ensure development appropriately balances social, economic and environmental interests of the community. The UHOP also contains Secondary Plans which include policies and mapping that provide community specific guidance on growth and change in smaller geographic areas of the City. The Airport Employment Growth District (AEGD) Secondary Plan includes the Study Area overlapping the designated features of the UHOP. Where Schedule B and the AEGD both overlap the Study Area, Schedule B of the UHOP is used to inform this report as being the most up to date (amended in 2021).

The RHOP is the land use planning document that guides development within designated rural portions of the City. The RHOP is also applicable to the project as a small section of lands located south of Twenty Road West and east of Glancaster Road are regulated under this plan within the Study Area. The lands, identified as Site Specific Policy Area 31 (R-31), are restricted from non-agricultural or urban uses.

The RHOP, UHOP and AEGD identify and map a Natural Heritage System which consists of the following in order to maintain the ecological functionality and connectivity of the natural system within the City of Hamilton:

• **Core Areas** – include key natural heritage features and key hydrological features as identified in the PPS such as PSWs, wetlands, ANSIs, streams and fish habitat, lakes and littoral zones, significant

^{1.} The Natural Heritage Information Centre and the NatureServe Network have developed standard methods to evaluate species and plant communities and assign conservation status ranks. S-rank is a sub-national conservation status assigned to a species or plant community within a particular province, territory or state (Ministry of Natural Resources and Forestry, 2019).

woodlands, significant valleylands, SWH and SAR habitat, as well as other locally and provincially significant natural areas such as Environmentally Significant Areas;

- Linkage Areas include natural areas such as old fields, meadows, thickets, successional habitat, hedgerows, riparian vegetation and woodlands that ecologically connect Core Areas that facilitate animal movement between critical habitats necessary for carrying out critical life functions (e.g., breeding, foraging, overwintering); and
- Niagara Escarpment Plan area includes a policy framework that balances development and protection/conservation of geological and ecological features along the Niagara Escarpment (Niagara Escarpment Commission, 2017).

Designated Natural and Natural Heritage Policy Areas are shown on Figures 2 and 3.

The City of Hamilton does not allow development and/or site alteration in the following features:

- Within PSWs, significant coastal wetlands or habitat for SAR listed as Threatened or Endangered under the SARO list; and
- In other Core Areas or adjacent lands unless it has been demonstrated through an Environmental Impact Statement (EIS) that there are: no negative impacts on the following:
 - o No negative impacts on natural heritage features therein and their ecological functions; and
 - o Linkage Areas are maintained, or where possible, enhanced; and
 - Removal of other natural heritage features shall be avoided or minimized to the extent possible.
- In lands designated as Hazard Lands unless it is approved and any required permit is issued by the Conservation Authority having jurisdiction.

The EIS shall also propose a vegetation protection zone (VPZ) which is buffer of self-sustaining vegetation that has sufficient width to protect Core Areas from development impacts. The UHOP and RHOP identify minimum VPZ widths for different natural feature types, which are summarized in the **Table 2-1** below. In addition, the EIS will also contain a Linkage Assessment if the proposed development is located within a Linkage Area of the Natural Heritage System, which will need to (City of Hamilton, 2015):

- Identify and assess the linkage area including its vegetative, wildlife, and/or landscape features and functions;
- Assess the potential impacts on the viability and integrity of the linkage as a result of the development proposal; and
- Make recommendations to protect, enhance or mitigate impacts on the linkage and its functions through planning, design and construction practices.

Table 2-1 Minimum Vegetation Protection Zones

Natural Heritage Feature	Minimum Vegetati	on Protection Zone	
	UHOP	RHOP	
Coldwater Watercourse and Critical Habitat	30 m on either side of stream	Not applicable	
Warmwater Watercourse and Important and Marginal Habitat	15 m from either side of stream	Not applicable	
Permanent and Intermittent Streams	Not applicable	30 m on site side from beyond stable top of bank	
Lakes	Not applicable	30 m from stable top of shoreline	
Fish Habitat	Not applicable	30 m on site side from beyond stable top of bank or meander belt allowance	
Wetlands (Evaluated as PSWs or Local Wetlands) and Unevaluated Wetlands greater than 2 hectares in size.	30 m	30 m	
Wetlands – Unevaluated wetlands less than 2 hectares in size	30 m unless identified a smaller VPZ can be identified via an EIS.	Not applicable	
Woodlands	10 m from dripline	15 m from dripline	
Significant Woodlands	15 m from dripline	30 m from dripline	
ANSI	15 m	30 m	
Valleylands	As required by the conservation authority	15 m from top of bank	

Given that the Glancaster Road improvements are being assessed under the MCEA, this Natural Environment Report is considered to be meeting the UHOP and RHOP policy requirements for preparing an EIS and has been prepared in accordance with the Environmental Impact Statement (EIS) Guidelines (City of Hamilton, 2015a). The natural heritage features and policy areas identified through background information review that fall within the Study Area are further discussed in **Section 3.1.2.1**.



Project Location: E: PRJ/60637047_Glancaster/Data/PRJ-60637047-GlencasterRoad-20220107.aprx Layout: ECO - Designated/NaturalandPolicyAreas-R00-6063704



Project Location: E. (PRJ)60637047-Glancaster/Data/PRJ-60637047-GlencasterRoad-20220107.aprx Layout: ECO - Designated/NaturalandPolicyAreas-R00-606











Legend

Study Area

Right of Way Limits

Official Plan Category

Urban Boundary

Conservation Authority Regulated Areas

Niagara Peninsula Conservation

Urban Hamilton Official Plan - Schedule B -Natural Heritage System (Feb, 2021)









Watercourse





Map Extents

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3. Existing Conditions

3.1 Background Information Review

A background information review was completed prior to field investigations to obtain information on known natural heritage features and species records, including rare species (i.e., SAR and SOCC) within the Study Area. The methods and results of the background information review are documented in the following sections.

3.1.1 Methods

Background information was obtained from the following sources:

- NDMNRF Make A Map: Natural Heritage Areas Application and NHIC NDMNRF GeoHub base mapping data, (NDMNRF, 2021a; NDMNRF 2021b; MNRF, 2017) for:
 - Designated natural areas (e.g., ANSI, wooded areas, PSWs/Locally Significant Wetlands[LSWs]/unevaluated wetlands, provincial parks);
 - Aquatic Resource Areas;
 - Dam Inventory,
 - Watershed mapping;
 - Wildlife habitats; and
 - NHIC provincially tracked species.
- Wildlife Atlases:
 - Ontario Breeding Bird Atlas (OBBA; BSC et al., 2006), Square 17TNH88;
 - Ontario Reptile and Amphibian Atlas (ORAA; Ontario Nature, 2019), Square 17NH88;
 - Ontario Butterfly Atlas (OBA; TEA, 2021), Square 17NH88;
 - Bat Conservation International (BCI) Range Maps (2021);
 - DFO SAR Mapping (DFO, 2021);
 - eBird (2021);
 - iNaturalist (2021);
- Planning Documents and Guidelines:
 - UHOP (City of Hamilton, 2013, amended 2021);
 - Schedule B, B-2, B-4 and B-8 Mapping
 - AEGD Secondary Plan
 - Linkage Assessment Guideline (City of Hamilton, 2015b); and,
 - Environmental Impact Statement (EIS) Guidelines (City of Hamilton 2015a)
 - RHOP (City of Hamilton, 2012, amended 2021)
 - 20 Mile Creek Watershed Plan (NPCA, 2006);
 - Natural Heritage Reference Manual (MNRF, 2010);
 - SWH Technical Guide (MNRF, 2000); and,
 - SWH Criteria Schedules For Ecoregion 7E (MNRF, 2015)
 - The Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (2008);
 - Ontario Wetland Evaluation System (OWES) Southern Manual (MNRF, 2013);
 - Survey Protocol for Ontario's SAR Snakes (MNRF, 2016);
- Open Portals and Interactive Mapping:
 - Open Hamilton, Environmentally Significant Areas only (City of Hamilton 2021)
 - HCA Regulated Areas Map Tool (HCA 2021)
 - NPCA GIS Open Data Portal (NPCA 2021)

- Fisheries and Oceans Canada (DFO) SAR mapping (DFO, 2019)
- Ontario Ministry of Agriculture and Rural Affairs (OMAFRA) AgMaps (OMAFRA, 2020);
- Reports:
 - AEGD Subwatershed Study & Stormwater Master Plan (Aquafor Beech, 2017);
 - Garner Road/Rymal Road and Garth Street Class Environmental Assessment, Environmental Study Report (SNC Lavalin, 2014); and,
- Aerial photography (2019).

Information requests were submitted to the NPCA and the HCA on August 27, 2020. A response was received from HCA, Colin Oaks, on September 3, 2020. HCA's response included 1 set of fish records for Tiffany Creek. A response was received from NPCA, Adam Aldworth, on September 18, 2020, which included links to natural heritage mapping, as well as, 20 Mile Creek Watershed Plan and AEGD Subwatershed Plan. Copies of agency correspondence are provided in **Appendix A**.

3.1.2 Results

The results of the background information review are provided below.

3.1.2.1 Designated Natural Features and Policy Areas

Designated natural areas or features include areas identified for protection by the NDMNRF, municipalities or other planning authority (e.g., conservation authority). Based on the review of the above-mentioned background information, the following provincially designated features are present within the Study Area:

- Deer Wintering Areas (NDMNRF)
- Tiffany Creek PSW Complex
- Tiffany Creek Environmentally Sensitive Area

The following locally designated natural areas are present within the Study Area as identified in the City's Natural Heritage System according to the UHOP, RHOP and AEGD:

- Core Areas (Schedule B)
- Linkages (Schedule B)
- Significant Woodlands (Schedule B2)
- Local Environmentally Significant Area (Schedule B6)
- Key Natural Heritage and Key Hydrologic Feature Wetlands (Schedule B4)
- Key Hydrological Features Streams (Schedule B8)

The above features are shown on **Figure 2** and **Figure 3**. It is important to note that not all Core Areas (i.e., habitat for Endangered and Threatened species, SWH, Significant Valleylands) have been mapped on these schedules.

Furthermore, the presence of SAR records and candidate (i.e., potential) SWH were identified within the Study Area through the background information review and are further detailed in **Section 3.1.2.6** and **Section 3.1.2.7**, respectively. Potential SAR habitats and candidate SWH are further discussed and refined based on results of field investigations in **Sections 3.3** and **3.4**, respectively.

3.1.2.2 Watercourses and Waterbodies

The Study Area is situated within the boundaries of the Jordan Harbour- Twenty Mile Creek and Burlington Canal-Hamilton Harbour quaternary watersheds. As such, the Study Area falls within the jurisdictions of both the NPCA and the HCA. All the watercourses and drains in the Study Area drain to Twenty Mile Creek, Three Mile Creek, and Tiffany Creek, and eventually into Lake Ontario. According to the MNRF, all of the watercourses have been classified with a warmwater thermal regime (NDMNRF, 2021a; NDMNRF, 2019; NDMNRF, 2021b). Watercourses and drains located in the Study Area are shown in **Figure 2**. According to available background information, there are no dams identified within the Study Area that could cause an impediment to upstream fish passage (NDMNRF, 2020). Based on the OMAFRA municipal drain mapping, there are no municipal drains (that have been classified by DFO or otherwise) in the Study Area (OMAFRA, 2020).

3.1.2.3 Fish and Fish Habitat

Records of documented aquatic species for the water features of the Study Area based on the background information review (refer to **Section 3.1.1)** are summarized in

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Table 3-1 below. Records of 18 fish species were returned, while the species recorded were mainly forage fish species (i.e., small-bodied species), a few records of game species (i.e., predatory, large-bodied typically targeted by recreational anglers) were returned for Twenty Mile Creek, Three Mile Creek, and Tiffany Creek (NDMNRF, 2019).

A review of DFO aquatic SAR mapping returned records of Grass Pickerel (*Esox americanus verniculatus*) within the Study Area (DFO, 2019). This species is listed as Special Concern under SARA and ESA (**Table 3-1**). While the Study Area is within the known range of Grass Pickerel, no records of occurrence were returned in the background information review. Despite this, Grass Pickerel is documented (as per **Table 3-1**) in other tributaries to Twenty Mile Creek and Three Mile Creek and has the potential to occur within the Study Area where there is suitable habitat.

Common Name	Scientific Name	SARA Schedule 1 Status ¹	ESA Status ²	Twenty Mile Creek	Three Mile Creek	Tiffany Creek
Black Crappie	Pomoxis nigromaculatus	-	-	Х		
Blacknose Dace	Rhinichthys atratulus	-	-			Х
Bluegill	Lepomis macrochirus	-	-	X		
Bluntnose Minnow	Pimephales notatus	-	-	X	X	
Brook Stickleback	Culaea inconstans	-	-			Х
Brown Bullhead	Ictalurus nebulosus	-	-	Х		
Central Mudminnow	Umbria limi	-	-		Х	
Fathead Minnow	Pimephales promelas	-	-	X	Х	Х
Golden Shiner	Notemigonus crysoleucas	-	-	X	Х	
Grass Pickerel	Esox americanus vermiculatus	SC	SC	X	X	
Green Sunfish	Lepomis cyanellus	-	-	X	Х	
Iowa Darter	Etheostoma exile	-	-		X	
Johnny Darter	Etheostoma nigrum	-		X		
Largemouth Bass	Micropterus salmoides	-	-	Х		
Northern Pike	Esox lucius	-	-	Х		
Pumpkinseed	Lepomis gibbosus	-	-	Х	Х	
Tadpole Madtom	Noturus gyrinus	-	-	Х		
White Crappie	Pomoxis annularis	-	-	X		
White Sucker	Catostomus commersonii	-	-		X	

Table 3-1: Fish Species within the Study Area

Table Legend

¹SARA Status: The Species at Risk Act (SARA) protects Species at Risk designated as Endangered, Threatened and Extirpated listed under Schedule 1, including their habitats on federal land. Schedule 1 of SARA is the official list of wildlife species at risk in Canada and includes species listed as Extirpated, Endangered, Threatened and of Special Concern. Once a species is listed on Schedule 1, they receive protection and recovery measures that are required to be developed and implemented under SARA. Species that were designated at risk by COSEWIC before SARA need to be reassessed based on the new criteria of the Act before they can be listed under Schedule 1. These species that are waiting to be listed under Schedule 1 do not receive official protection under SARA. Once the species on other schedules (2 and 3) have been reassessed, they are either listed under Schedule 1 or not listed under the Act. The following are definitions of the SARA status rankings assigned to each species in the table above:

END (Schedule 1) – These species are listed as Endangered under Schedule 1 of SARA and receive species and habitat protection under SARA, as well as recovery strategies and action plans.

THR (Schedule 1) – These species are listed as Threatened under Schedule 1 of SARA and receive species and habitat protection under SARA, as well as recovery strategies and action plans.

SC (Schedule 1) – These species are listed as Special Concern under Schedule 1 of SARA and receive management initiatives under SARA to prevent them from becoming endangered and threatened.

No Status (No Schedule) – These species are evaluated and designated by COSEWIC but are not listed under Schedule 1 and therefore do not receive protection under SARA.

NAR (Not at Risk)— These species have either been assessed by COSEWIC as Not at Risk or there is not enough data to assess the status ranking of the species and therefore these are not listed on Schedule 1 nor do they receive protection under SARA. Not Applicable (N / A) – These species have either been assessed by COSEWIC as Not at Risk or there is not enough data to assess the status ranking of the species and therefore these are not listed on Schedule 1 nor do they receive protection under SARA. Source: Government of Canada, 2009: Frequently Asked Questions: What are the SARA schedules? Accessed on January 2017. Available: http://www.dfo-mpo.gc.ca/species-especes/faq/faq-eng.htm

²³ESA Status: The Endangered Species Act 2007 (ESA) protects species listed as Threatened and Endangered on the Species at Risk in Ontario (SARO) List on provincial and private land. The Minister lists species on the SARO list based on recommendations from the Committee on the Status of Species at Risk in Ontario (COSSARO), which evaluates the conservation status of species occurring in Ontario. The following are the categories of at risk:

> **END** (Endangered) – A species facing imminent extinction or extirpation in Ontario. **THR** (Threatened) – Any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a large portion of its Ontario range if the limiting factors are not reversed. **SC** (Special Concern) – A species that may become threatened or endangered due to a combination of biological characteristics and identified threats.

NAR (Not at Risk) – A species that has been evaluated and found to be not at risk.

3.1.2.4 Vegetation Communities and Plants

The Study Area is in the Haldimand Clay Plain physiographic region and the Lake Erie Lowland Ecoregion (Ecoregion 7E). The Ecoregion is part of the Mixedwood Plains Ecozone, which extends from Windsor to Toronto and includes the Niagara Region. The Lake Erie Lowland Ecoregion is underlain by carbonate-rich, Paleozoic bedrock, and is dominated by a variety of deep glacial deposits (Marshall and Schut, 1999). Clayey gleysolic and grey brown luvisolic soils are dominant, and soils of the Haldimand Clay Plain physiographic region are characterized by heavy texture and poor drainage (Marshall and Schut, 1999; Chapman and Putnam, 1984).

Forests in this Ecoregion are sparse due to agricultural and urban development and typically include widespread sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), eastern hemlock (*Tsuga canadensis*) or eastern white pine (*Pinus strobus*) with species characteristic of the Carolinian zone including tulip tree (*Liriodendron tulipifera*), American sycamore (*Platanus occidentalis*), Kentucky coffee-tree (*Gymnocladus dioicus*), various oaks (*Quercus spp.*) and hickories (*Carya spp.*) and common hackberry (*Celtis occidentalis*) (Crins *et al.*, 2009).

The surficial geology throughout much of the Ecoregion is underlain by limestone bedrock overlain by a calcareous mineral substrate. The ecoregion also contains glacial deposits including moraine deposits, drumlins and lacustrine deposits. The predominant substrates in the ecoregion include Gray Brown Luvisols (60%) and Gleysols (37%) (Crins *et al.*, 2009).

According to NHIC records, one Endangered plant species, spotted wintergreen (*Chimaphila maculata*) and one plant SOCC, perfoliate bellwort (*Uvularia perfoliate*) (S1S2), were identified as occurring within the 1 x 1 km grid squares that encompass the Study Area (square 17NH8682, 8683, 8684 and 8784).

NPCA open data includes a Draft ELC Community Class Series. This feature layer is based on interpretation of orthoimagery and was used, where available, as a preliminary habitat assessment and guide for field investigations. Detailed site specific assessments of ELC and plant community composition were completed within the Study Area by AECOM in 2020 and 2021, which refined community classifications. For additional information pertaining to ELC communities refer to **Sections 3.2.2**.

3.1.2.5 Wildlife

Background data was collected from the OBBA (BSC *et al.*, 2006), ORAA (Ontario Nature, 2019), OBA (TEA, 2021), iNaturalist, eBird and BCI Range Maps (2021) to identify wildlife that has been recorded in the vicinity of the Study Area. A review of these records indicated potential presence for 95 bird species, 72 butterfly species, 42 mammal species and 26 herpetofauna species with records of occurrence within the 10 x 10 km grid square encompassing the Study Area. Based on a review of these results, the majority of the wildlife within the Study Area are considered common in Ontario and tolerant to anthropogenic disturbances, while a small proportion is comprised of sensitive or rare species (refer to **Section 3.3** and **Section 3.4** for discussion on SAR and SOCC respectively).

The core areas and linkages that make up the City of Hamilton's Natural Heritage System provide important habitats for sustaining species populations and providing breeding and foraging habitat for wildlife in an urban setting (City of Hamilton, 2021). Core Areas and linkages include contiguous forest, wetland communities, and the parks and open spaces wildlife will use to travel between areas.

Just north of Book Road East in the southern portion of the Study Area a deciduous forest tract marked as a Core Area by the City of Hamilton is present. This forest is a known deer overwintering area providing shelter, food and a central congregation point for local white-tailed deer *(Odocoileus virginianus)* populations. Forests like this would also support a wide variety of common small mammal species such as gray squirrels (*Sciurus carolinensis*), red

squirrels (*Tamiasciurus hudsonicus*) and eastern chipmunks (*Tamias striatus*) and the potential to support medium sized mammals such as red fox (*Vulpes vulpes*), coyote (*Canis latrans*) and raccoons (*Procyon lotor*).

The utility corridors along and perpendicular to Glancaster Road provide stepping stone habitat linking the core forest area with other sensitive habitats outside of the Study Area, the closest being the Tiffany Creek Headwaters just north of the study limits. The utility corridors are partially maintained and provide limited natural cover for species looking to move between areas. Land use along Glancaster Road and the utility corridor is also regularly interspersed with roads, driveways and maintained lawn areas providing barriers to smaller and less mobile wildlife present within the Study Area.

Most of the bird species recorded in the OBBA square consist of common species in Ontario that are tolerant to urban disturbance except for Barn Swallow (*Hirundo rustica*) and Chimney Swift (*Chaetura pelagica*), both SAR birds protected under the ESA. Both species are associated with anthropogenic structures, which increases their likelihood of using the Study Area. Other bird species recorded included Northern Cardinal (*Cardinalis cardinalis*), House Wren (*Troglodytes aedon*), Red-winged Blackbird (*Agelaius phoeniceus*), Rock Pigeon (*Columba livia*), House Sparrow (*Passer domesticus*), and European Starling (*Sturnus vulgaris*). It is important to note that isolated trees and shrubs, vegetation communities and anthropogenic structures (e.g., buildings, bridges) can provide nesting habitat for many migratory birds protected under the MBCA.

3.1.2.6 Species at Risk

Data obtained from the Study Area records review identified 16 SAR (Endangered or Threatened) as summarized in **Table 3-2**. Records of species observations greater than 20 years old were considered historical in accordance with the standard Conservation Status Assessment (NatureServe, 2019), which the NHIC uses to evaluate a species' S-rank, and have not been included in this report as it is unlikely these species persist within the Study Area. Those considered likely to be present within the Study Area (i.e., species observed during field investigation or species with suitable habitat in the Study Area which did not receive targeted surveys) are further discussed in **Section 3.3**.

Common Name	Scientific Name	S-Rank ¹	ESA Status ²	SARA Schedule 1 ³	Source
Species at Risk					
Barn Owl	Tyto alba	S1	END	END	OBBA
Bank Swallow	Riparia riparia	S4B	THR	THR	OBBA
Barn Swallow	Hirundo rustica	S4B	THR	THR	OBBA, eBird
Bobolink	Dolichonyx oryzivorus	S4B	THR	THR	OBBA
Chimney Swift	Chaetura pelagica	S4B,S4N	THR	THR	OBBA
Eastern Meadowlark	Sturnella magna	S4B	THR	THR	OBBA
Louisiana Waterthrush	Parkesia motacilla	S3B	THR	THR	OBBA
Northern Bobwhite	Colinus virginianus	S1	END	END	NHIC
Yellow-breasted Chat	Icteria virens	S1B	END	END	OBBA
Little Brown Myotis	Myotis lucifugus	S3	END	END	BCI
Eastern Small-footed Myotis	Myotis leibii	S2S3	END	No Status	BCI
Northern Myotis	Myotis septentrionalis	S3	END	END	BCI
Tricolored Bat	Perimyotis subflavus	S3?	END	END	BCI
Jefferson Salamander	Ambystoma jeffersonianum	SX	END	END	ORAA
Butternut	Juglans cinerea	S3	END	END	NHIC
Spotted Wintergreen	Chimaphila maculate	S1	THR	END	NHIC

Table 3-2: Species at Risk Records

¹ S rank: The natural heritage provincial ranking system (provincial S-rank) is used by the MNRF Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. The following status definitions were taken from NatureServe Explorer's (2015) National and Subnational Conservation Status Definitions available at http://explorer.natureserve.org/nsranks.htm:

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S3 - Vulnerable-Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation. S4 - Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors. S5 - Secure-Common, widespread, and abundant in the nation or state/province. SNR - Unranked-Province conservation status not yet assessed. SU - Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. SNA - Not Applicable — A conservation status rank is not applicable because the species is not a suitable target for conservation activities. **SWA** – Not Applicable — A conservation status rainer is not applicable bodded in a sporter of incertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4). S#? - Rank uncertain Breeding Status Qualifiers B - Breeding-Conservation status refers to the breeding population of the species in the province. N – Nonbreeding—Conservation status refers to the non-breeding population of the species in the province. ²ESA Status: The Endangered Species Act 2007 (ESA) protects species listed as Threatened and Endangered on the Species at Risk in Ontario (SARO) List on provincial and private land. The Minister lists species on the SARO list based on recommendations from the Committee on the Status of Species at Risk in Ontario (COSSARO), which evaluates the conservation status of species occurring in Ontario. The following are the categories of at risk: END (Endangered) - A species facing imminent extinction or extirpation in Ontario. THR (Threatened) - Any native species that, on the basis of the best available scientific evidence, is at risk of becoming Endangered throughout all or a large portion of its Ontario range if the limiting factors are not reversed. SC (Special Concern) – A species that may become Threatened or Endangered due to a combination of biological characteristics and identified threats. 3SARA Sched. 1 Status: The SARA protects and ensures the recovery of SAR listed on Schedule 1 as Extirpated, Endangered and Threatened, and their critical habitats at a federal level. Schedule 1 of the SARA classifies SAR as follows: Extirpated (EXP) - a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild (SARA Registry, 2012). Endangered (END) - a wildlife species that is facing imminent extirpation or extinction (SARA Registry, 2012).

Threatened (THR) – a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction (SARA Registry, 2012).

Special Concern (SC) – a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats (SARA Registry, 2012).

3.1.2.7 Significant Wildlife Habitat

The presence of SWH, candidate SWH, as well as the potential presence of SOCC were identified during background review (**Section 3.1.1**). Based on the background review, the Study Area has one confirmed SWH, a Deer Overwintering Area, and nine SOCC recorded of occurring in or in the vicinity of the Study Area as summarized in **Table 3-3**. SWH and SOCC are discussed further in **Section 3.4**.

Common Name	Scientific Name	S-Rank ¹	ESA Status ²	SARA Schedule 1 ³	Source	
Species of Conservation Concern						
Grass Pickerel	Esox americanus vermiculatus	S3	SC	SC	DFO	
Eastern Wood-pewee	Contopus virens	S4B	SC	SC	OBBA	
Golden-winged Warbler	Vermivora chrysoptera	S4B	SC	THR	OBBA	
Grasshopper Sparrow	Ammodramus savannarum	S4B	SC	SC	OBBA	
Wood Thrush	Hylocichla mustelina	S4B	SC	THR	OBBA	
Monarch	Danaus plexippus	S2N,S4B	SC	SC	OBA	
Northern Map Turtle	Graptemys geographica	S3	SC	SC	ORAA	
Snapping Turtle	Chelydra serpentina	S4	SC	SC	ORAA	
Perfoliate bellwort	Uvularia perfoliate	S1S2	-	-	NHIC	

Table 3-3: Species of Conservation Concern Records

¹ S rank:

The natural heritage provincial ranking system (provincial S-rank) is used by the MNRF Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. The following status definitions were taken from NatureServe Explorer's (2015) National and Subnational Conservation Status Definitions available at <u>http://explorer.natureserve.org/nsranks.htm</u>:

S3 – Vulnerable—Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 - Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 - Secure—Common, widespread, and abundant in the nation or state/province.

SNR – Unranked—Province conservation status not yet assessed.

SU – Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. SNA – Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities. S#S# - Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

Breeding Status Qualifiers

N - Nonbreeding—Conservation status refers to the non-breeding population of the species in the province.

B – Breeding—Conservation status refers to the breeding population of the species in the province.

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² ESA Status:	The Endangered Species Act 2007 (ESA) protects species listed as Threatened and Endangered on the Species at Risk in Ontario (SARO) List on provincial and private land. The Minister lists species on the SARO list based on recommendations from the Committee on the Status of Species at Risk in Ontario (COSSARO), which evaluates the conservation status of species occurring in Ontario. The following are the categories of at risk: END (Endangered) – A species facing imminent extinction or extirpation in Ontario. THR (Threatened) – Any native species that, on the basis of the best available scientific evidence, is at risk of becoming Endangered throughout all or a large portion of its Ontario range if the limiting factors are not reversed. SC (Special Concern) – A species that may become Threatened or Endangered due to a combination of biological characteristics and identified threats.				
³ SARA Sched. 1 Status:					
	The SARA protects and ensures the recovery of SAR listed on Schedule 1 as Extirpated, Endangered and Threatened, and their critical habitats at a federal level. Schedule 1 of the SARA classifies SAR as follows: Extirpated (EXP) – a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild (SARA Registry, 2012). Endangered (END) – a wildlife species that is facing imminent extirpation or extinction (SARA Registry, 2012). Threatened (THR) – a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or				

extinction (SARA Registry, 2012). Special Concern (SC) – a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats (SARA Registry, 2012).

3.2 Field Investigations

Aquatic and terrestrial field investigations were completed in 2020 and 2021 within the Study Area for Glancaster Road where permission to enter was available. **Table 3-4** provides a summary of all aquatic and terrestrial investigations undertaken in support of this Natural Environment Report, including the field staff and survey dates. Qualifications in the form of curriculum viteas (CVs) for the field staff and field notes are provided in **Appendix B and Appendix C**, respectively. The following sections document the detailed methods and the results of these investigations.

Table 3-4 Summary of Field Surveys Conducted for the Study Area

Survey Type	Field Staff	Survey Dates	Notes
Fish Habitat Assessment	Olivia Butty Adam Egan	October 6, 2020	Fish Habitat assessments were limited to within the municipal road right-of- way (ROW). Notes on fish habitat were taken from the roadside or fence line.
Fish Community Survey via Electrofishing	Olivia Butty Adam Egan	Not applicable.	Electrofishing was completed within the ROW at WC-09. This was the only watercourse where it was possible to electro-fish within the ROW. The property beyond the ROW is owned by Hydro One Networks Inc. and permission to enter was not available during the time of investigations. Fish community surveys are recommended to be completed during detailed design once permission to enter is granted.
Ecological Land Classification (ELC)	Kasey McKenzie Nataliya Simonova	August 31, 2020 October 6, 2020	ELC surveys were largely limited to within the municipal road ROW unless permission to enter private property was granted. Where access was not granted, notes on vegetation communities were taken from the roadside or fence line via use of binoculars. For areas not visible from public roads aerial photograph interpretation was completed.

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Survey Type	Field Staff	Survey Dates	Notes
Three-season Botanical Inventory	Kasey McKenzie Nataliya Simonova	Summer: August 31, 2020 Fall: October 6, 2020 Spring: May 20, 2021	Botanical surveys were largely limited to what was visible from within the municipal road ROW unless permission to enter private property was granted. Where access was not granted, notes on vegetation communities were taken from the roadside or fence line via use of binoculars. For areas not visible from public roads or without property access no inventory was completed.
Breeding Bird Surveys (Two Rounds)	Heather Hughes Mikayla Reid Nathan De Carlo	May 31, 2021 June 22, 2021	Breeding bird surveys were completed from within the municipal road ROW unless permission to enter private property was granted. Where permission to enter was provided surveys were conducted surrounded by the habitat.
Amphibian Vernal Pool Assessment	Kasey McKenzie	April 7, 2021	Within woodland features immediately adjacent to Glancaster Road where permission to enter was granted staff completed an assessment shortly after snow melt to identify vernal pools which may be used by amphibians for breeding.
Amphibian Nocturnal Call Surveys (Three Rounds)	Claire Atherton Mikayla Reid	April 15, 2021 May 17, 2021 June 15, 2021	Amphibian Nocturnal Call Surveys were completed from within the municipal road ROW adjacent communities where potentially suitable amphibian breeding habitat had been identified (vernal pools, wetlands, water features).
Snake Encounter Surveys (Five Rounds)	Claire Atherton Kasey McKenzie Heather Hughes Nataliya Simonova	August 31, 2020 October 6, 2020 April 7, 2021 May 20, 2021 June 22, 2021	Completed in conjunction with the above surveys.
Significant Wildlife Habitat Candidate and SAR Habitat Screenings	All above	All above	Completed in conjunction with the above surveys.
Incidental Wildlife Observations	All above	All above	Completed in conjunction with the above surveys.

A multi-season headwater drainage feature assessment in accordance with the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (CVC and TRCA, 2014) and the *Ontario Stream Assessment Protocol* (Stanfield, 2013) was also undertaken in conjunction with the above identified surveys; the methods and results of which are documented under a separate cover titled the *Glancaster Headwater Drainage Feature Assessment – Glancaster Road – Municipal Class Environmental Site Assessment Phases 3 and 4, AECOM 2022.*

3.2.1 Aquatic Habitat Assessment

3.2.1.1 Methods

On October 6, 2020, AECOM biologists conducted preliminary fish habitat assessments to document the existing conditions of the Twenty Mile Creek, Three Mile Creek, and Tiffany Creek tributaries within the Study Area (see **Figure 2**). Site reconnaissance focused on identifying and describing fish habitat suitability and features that may influence fish community composition. Due to the permission to enter limitations, the data for this report had to be collected mainly from the Glancaster Road ROW and from online sources. As a result, standardized methodologies such as Ontario Stream Assessment Protocol (OSAP) were adapted to characterize the fish habitat that was observed from the road. Fish habitat was documented following the definition provided in the NPCA watershed management as "*the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend on directly or indirectly in order to carry out their life processes.*"; as well as following the definition provided by NPCA Watershed Management plan as "*areas that fish need, whether directly or indirectly in order to carry out their life processes.*"; and in accordance with the definition of fish habitat as per the Fisheries Act whereby "*fish habitat*" means "water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds, nursery, rearing, food supply, and migration areas"; and in accordance with the definition of fish habitat as per the Fisheries Act whereby "*fish habitat*" means "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."

Data collection during field investigations included the following:

- Documentation of surrounding natural features and land uses (i.e., wetland, agriculture, etc.);
- Channel form, substrate composition, channel morphology and bank stability;
- Stream morphology forms:
 - Runs typically deep, fast moving water with little to no turbulence of water;
 - Riffles shallow, fast moving water typically running over rocks; riffles providing areas of high oxygenation;
 - Flats low flowing water with a smooth un-agitated surface; and
 - Pools deep pockets of slow-moving water that provide ideal habitat for fish;
- Substrate composition (i.e., clay, silt, sand, gravel, cobble, rock, boulder, muck and detritus);
- Water clarity, water colour, presence and type of macrophytes and algal growth, evidence of runoff;
- Identification of pollution sources (i.e., tile drain discharges, other piped discharges and road runoff); and
- A photographic record for each site to document habitat conditions.

Fish community surveys were not completed due to lack of permission to enter, unsuitable conditions for fish inhabitancy, and/ or fish community survey records were available for downstream of the Study Area. The watercourses that were feasible to conduct fish community assessments on were located on HONI lands, and AECOM Ecologists did not have permission to enter at the time of the surveys.

3.2.1.2 Results

A detailed description of the existing conditions documented in the field investigations is presented below. A photographic record was documented during the field surveys and is provided in **Appendix D** (fish and fish habitat photographs may be found in **Appendix D1**).

<u>WC-01</u>

This drainage feature to Three Mile Creek originates from what appears to be a combination of roadside drainage and a meadow on the east side of Dickinson Road, approximately 3 km upstream from its confluence with Three Mile Creek. When this drainage feature was assessed by AECOM ecologists it was determined that this feature is located outside of the Study Area.

The drainage feature does not cross Glancaster Road but originates from a woodlot on the southeast side. The description below describes the watercourse assessed from the Municipal ROW along Dickson Road West.

Only standing water was present in the culvert of this feature when it was surveyed in October 2020. At the time of field reconnaissance, the channel was not defined, and no prominent banks were observed within the assessed upstream reach. Some gravel/pebble substrates were observed at the culvert inlet and outlet, but there did not appear to be any evidence of substrate sorting upstream or downstream of the culvert. The feature was overgrown with vegetation, and cattails (*Typha spp.*) were most prevalent within the roadside ditch and at the culvert inlet and outlet. Goldenrod (*Solidago spp.*), sedges and other meadow species were most prevalent upstream further away from the culvert inlet. These water-tolerant vegetation species provided a buffer zone for the feature from the surrounding agricultural field. The downstream section (southeast of Dickinson Rd) of this feature was unable to be assessed as the culvert was buried under the residential neighbourhood.

While there is a mapped connection to Three Mile Creek, the presence of a piped portion of the water feature, coupled with the lack of a defined channel bed and bank provides evidence indicating that this location is likely not fish habitat. According to DFO online mapping (2021), habitat for aquatic SAR has not been identified within this section of the drainage feature. According to the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA)'s AgMaps (2020), the area on either side of Dickinson Road is not mapped as a significant groundwater recharge area as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

<u>WC-02</u>

This drainage feature to Three Mile Creek originates from what appears to be a combination of roadside drainage and a woodlot on the west side of Glancaster Road. It flows west to east under Glancaster Road, approximately 3 km upstream from its confluence with Three Mile Creek.

At the time of field reconnaissance, there was no water present within the assessed portion of this drainage feature. There was no defined channel or prominent banks at the culvert inlet, and the inlet of the culvert appeared to be crushed. The surrounding area was highly vegetated with various grasses, sedges, and shrubs and there was no evidence of substrate sorting within the drainage feature. On the east side of Glancaster Road (downstream section), the culvert outlet had a short (>5 m) open area that flowed directly into a like-sized culvert that flowed underneath a residential lawn. There was no evidence of substrate sorting in this open area, no defined banks, and the gap between the culverts was comprised of maintained grass.

While there is a mapped connection to Three Mile Creek, the presence of a piped portion of the water feature, coupled with the lack of a defined channel bed and bank provides evidence indicating that this location is likely not fish habitat. According to DFO online mapping (2021), habitat for aquatic SAR has not been identified within this section of the drainage feature. According to the OMAFRA's AgMaps (2020), the area on the west side of Glancaster Road in this location is mapped as a significant groundwater recharge area with a low/ medium (2/4) groundwater vulnerability rating as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be
vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

<u>WC-03</u>

This drainage feature to Twenty Mile Creek originates from what appears to be a combination of roadside drainage and drainage from the woodlot on the west side of Glancaster Road. It flows west to east under Glancaster Road, approximately 3 km upstream from its confluence with Twenty Mile Creek.

This feature had very little water in the culvert inlet (west, upstream side) when surveyed in Oct. 2020. At the time of field reconnaissance, there was no water present at the culvert outlet within the assessed upstream reach. The upstream portion west of Glancaster Road had a small, defined channel with a stream bottom that was comprised of sorted material (clay, silt, and sand). The culvert outlet on the east side of Glancaster Road was slightly perched and had a short (>5 m) swale feature that flowed directly into a like-sized culvert that flowed underneath a residential lawn. Riprap erosion protection lined the bottom of this "channel", and the banks were vegetated by the maintained lawn. No naturally occurring substrate sorting or vegetation was observed on the downstream side of this crossing.

While there is a mapped connection to Twenty Mile Creek, the presence of a piped portion of the water feature indicates that this location is likely not fish habitat. According to DFO online mapping (2021), the entire tributary has been mapped as potential Grass Pickerel (listed as Special Concern) habitat. OMAFRA's AgMaps (2020), maps the area on either side of Glancaster Road in this location as a significant groundwater recharge area with a low/ medium (2/4) groundwater vulnerability rating as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

<u>WC-04</u>

This water feature originates on the west side of Glancaster Road in a residential area and continues west to east under Kopperfield Lane. While there is a mapped connection to Twenty Mile Creek, there was no feature to assess at the Kopperfield Lane crossing. The water feature is piped underneath the residential neighbourhood, indicating that this feature is likely not fish habitat. It is approximately 1.9 km upstream from its confluence with Twenty Mile Creek.

The assessed reach is likely not fish habitat within the Study Area as there was only a drainage swale feature present. According to DFO online mapping (2021), habitat for aquatic SAR has not been identified within this section of the water feature. According to the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA)'s AgMaps (2020), the area on the southwest side of Kopperfield Lane and the west side of Glancaster Road in this location is mapped as a significant groundwater recharge area with a low/ medium (2/4) groundwater vulnerability rating as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

<u>WC-05</u>

This drainage feature to Twenty Mile Creek originates from what appears to be a stormwater management pond. It flows west to east under Glancaster Road, approximately 1.7 km upstream from its confluence with Twenty Mile Creek.

Standing water was present in the culvert when this feature was surveyed in October 2020. At the time of field reconnaissance, within the assessed upstream reach, there was a poorly defined channel that did not have

prominent banks and was overgrown with vegetation. At the culvert, common reed (*Phragmites australis subsp. Australis*) was the dominant vegetation type. Golden rod (*Solidago spp.*), sedges and other meadow species were most prevalent upstream further away from the culvert inlet. These water-tolerant vegetation species provided a buffer zone for the feature from the surrounding agricultural field. The downstream section (east side of Glancaster Rd.) of this drainage feature was unable to be assessed as the culvert was buried under the residential neighbourhood. As there was no permission to enter to the properties surrounding Glancaster Road, AECOM Ecologists were unable to determine if there was water present upstream of the culvert.

While there is a mapped connection to Twenty Mile Creek, the presence of a piped portion of the water feature, coupled with the lack of a defined channel bed and bank provides evidence indicating that this location is likely not fish habitat. According to DFO online mapping (2021), habitat for aquatic SAR has not been identified within this section of the drainage feature. According to OMAFRA's AgMaps (2020), the area on either side of Glancaster Road in this location is mapped as a significant groundwater recharge area with a low/ medium (4/2) groundwater vulnerability rating as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

<u>WC-06</u>

This drainage feature to Twenty Mile Creek flows west to east under Glancaster Road, approximately 1.5 km upstream from its confluence with Twenty Mile Creek.

At the time of field reconnaissance in October 2020, there was no defined channel in the upstream section within the assessed upstream reach, however, standing water was present in the upstream ditch. A new Hydro One access road crossing was observed at the upstream side. The downstream section (east side of Glancaster Rd.) of this drainage feature had a small defined channel (1.2 m bankful width) that had a stream bottom that was comprised of sorted material (cobble, gravel, sand, and silt were observed), and had flowing water at the time of inspection. The water present in the culvert and downstream of the culvert may be a collection of roadside drainage and stormwater collection. The banks appeared to be stable as they were heavily vegetated (70-90%) with primarily terrestrial, water-tolerant species. This led to the high riparian cover (~75%) in this drainage feature, as observed from within the right of way.

While fish were not observed during field reconnaissance, this tributary's potential fish community assemblage is likely similar to that of Twenty Mile Creek, which is comprised of primarily warmwater species. The assessed reach could provide seasonal habitat for small-bodied fish migration, feeding, and spawning and is generally non-limiting throughout (i.e., no sensitive, important or exceptional habitat was observed). According to DFO online mapping (2021), habitat for aquatic SAR has not been identified within this section of the drainage feature. According to OMAFRA's AgMaps (2020), the area on either side of Glancaster Road in this location is mapped as a significant groundwater recharge area with a low/ medium (2/4) groundwater vulnerability rating as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

<u>WC-07</u>

This drainage feature to Twenty Mile Creek is mapped as a warmwater system that originates on the east side of Glancaster Road and flows east towards Hawkswood Trail. There is no crossing structure associated with this feature along Glancaster Road. According to OMAFRA's AgMaps (2020), the area on either side of Glancaster Road in this location is mapped as a significant groundwater recharge area with a low/ medium (2/4) groundwater

vulnerability rating. This feature could not be assessed as AECOM's Ecologists did not have permission to enter the properties that this feature was on during the October 2020 field investigations.

<u>WC-08</u>

This drainage feature to Tiffany Creek originates across from the Glancaster Loop bus stop and flows north along the west side of Glancaster Road to its confluence with WC-09.

At the time of field reconnaissance in Oct. 2020, the assessed reach was dry. There was no defined channel or prominent banks, no evidence of substrate sorting, and the area around the culvert was treated as part of the maintained lawn of the surrounding property (the swale feature had mowed grass growing throughout it).

While there is a mapped connection to Tiffany Creek, lack of a defined channel bed and bank provides evidence indicating that this location is likely not fish habitat. According to DFO online mapping (2021), habitat for aquatic SAR has not been identified within this section of the feature. According to the OMAFRA's AgMaps (2020), the area on either side of Glancaster Road in this location is mapped as a significant groundwater recharge area with a low/ medium (2/4) groundwater vulnerability rating as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

<u>WC-09</u>

Tiffany Creek originates around Smith Rd, approximately 2km upstream of the Study Area and flows east towards Glancaster road where it receives inputs from surrounding roadside drainage, and then flows northeast under Glancaster and Rymal Road. The land use around Tiffany Creek is a mixture of agricultural lands, scrubland, wetlands, woodlots, and rural residential areas.

At the time of field reconnaissance in October 2020 the assessed upstream reach consisted of a small (>1 m) defined channel present at the culvert on Glancaster Road. The banks appeared stable and were heavily vegetated with water-tolerant terrestrial species. The stream morphology at this location would be classified almost entirely as a run, except for the culvert inlet and outlet pools. There was some evidence of sorted material along the stream bottom, but the substrate appeared to be comprised primarily of fines (sand, silt, clay) around the culvert. This watercourse's downstream section (east side of Glancaster Road, south side of Rymal Road) drained into a cattail area. No defined channel was observed at the Rymal Road culvert outlet, but standing water was present near the culvert. As there was no permission to enter this wetland, no further investigations of it were completed.

Two Brook Sticklebacks were observed during the field reconnaissance of WC-09, confirming that this watercourse does support fish habitat. Tiffany Creek's fish community assemblage is comprised of primarily warmwater species and the assessed reach provides habitat for small-bodied fish. The habitat at this crossing was generally non-limiting throughout (i.e., no sensitive, important or exceptional habitat was observed) and could be considered to contribute to fish migration, feeding, or spawning habitat. According to DFO online mapping (2021), habitat for aquatic SAR has not been identified within this section of the watercourse. According to OMAFRA's AgMaps (2020), the area on either side of Glancaster Road in this location is mapped as a significant groundwater recharge area with a low/ medium (2/4) groundwater vulnerability rating as defined by OMAFRA's source water protection plan factsheet (2019). OMAFRA defines these groundwater recharge areas as wellhead protection areas (WHPAs). WHPAs are areas that could be vulnerable to activities that could affect the quality and quantity of the groundwater near that wellhead. The higher the vulnerability score the more likely it is that certain works could impact the groundwater.

3.2.2 Vegetation Communities and Plants

3.2.2.1 Methods

ELC surveys and a botanical inventory were undertaken within the Study Area over three visits: August 31 and October 6, 2020, and May 20, 2021. Surveys were undertaken upon properties where PTE was granted; elsewhere in the Study Area, surveys were limited to roadside investigations (Refer to **Figure 4**).

Vegetation Community Classification and Delineation

Vegetation communities within the Study Area were classified using the Southern Ontario ELC system (Lee *et al.*, 1998), which provides a standard for comparing similar vegetation communities across Ontario. This protocol classifies vegetation communities through the completion of a multilayer (canopy, sub-canopy, ground cover) vegetation inventory. A summary of disturbance factors, community conditions, plant species list and representative photographs were also recorded for each vegetation patch.

Community Sensitivity

Vegetation community sensitivity was based on the calculation of the Mean Coefficient of Conservatism (CC), the Floristic Quality Index (FQI), and the Weediness index (WI) for the Study Area. These parameters are intended to be used together in order to assign an ecological community sensitivity ranking based on plant species composition, and not the actual value of a particular community.

- - Co-efficient of Conservatism (CC):

These values range from 0 (low) to 10 (high) and are based on species tolerance of disturbance and fidelity to a specific habitat.

Vegetation species and community sensitivity were assessed through the application of CC values, assigned to each native species in southern Ontario (Oldham *et al.* 1995). These values range from 0 (low) to 10 (high) and the occurrence of species with a CC of 9 or 10 can be good indicators of undisturbed conditions such as mature forests, fens or bogs. General habitat values associated with the CC values are:

- 0-3: species found in a wide variety of communities, including disturbed sites
- 4-6: species associated with a specific community, but tolerate moderate disturbance
- 7-8: species associated with a community in an advanced successional stage, tolerant of minor disturbances
- 9-10: species with a high degree of fidelity to a narrow range of synecological parameters

Floristic Quality Index (FQI):

The floristic quality of an area is reflected in the mean value of CC. For example, an old field or grazed woodlot would tend have a low mean CC; these habitats are dominated by opportunistic species that occur in a wide range of site conditions and are tolerant of disturbance. A bog, prairie or intact forest would have a higher value, reflecting the specific habitat requirements of many of the species and a generally undisturbed condition. A community with an FQI between 1-19 will be considered to be of low vegetative quality; communities with an FQI between 20-35 will be considered to have a high vegetative quality and communities with an FQI above 35 will be considered of "Natural Area" Quality.

Weediness Index (WI):

These values, range from -1 (low) to -3 (high) and quantify the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, it can be used as an indicator of disturbance.

The sensitivity of natural areas can be assessed through application of weediness as a measure of the potential invasiveness of non-native plants. In combination with the percentage of non-native plants can be used as an indicator of disturbance. Values (ranging from 1 - to - 3) have been assigned to most non-native species based on the potential impact each species can have in natural areas:

- 1: little or no impact on natural areas (most non-native plants are in this category)
- 2: occasional impacts on natural areas, generally infrequent or localized
- 3: major potential impacts on natural areas.

Coefficient of Wetness (CW):

All plants in southern Ontario have been assigned a wetland category, based on the designations developed for use by the United States Fish and Wildlife Service. Plants are designated into the following categories:

- Obligate Wetland (OBL): occurs almost always in wetlands under natural conditions (estimated >99% probability)
- Facultative Wetland (FACW): usually occurs in wetlands, but occasionally found in nonwetlands (estimated 67-99% probability)
- Facultative (FAC): equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability)
- Facultative Upland (FACU): occasionally occurs in wetlands, but usually occurs in nonwetlands (estimated 1-33% probability)
- Upland (UPL): occurs almost never in wetlands under natural conditions (estimated <1% probability)
- Each of the above wetland categories has been assigned a numerical value to facilitate the quantification of the wetness index.

3.2.2.2 Results

Terrestrial Vegetation Communities

Eight vegetation communities were identified within the Study Area through field investigation including Dry – Fresh Beech Deciduous Forest (FOD4-1), Dry – Moist Old Field Meadow (CUM1-1) with a Mineral Meadow Marsh (MAM2) complex, Cattail Mineral Shallow Marsh (MAS2-1), Dry – Fresh Oak – Hickory Deciduous Forest (FOD2-2), Dry – Moist Old Field Meadow (CUM1-1), Dry – Moist Old Field Meadow (CUM1-1) / Mineral Cultural Thicket (CUT1), Reed-canary Grass Mineral Meadow Marsh (MAM2-2), and Mineral Thicket Swamp (SWT2) / Reed-canary Grass Mineral Meadow Marsh (MAM2-2). A flora list was also gathered for vegetation within the municipal ROW. Each ELC community is described in **Table 3-5** and a representative photograph is provided in **Appendix D2**. The location of each vegetation community is shown on **Figure 4** and a list of vascular plants, including scientific names, for each community is provided in **Appendix E**.

Communities assessed through aerial photograph interpretation where permission to enter was not available are not included in the table. These include Deciduous Forest (FOD), Mineral Cultural Thicket (CUT1), Mineral Cultural Thicket (CUT1) / Mixed Forest (FOM), Open Aquatic (OAO), Mineral Cultural Woodland (CUW1), Mineral Cultural Meadow (CUM1) / Mineral Meadow Marsh (MAM2), and a Mineral Shallow Marsh (MAS2). These communities are delineated as air photo interpretation on **Figure 4**.

Table 3-5: Ecological Land Classification within the Study Area

	Dominant Species							
ELC Code	Provincial Rank*	Complex	Vegetation/Ecosite Name	Community Age	Canopy	Sub-canopy	Understorey	Ground Layer
Forested Co	ommunities	(FO)						
FOD4-1	S4S5	-	Dry – Fresh Beech Deciduous Forest Type	Mature	American beech (<i>Fagus grandifolia</i>), eastern hop-hornbeam (<i>Ostrya virginiana</i>), bitternut hickory (<i>Carya</i> <i>cordiformis</i>), and northern red oak (<i>Quercus rubra</i>).	Eastern hop- hornbeam, white ash (<i>Fraxinus americana</i>), American beech, and bitternut hickory.	European buckthorn (<i>Rhamnus cathartica</i>), riverbank grape (<i>Vitis</i> <i>riparia</i>), and Tatarian honeysuckle (<i>Lonicera</i> <i>tatarica</i>).	White ash, broad- leaved enchanter's nightshade (<i>Circaea</i> <i>canadensis</i>), goldenrod (<i>Solidago</i> sp.), and avens (<i>Geum</i> sp.).
FOD2-2	S3S4	-	Dry – Fresh Oak – Hickory Deciduous Forest Type	Mature	Northern red oak, shagbark hickory (<i>Carya ovata</i>), basswood (<i>Tilia</i> <i>americana</i>), and sugar maple (<i>Acer</i> <i>saccharum</i>).	Basswood, sugar maple, and shagbark hickory.	European buckthorn, white ash, Tatarian honeysuckle, (and grey dogwood (<i>Cornus</i> <i>racemosa</i>).	This community lacks a well-defined ground layer.
Marsh Communities (MA)								
MAS2-1	S5	-	Cattail Mineral Shallow Marsh Type	Mid -Age	This community lacks a well-defined canopy.	This community lacks a well-defined sub- canopy.	Narrow-leaved cattail (<i>Typha angustifolia</i>), reed canary grass (<i>Phalaris arundinacea</i>), and common reed (<i>Phragmites australis</i>).	This community lacks a well-defined ground layer.
MAM2-2	S5		Reed-canary Grass Mineral Meadow Marsh	Mid-Age	This community lacks a well-defined canopy.	This community lacks a well-defined sub-canopy.	Reed canary grass	Reed canary grass
Swamp Con	nmunities (S	SW)				· · ·		
SWT2	S5	MAM2-2	Mineral Thicket Swamp	Young	This community lacks a well-defined canopy	Gray dogwood <i>),</i> Tartarian Honeysuckle, Trembling Aspen (<i>Populus tremuloides</i>)	Reed canary grass Spotted jewelweed (Impatiens capensis), Sensitive Fern (Onoclea sensibilis)	Reed canary grass, (Spotted jewelweed, Sensitive Fern
Cultural Co	mmunities (CU)				•		
CUM1-1	-S5	MAM2	Dry – Moist Old Field Meadow Type	Young	Hybrid white willow (<i>Salix x fragilis</i>)	Red-osier dogwood (<i>Cornus sericea</i>), Tatarian honeysuckle, and black walnut (<i>Juglans nigra</i>).	Goldenrod, spotted jewelweed, aster (<i>Symphyotrichum</i> sp.), and thistle (<i>Cirsium</i> sp.).	Bluegrass (<i>Poa</i> sp.) and avens.

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	Dominant Species							
ELC Code	Provincial Rank*	Complex	Vegetation/Ecosite Name	Community Age	Canopy	Sub-canopy	Understorey	Ground Layer
CUM1-1	S5		Dry – Moist Old Field Meadow Type	Young	This community lacks a well-defined canopy.	This community lacks a well-defined sub- canopy.	Goldenrod, aster (, and thistle .	Bluegrass and avens.
CUM1-1	S5	CUT1	Dry – Moist Old Field Meadow Type	Young	This community lacks a well-defined canopy.	Gray dogwood Common buckthorn	Goldenrod, aster and thistle (Bluegrass .) and avens.

Notes: *Provincial ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. The following S-ranks are defined as follows:

S3 – Vulnerable—Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 – Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 – Secure—Common, widespread, and abundant in the nation or state/province.

S#S# - Range Rank — A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

Wetland Communities

Wetlands are defined by the NDMNRF as "Lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface; in either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophylic or water tolerant plants" (MNRF, 2013). These lands include ecosystems such as marshes, swamps, fens, bogs and open water communities.

Though there are no PSWs or Locally Significant Wetlands (LSW) present within the Study Area, as designated by NDMNRF the Tiffany Creek PSW Complex borders the northeastern limit of the Study Area within the regulated lands of the HCA. NPCA mapping matches NDMNRF with no regulated wetlands within the Study Area. Conservation Authorities regulate development within and adjacent to wetlands to ensure water sources and habitat are protected while also ensuring development does not occur in a high risk or hazardous area. The City of Hamilton also identifies wetlands and hydrologic features on Schedule B-4 of the UHOP, with a narrow unevaluated community identified east of Glancaster Road within the Hydro Corridor which has been identified as a Mineral Meadow Marsh (MAM2) identified from roadside during field investigations (refer to **Figure 2-03** and **Figure 4-03**).

During field investigations four wetland communities were identified within the Study Area. These include a Mineral Thicket Swamp – Reed Canary Meadow Marsh complex (SWT2/MAM2-2) north of Book Road East; a small Reed Canary Grass Mineral Meadow Marsh (MAM2-2) northwest of Kopperfield Lane along WC-05; and two Cattail Mineral Shallow Marshes (MAS2-1). Community descriptions for these wetland communities are provided in **Table 3-5** above in **Section 3.2.2.**

As described in the OWES Southern Manual (MNRF, 2013), wetlands smaller than 2 ha in size are not generally evaluated using OWES unless part of a larger complex. One MAS2-1 community at the intersection of Glancaster and Rymal Road West would benefit from additional assessment as it may be considered as part of the Tiffany Creek Wetland Complex. It conveys flows from WC-09 which continues to flow into the PSW. However, given its previous exclusion and surrounding development it is possible it arose as a result of stormwater management. Wetlands that are the result of stormwater management systems are typically excluded from evaluation and designation under OWES as they require regular maintenance activities. Further evaluation and consultation with the NDMNRF is recommended to confirm.

Other wetlands within the Study Area fall below the threshold for evaluation under OWES with the MAS2-1 community south of the entrance to Rehoboth United Reformer Church measuring only approximately 0.3 ha in size and not connected hydrologically to the Tiffany Creek PSW. The MAM2-2 (0.19 ha) near Kopperfield Lane and SWT2/MAM2-2 (0.4 ha) are both below the size threshold and dominated by invasive reed canary grass. Given the size of the wetlands and low quality of the vegetation present; these wetlands are not recommended for further OWES evaluation.

Botanical Inventory

Dry - Fresh Beech Deciduous Forest (FOD4-1)

A total of 72 taxa were identified within this community – eight of which could not be reliably identified to species level (i.e., wood fern [*Dryopteris* sp.], aster [*Symphyotrichum* sp.], goldenrod [*Solidago* sp.], currant [*Ribes* sp.], agrimony [*Agrimonia* sp.], avens [*Geum* sp.], rose [*Rosa* sp.], and sedge [*Carex* sp.]). Native species made up 76.4 % of species present. This community has an average CC of 4.08 (i.e., moderate sensitivity), with a FQI of 14.97. This community has moderate potential invasiveness, with a mean weediness of -2.22. This community is a facultative community, with an average wetness value of 1.47. Butternut (*Juglans cinerea*), an Endangered species under the ESA, was identified in this community.

Dry - Moist Old Field Meadow (CUM1-1) with Mineral Meadow Marsh (MAM2) complex

A total of 59 taxa were identified within this community – 14 of which could not be reliably identified to species level (i.e., aster, goldenrod, currant, avens, rose, sedge, beggar-ticks [*Bidens* sp.], thistle [*Cirsium* sp.], cherry [*Prunus* sp.], willow [*Salix* sp.], bulrush [*Schoenoplectus* sp.], rush [*Juncus* sp.], lily [*Lilium* sp.], and bluegrass [*Poa* sp.]). Native species made up 42.4 % of species present. This community has an average CC of 2.29 (i.e., lowest sensitivity), with a FQI of 7.57. This community has moderate potential invasiveness, with a mean weediness of - 1.95. This community is a facultative community, with an average wetness value of 0.11.

Cattail Mineral Shallow Marsh (MAS2-1)

A total of 34 taxa were identified within this community – one of which could not be reliably identified to species level (i.e., willow). Native species made up 55.9 % of species present. This community has an average CC of 2.89 (i.e., lowest sensitivity), with a FQI of 7.42. This community has moderate potential invasiveness, with a mean weediness of -2.00. This community is a facultative community, with an average wetness value of -0.88. This community has two locally uncommon species including purplestem angelica (*Angelica atropurpurea*) and inland sedge (*Carex interior*).

Dry - Fresh Oak - Hickory Deciduous Forest (FOD2-2)

A total of 65 taxa were identified within this community – five of which could not be reliably identified to species level (i.e., goldenrod, currant, hawthorn [*Crataegus* sp.], cherry, and greenbrier [*Smilax* sp.]). Native species made up 73.8 % of species present. This community has an average CC of 4.40 (i.e., moderate sensitivity), with a FQI of 14.54. This community has moderate potential invasiveness, with a mean weediness of -2.08. This community is a facultative community, with an average wetness value of 1.47. A dead Butternut sapling, an Endangered species under the ESA, was identified at the edge of this community.

Dry - Moist Old Field Meadow (CUM1-1)

A total of 42 taxa were identified within this community – four of which could not be reliably identified to species level (i.e., aster, thistle, goldenrod, and bluegrass). Native species made up 50.0 % of species present. This community has an average CC of 1.90 (i.e., lowest sensitivity), with a FQI of 6.32. This community has moderate potential invasiveness, with a mean weediness of -1.69. This community is a facultative community, with an average wetness value of 1.24.

Dry - Moist Old Field Meadow (CUM1-1) / Mineral Cultural Thicket (CUT1)

A total of 36 taxa were identified within this community – six of which could not be reliably identified to species level (i.e., elderberry [*Sambucus* sp.], aster, goldenrod, hawthorn, rose, and bluegrass). Native species made up 47.2% of species present. This community has an average CC of 2.59 (i.e., lowest sensitivity), with a FQI of 6.63. This community has moderate potential invasiveness, with a mean weediness of -1.92. This community is a facultative community, with an average wetness value of 1.13.

Reed-canary Grass Mineral Meadow Marsh (MAM2-2)

A total of 29 taxa were identified within this community – three of which could not be reliably identified to species level (i.e., aster, goldenrod, and willow). Native species made up 51.7% of species present. This community has an average CC of 1.87 (i.e., lowest sensitivity), with a FQI of 5.29. This community has moderate potential invasiveness, with a mean weediness of -2.00. This community is a facultative community, with an average wetness value of 0.04.

Mineral Thicket Swamp (SWT2) / Reed-canary Grass Mineral Meadow Marsh (MAM2-2)

A total of 48 taxa were identified within this community – five of which could not be reliably identified to species level (i.e., rose, willow, sedge, bulrush, and rush). Native species made up 68.8% of species present. This

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community has an average CC of 3.16 (i.e., lowest sensitivity), with a FQI of 10.21. This community has moderate potential invasiveness, with a mean weediness of -2.30. This community is a facultative community, with an average wetness value of -0.71.

Municipal Right-of-way

A total of 23 taxa were identified within this community – two of which could not be reliably identified to species level (i.e., goldenrod and avens). Native species made up 47.8% of species present. This community has an average CC of 1.45 (i.e., lowest sensitivity), with a FQI of 4.00. This community has moderate potential invasiveness, with a mean weediness of -1.90. This community is a facultative community, with an average wetness value of 1.29.

A list of vascular plant species observed within each vegetation community is provided in Appendix E.



Right of Way Limits

Field Identified Ecological Features

C

Amphibian Station

Breeding Bird Station



Assessed with aerial photo interpretation

AECOM Field Collection - 2021

- **Aquatic Thermal Regimes**
- Unknown Thermal Regime







Legend

Study Area

Right of Way Limits

Field Identified Ecological Features



Breeding Bird Station



Amphibian Station



Assessed with aerial photo interpretation



AECOM Field Collection - 2021

- **Aquatic Thermal Regimes**
- Unknown Thermal Regime





ELC Code Description

CUM1-1: Dry – Moist Old Field Meadow

CUM1-1/CUT1: Dry – Moist Old Field Meadow with Mineral Cultural Thicket complex MAS2: Mineral Shallow Marsh Ecosite MAS2-1: Cattail Mineral Shallow Marsh Mowed: Mowed ROW:Right of Way Residential: Residential





3.2.3 Breeding Birds

3.2.3.1 Methods

Various protocols were adapted to design the breeding bird survey methods for the Study Area, utilizing both area searches and stationary point count surveys. Seven point-count stations were surveyed, located at least 200 m apart to maintain a degree of separation and reduce the chances of double counting individual birds. Survey station locations are shown on **Figure 4**. Each station was surveyed twice during breeding bird season (May 24 – July 10). Two survey dates are recommended as they typically provide data that more accurately reflects the number of species and birds utilizing the habitat at each station (EC-CWS, 2009). Surveys were completed between 5:00 am and 10:00 am under appropriate weather conditions (i.e., no precipitation, calm to light wind (EC-CWS, 2009). Each point-count consisted of a 10-minute survey, recording the time, species, breeding evidence and individual bird movement within a 100 m radius. Birds observed beyond 100 m or as flyovers were recorded as incidental observations.

3.2.3.2 Results

Breeding bird surveys were conducted on May 31 and June 22, 2021. A total of 35 bird species were identified within the Study Area. The most abundant species being Red-winged Blackbird, American Robin (*Turdus migratorius*), and Song Sparrow (*Melospiza melodia*). One species, Barn Swallow, is listed as Threatened under the ESA. Two SOCC were also observed, Eastern Wood Pewee (*Contopus Virens*), and Wood Thrush (*Hylocicla mustelina*). Five birds were recorded that are also considered to be uncommon to the Hamilton Area, including the Eastern Towhee (*Pipilio erythrophthalmus*), Brown Thrasher (*Toxostoma rufum*), Wood Thrush, Alder Flycatcher (*Empidonax alnorum*) and Great Blue Heron (*Ardea herodias*) according to HCA's 2013 Bird Checklist. The remaining species are considered common and tolerant of disturbance with the majority of recorded birds protected under the MBCA A summary of breeding bird survey results is provided in **Appendix F** and the locations of each breeding bird station are provided on **Figure 4**.

Barn Swallow

One individual was observed within suitable foraging habitat (i.e., CUM1-1), within 100 m of Station BBS-03 on June 22, 2021 (round 2).

Eastern Wood-Pewee

Several males were heard singing on both visits within suitable habitat (i.e., FOD4-1), within 100 m of Station BBS-06.

Wood Thrush

A single male was heard calling within 100 m of Station BBS-04 and BBS-06 on May 31, 2021 (round 1) within suitable habitat (i.e., FOD4-1).

SAR and SAR habitat, and SWH, including SOCC habitat, are further discussed in Sections 3.3 and 3.4.

3.2.4 Amphibians

3.2.4.1 Methods

The purpose of amphibian breeding surveys is to identify species composition, including presence or absence of any significant species of calling anurans (e.g., frogs and toads) within the Study Area. The Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (2008) provides standardized field methods for audiosurveys of breeding anurans within the province. In order to detect both early and late anuran breeders, three site visits were conducted at the wetland communities during the breeding season. In accordance with the protocol, surveys did not begin until at least one-half hour after sunset and were completed before midnight during suitable weather conditions (winds less than 19 km/hr and minimum night-time air temperatures of at least 5°C for the first survey, 10°C for the second survey and 17°C for the third survey). Species observed and call frequency were recorded by biologists during each three-minute point count. The frequency categories of anuran calls are:

- 0 None heard
- 1 Individuals can be counted, calls not overlapping
- 2 Numbers of some individuals can be estimated or counted, others overlapping
- 3 Full chorus, calls continuous and overlapping, and individuals not distinguishable

Amphibian breeding surveys were completed on the evenings of April 15, May 17, and June 15, 2021 at six survey stations within the Study Area under appropriate weather conditions. Survey station locations are shown on **Figure 4**.

3.2.4.2 Results

A brief summary of the survey conditions and results is provided in **Table 3-6**. The locations of each station are provided in **Figure 4**. Background noise at stations was generally considered to be moderate to high due to traffic along Glancaster Road. Most stations had low activity, none reaching a full chorus or call code 3 for any one species, based on this none of the features assessed would be confirmed significant amphibian habitat based on the SWH 7E criteria.

Table 3-6: Summary of Amphibian Breeding Survey Conditions and Results

Monitoring	Date, Time, and	Amphibian Night Call Survey Results					
Station	Weather Conditions	Round 1	Round 2	Round 3			
AMP_01	Date:	April 15, 2021	May 17, 2021	June 15, 2021			
_	Start – End Time	20:26 - 20:30	21:02 - 21:05	21:33 – 21:36			
	Beaufort Wind Scale	2	0	0			
	Cloud Cover (%):	95	0	10			
	Background Noise:	3	3	3			
	Air Temperature (°C):	6	18	19			
	Precipitation:	None	None	None			
	Results < 100 m:	No amphibians heard calling.	No amphibians heard calling.	No amphibians heard calling.			
	> 100 m:	None	None	None			
AMP_02	Date:	April 15, 2021	May 17, 2021	June 15, 2021			
	Start – End Time	20:33 – 20:36	21:12 – 21:15	21:40 – 21:43			
	Beaufort Wind Scale	3	1	0			
	Cloud Cover (%):	95	0	0			
	Background Noise:	3	3	2			
	Air Temperature (°C):	5	18	19			
	Precipitation:	None	None	None			
	Results < 100 m:	No amphibians heard calling.	No amphibians heard calling.	No amphibians heard calling.			
	> 100 m:	None	None	None			
AMP_03	Date:	April 15, 2021	May 17, 2021	June 15, 2021			
	Start – End Time	20:42 - 20:45	21:02 - 21:05	21:33 – 21:36			
	Beaufort Wind Scale	2	0	0			
	Cloud Cover (%):	95	0	10			
	Background Noise:	3	3	3			
	Air Temperature (°C):	6	18	19			
	Precipitation:	None	None	None			
	Results < 100 m:	Spring Peeper: 4 individuals,	Spring Peeper: 4 individuals,	Green Frog: 3 individuals,			
		call code 2	call code 2	call code 2			
	> 100 m:	None	Gray Treefrog: 1 individual, call code 1	None			
AMP_04	Date:	April 15, 2021	May 17, 2021	June 15, 2021			
	Start – End Time	20:50 - 20:53	21:39 - 21:42	22:02 - 22:05			

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Monitoring	Date, Time, and	Amphibian Night Call Survey Results					
Station	Weather Conditions	Round 1	Round 2	Round 3			
	Beaufort Wind Scale	2	0	0			
	Cloud Cover (%):	95	0	0			
	Background Noise:	2	2	2			
	Air Temperature (°C):	4	15	16			
	Precipitation:	None	None	None			
	Results < 100 m:	None	Spring Peeper: 2 individuals, call code 2	No amphibians heard calling.			
	> 100 m:	Spring Peeper: 4 individuals, call code 2	None.	None.			
AMP_05	Date:	April 15, 2021	May 17, 2021	June 15, 2021			
	Start – End Time	20:56 – 21:00	21:52 – 21:55	22:11 – 22:14			
	Beaufort Wind Scale	1	0	0			
	Cloud Cover (%):	95	0	0			
	Background Noise:	3	2	2			
	Air Temperature (°C):	4	15	16			
	Precipitation:	None	None	None			
	Results < 100 m:	None	American Toad: 1 individual, call code 2	No amphibians heard calling.			
	> 100 m:	Spring Peeper: 1 individual, call code 1	Spring Peeper: 3 individuals, call code 2	None			
AMP_06	Date:	April 15, 2021	May 17, 2021	June 15, 2021			
	Start – End Time	21:03 – 21:08	22:01 – 22:04	22:18 – 22:21			
	Beaufort Wind Scale	2	0	1			
	Cloud Cover (%):	95	0	0			
	Background Noise:	2	2	3			
	Air Temperature (°C):	4	15	16			
	Precipitation:	None	None	None			
	Results < 100 m:	No amphibians heard calling.	American Toad: 4 individuals, call code 2	No amphibians heard calling.			
	> 100 m:	None	Spring Peeper: 4 individuals, call code 2	None			

Notes: Background noise is indicated using the following background noise codes reproduced the Marsh Monitoring Program Participants Handbook BSC, 2008)

0 – No appreciable effect (e.g., owl calling)

1 - Slightly affecting sampling (e.g., distant traffic, dog barking, car passing

2 – Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)

3 – Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)

4 – Profoundly affecting samplings (e.g., continuous traffic passing, construction noise)

3.2.5 Reptiles

3.2.5.1 Methods

The purpose of the surveys was to assess potential presence and use of the area by snakes as requested by the City of Hamilton. Area searches for snakes were conducted within areas of suitable habitat within the Study Area following the methods outlined in Survey Protocol for Ontario's Species at Risk Snakes (MNRF, 2016). Five rounds of visual encounter surveys were conducted under suitable weather conditions (i.e., sunny, warm temperatures). Five rounds were completed instead of the ten rounds, as five rounds are the minimum number of site visits as per the Survey Protocol for Ontario's Species at Risk Snakes (MNRF, 2016) which was deemed sufficient especially there were no records of any SAR or SOCC snakes identified through the background information review (refer to **Section 3.1.2.6** and **3.1.2.7**). The location and species of snakes observed during the area search were documented.

3.2.5.2 Results

A single snake was observed through these surveys on May 20, 2021 basking along the north shoulder of Book Road East. The Eastern Gartersake (*Thamophis sirtalis*) is a widespread and tolerant species present through most of Ontario. A brief summary of the survey conditions and results is provided in **Table 3-7**.

Table 3-7: Summary of Snake Survey Conditions and Results

Parcol ID	ELC			Results		
Parcerib	Community	Round 1	Round 2	Round 3	Round 4	Round 5
Date:		August 31, 2020	October 6, 2020	April 7, 2021	May 20, 2021	June 22, 2021
Time		9:30 - 16:00	8:50 - 14:00	9:00 - 13:00	8:25 – 11:25	7:15 – 9:00
Beau	fort Wind Scale:	2	5	3	1	1
Cloud Cover (%):		15	50	0	100	15
Air Temperature (°C):		15-24	8-18	8-16	17-27	11-15
Precipitation:		None	None	None	None	None
170810039	MAM / MAS / CUM	No snakes observed	No snakes observed	No snakes observed	No snakes observed	No snakes observed
170820033	FOD4-1	No snakes observed	No snakes observed	No snakes observed	Eastern Gartersnake (Thamnophis sirtalis)	No snakes observed
170820033	SWT2 / MAM2	No snakes	No snakes	No snakes	No snakes observed	No snakes
		observed	observed	observed		observed

3.2.6 Incidental Wildlife

3.2.6.1 Methods

Incidental wildlife observations were recorded during all field investigations. Incidental observations noted include species sightings, tracks, scat, as well as any other wildlife activity.

3.2.6.2 Results

A total of 13 species were observed incidentally, including one SOCC (Monarch). Refer to **Table 3-8** for additional details pertaining to incidentally observed wildlife.

Таха	Common Name	Latin Name	S-Rank ¹	ESA Status ²
Amphibians	American Toad	Anaxyrus americanus	S5	-
Birds	American Goldfinch	Spinus tristis	S5	-
	American Robin	Turdus migratorius	S5	-
	American Woodcock	Scolopax minor	S4B	-
	Black-capped Chickadee	Poecile atricapillus	S5	-
	Mallard	Anas platyrhynchos	S5	-
	Northern Flicker	Colaptes auratus	S5	-
	Red-tailed Hawk	Buteo jamaicensis	S5	NAR
	Red-winged Blackbird	Agelaius phoeniceus	S5	-
	Turkey Vulture	Cathartes aura	S5B, S3N	-
	Yellow-bellied Flycatcher	Empidonax flaviventris	S5B	-
Insects	Darner	Aeshnidae sp.	-	-
	Monarch	Danaus plexippus	S2N,S4B	SC

Table 3-8: Incidentally Observed Wildlife in the Study Area

3.3 Species at Risk Assessment

A habitat screening was undertaken to determine potential SAR occurrence within the Study Area by comparing SAR identified through background data sources to existing habitat features. For the purposes of this screening, species identified as Endangered or Threatened under the ESA are considered SAR. Species listed as Special

Concern under the ESA are considered SOCC and are addressed through the SWH screening exercise (**Section 3.4**). Refer to **Figure 5** for mapped potential SAR habitat.

3.3.1 Methods

A background review was conducted for SAR and SAR habitat in accordance with the methods identified in **Section 3.1.2.6**. Following which, a SAR habitat assessment was completed to determine the presence of suitable habitat for each SAR identified based on the habitat present onsite. This assessment was completed using aerial photo interpretation to delineate habitat communities in the Study Area and was further refined after ELC community delineation during field investigation. The probability of SAR occurrence within the Study Area was determined based on the following rankings:

- Low Probability: neither species nor suitable habitat observed through field investigations but there is a known species record in the general area;
- Medium Probability: species not observed; however, potentially suitable habitat identified through field investigations and there is a known species record in the general area; and
- High Probability: good quality habitat identified (e.g., sufficiently large areas of suitable vegetation and presence of key features such as nesting sites), and species observed in the Study Area either through current or previous field investigations.

Appendix G provides the habitat assessment for SAR in the Study Area and includes their habitat preferences and assessment of potential occurrence in the Study Area.

3.3.2 Results

A total of 15 SAR has been recorded or have known species ranges within or in the vicinity of the Study Area or are considered potentially present in the Hamilton Area based on agency consultation and background information review. The SAR screening (**Appendix G**) identified the following seven SAR with high to medium probability of occurring in the Study Area:

High Probability of Occurrence:

- Barn Swallow [source: OBBA and eBird records] This species is listed as Threatened in Ontario. Barn Swallows occur in close association with human-made structures, building their cup-shaped mud nests almost exclusively on structures such as open barns, under bridges and in culverts (MECP, 2019a). Anthropogenic structures, especially barns, that may provide suitable nesting habitat are present within the Study Area. Furthermore, this species was observed foraging in suitable habitat (cultural meadow) during field investigations. No nests were observed during field investigations; however, surveys were limited to roadside inspection through much of the Study Area.
- Butternut [source: NHIC] This species is listed as Endangered in Ontario. Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams but is also found on well-drained gravel sites and rarely on dry rocky soil (Poisson and Ursic, 2013). This species does not grow well in the shade and is most often found in sunny openings and near forest edges (Poisson and Ursic, 2013). Eight Butternuts were observed in and across from the FOD4-1 community during field investigations, these are shown on Figure 5. In addition a dead Butternut was also observed at the edge of the FOD2-2 community. As a general rule the 25 m buffer around a butternut is considered as the Critical Root Zone and protected as regulated habitat under the ESA; this area is considered to have the lowest threshold for alterations. The 25-50 m buffer around the tree is also protected as this is the area of

dispersal and seedling establishment, however this buffer is considered to have a moderate threshold to alterations. These buffers are shown on **Figure 5**.

Medium Probability of Occurrence:

- Chimney Swift [Source: OBBA records] This species is listed as Threatened in Ontario. Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests (MECP, 2019b). Today, they are more likely to be found in and around urban settlements where they nest and roost in chimneys and other manmade structures. Suitable chimneys may be present within the Study Area; however, none were observed in the proposed ROW.
- Tri-colored Bat [source: BCI Range Maps] This species is listed as Endangered in Ontario. They live in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities, occasionally also in barns or other man-made structures (MECP, 2019c). This species forages over water and along streams in forests (MECP, 2019c). Deciduous forest and buildings within the Study Area provide potentially suitable habitat for this species (all mapped FOD communities).
- Little Brown Myotis [source: BCI Range Maps] This species is listed as Endangered in Ontario. Roosts and maternity colonies of Little Brown Myotis may occur in manmade structures (attics, abandoned buildings, barns), rock crevices, behind loose or flaking bark, or within tree cavities (COSEWIC, 2013; MECP, 2019d). Little Brown Myotis forages over water, rivers, and open areas within forests (e.g., gaps, edges; COSEWIC, 2013). Deciduous forest and buildings within the Study Area provide potentially suitable habitat for this species (all mapped FOD communities).
- Northern Myotis [source: BCI Range Maps] This species is listed as Endangered in Ontario. They are associated with forest habitats roosting under loose bark or in tree cavities (MECP, 2019e). Deciduous forest within the Study Area provide potentially suitable habitat for this species (all mapped FOD communities).
- Eastern Small-footed Myotis [source: BCI Range Map] This species is listed as Endangered in Ontario. Eastern Small-Footed Myotis roosts in a variety of habitats, including under rocks and bridges and in rock outcrops, caves, mines, and hollow trees. Individuals may change their roosting location daily (MECP, 2019f). This species hibernates in caves and abandoned mines, preferring colder, drier sites and showing strong hibernation site fidelity. Deciduous forest and buildings within the Study Area provide potentially suitable habitat for this species (all mapped FOD communities).

The following SAR were identified as having a low probability to occur due to lack of suitable habitat present within the Study Area:

- Barn Owl
- Bank Swallow
- Bobolink
- Eastern Meadowlark
- Louisiana Waterthrush
- Northern Bobwhite
- Yellow-breasted Chat
- Jefferson Salamander























Legend

Study Area Right of Way Limits





Aerial imagery provided by: City of Hamilton

Glancaster Road Class EA



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3.4 Significant Wildlife Habitat Assessment

A SWH screening exercise was conducted using the SWH Criteria Schedules for Ecoregion 7E (MNRF, 2015a) to determine the presence of candidate or confirmed SWH, including the habitat of SOCC (**Appendices F1** and **F2**). The Ecoregion 7E Schedule includes descriptions of the different wildlife habitat types, indicator species, and criteria to determine significance. **Methods**

The presence of candidate SWH was identified through a preliminary assessment using background data and air photo interpretation. The presence or absence of candidate or confirmed SWH within the Study Area was further refined by comparing habitat and indicator species criteria against existing conditions based on ELC, botanical inventory, breeding birds, anuran call surveys, snake surveys and incidental wildlife.

3.4.2 Results

The preliminary SWH screening exercise identified several preliminary SWH types within the Study Area (**Appendix H1** and **H2**). Field investigations, including ELC, botanical inventories, breeding bird surveys, amphibian breeding surveys further refined this total to one candidate SWH and three confirmed SWH; these are mapped on **Figure 6**. Full results of the SWH screening are provided in **Appendix H1** and **H2**.

3.4.2.1 Seasonal Concentration Areas

The following are the candidate SWH identified within the Study Area:

Bat Maternity Colonies – bat species may use deciduous forest (FOD) communities for maternity roost habitat, where tree cavities or loose bark are present. Forested areas within the Study Area presented suitable characteristics for use by bats, but no acoustic monitoring was completed at this stage. This is recommended for completion as part of Detailed Design Phase.

The following are confirmed SWH identified within the Study Area:

Deer Overwintering Area – Deer overwintering and congregation areas are tracked by the MNDMNRF across Ontario. White-tailed Deer (*Odocoileus virginianus*) utilize large woodlots with suitable areas of cover, food and adjacent natural lands. The deciduous forest north of Book Road East is tracked as deer overwintering shown on Figure 6.

There was no other candidate or confirmed SWH under Seasonal Concentration Areas.

3.4.2.2 Rare Vegetation Communities

A single community, Dry – Fresh Oak – Hickory Deciduous Forest (FOD2-2), was identified as being S3S4 provincially. An S3 ranking is indicative of a vulnerable population (between 20-100 occurrences) while S4 are apparently secure (more than 100 occurrences) though uncommon.

There was no other candidate or confirmed SWH under Rare Vegetation Communities.

3.4.2.3 Specialized Habitats for Wildlife

There was no candidate or confirmed SWH identified within the Study Area under Specialized Habitats for Wildlife.

3.4.2.4 Habitats of Species of Conservation Concern

The following SOCC were not detected during field surveys but have suitable habitat within the Study Area. They are considered candidate SWH:

• **Candidate Habitat for SOCC: Snapping Turtle** - This species is listed as Special Concern in Ontario, it was not observed during surveys however may use the open aquatic habitat present within the Study Area.

The following are the confirmed SWH identified within the Study Area:

- Habitat for SOCC: Monarch This species is listed as Special Concern in Ontario and was observed in cultural meadow (CUM) communities throughout the Study Area during the field investigations. Caterpillars feed on milkweed (*Asclepias* spp.) and are confined to meadows or open areas where these plants grow (MECP, 2019g). Common milkweed (*Asclepias syriaca*) was observed within cultural meadow (CUM) communities during field investigations; as such, these communities are considered confirmed SWH.
- Habitat for SOCC: Wood Thrush This species is listed as Special Concern in Ontario and was detected at BBS -04 and BBS-06 within the Dry Fresh Beech Deciduous Forest Community. The Wood Thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests, but will also use smaller stands of trees. They build their nests in living saplings, trees, or shrubs, usually in Sugar Maple or American Beech (NDMRF, 2021a).
- Habitat for SOCC: Eastern Wood Pewee This species is listed as Special Concern in Ontario and was detected at BBS-06 within the Dry Fresh Beech Deciduous Forest community. The Eastern Wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate-age mature forest stands with little understorey vegetation (NDMNRF, 2021b).

There was no other candidate or confirmed SWH under Habitat of SOCC within the Study Area.

3.4.2.5 Animal Movement Corridors

Continuous corridors (unbroken by roads, residential areas and water) linking significant natural areas within a municipality may be considered SWH especially when they provide cover at different heights for wildlife to use. Though a Hydro Corridor runs roughly east to west crossing the Study Area it is bisected by Glancaster Road and generally runs perpendicular to the local core areas. While wildlife likely use these features, there are no SWH animal movement corridors in the Study Area.

3.5 Linkage Assessment

The City of Hamilton's Natural Heritage System consists of Core Areas, which represent significant natural features (i.e. watercourses, wetlands, significant woodlands), supported by Linkages. Linkages are remnant natural areas in the landscape (i.e., riparian areas and hedgerows) that ecologically connect Core Areas, by providing avenues that facilitate movement of plants (e.g., propagules) and animals in response to life cycle requirements or environmental changes; thereby, enhancing biodiversity and resiliency of the Natural Heritage System (City of Hamilton, 2015b). Linkages support the ecological function of Core Areas by increasing their size and buffering them from adjacent land uses. Linkages can also be important natural features on their own, or degraded habitat which can be improved through restoration.

3.5.1 Methods

The purpose of a Linkage Assessment is to establish existing conditions and assess the ecological functions of a potential Linkage. An assessment of the ecological function was completed in accordance with the Natural Heritage Reference Manual (MNRF, 2010) and Linkage Assessment Guidelines (City of Hamilton, 2015b), using the results of background information review and field investigations.

3.5.2 Results

The Linkages within the Study Area, as depicted in Schedule B of the UHOP, connect a core area north of the Study Area to a core area within the south of the Study Area at Book Road East along the west side of Glancaster Road; this path roughly overlaps with portions of the hydro corridor extending north and south. Mapped as a contiguous strip on **Figure 3**, ELC on **Figure 4** demonstrate a more fragmented path with cultural meadows, residential and maintained areas (refer to **Section 3.2.2.2** for community descriptions) separated by mowed and maintained properties of institutional and residential buildings. Extending outside of the Study Area the linkages generally follow the path of the Hydro corridor to the east and west maintaining connections to other core areas. Watercourses are considered core areas in and of themselves while the riparian habitat can function as a linkage facilitating movement and use for larger species. Within the Study Area the linkages are generally consistent with the ELC. The main linkage along Glancaster Road based on Schedule B of the UHOP, 2013 above was generally consistent with those linkages depicted in the Schedule B2 for the AEGD with the exception of lands south of Twenty Road West, which on the AEGD Schedule B2 are mapped as a single core areas. Since the AEGD Schedule B2 is dated from 2009, Schedule B2 and are considered to be the most up to date delineations.

Vegetation communities within the linkages are highly influenced by anthropogenic activities including periodic mowing and other maintenance activities (e.g., tree and shrub clearing). The Linkage within the Study Area is fragmented by residential land uses. Vegetation communities identified within the Study Area, that were not identified in the UHOP and which could be considered for inclusion into the Linkage feature, include the following:

Cultural Communities (i.e., CUM1, CUT1):

Cultural vegetation communities including Cultural Meadow, and Cultural Thicket were identified throughout the Study Area (refer to **Figure 4**). These communities are fragmented by residential lands uses. Cultural Meadows were identified as confirmed SWH for Monarch. Within several cultural meadow communities, a transition to more cultural thicket habitat is occurring. This vegetation diversity may provide linkage opportunities for terrestrial wildlife such as medium sized mammals (e.g., racoons, coyote) and larger mammals (i.e., deer). This vegetation also provides perching and nests habitat for birds.

Reed Canary Grass Mineral Meadow Marsh (MAM2):

This community was not identified as SWH however it provides naturalized vegetation and permits linkage between other linkage features and Core Natural Areas to the north of the Study Area.

Associated Riparian Vegetation

Riparian corridor along WC-06 provides a Linkage opportunity. These may permit movement of wildlife from urbanized or residential areas into the other linkages and the Core Natural Feature both within and outside of the Study Area. Some terrestrial wildlife such as amphibians, turtles, medium sized mammals and larger mammals may prefer to move along a watercourses edges or banks rather than exposing themselves in more open habitats like the Cultural Meadow noted above. Other riparian areas assessed within the Study Area, such as WC-09, may provide some linkage, but are considered to have limited functionality due to reduced, patchy and/or maintained riparian vegetation.

The current condition of the linkages within the Study Area largely consists of regenerating cultural habitats or remnant natural vegetation communities that are degraded as evidenced by an abundance of non-native species observed during field investigations. A total of 35 avian species were detected during breeding bird surveys, and a total of four amphibian species during amphibian call count surveys. In addition, one amphibian, one reptile, and two insect species were identified incidentally during field investigations. Wildlife species using the linkages, including the SOCC Barn Swallow and Monarch, are tolerant of urban disturbance. The linkages provide supporting habitat to the nearby Core Areas by providing foraging, resting, or dispersal areas for wildlife in the Core Area. The results of the Linkage Assessment are provided in **Table 3-9**.

Linkage Characteristic	Evidence
Ecological Function	The linkages are ecologically functional, providing breeding habitat or facilitates local movement of terrestrial wildlife; however, movement corridors may not be of significant ecological value at this time.
Size and Scale	The dimensions of the linkages may be appropriate to the scale of planning as identified in the UHOP, and generally extends between Book Road E and Garner Road linking two core areas; however, significant fragmentation and distance between core areas occurs on a landscape level to the east and west beyond the Study Area.
Redundancy	The overall linkages provide alternative pathways to Core Areas that occur within and beyond the Study Area.
Stepping Stones	Linkages within the Study Area consists of habitat patches that may provide temporary refuge and facilitate local movement. These habitat patches are mostly separated by residential properties.
Ecological Appropriateness	The mapped Linkage does not currently reflect a natural relationship between Core Areas being connected.
Suitability of the Path	Linkages provide opportunities for some species to move successfully; however, existing infrastructure and development may already impede less mobile species on a landscape level.
Surrounding Land Uses	The linkages within the Study Area are mostly surrounded by residential areas, which may permit terrestrial wildlife movement and dispersal for highly mobile wildlife.
Connection to Landforms and Areas with High Restoration Potential	Land within the Study Area and on the greater landscape currently supporting agricultural activities may be restored or rehabilitated to provide habitat for terrestrial wildlife in the future.
Connecting Core Areas	Linkages in the Study Area provide access to the Core Areas associated with SWH identified during Field Investigation.
Water Features	The linkages contain some riparian habitat

Table 3-9: Study Area Linkages Assessment Summary



Legend

Study Area

Right of Way Limits

Confirmed SWH

 $\langle /$

Special Concern and Rare Wildlife Species (Wood Thrush and Eastern Wood-Pewee)



Bat Maternity Colonies
Hamilton Water Features
Watercourse





Project Location: EVPR/060837047 Glancaste/Data/PRJ-60637047-GlencasterRoad.aprx Layout: ECO - SignificantWildlifeHabitat-R00-60637











Map Extents any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.











4. Assessment of Significance

Natural features are assessed using federal, provincial and local legislation policies and evaluation systems. The following provides a summary of significant features identified within the Study Area.

4.1 Federal

The majority of avian species nesting within the Study Area are afforded protection under the MBCA.

The Federal SARA applies to federal lands, federally regulated projects, or SAR birds receiving protection under the MBCA. It should be noted that Barn Swallow, and Wood Thrush which are designated as Threatened under the SARA, and Eastern Wood-Pewee, which are designated as Special Concern, were observed within the Study Area. Barn Swallow are also designated as Threatened under the ESA, they will be further addressed in **Section 4.2**. Wood Thrush and Eastern Wood-Pewee receive protection under the MBCA and their habitat is designated as SWH addressed further in **Section 4.2**.

4.2 Provincial

Provincially recognized features and species were identified within the Study Area during field investigations. They include:

- Barn Swallow, listed as Threatened under the ESA, was observed foraging within the Study Area. No nests were observed on anthropogenic structures; however, suitable nesting habitat may occur elsewhere within the Study Area.
- Butternut, listed as Endangered under the ESA, was observed within the Dry Fresh Beech Deciduous Forest Type (FOD4-1), and Dry – Fresh Oak – Hickory Deciduous Forest Type (FOD2-2).
- Candidate habitat for bat SAR is present within the Study Area (refer to Figure 5); however, targeted surveys were not performed for this EIS as these are best deferred to detailed design when impacts to habitat are better defined.
- Significant Wildlife Habitat one Candidate SWH (Bat Maternity Colonies) and four Confirmed SWH (Monarch Habitat, Wood Thrush Habitat, Eastern Wood-Pewee Habitat and Deer Overwintering) were identified within the Study Area.
- Significant Woodland under the PPS; and,
- HCA and NPCA Regulation Limits.

4.3 Municipal

Features and functions of the City's Natural Heritage System within the Study Area include:

- Linkages as defined by Schedule B of the UHOP;
 - Core Natural Areas as defined by Schedule B of the UHOP including;
 - o Significant Woodland;
 - o Unevaluated wetlands;
 - o Significant woodlands as per Schedule B-2 of the UHOP
 - o Ponds;
 - Key Hydrological Features Streams as defined by Schedule B-2 of the UHOP. These features were identified as contributing fish habitat.

- Species at Risk habitat for Barn Swallow, Butternut, Chimney Swift, Tri-coloured myotis, Little Brown Myotis, Northern Myotis and Eastern Small-footed Myotis; and
- Significant Wildlife Habitat for bat maternity colonies, deer overwintering, and species of conservation concern including Snapping Turtles, Monarch, Wood Thrush and Eastern Wood-Pewee..

5. Additional Surveys and Next Steps

Assessment of potential impacts as result of the proposed works and identification of appropriate avoidance and mitigation measures, including setbacks, and monitoring plan will be provided for the City of Hamilton at the next iteration of this report.

The following recommendations are for additional surveys and next steps based on the existing conditions documented herein. These should be undertaken in consultation with appropriate agencies, and during the Detail Design phase of the Project.

- Bat Acoustic Surveys Depending on the proposed impacts to the deciduous forest communities along Glancaster Road and Book Road East at detailed design, an acoustic monitoring survey should be completed to confirm any impacts to bat SAR habitat which may occur in the area and facilitate necessary permits. MECP should be consulted to confirm survey methodology and permitting requirements.
- Barn Swallow Nesting Surveys Although no nests were identified during field investigations, all buildings and culverts to be impacted by proposed works should be examined, both internally and externally, prior to construction for use as nesting structures by this species. These surveys should be completed during the appropriate season immediately prior to commencement of construction.
- Tree Inventory and Butternut Health Assessment Complete a tree inventory including hawthorn identification to species level and Butternut Health Assessment (BHA) during the Detail Design stage of the Project in accordance with the City of Hamilton's tree by-laws to quantify and assess trees which might require removal or may be damaged. The tree inventory will confirm the presence and health of Butternut within or adjacent to the proposed ROW. Any ground disturbance work within 50 m of a pure butternut will require a BHA and potentially a permit or authorization if impacts cannot be avoided. The tree inventory will also gather information on hawthorns identified to species level within the proposed areas of impact to ensure any provincially rare (S1, S2 or S3) species are protected.
- Prepare a Tree Preservation, Maintenance and Replacement Plan Prepare a tree preservation, maintenance and replacement plan at the Detail Design phase of the Project, with HCA, in order to offset tree removals, limit or prevent tree injury or mortality, and ensure compliance with arboriculture best practices. This report shall be reviewed by the City. If necessary.
- **Fish community sampling** at Detail Design phase of the project, fish community assessments should be completed (where appropriate) once permission to enter has been obtained for lands beyond the municipal ROW and the Hydro One lands..
6. Summary and Conclusions

The following Natural Heritage features, SAR, SAR habitat and SWH are or may be present within the Study Area:

- Birds and their nests, protected under the MBCA;
- Potentially suitable habitat for, Barn Swallow, Butternut, Little Brown Myotis, Eastern Small-footed Myotis, Tricoloured Bat and Northern Myotis, all of which are protected under the ESA;
- Confirmed and candidate SWH types which are afforded protection under both the PPS and the UHOP, these include: Monarch habitat, Wood Thrush Habitat, eastern Wood-pewee habitat and Bat Maternity Colonies;
- Linkages and Key Hydrological features afforded protection under the UHOP; and,
- Contributing fish habitat (AECOM 2021).

Based on the results of field investigations and development of this report, the following additional field investigations are recommended during Detail Design, where impacts are anticipated:

- Survey of anthropogenic structures for evidence of Barn Swallow nests;
- Acoustic survey to assess the presence of bat SAR within affected forest communities;
- Tree inventory in accordance with the City of Hamilton's tree by-laws to quantify and assess trees which might require removal or may be damaged.
- Tree Inventory as well as assessment of Butternut Health and consultation with MECP to determine if permits would be required;
- During detailed design identify Hawthorn's to species level to capture any locally or provincially rare trees for protection;,
- Fish community assessments in relevant watercourses once permission to enter has been given to confirm fish community assemblage identified in background review;

An impact assessment and recommendations for the protection of the natural features will be developed when preliminary designs have been determined and further refined with Detailed Design.

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Agency Correspondence

From:	Adam Aldworth
To:	MacKay Ward, Jessica
Cc:	Jason Culp; David Deluce
Subject:	[EXTERNAL] RE: Glancaster Road EA - Information Request & COVID-19 Safety Protocols
Date:	Friday, September 18, 2020 8:23:50 AM
Attachments:	image001.png

Hi Jessica,

Sorry for the delay responding to your information request for this project. Below is the information the NPCA has on file for this area:

- Natural Heritage Mapping can be accessed through the NPCA website at: https://gis-npca-camaps.opendata.arcgis.com/
- It would be pertinent to review the 20 Mile Creek Watershed Plan: https://npca.ca/images/uploads/common/NPCA-Watershed-Plan-20Mile-Creek.pdf
- The watercourses have been further assessed in the AEGD Subwatershed Plan (https://www.hamilton.ca/sites/default/files/media/browser/2017-08-04/aegd-updatesubwatershed-stormwater-master-pan.pdf) as being supporting/contributing fish habitat or seasonal/warmwater fish habitat.

The majority of this project falls within the 20 Mile Creek Watershed, however the watershed divide between 20 Mile Creek and The Welland River occurs along Glancaster Road just north of Book Road. Mapping of the watershed boundaries can be found at the link provided above on the NPCA website.

I hope this information is useful.

Adam

From: MacKay Ward, Jessica <Jessica.MacKayWard@aecom.com>
Sent: August 27, 2020 1:06 PM
To: Jason Culp <jculp@npca.ca>; Adam Aldworth <aaldworth@npca.ca>
Cc: Naderi, Armin <Armin.Naderi@aecom.com>; Grueneis, Karl <Karl.Grueneis@aecom.com>; Fazio, Margaret <Margaret.Fazio@hamilton.ca>
Subject: Glancaster Road EA - Information Request & COVID-19 Safety Protocols

Hi Jason and Adam,

Thank you for accommodating yesterday's meeting and the upcoming site visit within your busy schedules. Please find attached an information request letter for the Glancaster Road EA, which includes a summary of our preliminary natural heritage background information review for the Study Area.

Also attached is AECOM's Pandemic Procedure, Precautions for Coronavirus Task Hazzard

Assessment (THA) Form, and Coronavirus Vehicle Cleaning THA Form. Kindly review these in advance of Monday's site visit. In order to help prevent the spread of COVID-19, AECOM staff will travel to the site in separate vehicles, will maintain physical distancing (2 m), and will wear a non-medical mask if 2 m separation cannot be maintained while conducting field work.

We kindly request NPCA to convey any expectations in relation to the July/August botanical inventory and July/August site visit in support of the headwater drainage feature assessment in advance of Monday or acknowledge that these field surveys will proceed as planned and any additional information required will be captured during the fall 2020 and/or spring 2021 field investigations.

Many thanks,

Jessica

Jessica M. Ward, PhD, PMP

Senior Project Manager / Senior Ecologist Impact Assessment and Permitting, Environment D. 905.747.7514 M. 416.333.5274 Cisco Ext. 3237514 jessica.mackayward@aecom.com

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From:	<u>Oaks, Colin</u>
To:	MacKay Ward, Jessica
Cc:	Jamieson, Nora; McDonell, Lesley
Subject:	[EXTERNAL] RE: Glancaster Road EA - Information Request & COVID-19 Safety Protocols
Date:	Thursday, September 3, 2020 3:11:11 PM
Attachments:	image001.png

Hi Jessica,

We only have 1 set of fish records for that section of Tiffany Creek. They come from a 1992 Fisheries Assessment of Tiffany Creek between Golf Links Road and Highway 53 that the City(Regional Municipality of Hamilton-Wentworth at the time) had done by Cam Portt and Associates. It looks like they sampled the 50m reach just downstream of Garner Rd. and caught >100 Brook Stickleback (Culaea inconstans) and 1 Fathead Minnow (Pimephales promelas). As we observed on the site visit the creek in the reach through the school property is intermittent. Please let me know if you have any questions or concerns.

Sincerely,

Colin Oaks

From: Jamieson, Nora
Sent: August 27, 2020 1:40 PM
To: McDonell, Lesley <Lesley.McDonell@conservationhamilton.ca>; Oaks, Colin
<coaks@conservationhamilton.ca>
Subject: RE: Glancaster Road EA - Information Request & COVID-19 Safety Protocols

Hi Lesley & Colin,

Lesley can you provide Jessica with requirements for summer (it's a little) and fall botanical inventories i.e. timing between both inventories, and the NAI database cost, etc.? Colin can you respond to HDF requirements and fisheries assessments? Do you have any fish data for this area.

Thanks.

From: MacKay Ward, Jessica <<u>Jessica.MacKayWard@aecom.com</u>>
Sent: Thursday, August 27, 2020 1:12 PM
To: Jamieson, Nora <<u>Nora.Jamieson@conservationhamilton.ca</u>>; McDonell, Lesley
<<u>Lesley.McDonell@conservationhamilton.ca</u>>; Oaks, Colin <<u>coaks@conservationhamilton.ca</u>>;
Cc: Naderi, Armin <<u>Armin.Naderi@aecom.com</u>>; Grueneis, Karl <<u>Karl.Grueneis@aecom.com</u>>; Fazio,
Margaret <<u>Margaret.Fazio@hamilton.ca</u>>
Subject: Glancaster Road EA - Information Request & COVID-19 Safety Protocols

Hi Nora, Lesley, and Colin,

Thank you for accommodating yesterday's meeting and the upcoming site visit within your busy schedules. Please find attached an information request letter for the Glancaster Road EA, which includes a summary of our preliminary natural heritage background information review for the Study

Area.

Also attached is AECOM's Pandemic Procedure, Precautions for Coronavirus Task Hazzard Assessment (THA) Form, and Coronavirus Vehicle Cleaning THA Form. Kindly review these in advance of Monday's site visit. In order to help prevent the spread of COVID-19, AECOM staff will travel to the site in separate vehicles, will maintain physical distancing (2 m), and will wear a non-medical mask if 2 m separation cannot be maintained while conducting field work.

We kindly request HCA to convey any expectations in relation to the July/August botanical inventory and July/August site visit in support of the headwater drainage feature assessment in advance of Monday or acknowledge that these field surveys will proceed as planned and any additional information required will be captured during the fall 2020 and/or spring 2021 field investigations.

Many thanks,

Jessica

Jessica M. Ward, PhD, PMP

Senior Project Manager / Senior Ecologist Impact Assessment and Permitting, Environment D. 905.747.7514 M. 416.333.5274 Cisco Ext. 3237514 jessica.mackayward@aecom.com

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Appendix **B**

Field Staff Curriculum Vitae



Adam Egan, B.Sc.

Terrestrial Ecologist

Education		Role on this Project	Training and Certifications	
Bachelor of Science in Environmental Sciences, Major; Ecology University of Guelph, 2017		Junior Ecologist	Class 2 Electrofishing Certification	
		Area of Expertise	OSHA 10-hour construction	
		Fisheries collection safe techniques, sampling and UTV assessment	safety training	
Years of Experience			UTV operation certification	
With AECOM: With Other Firms:	3 2	Fish salvage/rescue	Standard First Aid and CPR level C	
		Wildlife population assessments	Wilderness First Aid	
		Construction monitoring and wildlife relocation		

Professional History

Adam is a Junior Ecologist in AECOM's Environmental Group. Adam has a variety of experience leading and performing aquatic assessments, fish salvages for different construction projects, and fisheries population assessments for a variety of different species across Ontario. Adam has experience construction monitoring on a variety of different projects including highway expansions, wind farms, and natural gas pipelines. Species that Adam has performed population assessments on include Lake Sturgeon, Walleye, Black Crappie, and Smallmouth Bass. He has experience with a variety of netting protocols, tagging procedures, as well as collecting different aging samples. Adam has done work with several different Species at Risk including Lake Sturgeon, habitat assessments of Barn Swallows as well as monitoring for Blanding's Turtle, Spotted Turtle, Whip-poorwill, Common Nighthawk, Kirtland's Warbler, Hognose Snake and Massasauga Rattlesnake. He has also performed population assessments for a variety of terrestrial wildlife in Ontario. He also has practical experience in aquatic monitoring techniques such as benthic invertebrate identification and collection methods as well as water chemical and physical testing. Adam has experience performing field work in remote areas of the country such as Marten Falls First Nation, ON, and Faro Mine, YT. Adam's combined experience with AECOM and the Ministry of Natural Resources and Forestry (MNRF) has provided him with experience following protocols and guidelines.

Project Experience

Infrastructure

Transportation

Ministry of Transpiration, Highway 401 Maitland Road Interchange to Highway 16 Interchange Preliminary Design and Environmental Assessment, Maitland, ON: Adam led field investigations including aquatic habitat assessments to collect existing condition status on water features and water crossing structures throughout the proposed project area.

Ministry of Transpiration, Highway 401 West Widening, Milton, ON: Adam was a lead environmental monitor for the technical adviser team. He performed site inspections, wrote reports, and flagged environmental concerns for the contractor and Ministry of Transportation.

Ministry of Transpiration, GTA West Transportation Corridor Route Planning and Environmental Assessment, Brampton, ON: Performed field investigations including fluvial and aquatic habitat assessments on water features that are flowing through the proposed project area.

Ministry of Transpiration, Highway 403 and Highway 6 Improvements, Hamilton, ON: Performed field investigations including aquatic habitat assessments on water features and water crossing structures for the highway 403 and highway 6 interchange.

Marten Falls First Nation, Marten Falls Community Access Road Environmental Assessment, Marten Falls, ON: Performed northern ecological land classification and set up bird and bat acoustic monitors on different proposed routes for the community access road. Travelled by helicopter to different points in the Hudson Bay lowlands to perform assessment.



MNRF, Roads Inventory Project, North Bay District, ON: Was a lead on project, responsible for leading staff out to perform inventories and assessments of roads and water crossings. Collected and managed data then reported bi-weekly to regional office on progress of the project.

Trout Unlimited Canada, Culvert Assessment Protocol Development, Guelph, ON: Performed research and field work to develop water crossing assessment protocol. Adam also performed a data analysis on data from Credit Valley Conservation in order to develop an effective protocol.

VIA Rail, QMOT VIA Rail, Toronto, ON: Conducted field investigations including aquatic habitat assessments to collect existing condition status on water features and water crossing structures for the VIA Rail line.

Resource Extraction

Crown-Indigenous Relations and Northern Affairs Canada, Faro Mine Rehabilitation, Faro, YT: Monitored and consulted for a stream diversion on the Faro Mine site. Adam also was responsible for ensuring that no fish were trapped in the original channel after the water was diverted and monitoring the diversion of the channel.

Energy

Enbridge, Owen Sound Phase 4 Reinforcement, Owen Sound, ON: Conducted fish salvages on multiple water crossings for the installation of the natural gas pipeline.

Nigig Power Corporation, Wind Farm Project at Henvey Inlet First Nation, Georgian Bay, ON: Developed and updated protocols for field work to be done on the project. Adam also acted as a Qualified Biologist and performed several fish rescues, site inspections and wildlife relocations.

Union Gas, Stratford Reinforcement Project, Stratford, ON: Developed safe work plans for environmental monitoring and surveys that will be performed on site.

Union Gas, Sudbury Lateral Pipeline Replacement, Sudbury, ON: Developed protocols for environmental monitoring and survey work on the project. Planned and coordinated staff involvement with field work for the project. Adam also performed several fish rescues and wildlife relocations.

Other Infrastructure Projects

MNRF, Net Lake Dam Repair, Net Lake, North Bay District, ON: Assisted regional engineer with dam repair. A temporary berm was created to hold water away from work area. Coordinated with welder, steal provider, and Temagami First Nation to perform project.

Population Monitoring

Fisheries

MNRF, Fall Walleye Index Netting, Lake Nipissing, ON: Performed walleye population assessment to investigate population decline and decline in body size. This involved setting a variety of gill nets with a variety of mesh sizes at different depths. Sampling involved collecting measurements of the fish and aging structures including scales, otoliths, and cleithrum for all sportfish caught.

MNRF, Lake Sturgeon Population Monitoring, Rainy River, Rainy River, ON: Performed Lake Sturgeon population assessment to observe recovery of Lake Sturgeon population. This involved setting gill netting as well as catching by hand of Lake Sturgeon in stream. Processing included collecting length and weight measurements as well as tagging the fish to observe recapture rates in later months.

MNRF, Black Crappie Population Assessment, Big Sawbill Lake, Rainy River District, ON: Performed Black Crappie population assessments to observe the population and compare to other lakes. Involved setting near shore community index netting to trap the fish. Then to process them we took length and weight measurements, a dorsal fin clip for aging, and marked the fish to observe recapture rates in later months.

MNRF, Smallmouth Bass Population Assessment, Rainy Lake, Rainy River District, ON: Performed Smallmouth Bass population assessment to monitor Rainy Lake population. To do this fish were collected from anglers of the Fort Frances Bass Championship. This involved Collect length and weight data, as well as dorsal fins for aging structures.

Wildlife

MNRF, Bear Wire Hair Trap Project, North Bay District, ON: Lead students out to perform baited station set up, rebaiting, and takedown. Project assessed bear population in the district. Adam Collected hair samples from barbed wire to perform DNA testing in order to identify individuals.



Forest Monitoring

MNRF, Silviculture Effectiveness Monitoring: Performed silviculture effectiveness monitoring on a number of different cut blocks in the district. Data was collected and reported back to District Forester.

- North Bay District, ON
- Rainy River District, ON



Heather Hughes, M.Res., B.Sc., CAN-CIESC

Ecologist

Education

Role on this Project

M.Res. Ecology; Postgraduate Certificate Ecosystem Restoration; B.Sc. Environmental Sciences – Ecology

Years of Experience

With AECOM: 2+ With Other Firms: 7 Ecologist (Kitchener)

Areas of Expertise Species at Risk Surveys Breeding Bird Surveys

Herpetofauna Surveys

Ecological Land Classification (ELC) Habitat and Vegetation

Restoration

Training and Certifications

Certified Inspector of Sediment and Erosion Control (CISEC), 2019

OSHA 40-Hour Hazardous Waste Worker, Refresher, 2018

Ontario Wetland Evaluation System (OWES), 2018

Ontario Reptile and Amphibian Survey Course (2017)

Ecological Land Classification (ELC), 2013



Professional History

Heather is an ecologist and environmental monitor with over nine years of experience. As an ecologist with construction operations she may be called upon to complete nest sweeps or assist in the management and training on project sites with Species at Risk (SAR). In completing existing conditions and environmental assessments Heather's experience includes amphibian and reptile surveys, breeding bird surveys, Species at Risk (SAR) surveys, and habitat and vegetation restoration. Through all phases of a project, from pre-construction, startup, to restoration, her training and experience work with the Project Team to keep things on track and identify concerns early in the planning process. As a Certified Inspector of Sediment and Erosion Control (CISEC) Heather applies her experience and training to ensure appropriate measures are applied to the protection of sensitive natural areas during construction mitigation planning.

Project Experience

Existing Conditions and Environmental Assessments

Ecologist. Pre-demolition Species At Risk Assessment | Metrolinx | Hamilton, ON | 2021. Heather led field activities and reporting completing species at risk assessments on buildings set for demolition. This included evaluation of the buildings for evidence of bat roosting or potential access points of SAR bats as well as assessment of chimneys for evidence of use or suitability for Chimney Swift.

Ecologist. Bradford Bypass | Ministry of Transportation | Bradford, ON | 2021. Heather led and completed field surveys and reporting for breeding bird surveys across the Study Area for the proposed Bradford Bypass environmental assessment and impact assessment. She also assisted in the completion field activities including vegetation inventory, SAR screening, ELC, and incidental wildlife observations.

Ecologist. Highway 401: Highway 16 Interchange to Maitland Road Interchange Preliminary Design | Ministry of Transportation | Maitland ON | 2021. Heather led and completed field surveys and reporting for breeding bird surveys across the Study Area for the proposed Bradford Bypass environmental assessment and impact assessment. She also assisted in the completion field activities including vegetation inventory, SAR screening, ELC, and incidental wildlife observations.

Ecologist. Highway 400 10 Structures | Ministry of Transportation | Port Severn, ON | 2021. Heather led and completed field surveys and reporting for ELC, and SAR habitat assessments for the rehabilitation of ten structures along the Highway 400.

Ecologist. Glancaster Road Environmental Assessment | City of Hamilton | Hamilton ON | 2021 Heather led field activities related to a Class EA for a proposed road widening. Field activities included breeding bird survey, vegetation inventory, SAR screening, ELC, and incidental wildlife observations. She also led preparation of the report.

Ecologist. Empey Street Wastewater Pumping Station Upgrades Municipal Class Environmental Assessment | City of Brantford | Brantford, ON | 2021. Heather led and completed field surveys and reporting for the Municipal Class Environmental Assessment Natural Environment Existing Conditions Report. Field Activities included ELC, vegetation inventory, SAR screening and incidental wildlife observations.



Ecologist. Mine Decommissioning and Closure Plan | Windsor Salt | Windsor, ON | 2018 – 2019. To facilitate the development of a closure plan and develop plans for rehabilitation of the lands around the Windsor Salt Mine, Heather lead a team completing snake coverboard surveys around the lands. Responsibilities included a desktop review of available secondary source information on existing environmental conditions, preparing an animal care protocol and other submissions required for the Wildlife Scientific Collectors Permit, leading the surveys, and preparing reports at the completion of work.

Ecologist. Stream Alteration/Restoration Scoped Environmental Impact Study (EIS) | Toronto and Region Conservation Authority (TRCA) | Markham, ON | 2017 – 2018. Heather assisted in preparing a Scoped EIS for proposed stream alteration and restoration works to protect existing infrastructure within the City of Markham. Responsibilities included a desktop review of available secondary source information on existing environmental conditions, preparing existing conditions descriptions of the affected areas, and assessing potential impacts and suitable mitigation measures to offset the proposed works.

Ecologist. Stream Alteration/Restoration Scoped EIS | TRCA | Richmond Hill, ON | 2017 – 2018. Heather assisted in preparing a Scoped EIS for proposed stream alteration and restoration works to protect existing infrastructure within the City of Richmond Hill. Responsibilities included a desktop review of available secondary source information on existing environmental conditions, preparing existing conditions descriptions of the affected areas, and assessing potential impacts and suitable mitigation measures to offset the proposed works.

Ecologist. Terrestrial Ecosystem Existing Conditions and Impact Assessment | MTO | Parry Sound, ON | 2017-2018 Heather worked as part of a team to complete field surveys and reporting for proposed widening and maintenance works of Highway 400 south of Parry Sound and other Ministry controlled roads north east of Parry Sound. Works included breeding bird surveys, wildlife assessments and ecological land classification of the subject lands.

Ecologist. Stormwater Management Pond Retrofit Class Environmental Assessment (EA) | Town of Caledon | Caledon, ON | 2017. Heather assisted with field activities related to a Class EA for a proposed stormwater management pond retrofit. Field activities included breeding bird survey, vegetation inventory, SAR screening, ELC, and incidental wildlife observations. She also assisted in preparing data for the report.

Ecologist. Stoney Creek Regional Facility EA | Terrapure Environmental | Stoney Creek, ON | 2017. Heather completed grassland breeding bird surveys to determine the presence and abundance of the eastern meadowlark (a species at risk) on target lands, for use in the EA of the site.

Ecologist. Snow Disposal Facility Scoped EIS | City of Guelph | Guelph, ON | 2017. Heather assisted with field activities related to a Scoped EIS for a proposed snow disposal facility. The proposed location was adjacent to a Provincially Significant Wetland (PSW) and required special considerations. Field activities included breeding bird survey, vegetation inventory, SAR screening, ELC, and incidental wildlife observations. Heather also assisted in preparing data for the report.

Terrestrial Field Ecologist. Brantford-Kirkwall Pipeline EA | Union Gas | Brantford and Kirkwall, ON | 2014. Heather assisted in completing field surveys and reporting as part of the EA for the proposed installation of a natural gas pipeline from Brantford to Kirkwall, Ontario. Field surveys included visual encounter surveys for snakes, basking surveys for turtles, SAR salamander trapping surveys, amphibian call count surveys, grassland breeding bird surveys, and vegetation inventories and categorization as per ELC.

Terrestrial Field Ecologist. Pipeline EA | Confidential Client | Ontario | 2013 – 2014. Heather completed field surveys to assess habitat and use by various species at risk along the pipeline corridor. Field surveys included vegetation inventories as per ELC, visual encounter surveys for snakes, basking surveys for turtles, and grassland breeding bird surveys.

Terrestrial Ecologist. Line 9 Integrity Digs | Enbridge | Ontario | 2013 – 2014. The urgent nature of the integrity digs necessitated rapid completion of habitat assessments for species at risk via desktop review. Using aerial photography, site photos and site notes provided by those supervising construction, Heather was part of a team of ecologists to efficiently complete desktop screenings and provide construction constraints to identify all suitable habitats of species at risk most likely to be present at the site location.

Terrestrial Field Ecologist. Energy East Pipeline EA | TransCanada | Cornwall, ON | 2013 – 2014. Heather worked as part of a team of ecologists to complete field surveys along the section of pipeline stretching from Ontario's western to eastern border for this large-scale EA. She completed breeding bird surveys, marsh monitoring callback surveys, amphibian surveys, and vegetation inventories as per ELC.

Terrestrial Field Ecologist. Grand River Renewable Energy EA | Samsung Energy | ON | 2012 – 2014. Heather led a team in completing amphibian surveys following marsh monitoring protocol methods and assisted with vegetation inventories as per ELC for the EA for project approvals. During construction, she applied her experience with breeding birds to complete nest searches prior to vegetation removal.



Construction

Environmental Monitor, Watson Park Watermain Replacement | City of London | London, ON | 2021. Heather worked as part of a team to inspect compliance of environmental controls and operations in replacement of a watermain segment crossing a small creek within the City of London. As part of these operations she completed inspections of erosion and sediment control, daily reports, and nest sweeps for migratory birds prior to vegetation clearing within the breeding bird window.

Ecologist. Queen Elizabeth Way Credit River Bridge | Ministry of Transportation | Mississauga ON | 2020- Present.

AECOM is part of the EDCO partnership for the design, build and finance of the QEW/Credit River Improvement project. Heather works as part of the team to provide guidance and site assistance in completing construction activities in accordance with the environmental mitigation measures committed to in the contract documents and project permits. This includes field visits to confirm the limits of clearing around protected areas, organization of the Scientific Collectors Permit for wildlife relocations and annual reporting or vegetation monitoring.

Ecologist. Highway 401 Expansion Project, Technical Advisor | Ministry of Transportation |, Milton/Mississauga, ON | 2019 - Present Environmental monitoring lead for highway widening between Credit River and Regional Road 25 in Milton. Heather provides technical advisory services to MTO to assess contractor consistency with environmental commitments outlined in the Terrestrial Framework, Species at Risk Framework, the MECP Letter of Advice for Bat SAR and the Project Agreement. In addition to field inspections, Heather completes reviews of environmental submittals to look at erosion and sediment control measures [2019 - Present].

Environmental Scientist. Lock 45 Trent-Severn Waterway | Soletanche Bachy Canada | Port-Severn, ON | 2018-2019. Prior to project startup Heather independently prepared the Site-Specific Environmental Management Plan (SSEMP) related to installation of the cofferdams and planned restoration works of the Lock 45 for senior review and approval. Using her attention to detail she combined the relevant constraints from several background documents to form a cohesive guidance document on a quick timeline to meet and exceed the standards of Parks Canada. She also applied her technical expertise of Species at Risk (SAR) to the preparation of training and reference documents for Site staff. During construction, Heather was on Site when needed as an Environmental Professional providing monitoring of the water quality and working with the team to address any concerns as they arise.

Environmental Scientist. Locks 23, 24, 25 Trent-Severn Waterway | EBC | Peterborough, ON | 2018-2019 Working quickly and directly with the client Heather modified the provided Environmental Management Plans to reflect the Site-Specific constraints for proposed construction to meet and exceed the standards of Parks Canada. Applying her technical experience with SAR she prepared training and reference documents specific to the habitat available at site. During construction, Heather was called to Site as needed as the Qualified Professional to provide guidance and monitoring on erosion and sediment control and other environmental concerns.

Terrestrial Field Ecologist. Kingsbridge Wind Farm | Capital Power | Ashfield-Colborne-Wawanosh, ON | 2014. As a condition of construction for the Kingsbridge Wind Farm, an overall benefits permit for species at risk bobolink and eastern meadowlark habitat was required. Heather prepared the permit application, assisted in selecting suitable fields as compensatory habitat, and completed grassland breeding bird surveys to assess use by the target species.

Terrestrial Field Ecologist. West Side Waterloo | Greyerbiehl, Clair Creek Meadows, and Vista Hills | Waterloo, ON | 2012 – 2014. As part of construction compliance at the active housing development, Heather completed spring and fall monitoring of vegetation communities and sediment and erosion control measures installed on site. She was responsible for scheduling the necessary field days around other commitments, completing reporting and determining when a monitoring location could be removed from annual checks.

Terrestrial Field Ecologist. Carriage Crossing Development | Activa | Waterloo, ON | 2012 – 2014. As with the project above Heather completed spring and fall monitoring of vegetation communities and sediment and erosion control measures installed on Site. She was responsible for scheduling the necessary field days, completing reporting and eliminating stations as construction progressed.

Terrestrial Field Ecologist. Port Dover and Nanticoke Wind Farm | Capital Power | Haldimand and Norfolk Counties, ON | 2012 – 2014. Heather completed ongoing environmental monitoring during construction activities across the site, including nest searches prior to vegetation clearing during nesting season, bald eagle nest monitoring and movement surveys, and general monitoring of exclusion and erosion fencing around project footprints and nearby natural features.

Terrestrial Field Ecologist. Gosfield Wind Farm | Brookfield Renewable Power | Kingsville, ON | 2013. To ensure those searching the Gosfield wind farm were effective at finding possible bird and bat mortalities, Heather completed searcher efficiency testing. As part of this process, she tracked the numbers to ensure they did not fall below accepted efficiency thresholds for inclusion in reporting.

Terrestrial Field Ecologist. Comber Wind Farm | Brookfield Renewable Power | Lakeshore, ON | 2013. In compliance with



the Renewable Energy Act, Heather completed mortality monitoring and data entry of Comber wind farm during the fall season. She also assisted in testing search efficacy of other field staff and the analysis and reporting of results.

Terrestrial Field Ecologist. Grand Valley Wind Farm Phase 2 Monitoring | Grand Valley Wind | Grand Valley, ON | 2012 – 2013. In compliance with the renewable energy act, Heather was responsible for the mortality monitoring and data entry for the Grand Valley wind farm (phase 2). As part of this process, she assisted in the analysis and reporting of the data.

Restoration

Environmental Scientist. Rifle Range Decommissioning | QM Environmental | Niagara-on-the-Lake, ON | 2018. Under the guidance of senior staff, Heather applied her knowledge of sensitive communities and native plants to develop a planting plan and select seed mixes which would meet regulatory commitments and develop into suitable habitat for targeted species at risk. Heather was also the ecologist on site during removal of a potential snake hibernacula to ensure individuals could be recovered and relocated.

Environmental Scientist. Waterloo Landfill | Regional Municipality of Waterloo | Waterloo, ON | 2017 – 2018. Heather was the ecologist on site during revegetation plantings for a stormwater area and wetland. She provided guidance on plant spacing, or moving of plants when required to provide the best habitat for birds and mammals using the site or highest survival rate of plants. After construction, her attention to detail and collection of notes was used to produce the as built drawings for submission to the client and a warranty inspection the following year. Under the guidance of senior staff, Heather developed the planting plan and selected recommended plants for installation at an additional stormwater area being designed on the same property.

Environmental Scientist. Post-Construction Restoration Plantings | Holden Mine | Washington | 2017. Heather was part of a team providing quality assurance and quality control of trees and shrubs during the restoration plantings at the Holden Mine Legacy site. Day to day responsibilities included working closely with contractors providing plant materials and those planting them and providing daily feedback on any concerns at the end of day status meeting. After the seasons planting completed, she assisted in completing density plots creating a baseline to monitor survival of trees.

Publications

"Effects of temporary captivity on ranging behavior in urban red foxes (*Vulpes vulpes*)", Applied Animal Behaviour Science, Vol. 181, pp 82-190 (with B. Tolhurst, A. Grogan and D. Scott)



Kasey McKenzie Ecologist

Education

Diploma, Ecosystem Management Technology -Biodiversity/Restoration Ecology/Conservation, Sir Sandford Fleming College, 2014

Years of Experience With AECOM: 1.5 With Other Firms: 0

Role on this Project

Ecologist

Area of Expertise

Species at Risk Surveys Urban Forestry Rare Plant Surveys Herpetofauna Surveys Ecological Land Classification

Training and Certifications

Ontario Reptile and Amphibian Survey Course

Ontario Benthics Biomonitoring Network Certification

Professional History

Ms. McKenzie is an ecologist with an interest in species at risk, restoration, and herpetofauna. She has contributed to subdivision, industrial, highway, and wind energy projects. Ms. McKenzie's projects have included terrestrial field work, such as wildlife surveys, ecological land classification, species at risk habitat surveys and rare plant surveys. She has also contributed to data analysis and the preparation of natural heritage assessment reports, environmental impact studies and environmental assessments.

Ms. McKenzie also has previous experience with species at risk in Ontario, as well as urban forestry and invasive species.

Project Experience

Ontario Ministry of Transportation, GTA West Corridor Stage 2, Toronto, Ontario. Completed the significant wildlife habitat evaluation, species at risk habitat evaluation and edited the net effects tables and comparative evaluation tables.

Pattern Energy Group Ltd, Henvey Inlet First Nation - Wind Energy Centre Environmental Assessment, Parry Sound, Ontario. Conducted field investigations for the Henvey Inlet Wind Project which is proposed to be constructed in the Parry Sound District. Field investigations completed included ecological land classification, rare plant surveys, old growth forest surveys (tree coring) and various significant wildlife habitat surveys (turtle basking, snake hibernacula, bat maternity roosting, amphibian breeding etc). Kasey also contributed to data analysis, the natural heritage assessment report, species at risk permitting report, environmental impact study, and the environmental assessment.

Sifton Properties Ltd., Victoria On The River Environmental Impact Statement, London, Ontario. Coordinated all terrestrial field work for 2016, as well as prepared the environmental impact study.

Niagara Region, Dominion Road Reconstruction, Fort Erie, Ontario. Completed the ecological land classification for the natural areas associated with the road widening, as well as the existing conditions memo.

City of Toronto, Stormwater Management Pond Facility Condition Assessments, Toronto, Ontario. Completed species at risk habitat screenings and the ecology sections for stormwater management pond assessment reports.

City of London, Baker Lands Wetland Delineation and Environmental Impact Statement, London, Ontario. Coordinated and completed a background review, terrestrial field investigations, and reporting of industrial lands. Field investigations included ecological land classification, amphibian call surveys, breeding bird surveys, snake cover board surveys, incidental wildlife, a fish habitat assessment, and a butterfly survey. Reporting included a description of existing terrestrial conditions, impact assessment, and proposed mitigation measures.

Sifton Properties Ltd., Brantford Residential Subdivision Preliminary Design, Brantford, Ontario. Coordinated and completed all 2016 field work which included snake cover board surveys, breeding bird surveys, amphibian call surveys, floral inventories, and an aquatic habitat assessment. Currently updating and preparing the environmental impact study report, which includes evaluation of potential impacts and recommendations for suitable mitigation measures.



City of London, North Huron Land Status Report, London, Ontario. Assisted with snake coverboard surveys, as well as an ecological land classification.

Torys LLP, Settlers Landing Wind Park, Toronto, Ontario. Assembled multiple literature reviews and photo logs for witness statements.

City of Port Colborne, East Side Employment Lands Servicing, Port Colborne, Ontario. Completed the ecological land classification for the natural areas within the study area, as well as the natural heritage review



Mikayla Reid, B. Sc., G.I.T.

Fluvial Geomorphologist In Training

Education

Bachelor of Science, Environmental Geoscience (Honours), Brock University

Years of Experience

With AECOM: 1 With Other Firms: 1.5

Role on this Project

Fluvial Geomorphologist in Training

Professional Affiliations

Association of Professional Geoscientists of Ontario

Training and Certifications

Ontario Stream Assessment Protocol – Headwater Drainage Feature Assessment Course

Repairing Incised and Degraded Watercourses – Natural Channel Design Course

Professional History

Mikayla Reid is a Fluvial Geomorphologist in Training registered as a Geoscientist in Training with the Association of Professional Geoscientists on Ontario. She has a cumulative 1.5 years of experience with the Department of Fisheries and Oceans Canada as a Tides and Water Levels Assistant and Entomogen Inc. as part of the Storm Water Management Field Crew. Mikayla is currently accumulating fluvial geomorphology desk based and field based experience through her current role at AECOM. She has contributed to several channel rehabilitation, realignment and natural channel designs and meander belt assessment projects, often in support of Municipal Class Environmental Assessments. Mikayla has also gained experience with restoration projects including storm sewer sampling and groundwater sampling at waste management sites.

Project Experience

Municipal Class Environmental Assessment

City of Hamilton, Twenty Road East and Upper Red Hill Valley Parkway Extensions Municipal Class EA Phases 3 and 4. Project team member assisting with field investigations, data analysis and reporting. The study builds upon several previously completed Municipal Class EA processes that identified the need for transportation network improvements required to support future industrial development. Project challenges include disruption to natural features and water courses, considering meander belts and downstream impacts. (September 2018 – present)

York Region and Lake Simcoe Region Conservation Authority (LSRCA) Phosphorus Removal Demonstration Project – Storm Water Management Pond Retrofit Municipal Class EA. Responsible for assisting with field reconnaissance as well as preparation of an existing conditions report for a Storm Water Management Pond Retrofit. Project is following the Schedule A+ Municipal Class EA planning process and included a public information centre to explain proposed impacts to Tamarac Green Park (change from dry pond to constructed wetland, loss of trees, relocation of playground). Provided input into the geomorphological constrains to design a long term solution that will improve both sediment and water quality from a geomorphological perspective. (September 2018 – present)

Town of Whitby, Lynde Creek Master Drainage Plan Update – Municipal Class EA. Technical support for Town of Whitby/Central Lake Ontario Conservation Authority (CLOCA) Drainage Plan Update for the Lynde Creek Watershed. Assisted with field reconnaissance and reporting for a detailed update to the existing erosion inventory and fluvial geomorphic works completed in previous studies. The Lynde Creek Watershed, including its tributaries, has a total drainage area of 130 km². It is predominately located in the Town of Whitby and also extends into adjacent municipalities to the north and west. The study will update the original 1988 Master Drainage Plan and consider a number of additional reports that have been prepared since 1988. The purpose of this update is to provide guidance to both the Town of Whitby, CLOCA and other affected municipalities in continued management of the Lynde Creek watershed and stream corridors, in terms of flows and erosion, resources protection and development. The study will also support watershed management objectives as directed by the 2012 Lynde Creek Watershed Plan (CLOCA). The Class EA study will follow the Class EA Schedule B requirements (Master Plan Approach #2) of the Municipal Class EA document. (May 2018 – present)

Channel Rehabilitation, Realignment and Natural Channel Design

Stormwater Management Facility Pond 27-2 Feasibility Study, Richmond Hill, ON. Responsible for assisting with fluvial geomorphological field investigations and desktop analyses for a Reach in the vicinity of SWMF 27-2, with a focus on sediment



management and opportunities to work with natural creek processes. Recommendations to protect enhance or restore stream morphology and maintain channel processes and functions were provided to inform design alternatives. (July 2018 – present)

Cedarvale Well Field Upgrades and Riffle Design, Halton Region, Georgetown, ON. Project team member responsible for assisting with fluvial geomorphological field investigations and desktop analyses for a Reach in Silver Creek to assist in the detailed design and construction of a backwater riffle-crest in order to eliminate a perched culvert condition. This benefits and improves migration opportunity for fish and would be suitable as an overall benefit for Redside Dace. (July 2018)

Silver Creek Impact Assessment, Halton Region, Georgetown, ON. Assisted with fluvial geomorphological field investigations and desktop analysis to characterize existing conditions of the creek and determine potential impacts of reduced flows on creek morphology with proposed plans for wastewater diversion from the Georgetown WWTP. (November, 2018)

McGillivray Road Realignment, Ministry of Transportation, Vaughan, ON. Project team member responsible for assisting in conducting the desktop assessment and field reconnaissance to aid in the completion of detailed design services of the proposed Highway 427, McGillivray Road realignment. Detailed fluvial geomorphic designs and assessments were completed at both main crossings. (June 2018)

Airport Road, Ministry of Transportation, West Humber, ON. Project team member responsible for the report on existing conditions and completing field reconnaissance. The channel design incorporated the southernmost channel that flows south of Eagle Trace Drive and Whitwell Drive and runs parallel to Airport Road for approximately 175 m and was identified for potential realignment and design. (May 2018)

Bonar Creek, City of Toronto, Toronto, ON. As part of the natural channel design to the proposed outlet of the Bonar Creek Stormwater Management Facility (BCSWMF) into Mimico Creek, responsibilities included conducting a desktop assessment and background review as well as field reconnaissance to determine existing conditions at the site. This will aid in the future channel design processes. (September, 2018)

Meander Belt Assessments

North Huron Industrial Lands, Thames River Conservation Authority, London, ON. Project team member responsible for conducting existing conditions and field reconnaissance. Assisted in a Meander Belt Assessment to help with future design and to avoid potential impacts of development pressures at the site. (January 2019 – present)

Ninth Line, Halton Region, Milton, ON. Project team member responsible for assisting in a Meander Belt Assessment in the support of a proposed Road Widening along Ninth Line between 10 Side Road and Steeles Avenue for a new road crossing. Natural Channel Design and Rehabilitation will also be completed at this location. (September 2018 – present).

Highway 401 – OE, Ministry of Transportation, Milton, ON. Project team member responsible for assisting in a Meander Belt Assessment in support of proposed Road widening at Highway 401 and Regional Road 25 in support of Redside Dace protected and contributing habitat. (August 2018)

Highway 48th and 19th Street, Ministry of Transportation, Markham, ON. Project team member responsible for assisting in compiling a desktop review and field reconnaissance as part of a meander belt assessment in support of proposed improvements at the intersection of Highway 48 and 19th Avenue as well as assist in providing fluvial geomorphological input for culvert rehabilitation. (May 2018)

Waste Management Monitoring

Wentworth Waste Management Facility Storm Water Monitoring, Brampton, ON. Project team member responsible for assisting in conducting storm sewer sampling for the Waste Management Site in Brampton, Ontario. This was conducted in order to monitor the discharge from the Wentworth Waste Management Facility site to the storm sewers. This monitoring was conducted as part of the Stormwater Management Monitoring Program that was developed in 2002. (August 2018)

Lynn River and Big Creek Surface Water Monitoring Program, Norfolk County, Simcoe, ON. Project team member responsible for assisting in field reconnaissance data and laboratory data input, compilation and assessment. This data is part of a water quality monitoring programme for the Long Point Regional Conservation Authority (LPRCA). (June 2018 – present).



Nataliya Simonova, M.Sc., Ph.D

Terrestrial Ecologist

Education

MSc, Botany (Biology Teacher Education), Kuybyshev State Pedagogical Institute USSR (now Samara State University), 1991

PhD, Biology (Ecology), Institute of Ecology of Volga Basin now Russian Academy of Science), 2001

Years of Experience

With AECOM:5.5With Other Firms:19

Role on this Project

Terrestrial Ecologist (Kitchener)

Areas of Expertise

Environmental Impact Studies Natural Heritage Assessments Environmental Field Surveys

Professional Affiliations

Member, Field Botanists of Ontario Member, Society for Ecological Restoration (SER)

Training and Certifications

Ecological Land Classification, 2013 Ecosystem Restoration, 2014 Ontario Reptile and Amphibian Survey Course, 2016 Ontario Wetland Evaluation System, 2017 NHIC/ MNRF Data Sensitivity Training, 2017 Standard First Aid with CPRA+AED, 2019 General Arts and Science: English Language Studies, 2011

Professional History

Nataliya Simonova is a terrestrial ecologist with AECOM's Ecological Services Group working in Kitchener, Ontario. While at AECOM, she has contributed to a number of projects, including large scale highway expansions, renewable energy developments and a number of smaller scale transportation and infrastructure rehabilitation projects Her involvement in these projects has included: terrestrial fieldwork, data analysis and report writing.

Nataliya Simonova has knowledge and experience in diagnostic environmental assessment, monitoring of ecosystem, wetland evaluation, and field identification of flora (trees, shrubs, herbaceous plants including grasses, sedges and common invasive species). Her experience has involved a combination of terrestrial vegetation assessment and wildlife surveys. Dr. Simonova has also assisted in performing ecological land classification field work, species-at-risk permitting, herpetofauna survey, species-at-risk surveys, tree inventories and preservation plans, as well as provides support during construction providing guidance for proper tree maintenance. She has also analyzed data collection of ELC and plant list.

Project Experience

Environmental Assessment

Union Gas, Beachville Expansion, Tavistock, Ontario (Terrestrial Ecologist) Conducted terrestrial field investigations ecological land classification (ELC) in the project study area. Analyzed a data collection of ELC and plant list.

Union Gas, Sudbury Lateral Pipeline (Terrestrial Ecologist) Conducted terrestrial field investigations in the project study area. Analyzed a data collection and plant list.

GE Capital, Forefront & Edmonton Oil, Welland, Ontario (Terrestrial Ecologist) Assisted with data analysis.

City of London, Baker Lands Wetland Delineation and Environmental Impact Statement, London, Ontario(Terrestrial Ecologist) Performed background information research using the Natural Heritage Information Centre's (NHIC) Biodiversity explorer, as well as prepared a species at risk (SAR) table which outlines the species, its preferred habitat, and when species was last observed. Assisted in performing terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area. Analyzed a data collection of ELC and plant list.

City of Toronto, Stormwater Management Pond Facility Condition Assessments, Toronto, Ontario (Terrestrial Ecologist) Performing terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area. Data collection analyzing of ELC and plant list. Assisted with tree inventories and preservation plans, as well as providing support during construction including guidance for proper tree maintenance.

Halton, Regional Municipality of, Cedarvale Well Field Upgrade, Georgetown, Ontario (Terrestrial Ecologist). Conducted terrestrial field investigations ecological land classification (ELC) and species-at-risk permitting, herpetofauna



surveys, and species-at-risk surveys in the project study area. Analyzed a data collection of ELC and plant list, and performed environmental impact statement report writing.

Sifton Properties Ltd., Victoria on the River Environmental Impact Statement, London, Ontario (Terrestrial Ecologist). Conducted terrestrial field investigations ecological land classification (ELC) and herpetofauna surveys, and species-at-risk surveys in the project study area. Analyzed a data collection of ELC and plant list, and performed environmental impact statement report writing.

City of London, North Huron Land Status Report, London, Ontario (Terrestrial Ecologist). Performed terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area. Analyzed a data collection of ELC and plant list.

Sifton Properties Ltd., Brantford Residential Subdivision Preliminary Design, Brantford, Ontario (Terrestrial Ecologist). Performed terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area, herpetofauna surveys, and species at risk surveys. Analyzed a data collection of ELC and plant list and performed environmental impact statement report writing.

Sifton Properties Ltd., Old Victoria - High Density, London, Ontario (Terrestrial Ecologist). Conducted terrestrial field investigations ecological land classification (ELC) and herpetofauna surveys, and species-at-risk surveys in the project study area. Analyzed a data collection of ELC and plant list, and performed environmental impact statement report writing.

City of London, Huron Road Species At Risk Assessment, London, Ontario (Terrestrial Ecologist). Performed tree inventories and preservation plans, as well as provided support during construction including guidance for proper tree maintenance in the development limits. Data collection analyzing.

City of London, North Huron Land Status Report, London, Ontario(Terrestrial Ecologist). Performed terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area. Analyzed a data collection of ELC and plant list.

Regional Municipality of York, Administrative Centre Annex with Provincial Offences Act Courts, Newmarket, Ontario (Terrestrial Ecologist). Assisted with data analysis and rehabilitation management plan writing.

GE Canada, 2016 Phase II Environmental Site Assessments, Welland and Strathroy, Ontario (Terrestrial Ecologist). Assisted with data analysis.

City of London, Kiwanis Park Pathway Detailed Design, London, Ontario (Terrestrial Ecologist). Conducted significant wildlife habitat assessment and species at risk surveys within the project study area. Rehabilitation plan writing.

Sifton Properties Ltd., Riverbend South Environmental Management Plan, London, Ontario (Terrestrial Ecologist) Assisted in preparation of a 3-year monitoring program which tracks potential impacts that development of farmland may have on the associated woodland and cultural plantation. Five plots were constructed in randomly selected areas, where vegetation communities will be closely monitored as well as tree health. Assisted in the completion of field investigations, which included the data collection of detailed plant lists and tree inventory.

Corporation of the City of London, Tributary C Construction and Post- development Phase Monitoring, London, Ontario (Terrestrial Ecologist). Assisted in preparation of 3-year monitoring program which tracks potential impacts to wetland vegetation communities within the representative wetland communities along Tributary C. Twenty (20) random quadrats were established where vegetation communities will be closely monitored. Lead in the completion of vegetation field investigations, which included the data collection of detailed plant lists and tree inventory. Analyzed data collection and report writing.

Corporation of the City of London, Project Dodge: 1577 and 1687 Wilton Grove Road Baseline Vegetation and Buffer Monitoring, Pre-Construction Phase, London, Ontario (Terrestrial Ecologist). Assisted in preparation three year wetland monitoring program which will be conducted to determine if there are any negative impacts to the Westminster Provincially Significant Wetland (PSW) as a result of the adjacent manufacturing development and associated stormwater management facilities. This program includes monitoring the wetland using five permanent quadrat sampling, wetland boundary delineation as well as species-specific surveys for skunk cabbage. Lead in the completion of vegetation field investigations, which included the data collection of detailed plant lists and tree inventory. Analyzed data collection and report writing.



Renewable Energy

Henvey Inlet First Nation, Henvey Inlet First Nation - Wind Energy Centre Environmental Assessment, Parry Sound, Ontario (Terrestrial Ecologist) Conducted ecological land classification, significant wildlife habitat assessment, and species at risk surveys within the project study area. Lead botanical surveys for bog plant species Branched Bartonia according to Ministry of Natural Resources protocol. Rrehabilitation management plan writing. Lead salvage of vegetation. Participated in data analysis.

Torys LLP, Settlers Landing Wind Park, Toronto, Ontario (Terrestrial Ecologist) Performing terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area. Analyzed a data collection of ELC and plant list. Assisted with tree inventories and preservation plans, as well as providing support during construction including guidance for proper tree maintenance.

Ministry of Transportation

Highways 6 & 401 improvements from Hamilton North Limits to Guelph South Limits including the new alignment of a segment of Highway 6 (G.W.P 3042-14-00), in the Township of Puslinch (Terrestrial Ecologist) Conducted terrestrial field investigations for the ecosystem's component of the project. Field investigations included identification of Species at Risk & Significant Wildlife Habitat and Ecological Land Classification during the 2017 field season in order analyzed a data collection of ELC and plant list.

City of Markham, Verclaire Gate Bridge Rouge River Crossing - Part A, Markham, Ontario (Terrestrial Ecologist) Assisted with tree inventories and preservation plans, as well as providing support during construction including guidance for proper tree maintenance. Township of LaSalle: Environmental Screening and MNRF Permitting for Various Road Improvement

Ontario Ministry of Transportation - Central Region, Greater Toronto Area West 400 Highway - Stage 2, Caledon, Ontario (Terrestrial Ecologist) Conducted terrestrial field investigations ecological land classification and species at risk permitting, herpetofauna surveys, species at risk surveys for the GTA West 400 series highway, and conducted data analysis.

Greater Toronto Area (GTA) West Transportation Corridor, Halton/Peel Townships, Ontario (Terrestrial Ecologist). Conducted terrestrial field investigations ecological land classification and species at risk permitting, herpetofauna surveys, species at risk surveys for the GTA West 400 series highway, and conducted data analysis.

Ministry of Transportation, Highway 401 and Hwy 6, Guelph, Ontario (Terrestrial Ecologist). Conducted terrestrial field investigation SAR surveys including Jefferson Salamander, Blanding's Turtle and. bat SAR habitat assessment, acoustic monitoring.

Southdale Road West Improvements – Pine Valley to Colonel Talbot Road, City of London (Terrestrial Ecologist) Performed background information research using the Natural Heritage Information Centre's (NHIC) Biodiversity explorer, as well as prepared a species at risk (SAR) table which outlines the species, its preferred habitat, and when species was last observed. Assisted in performing terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area. Analyzed a data collection of ELC and plant list.

City of London, Huron Road Species At Risk Assessment, London, Ontario (Terrestrial Ecologist). Performed tree inventories and preservation plans, as well as provided support during construction including guidance for proper tree maintenance in the development limits. Data collection analyzing.

City of London, Western Road and Sarnia Road/Philip Aziz Avenue Improvements - Environmental Ass, London, Ontario (Terrestrial Ecologist). Conducted terrestrial field investigations ecological land classification (ELC) and species-atrisk permitting, herpetofauna surveys, and species-at-risk surveys in the project study area. Analyzed a data collection of ELC and plant list.

City of London, Victoria Bridge Environmental Impact Study Report. (Terrestrial Ecologist) Conducted terrestrial field investigations ecological land classification (ELC) and species-at-risk permitting, herpetofauna surveys, and species-at-risk surveys in the project study area. Analyzed a data collection of ELC and plant list. Assisted with the completion of impact assessment and preparation of an EIS report.

Stouffville Road Environmental Assessment - Yonge Street to Highway 404, Markham, Ontario (Terrestrial Ecologist) Assisted with tree inventories and preservation plans, as well as providing support during construction including guidance for proper tree maintenance.



Metrolinx

Metrolinx, Kitchener Corridor Expansion 2019-2020 - TPAP Tree Inventory, Kitchener, Ontario. Conducted the arborist field work and data collection of tree health assessment.

Metrolinx, GO Transit - Bala Bridge Replacements, Toronto, Ontario (Terrestrial Ecologist). Conducted ecological land classification, significant wildlife habitat assessment, and species at risk surveys within the project study area. Analyzed a data collection of ELC and plant list. Assisted with tree inventories.

Regional Municipality of York, Stouffville Road Environmental Assessment - Yonge Street to Highway 404, Markham, Ontario (Terrestrial Ecologist). Assisted with tree inventories and preservation plans, as well as providing support during construction including guidance for proper tree maintenance.

Metrolinx, GO Rail Service Expansion - Lakeshore East Rail Corridor, Toronto, Ontario (Terrestrial Ecologist). Performed delineation and mapping of vegetation community using ecological land classification (ELC).

Metrolinx, Stouffville Rail Corridor Expansion - Second Track, Scarborough, Ontario (Terrestrial Ecologist). Assisted with tree inventories and preservation plans, as well as providing support during construction including guidance for proper tree maintenance.

Metrolinx, Burloak Drive Grade Separation Environmental Assessment and Design, Oakville, Ontario (Terrestrial

Ecologist). Performed background information research using the Natural Heritage Information Centre's (NHIC) Biodiversity explorer, as well as prepared a species at risk (SAR) table which outlines the species, its preferred habitat, and when species was last observed. Assisted in performing terrestrial site investigations using ecological land classification (ELC) to characterize vegetation communities in the project study area. Analyzed a data collection of ELC and plant list. Assisted with tree inventories and environmental impact statement report writing.



Nathaniel DeCarlo, MES

Ecologist

Education

Master of Environmental Studies, University of Waterloo, 2017

Ecosystem Management Technology Advanced Diploma, Fleming College, 2014

Honours Bachelor of Science in Wildlife Biology, University of Guelph, 2013

Years of Experience

With AECOM: 4 With Other Firms: 3

Role on this Project

Ecologist (Kitchener)

Area of Expertise

Project planning and coordination

Ecosystem and habitat classification

Policy, permitting and reporting

Impact assessments

Training and Certifications

Class 2 Electrofishing – Crew Leader Reptile and Amphibian Survey Course Standard First Aid and CPR-C Canadian Safety Council UTV & Snowmobile Certification OSHA 10 & 30 Hour Construction Industry Outreach Training Courses Ministry of Labour 5-Step Supervisor Training START Supervisor Training Field Safety Trainer 2020

Professional History

Nathaniel (Nathan) DeCarlo is an ecologist with a strong background in terrestrial and aquatic ecology, with an emphasis project coordination and implementation. Nathan is a graduate from the University of Guelph and Waterloo with a Bachelor's degree in Wildlife Biology and a Masters of Environmental Studies, respectively, as well as Fleming College with an advanced diploma in Ecosystem Management Technology. Nathan has the education and experience to contribute to various projects in a meaningful way including field assessment, project planning and coordination, reporting processes, and providing presentations. Nathan has worked extensively on an array of development projects, with specific experience in the municipal sector, including background review, site assessment, impact studies, as well as extensive experience in environmental monitoring during the construction phase. Nathan has worked in a supervisory role within AECOM, and exhibits strong leadership as well as enthusiasm and positivity within a team setting. Nathan has been recognized for health and safety on-site, and brings a wealth of ecological and environmental knowledge to the projects he is involved with.

Project Experience

Municipal

United Counties of Leeds and Grenville, Four Lane Upgrade of County Road 43, Kemptville, Ontario. Preliminary speciesat-risk screening and reporting for both the provincial and federal agencies. Contributed to Environmental Impact Study including SAR observation protocols, Post Effectiveness Monitoring Plan, and Environmental Management Plans

City of London, W12A Landfill Expansion, London, Ontario. Conducted Ecological Land Classification, Species at Risk habitat assessments, and Significant Wildlife Habitat assessments. Drafted Preliminary SAR Screening Memorandum.

City of London, Kilworth Bridge Rehabilitation, London, Ontario. Conducted SAR habitat assessments, Ecological Land Classification, barn swallow nest surveys, and aquatic habitat assessments. Aided in scoping and drafting of an Environmental Impact Statement.

City of London, Watson Street EIS, London, Ontario. Conducted wildlife and SAR vegetation sweeps ahead of construction activities. Conducted site meeting with City of London staff, arborists, and contractor.

City of London, Mud Creek Channel Restoration Phase 2 Detailed Design, London, Ontario. Drafted and submitted Preliminary SAR Screening Memorandum to confirm workplan and permitting requirements.

City of London, Hyde Park SAR Screening, London, Ontario. Aided in drafting a SAR Screening Technical Memorandum.

City of Woodstock, Woodstock Stormwater Facility Sediment Removals, Woodstock, Ontario. Compiled information for and submitted multiple Wildlife Scientific Collector's Authorization applications and a License to Collect Fish for Scientific Purposes.



Municipality of Middlesex Centre, Middlesex Stormwater Facility Sediment Removal, Ilderton, Ontario. Compiled information for and submitted multiple Wildlife Scientific Collector's Authorization applications and a License to Collect Fish for Scientific Purposes. Conducted fish and reptile salvage for SWM facility sediment removal.

City of Woodstock, Corlett Industrial Development, Woodstock, Ontario. Conducted Ecological Land Classification, Blanding's Turtle targeted surveys, and amphibian call surveys.

City of Pickering, Walnut Lane Road Extension, Pickering, Ontario. Prepared the Terms of Reference and aided in reporting for EIS.

York Region, York Region Phosphorus Removal Demonstration Project, East Gwillimbury, Ontario. Conducted terrestrial conditions reporting. Provided input for the existing terrestrial conditions for a Site Investigation Report for the Lake Simcoe Region Conservation Authority.

Township of Centre Wellington, Centre Wellington Water Supply Management Plan, Centre Wellington, Ontario. Conducted background screening (i.e., SAR, SWH) and Natural Heritage Background Review reporting.

City of Cambridge, Elgin Street North Environmental Impact Study, Cambridge, Ontario. Conducted fish habitat assessments for a proposed sewer outlet structure to Mill Creek.

Transportation

Metrolinx, Kitchener Corridor Expansion 2019-2020 - TPAP Environmental Assessments, Kitchener, Ontario. Conducted terrestrial and aquatic ecological monitoring including the setup and collection of bat acoustic monitors and fish community surveys. Supported existing conditions reporting including species at risk and significant wildlife habitat screening using field data and aerial photography. Aided in the reporting of results from baseline monitoring (i.e., ELC, breeding bird surveys). **Metrolinx, Ontario Line North, South, and West Subway Projects, Toronto, Ontario.** Conducted terrestrial monitoring including bat exit surveys and the setup and collection of bat acoustic monitors.

Windsor-Detroit Bridge Authority, Gordie Howe International Bridge, Windsor, Ontario. Aided in preparing the Sediment and Erosion Control, Wildlife and Species-at-Risk, and Vegetation and Invasive Species Environmental Monitoring and Management Plans. Conducted health, safety, and training tracking including the organization and tracking of health and safety training compliance for AECOM staff on the project, Site Induction training, and Species at Risk Awareness training.

Ministry of Transportation, QEW Credit River Improvement Project, Mississauga, Ontario. Drafted, submitted, and procured an approved Wildlife Scientific Collector's Authorization and associated Animal Care Protocol for wildlife relocation and turtle nest relocation. Conducted fish and wildlife salvages utilizing electrofishing and seine nets, as well as turbidity monitoring. Provided technical expertise for wildlife exclusion and sediment and erosion control measures.

Ministry of Transportation, Stage 2: GTA West Transportation Corridor Route Planning and Environmental Assessment Study, Greater Toronto Area, Ontario. Conducted terrestrial and aquatic monitoring and data management including breeding bird surveys, Ecological Land Classification, amphibian call surveys, fish habitat assessment, and fish community surveys. Coordinated data analysis, fieldwork reporting, and wildlife crossing identification. Drafted fieldwork summary memorandums, provided technical expertise as a terrestrial specialist, conducted wildlife crossing input, and coordinated fieldwork and reporting tasks.

Ministry of Transportation, Highway 403/6 Grindstone, Burlington/Dundas, Ontario. Conducted terrestrial monitoring including breeding bird surveys and Ecological Land Classification.

Ministry of Transportation, Highway 401/6 Improvements, Puslinch & Guelph, Ontario. Conducted terrestrial ecological monitoring including Jefferson Salamander surveys and habitat, species-at-risk turtle surveys, insect trapping, and breeding bird surveys. Aided in reporting of Jefferson Salamander field results.

Energy

Enbridge (Union Gas) Pipeline, Sarnia Storage Enhancement Project, Sarnia, Ontario. Provided terrestrial natural heritage input (including impact assessment) to the Environmental Report and Information Gathering Form. Conducted species-at-risk habitat assessments, Ecological Land Classification and botanical inventory, bat acoustic monitoring and extensive Butler's gartersnake coverboard surveys.

Enbridge (Union Gas) Pipeline, Beachville Expansion & Kingsville Reinforcement, Stratford/Kingsville, Ontario. Compiled and organized data for vegetation and bat surveys for reporting. Acquired MNRF authorization for turtle nest relocation. Conducted turtle nest relocations and releases.

Enbridge (Union Gas) Pipeline, Sudbury Lateral Pipeline, Sudbury; Owen Sound Lateral Replacement: Conducted fish salvages, using minnow traps, fyke nets, and electrofishing. Conduct area searches ahead of construction activity for SAR



species, including monitoring turtle traps. Obtained an amendment to the Wildlife Scientific Collector's Authorization for turtle nest salvage and transport including an approved Animal Care Protocol.

Pattern Energy Group Ltd., Henvey Inlet Wind, Parry Sound, Ontario. Acted as Lead Environmental Monitor consisting of the following:

- Coordinated dozens of environmental monitors and biologists during construction phase and work as health and safety lead for field staff;
- Coordinated construction activities with the client and contractor on a daily basis and act as Environmental trainer for site staff, contractors, and visitors; and
- Acted as on-site point of contact for ecology and environmental issues for monitors and biologists.

Acted as Qualified Biologist consisting of the following:

- Conducted fish salvages at proposed water crossings using electrofishing and monitored the installation of the culverts;
- Monitored for SAR ahead of vegetation crews and blasting activities as well as general monitoring for compliance with the SARA Permit and EA obligations;
- Performed species relocation on-site for SAR and Non-SAR reptiles;
- Conducted ongoing habitat assessments such as bat crevices/trees, micrositing for SAR habitat, and SAR reptile hibernacula and gestation site; and
- Assessed sediment and erosion control and the ecological impact of spills on habitat.

Residential

Sifton Properties Ltd., Hardy Road, Brantford, Ontario. Conducted terrestrial ecological monitoring including spring vegetation monitoring (transects, quadrats), bat acoustic monitoring, species-at-risk snake surveys, turtle and turtle nesting surveys. Contributed to terrestrial baseline conditions reporting.

Sifton Properties Ltd., High Density, London, Ontario. Aided in the organization of field program. Conducted SAR snake surveys.

2081788 Ontario Corporation, Broos Subdivision Phase 2, Ayr, Ontario. Conducted SAR screening/background review and aided in reporting for EIS.

Technical

Toronto and Region Conservation Authority, Natural Systems Climate Change Adaptation, Greater Toronto Area, Ontario. Conducted technical research, site visits, and reporting on best practices for climate change adaptation and application of best practices to case studies within TRCA jurisdiction.

City of London, Environmental Management Guidelines Update, London, Ontario. Conducted consultation meeting with stakeholders. Conducted background review of policy and scientific literature related to ecological buffers, evaluation of natural heritage feature significance, ecological compensation, and general best practices for environmental management of natural heritage systems for the update. Aided in the drafting of the updated Environmental Management Guideline documents.

Publications

DeCarlo, N., Oelbermann, M., & Gordon, A.M. (2019). Carbon dioxide emissions: spatiotemporal variation in a young and mature riparian forest. Ecological Engineering, 138:353-361.

DeCarlo, N., Oelbermann, M., & Gordon, A.M. (2019). Spatial and temporal variation in soil nitrous oxide emissions from a rehabilitated and undisturbed riparian forest. Journal of Environmental Quality, 48:624-633.

Awards

AECOM Impact Assessment & Permitting – Challenge Coin; AECOM Safety Award – Silver Coin – Henvey Inlet Wind



Olivia Butty, Hon. B.Sc.

Aquatic Ecologist

Education		Role on this Project	Training and Certifications	
Honours Bachelor of Science, Marine & Freshwater Biology, University of Guelph, 2015	Aquatic Ecologist	MTO Fisheries Assessment Specialist (2019)		
		Areas of Expertise	MTO/DFO/MNRF Fisheries Protocol (2018)	
		Environmental Permitting	Identification of Ontario Minnows, Royal Ontario Museum (2018)	
Years of Experience With AECOM: 4 With Other Firms: 2	4	Aquatic Species at Risk	Identification of Ontario Species at Risk, Royal Ontario Museum (2019)	
	2	Field Assessments	UTRCA Erosion and Sediment Control Workshop (2018)	
			Class 2 Electrofishing Recertification (2017)	
			Small Vessel Operator Proficiency (2014)	
			Marine radio operator (2013)	
			Small Non-Pleasure Vessel Basic Safety (2012)	

Professional History

Olivia is an Aquatic Ecologist on AECOM's Water & Natural Resources Team and is based in the Guelph, Ontario office. She has a focused background in aquatic ecology in both the mining and construction sectors. She is experienced in the design and implementation of field studies and preparation of technical reports for a range of environmental projects including environmental assessments, impact assessment and mitigation, baseline studies, environmental impact statements, environmental effects monitoring, fisheries/habitat compensation strategies, Species at Risk screenings, overall benefit studies and environmental (including SAR) permitting and approvals.

VHF Operators Training (2012)

Project Experience

Fish and Fish Habitat Assessments

Township of Centre Wellington, 20th Sideroad Structure 27-WG, Elora: Provincial and federal SAR permitting; conducted eDNA and conventional sampling targeting Redside Dace in Irvine Creek Watershed.

Fisheries and Oceans Canada, Redside Dace Sampling in the Irvine Creek Watershed: Field lead. Provincial and federal SAR permitting.

Ontario Ministry of Transportation, Highway 401 East Bound Core and Collector Lanes between Neilson Road and Whites Road, City of Pickering: Field lead. Fish and fish habitat existing conditions and impact assessment report for the reconstruction of a portion of Highway 401, including the rehabilitation of two structural culverts over Petticoat Creek and two bridges over the Rouge River in the City of Pickering.

Ontario Ministry of Transportation, Highways 6 and 401 Improvements, Hamilton to Guelph: Field lead. Fish and fish habitat existing conditions and impact assessment report at 56 watercourses within the project area. Environmental permitting.

Ontario Ministry of Transportation, Highway 401 OE, Milton to Mississauga: Assessed and reported aquatic habitat conditions at watercourses within the project area to determine existing conditions and assess impacts.

Ontario Ministry of Transportation, Highways 9 and 26 Culvert Rehabilitation: Assessed and reported aquatic habitat conditions at watercourses within the project area.

Ontario Ministry of Transportation, Highway QEW Task 8: Field lead. Fish and fish habitat existing conditions and impact assessment report at watercourses within the project area.



Ontario Ministry of Transportation, Highway QEW North Shore: Assessed and reported aquatic habitat conditions at watercourses within the project area to determine existing conditions and assess impacts.

Ontario Ministry of Transportation, Highways 9 and 26 Culvert Rehabilitation: Undertook impact assessments on 5 watercrossings within the Hwy 9 & 26 project limits.

Ontario Ministry of Transportation, Highway 401 OE, Milton to Mississauga: Undertook impact assessments on 22 watercrossings within the Hwy 6 & 401 project limits.

Ontario Ministry of Transportation, Porcupine River Culvert Rehabilitation: Completed DFO Pathways of Effects process for culvert rehabilitation and partial removal.

Ontario Ministry of Transportation, Highway 403 & Highway 6 Preliminary Design: Field lead. Fish and fish habitat existing conditions at 18 at water crossings within the Hwy 6 & 403 project limits; preparation of technical report.

Ontario Ministry of Transportation, Highway 403 & Eglinton East Culvert: Field lead. Fish and fish habitat existing conditions at water crossings within the project limits; preparation of technical report.

Metrolinx, Kitchener Corridor Expansion: Field lead. Assessed aquatic habitat conditions at 45 watercourse crossings within the project area and reported within an impact assessment report.

Metrolinx, King City GO Station Improvements, King City: Assessed aquatic habitat conditions at watercourses within the project area and reported within a Natural Environment Report. Environmental permitting.

Metrolinx, Lakeshore LSE, Scarborough: Conducted species-at-risk mussel presence/absence survey.

Metrolinx, Union Station Bus Terminal, Toronto: Reported aquatic habitat conditions and species-at-risk limitations within a Natural Environment Report.

Metrolinx, Kitchener Expansion: Field lead. Lead aquatic field studies and reported aquatic habitat conditions and impact assessment at 90 sites within the Study Area. Environmental permitting.

Metrolinx, Ontario Line Lead aquatic field studies and reported aquatic habitat conditions and impact assessment at 90 sites within the Study Area.

Region of Halton, Emergency Cross Culvert Rehabilitation and Slope Stabilization, Milton: Assessed aquatic habitat conditions at location of proposed works and reported within a technical memo.

Region of Halton, Silver Creek WWTP Impact Assessment, Georgetown: Assessed and reported aquatic habitat conditions at five reaches of Silver Creek within the project area.

Region of Peel, The Gore Road Improvements Between Queen Street East and Castlemore Road, Brampton: Assessed aquatic habitat conditions within the project area; prepared natural environment preservation and planning memorandum.

Enbridge, Owen Sound Lateral Replacement, Durham: Assessed and reported aquatic habitat conditions at watercourses within the project area to create an Aquatic Technical Report. Environmental permitting.

Enbridge Stratford Reinforcement Project, Zorra Township, Ontario. Field lead. Assessed and reported aquatic habitat conditions at watercourses within the project area to create an Aquatic Technical Report. Environmental permitting.

City of Hamilton, Twenty Road URVHP Extensions: Field lead. Assessed aquatic habitat and headwater features within the study area. Reported findings and recommendations within a technical memo; performed amphibian surveys.

City of Kitchener, Sandrock Bridge Replacement: Completed impact assessment and DFO Pathways of Effects process for the proposed replacement of the bridge crossing Sandrock Creek with a new clear span bridge.

City of London, W12 Landfill EA and REA, London: Assessed aquatic habitat conditions at watercourses within the project area.

City of London, South London Wastewater Servicing, London: Assessed aquatic habitat conditions at watercourses within the project area.

City of London, 187 Byron Ave, London: Field lead. Assessed aquatic habitat conditions at watercourses within the project area and reported within an Environmental Impact Study.

Evaluation of Habitat Restoration Activities for Species at Risk Fishes

Conducted 3 years of bi-annual large-scale fisheries sampling and habitat assessment program. Species present included: Pugnose Shiner, Lake Chubsucker, Grass Pickerel and Warmouth.

Distribution of Spotted Gar adults and juveniles in Rondeau Bay, Long Point Bay and Hamilton Harbour Watershed: Conducted eDNA water sampling and fish and habitat assessments at 98 sites within Rondeau Bay and its tributaries, Long Point Bay and its tributaries, Cootes Paradise and Hamilton Harbour. Methods included:

ΑΞϹΟΜ

- eDNA sample collection and filtration
- Spawning surveys
- Spawning habitat assessments
- Juvenile habitat assessments

Mining Specific

North American Palladium:

Environmental Effects Monitoring

Conducted cycle 5 of environmental effects monitoring, including water chemistry, benthic community, sediment toxicity, fisheries sampling (community, tissue toxicity, fecundity) and aquatic habitat assessments.

Mount Polley Gold Mine:

Post-Spill Monitoring

Conducted two series of fisheries inventories (community, tissue toxicity, fecundity) and aquatic habitat assessments at 2 affected lakes, 2 affected watercourses and 3 reference locations following Mount Polley dam collapse disaster. *Additionally:* benthic community, water chemistry and sediment toxicity sampling.

Mount Polley Gold Mine:

Environmental Effects Monitoring

Conducted cycle 1 of environmental effects monitoring, including water chemistry, sediment toxicity, benthic community, 24h benthic depuration, fisheries sampling (community, tissue toxicity, fecundity, spawning and larval surveys) and aquatic habitat assessments.

Brunswick 12 Mine:

Environmental Effects Monitoring

Conducted environmental effects monitoring, including water chemistry, sediment toxicity, benthic community, fisheries inventory and aquatic habitat assessments on 5 reference, 5 near-field and 5 far-field watercourses.

Faro Mine Complex, Fish Salvage, Yukon: AECOM field lead on a team of stakeholders at large-scale fish salvage within 3 km isolated reach of affected watercourse.

Musselwhite

Environmental Effects Monitoring

Prepared mandatory EEM electronic reporting documents for Musselwhite.

TECK Elk Valley

Local and Regional Aquatic Effects Monitoring Program Conducted multi disciplinary reference area sampling (fisheries, benthic community, periphyton, water quality) for TECK operations within the Elk Valley area.

Environmental Monitoring

Enbridge, Owen Sound Phase 4 Reinforcement Project, Owen Sound: Lead ecologist at fish removals in isolated work areas. Environmental permitting.

Township of Centre Wellington, 20th Sideroad Structure 27-WG, Elora: Conducted fish removals in isolated work areas and submitted results to MNRF.

Municipality of Chatham-Kent, Thamesville Bridge EA, Thamesville: Conducted fish removals in isolated work areas and submitted results to MNRF.

CER, **Henvey Inlet Wind Energy Centre**, **Henvey Inlet**: Monitored culvert installations for DFO permit compliance and conducted fish removals in isolated work areas; monitored installation of species-at-risk exclusion fencing; conducted species-at-risk sweeps and relocations prior to vegetation clearing; conducted pre- and post-blast species-at-risk sweeps.

Union Gas, Sudbury Lateral Pipeline, Sudbury: Conducted breeding bird sweeps prior to vegetation clearing and fish removals in isolated work areas.

City of London, Tributary C Spawning Surveys: Field lead. Conducted brook trout spawning surveys in 2018 and 2019 season; post-survey reporting.

Triton Engineering, 20th Sideroad Structure 27-WG, Elora: Conducted environmental monitoring and fish salvage to support construction.



Appendix C

Field Notes

- C.1 Fish Habitat Assessment
- C.2 Ecological Land Classification Notes
- C.3 Botanical Inventories
- C.4 Amphibian Surveys
- C.5 Breeding Bird Surveys
- C.6 Reptile Encounter Surveys



C.1 Fish Habitat Assessment

Butty, Olivia

From: Sent: To: Subject: Butty, Olivia Tuesday, October 6, 2020 11:05 AM Aberdein, Andrew Glancaster EA field results

Wc01- assessed at Dickinson rd outside of study area from ROW; wet meadow, channel not defined, wet for about 10 m either side or road, no flow

Wc02- assessed from ROW, dry

Wc03- assessed from ROW; east side dry with perched cuvlert and piped under lawn; west side wet at culvert, no flow, poorly defined channel through residential property

Wc04- assessed from ROW on Kopperfield Rd; buried through residential neighbourhood

Wc05- assessed from ROW; us wet in culvert, poorly defined channel through meadow species; ds buried under residential neighborhood

Wc06- assessed from ROW, field upstream no defined channel with minimal standing water in roadside ditch and new hydro road crossing on us side; ds has water and defined channel on parcel 16901001 but no pte; fish this site further ds with hydro one access next year

Wc07- did not assess, no PTE; revisit with hydro one PTE

Wc-08- mowed swale no watercourse

Wc09- pools only at culvert Crossing glancaster; Efish 200V 30A 25% 2 brook stickleback; pools at culvert crossing Rymal, no PTE to enter wetland (hydro one)

Get Outlook for iOS



C.2 Ecological Land Classification Notes
	~~~	al	1	2	
FLO	Site: Shinne	Sterkd	Polygon:	7)	
Community	Surveyor(s):	Date:	Tim	e start	3:30pm
Description and	LITMZ:	LITMZ:	4201	tinish:	4 Bpm

System	Substrate	Topographic Feature	Plant Form	Community
Vetland Aquatic Site	Organic Mineral Soil Parent Min.	Lacustrine Riverine Bottomland Terrace	Plankton Submerged Floating-LVD Graminoid	Lake Pond River Stream
Open Water Shallow Water Surficial Dep. Bedrock	Basic Bedrk	Valley Slope Tableland Roll. Upland	Errb Lichen Bryophyte	Marsh Swamp Fen Bog
History ANatural Cultural		Crevice/Cave	Mixed	Barren Meadow Prairie
Cover Open Shrub Treed		Rockland Beach / Bar Sand Dune Bluff		Thicket Savannah Woodland Forest Plantation

### Stand Description

Layer	нт	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	2	9	FAGGRAN >> OSTVIRG> CARCOLD>QUERUB
2	3	4	COTVIRES > FRAAMER > FAGORAN 1> CARCOR
3	L	4	PHACATH > VITRIPH > LONTARI
4	5	4	EPAMERY FIRLUTE > SOLSP > GELM SP

HT Codes: 7 <0.2m 6 >0.2-0.5m 6 >0.5-1m 4 >1-2m 3 >2-8m 2 >6-25m 1 >25m CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	TA-	<10	A	10-24	A	25-50	0	>50
	Standing Snags:	A	<10	O	10-24	0	25-50	R	>50
BA:	Deadfall / Logs:	A	<10	0	10-24	R	25-50	N	>50

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

Com. Age:	Pioneer	Young	Mid-Age

Ecosite:	DRH-FRESH VELIDIOUS HERE	Code:	HCOH
Vegetation Type:	Dry-Fresh Beech Deciduais	Code:	F004-1
Inclusion:		Code:	
Complex:		Code:	

Mature

Old Growth

### Community Profile Diagram/Comments

[]				
	(1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,			****
Notes: Jarage	dead asnes.	, some potentia	al pooling .	arcas.

Tree Tally by S	Species			Pris	m Factor	2
Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
				/		
	1		/			
			<hr/>			
	/			~		
Total						100
Basal Area (BA)	/					
Dead <						

Soils Ontario	and	ELC	Soils	Descr	pti	ion
---------------	-----	-----	-------	-------	-----	-----

	F	Pit/Auger #							Sum	mary
		Zone					2			
S	MI	Easting				1	/		Mois	sture
etric	Þ	Northing				/			Reg	ime
Me		Position	~	-	/					
Site	φ	Aspect		1						
	Slop	Percent		/						
	0,	Slope Length	/						Drai	nage
-	Mott	les								
to	Gley								Effe	ctive
÷	Wate	er Table					_		Tex	ture
Del	Carb	onates							(indi	icate
	Bedr	ock						04.05	Del	ow)
	1	Depth from zero	-	% CF	-	% CF		% CF		% CF
		Texture						5		
	2	Depth from zero		% CF		% CF		% CF		% CF
tion		Texture					/			
escrip	3	Depth from zero		% CF	$\sim$	% CF		% CF		% CF
O UO		Texture				/	_			
4 Horiz	4	Depth from zero	1	% CF		% CF		% CF		% CF
Soi		Texture	1							
		% Surface Stone/Rock								-
	Mois	ture Regime								
	Drain	nage								

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ELC Community	Site: (B)ancaste	XKO	Polyg	on:	)	
	Surveyor(s):	Date:	20	Time	start: finish:	900am
Classification	UTMZ:	UTMZ:		U	TMN:	

System	Substrate	Topographic Feature	Plant Form	Community
Terrestrial Wetland Aquatic Site Open Water Shallow Water Shallow Water Bedrock History Natural Cover Open Shrub Treed	☐ Organic ☑ Mineral Soil ☐ Parent Min. ☐ Acidic Bedrk ☐ Basic Bedrk ☐ Carb. Bedrk	Lacustrine Riverine Bottomland Terrace Valley Slope Tableland Cliff Talus Crevice/Cave Alvar Rockland Beach / Bar Sand Dune Bluff	Plankton Submerged Floating-LVD. Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed	Lake Pond River Stream Marsh Swamp Fen Bog Barren Meadow Prairie Thicket Savannah Woodland Forest Plantation

#### Stand Description

Layer	нт	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	2	2	SAILUBE
2	4	2	CRESERI > LONTART > JUGNICK
3	5	4	SOLSP> IMPLAPE > SHI SP > CIR SP
4	6	14	PORSP > GEUMSP

 HT Codes:
 7 <0.2m</th>
 6 >0.2-0.5m
 6 >0.5-1m
 4 >1-2m
 3 >2-8m
 2 >6-25m
 1 >25m

 CVR Codes:
 0 = none
 1 0% - 10%
 2 10 - 25%
 3 25 - 60%
 4 > 60%

Stand Composition:	Size Class Analysis:	0 <10		R	10-24	R	25-50	N	>50
	Standing Snags:	E1	<10	N	10-24	N	25-50	N	>50
BA:	Deadfall / Logs:	N	] <10	N	10-24	N	25-50	N	>50
Abundance Codes: 1	N = None R = Rare O =	Occas	Ional	A = At	oundant				

The second secon

Com. Age:	Fioneer Found Mid-Age	Iviature	
Ecosite:	Mineral Curtural Headow	Code:	CUMI
Vegetation Type:	Dry-Moist Old Field Meadaw	Code:	CUM)-1
Inclusion:		Code:	
Complex:	Mineral Meadow Marsh	Code:	MAM2

## Community Profile Diagram/Comments

Notes:

## Tree Tally by Species

Prism Factor 2

Species	Tally 1	Tally 2	Tally 3	Tally 4	Total	Rel. Avg.
~						
			/			
		/				
		1/				
and the second s	/	1				
	/					
Total	1					100
Basal Area (BA)						
Dead						

## Soils Ontario and ELC Soils Description

	P	it/Auger #							Sum	marv
- 6		Zone					_			
22	TM	Easting								ACCUS
Ĕ	D	Northing		_		1			Rec	sture
Ň		Position				/			Regime	
Site	Φ	Aspect	1		/					
201	golo	Percent		~	$\leq$					
	0)	Slope Length				/			Drai	nage
	Mottles									
to	Gley		_	_					Effe	a the
듚	Wate	er Table							Tex	ture
Dep	Carbonates								(indi	cate
	Bedrock								bel	ow)
	1	Depth from zero	-	% CF		% CF		% CF		% CF
		Texture						~		
	2	Depth from zero		% CF		% CF		% CF		% CF
otion		Texture				/				
escrip	3	Depth from zero		% CF	×	% CF		% CF		% CF
zon D		Texture		/			/			
I Hori	4	Depth from zero	X	% CF		% CF		% CF		% CF
Soi		Texture <								
		% Surface Stone/Rock								
	Mois	sture Regime						-	6	-
	Drai	nage								

The summer with the second bar the second se

FLC	Site: Harrast	er Rd Polys	gon:	-)	
Community	Surveyor(s):	Date:	Time	start: finish:	920 am
Classification	UTMZ:	UTMZ:	U	TMN:	

System	Substrate	Topographic Feature	Plant Form	Community
Terrestrial Wetland Site Open Water Shallow Water Sufficial Dep. Bedrock History Natural	Organic Mineral Soll Parent Min Acidic Bedrk Basic Bedrk Carb, Bedrk	Lacustrine Riverine Bottomland Terrace Valley Slope Tableland Roll Upland Cliff Talus Crevice/Cave	Plankton Submerged Floating-LVD Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed	Lake Pond River Stream Marsh Swamp Fen Bog Barren Meadow
Cultural		Alvar Rockland		Prairie Thicket
Open Shrub Treed		Beach / Bar Sand Dune Bluff		Savannah Woodland Forest Plantation

#### Stand Description

Layer	нт	CVR	Species In Order of Decreasing Dominance (up to 4 sp) (>> Much Greater Than; > Greater Than; = About Equal To)
1	4	4	TYPANGUST PHAARUN > PHRAVIST
2			
3			
4			

HT Codes: 7 <0.2m 6 >0.2-0.5m 6 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis: Standing Snags:		s: 🖗	<10 <10	R	10-24	RI	25-50 25-50	N	>50 >50
BA:	Dea	adfall / Log	s: 4	<10	N	10-24	N	25-50	[N	>50
Abundance Codes: 1	N = None	R = Rare	0 = Occas	onal	A = A	bundant				

Young Mid-Age Mature Com. Age: Pioneer MAS2 Mineria Sharkow Marsh Code: Ecosite: Code: MAS2-1 Vegetation Cottail Mineral Shallow Marsh Type: Code: Inclusion: Code: Complex:

Old Growth

## Community Profile Diagram/Comments

and and an a second s
Notes'
40.00

_		Casalan	Tal	by 4	Tally 2	Tally 3	Tally	4   T	otal	Rel. Avg.	
-		Species	Tai	iy i	Tany 2	Tany J	Tuny				
-			-						2		
		~			7						
			-		1				_	-	
_			_	7			1			1	
			17					+		100	
ota	al Are	a (BA)	-	-							
ea	d										
30	ils	Ontario a	nd EL	C S	oils De	script	ion				
	P	it/Auger#							SL	ummary	
		Zone									
S	Σ	Easting				1				laiatura	
Š	5	Northing			-	/			Regime		
Mei		Position		_	- 7				1	toginto	
Ite		Aspect			-/-				-		
s,	ope	Percent									
	S	Slope		/					D	rainage	
	_	Length	/						1		
	Mott	les	/								
0	Gley			_			_		E	ffective	
÷	Water Table									Texture	
Dep	Carbonates							_	(	indicate	
	Bed	rock				Lung			L	below)	
	1	Depth from zero		% CF		% CF		% CF		% CF	
		Texture					/				
	2	Depth from zero	-	% CF		% CF		% CF		% CF	
5		Texture		-	-	/					
ripti		Depth from		% CF	$\rightarrow$	T%-CF	18	% CF		% CF	
esc	3	zero			X						
On D		Texture		/							
Soil Horiz	4	Depth from zero	/	% CF		% CF		% CF		% CI	
		Texture									
		% Surface						1			
	Mal	Stone/Rock		-							
	MOI	arule Regime									
	Dra	inage									
	1										

#### fals community descention because all shows increments

FIC	Site: Chancose	N Roly	gon:	
Community	Surveyor(s):	Date:	Time start:	100/20/1
Description and	Kase 4 Mekensu	41 Oct 6 620	finish:	1:30000
Classification	UTMZ:	UTMZ:	UTMN:	

System	Substrate	Topographic Feature	Plant Form	Community
Terrestrial Wetland Site Open Water Shallow Water Surficial Dep. Bedrock History Natural Cultural Cover	Organic Mineral Soil Parent Min. Acidic Bedrk Basic Bedrk Carb. Bedrk	Lacustrine Riverine Bottomland Terrace Valley Slope Tableland Roll. Upland Cliff Talus Crevice/Cave Alvar	Plankton Submerged Fioating-LVD. Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed	Lake Pond River Stream Marsh Swamp Fen Bog Barren Meadow Prairie Thicket
Open Shrub Treed		Beach / Bar Sand Dune Bluff		Savannah Woodland Forest 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	1	4	QUERUBE > CAROVAT > TILAMER > ADESALC
2	2	4	THAMER > ACESALC> CARDIAT
3	4	3	CHACATH > FRAAMER> LONTART SCORRAC
4			

HT Codes: 7 <0.2m 6 >0.2-0.5m 6 >0.5-1m 4 >1-2m 3 >2-6m 2 >6-25m 1 >25m CVR Codes: 0 = none 1 0% - 10% 2 10 - 25% 3 25 - 60% 4 > 60%

Stand Composition:	Size Class Analysis:	A	<10	A	10-24	A	25-50	0	>50
	Standing Snags:	A	<10	0	10-24	R	25-50	N	>50
BA:	Deadfall / Logs:	O	<10	R	10-24	N	25-50	N	>50

Abundance Codes: N = None R = Rare O = Occasional A = Abundant

1	1	P		( Section 1	
Com. Age:	Pioneer	Young	Mid-Age	X Mature	Old Growth
a a la	The second s	100 TO		the second states a state of the second	A STATE AND A STAT

Ecosite:	Dry-FreinCar-Morely- Hickory	Code:	Fap2
Vegetation Type:	Dry-Fresh Oak Hickory Okciduary	Code:	F002-2
Inclusion:		Code:	
Complex:		Code:	

## Community Profile Diagram/Comments

1
Notes: The Asthrey I

i re	10	lany by a	phecie	3	La Calendaria	I more a	1	- nam	- acto	
		Species	Ta	lly 1	Tally 2	Tally 3	Tall	y 4	Total	Rel. Avg.
			_			2	-	-		
_						/		-+		
-					/		-			
					>~					
				1						
			/					_	_	-
lota	1							-	_	100
Basa	al Are	ea (BA)								
Dead	1			0.0	IL- De	a a ri a i	100	-	-	-
So	ils	Ontario	and El	_C SC	DIIS De	scrip	tion			
	P	it/Auger #							SI	Immary
t		Zone								
52	ML	Easting					/		N	loisture
tric	5	Northing					/		F	Regime
Me	-	Position	~			/				
Site	1	Aspect								
	ope	Percent			/					
	S	Slope		/	1				7 0	rainage
		Length		1						
	Mott	les	/							
<u>e</u>	Gley		1					_	E	ffective
s	Wate	er Table		-					Ĩ	exture
ge [	Carb	onates 🦳							(i	ndicate
-	Bedr	ock								pelow)
	4	Depth from		% CF		% CF		% CF		% CF
		Texture						2	-	
		Texture					1			
T		Depth from		% CF		% CF	/	% CF		% CF
	4	zero				1				
ion		Texture				/				
rpt	-	Depth from		% CE		% CE		% CE		1 % 05
esc	3	zero		10 01	1	10 OF		70 CT		10 OF
0		Texture		1		1				
IOZI				1						
Hor	4	Depth from	1	% CF		% CF		% CF		% CF
10	1	Zero	1						-	
Š		rexture								
T	-	% Surface								
		Stone/Rock					_			
	Mois	ture Regime								
-	Deal	2222					_		-	
	Drail	lage								

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Cale and an and a standard and the second standard and the second standard at the second st













# C.3 Botanical Inventories



Page 1 of 2

## Plant Species List

Londor         Decisions         Decisions         Decisions           Amounto Alerge Carbon C	2 3 4	1	Graminolds	5 6	3 4	2	1	Tree & Shrubs	3 4 5 6	2 3 4	1 3	es & Shrubs	1.0
Comment of the control of the contr	111		Grasses			19		Deciduous				Conifera	Bulson Die 242
The many method base procession of the advance of the control of	111		Glant Redtop (Agrostis gigantea)					White Oak (Quercus alba)				(Junioerus communie)	Common Junior
Landow and a second se	10		Redtop (Agrostis stolonifera)	-				Red Oak (Quercus macrocarpa)				« (Junperus virginiana)	Eastern Red Cer
The Disc Processing of the State Constrained of the State Constraine	P	-	Bromus		Wit-			Alder Buckthorn (Rhamnus alnifolia)				nicina)	Tamarack (Larix
Nave Store (Presiman) Extension Exte			Blue-joint Grass (Calamagrostis canadensis)		u	2	R	Common Buckthorn (Rhamnus cathartica)				ea alauca)	White Spruce /P
Alle Nervi Alle Paris Astronomic Alle Alle Alle Alle Alle Alle Alle All	D		Orchard Grass (Dactylis glomerata)					Stachom Sumac (Rhus glabra)				na mariana)	Black Spruce (P)
The set of			Poverty Oat Grass (Danthonia spicata)		MU			Wild Black Currant (Ribes americanum)				warikstoria)	Jack Pine (Pinus
Such Profiles extended Such Profiles Such			Virginia Wild Rye (Elymus virginicus)					Prickly Gooseberry (Ribes cynosbati)				(Binus strabur)	Eastern White Pr
Canada May Tanus Landon Bandari Canada May Tanus Landon Bandari Canada May Tanus Landon Bandari Canada May Landon Bandari Can			Elymus					Swamp Black Currant (Ribes lacustre)				s sylvestris)	Scotch Pine (Pin
Earlier Markets Charles Charles Constrained File Constrained Cons			Fowl Manna Grass (Glyceria striata)					Ribes				us canadansis)	Canada Yow (Ta
Value Construction of the second of the sec			Givenia Pice Cut Grass // correle as welded				+	Black Locust (Robinia pseudo-acacia)				far (Thuin occidentalis)	Eastern White Ce
Decision         Decision           Bits Allega Age         Bits			Tall Fescue (Lollum arundinaceum)					Prickly Rose (Rosa acicularis)				a saroni carnadensas)	PANAMUTUNANUIRAR
Analysis and Decision  Analysis (April 1997)			Muhlenbergia					Multiflora Rose (Rose guiliflore)					
Bask Aller Agent Aller A			Witch-grass (Panicum capillare)			1	10	Rosa 50				rciduous	Mantoba Maole
Names Alex Alex Alex Constant and Alex Alex Alex Alex Alex Alex Alex Alex	in c	-	Reed Canary Grass (Phalaris arundinacea)			1	10	Com Blackberry (Rubus allegheniensis)	14	1 18		niarum)	Black Maple (Ace
No. Major March 1997. Provide the service of the se	1 Mars		Timothy (Phleum pratense)					Black Raspherry (Rubus assidents)				r platanoides)	Norway Maple (A
The Rank Mark Access of Karmanes  See Mark Access of Karmanes  Access  See Mark Access of Karmanes  Ac	14		Common Reed (Phragmites australis)			1	V	Purple-fl. Raspberry (Rubus odoratus)				(brum)	Ked Maple (Acer)
<ul> <li>Janet Markel (Ace accolumn)</li> <li>Johnson Markel (Ace accolumn)</li> <li>Johnson Markel (Ace accolumn)</li> <li>Derry Servesberry (Arensia)</li> <li>Derry Marker (Law Servesberry (Arensia))</li> <li>Derry Marker (Law Servesberry (Law Ser</li></ul>			Fowl Meadow Grass (Poa palustris)					Dwarf Raspberry (Rubus pubescens)				Seconemum) Acer X freemanii)	reeman's Maple
Social Materia (Acce scheme)  Socia			Kentucky Bluegrass (Poa pratensis)					Rubus Peach leaved Witten (5-4)				saccharum)	Sugar Maple (Ace
Personal Book (Infrase Incase) Personal (Infrase Infrase) Personal (Infrase Infra			Yellow Foxtail (Setaria pumila)					Bebb's Willow (Salix bebbiana)				cer spicatum)	Aountain Maple //
analystepsing (Analystepsing (Analystepsing)) analystepsing (Analystepsing) analystepsing (Analystepsing) analystepsing (Analystepsing) analystepsing (Analystepsing) analystepsing (Analystepsing) between (Analystepsing) b		r.	Green Foxtall (Setaria viridis)					Pussy Willow (Salix discolor)				nas incana)	Deckled Alder (A
Tables Bint (Bauta astephanesis) The Bint (Bauta astephanesis) Bint (	THORE	21	Popuso					Missouri Willow (Salix eriocephala)				anchier sanouinea)	erviceberry (Am
Internant Haad (Corean prefail)     Internant Haad (Corean pr			4					Sandbar Willow (Salix exigua)				a alleghaniensis)	ellow Birch (Betu
The device of constraine percential and before the constraine percential analysis of thermal before (Constrained and the constrained and the cons								Black Willow (Salix nigra)				papyrifera)	Inite Birch (Betu
Terment heads (Care a varia) Terment heads (Terme a varia)			· · · · · · · · · · · · · · · · · · ·					Slender Willow (Salix petiolaris)				tula pendula)	uropean Birch (E
Databath       Procession       Procession       Procession       Procession         Dimmon       Nackberry       Clear & Vision       Procession       Procession         Bindboorty       Statute       Bindboorty       Procession       Procession       Procession         Bindboorty       Statute       Bindboorty       Statute       Procession       Process				1 11		1		Salix				erva cordiformie	itternut hickory /
Interburg Elements (Cale accelerate)     Interburg Elements Elements Elements (Cale accelerate)     Interburg Elements     Interburg     Interburg Elements				W	1.5	AN	0	Black-berried Elder (Samburgers)	X	N.		Carva ovata)	hagbark Hickory
Officient Indexterry (Cells according)       Buffabberry (Shepherdia canadinasa)       Science         Hamend Converting and Converting and Converting and Converting according and Converting according								Red-berried Elder (Sambucus racemosa)				n (Celastrus scandens,	limbing Bitterswe
H. Haened Converse (Conscience) (Conscience		-	Sednes					Buffaloberry (Shepherdia canadensis)				v (Celtis occidentalis)	uttorbush (Cent
Bit Dopped (Corus amount)         Corus amount)         Corus amount)         Corus amount)           Control amount)         Corus amount)         Corus amount)         Corus amount)           Carus connotinas)         Corus amount)         Corus amount)         Corus amount)           Carus connotinas)         Corus amount)         Corus amount)         Corus amount)           Carus connotinas)         Corus amount)         Corus amount)         Corus amount)           Carus corus         Corus amount)         Corus amount)         Corus amount)           Carus corus         Corus amount)         Corus amount)         Corus amount)           Corus amount)         Corus amount)         Corus amount)         Corus amount) <td< td=""><td></td><td></td><td>Drooping Wood Sedge (Carex arctata)</td><td></td><td></td><td></td><td></td><td>Eur. Mountain Ash (Sorbus aucuparia)</td><td></td><td>11</td><td>1</td><td>d (Comus alternifolia)</td><td>It leaved Dogwo</td></td<>			Drooping Wood Sedge (Carex arctata)					Eur. Mountain Ash (Sorbus aucuparia)		11	1	d (Comus alternifolia)	It leaved Dogwo
Inchitery (Corrus a candense)     analysis and convert (Corrus a candense)     analysis and convert (Corrus a candense)     analysis (Corrus a candense)     analysis (Corrus a candense)     analysis (Corrus a candense)     Circhard Ease (Corrus a candense)     Circhard Ease (Corrus a candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Circhard Ease (Corrus a candense)     Circhard Ease (Corrus a candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Corrus (Corrus a candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Corrus (Corrus a candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Section 1 (Contense candense)     Corrus     Section 1 (Contense candense)     Corrus     Section 1 (Contense candense)     Section 1 (Contense candense)     Corrus     Corr			Golden-fruited Sedge (Carex aurea)				-	Common Lilac (Suringa undarra)				nus amomum)	lky Dogwood (C
Bit downood (Corrus anamycan)         Corrus anamycani (Corrus anamycan)			Graceful Sedge (Carex gracillima)					Basswood (Tilia americana)				s canadensis)	unchberry (Corne
Climbia Poseo-hy (Toxicofendra raticents) Climbia Poseo-hy (Toxicofendra raticents) Cales of the constraint of the cons	+++		Bladder Sedge (Carex interior)		M			Poison-ivy (Toxicodendron rydbergii)	FUN	UFI	Uli	nus racemosa)	ray dogwood (Co
menchan Hazail (Corputs contruls)       Mill Lim (Lim)is antificant)         boltsput Thom (Critegous sunctate)       Mill Lim (Lim)is antificant)         boltsput Thom (Critegous sunctate)       Mill Lim (Lim)is antificant)         bill Lim (Lim)is antificant)       Mill Lim (Lim)is antificant)			Lake-bank Sedge (Carex lacustris)				1	Climbing Poison-lvv (Toxicodendron radicans)	1 1 1 1		NIT.	(Comus serices)	ed-osier Dogwoo
			Hop Sedge (Carex lupulina)				-	Siberian Elm (Ulmus americana)	- WW		Not-	orylus americana)	merican Hazel (C
Constant       Item (Crategous process)         International Structure (Carlescus process)       Item (Crategous process)         International Thom (Crategous process)       Item (Crategous process)         International Structure process process)       Item (Crategous process)         International Thom (Crategous process)       Item (Crategous process)         International Thom (Crategous process)       Item (Crategous process)         International Thom (Crategous process)       Item (Crategous process)         Inte			Pennsylvania Sedge (Carex pensylvanica)				+	Slippery Elm (Ulmus rubra)				ilus cornuta)	saked Hazei (Co
Index. mail         Mape-lead Nummum (Vourum acerdoum)         Cares           Cares         Cares         Cares<			Fox Sedge (Carex vulpinoidea)					Low Blueberry (Vaccinium angustifolium)			_	ataegus crus-galli)	ockspur Thom (C
references			Carex					Maple-leaf Viburnum (Viburnum acerifolium)		11		(Crataedus monogyna)	arge-fruited Thor
raiteagus saish forersackle (Dierville lonicers) usaisn Oliver (Eleadanus angustiola) usaisn Oliver (Eleadanus angustiola) Am. Prickiva Ballies Starbaberry (Fragata kramania) Vite Ash (Frazinus angra) Saes Buschonius anerocana) Vite Ash (Frazinus angra) Saes Allies Usaisna anerocana) Vite Ash (Frazinus angra) Saes Allies Care k Care k Ca			Carex				+	Nannyberry (Viburnum lentago)	A	A		(ereisenes partotato)	rataegus ->>>
User Honessucke (Derevible (oncere) Jaham Dover (Eleadorus anuclasticitat) Jaham Dover (Eleadorus anuclasticitat) Jaham Dover (Eleadorus anuclasticitat) Jaham Dover (Fragaria systematicitat) Jaham Satukatorus (Fragaria systematicitat) Jahack Aah (Frazinus anercana) Jahack Jahan (Jahan Jahan) (Contanercana) Jahack Jahan (Jahan Jahan) Jahack Jahan (Jahan Jahan) Jahan Jahan (Jahan Jahan) Jahan Jahan Jahan Jahan (Jahan Jahan) Jahan Jahan Jaha			Carex					Guelder-Rose (Viburnum opulus)					rataequs
Anamin Ontex (Lanespuns and Justicity)     Anamis Ontex (Lanespuns and Justicity)     Anamina Ontex			Carex					Downy Arrow-wood (Vib. rafinesquianum)			-	(Diervilla Ionicera)	ush Honeysuckie
Lur. Strawberr-bush (Equicity and official)       Care in the interval base (Faque grandicial)         Jobes Buckhom (Fraque and official)       Ferra & Allies         Jobes Ab (Frazuns and recenal)       Lady Fern (Athysis and Bio-formina)         Back Ab (Frazuns and recenal)       Ratissnake Fern (Borychinera)         Steen Abit (Frazuns and official)       Builter Bioder Fern (Cystopters builtivera)         Steen Abit (Frazuns and official)       Builter Bioder Fern (Cystopters builtivera)         Steen Abit (Frazuns and official)       Builter M (Judies cheres)         Black Abit (Frazuns and official)       Builter M (Judies cheres)         Black Abit (Frazuns and official)       Builter M (Judies cheres)         Black Abit (Frazuns and official)       Builter M (Judies cheres)         Black Abit (Frazuns and official)       Builter M (Judies cheres)         Black Abit (Frazuns and official)       Darkopters         Storebush (Linders denzon)       Full (Support (Support))         Phonesystick (Loncer and densis)       Common Aprile (Support)         Garact (Rouce and densis)       Common Aprile (Maus and Marinal Wooffer and Builtonin)         Marinal Wooffer (Morea and Support)       Common Aprile (Maus and Marinal Wooffer and Builtonin)         Morea Support (Morea and Builtonin)       Common Aprile (Maus and Marinal Wooffer and Builtonin)         Morea Support (Morea and Builtonin)			Carex		F	W.	- 14	Am Prickly ach (Zaothovulum americanum)				agnus umbellata)	utumn Olive (Ela
Intercent Beach (Faquare vigniane)         Ferns & Alles           Disses Buckhom (Fraquere vigniane)         U         Ferns & Alles           Disses Buckhom (Fraquere vigniane)         U         Rattissnake Fern (Botychium vignianum)           Disse Ash (Fraxous energia)         Bube Black Fern (Chapters bubblers)         Redroot Spike-rush (Eleocharis enthroadel)           Disck Ash (Fraxous energia)         Bube Black Fern (Chapters bubblers)         Redroot Spike-rush (Eleocharis enthroadel)           Disck Ash (Fraxous energia)         Crees         Crees           Sch Stem Bulinsh (Schoenoplectus exture)         Sch Stem Bulinsh (Schoenoplectus exture)           Disck Value) (Judiens finere)         Crees (Botychiers cristate)           Back Value) (Judiens finere)         Bube Black (Concers canadensis)           Corres (Concers canadensis)         Corres (Botychiers cristate)           Corres (Concers canadensis)         Crees (Concers canadensis)           Corres (Marco energia)         Corres (Sarcous energia)           Corres (Marcous energia)         Corres (Sarcous energia)           Corres (Corres (	111		Carey		11			Sarabalas SP				sh /Euonymus obovata	un. Strawberry-b
Dobs/Subckhom       Ferne & Allies         Carex       Carex         Vihite Ash (Fraxinus americana)       Lady Fern (Arytum Rischem volnanum)         Back Ash (Fraxinus americana)       Lady Fern (Arytum Rischem volnanum)         Sine Ash (Fraxinus energia)       Lady Fern (Arytum Rischem volnanum)         Sine Ash (Fraxinus energia)       Bulbet Bladder Fern (Crystopters carthusiana)         Sine Moof Fern (Dryotheris carthusiana)       Bulbet Bladder Fern (Crystopters in argunals)         Ormon Privat (Laustrum vulcare)       Scin. Wood Fern (Dryotheris carthus)         Sine Wood Fern (Dryotheris carthus)       Schnemeson (Scinus Scines acuta)         Back Main (Laustrum vulcare)       Carex (Carex Care)         Schnemeson (Laustrum vulcare)       Carex (Care)         Schnemeson (Laustrum vulcare)       Carex (Care)         Schnemeson (Laustrum vulcare)       Carex (Care)         Schnemeson (Care)       Care (Care)         Schnemeson (Care)       Care (Care)         Schnemeson (Care)       Care)         Schnemeson (Care)       Care)         Schnemeson (Care)       Care) </td <td></td> <td></td> <td>Carex</td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td>agus grandifolia)</td> <td>mencan Beech</td>			Carex					1				agus grandifolia)	mencan Beech
Vilies Ash, Previous americana)         Ladv Fern (Achyrum Buckernia)           Back Ash, Previous americana)         Ratissnake Fern (Borychum vycaniam)           Back Ash, Previous americana)         Ruth Hammels vrganena)           Witterbervilles ensylvanical         Spin: Wood Fern (Dryopteris catulusea)           Witterbervilles ensylvanical         Spin: Wood Fern (Dryopteris catulusea)           Witterbervilles         Spin: Wood Fern (Dryopteris catulusea)           Witterbervilles         Spin: Wood Fern (Dryopteris americana)           Witterbervilles         Spin: Wood Fern (Dryopteris americana)           Back Wahni, Liudeins ingra)         Schesbash (Linders banzon)           Schesbash (Linders banzon)         Schesbash (Linders banzon)           Back Wahni, Liudeins ingra)         Schesbash (Linders banzon)           Redictorers canadensis)         Garaxe           Ganzons Atopie (Matus sumie)         Schesbash (Linders banzon)           Revel (Londers canadensis)         Garaxe (Revel (Linders canadensis))           Ganzons Atopie (Matus sub)         Schesbash (Linders banzon)           Savet Sche (Marca sale)         Wool-grass (Schruus subming)           Garave (Revel (Linders canadensis))         Garave (Revel (Saraganium aurycarpum)           Narow (Watus sale)         Schesbash (Linders americana)           Savet Sche (Marca sale)         Sc			Carex				-	Earnin P. Allian				Franquia alnus) (Franaria virginiana)	licitics buckthom
Back Ash (Fraxmus piers).       Rattlesnake Ferri (Botrichium reprinarium)       Ciperus       Ciperus       Ciperus       Ciperus       Ciperus       Ciperus       Ciperus       Ciperus       Ciperus       Eleccharis       Elecharis       Elecharis <td></td> <td></td> <td>Carex</td> <td></td> <td></td> <td></td> <td></td> <td>Lady Fem (Athvrium filix-femina )</td> <td></td> <td>111</td> <td></td> <td>s americana)</td> <td>Vhite Ash (Fraxin</td>			Carex					Lady Fem (Athvrium filix-femina )		111		s americana)	Vhite Ash (Fraxin
Schem Ash: (Frakkins beinstein       Bubbet Bladder Ferm (Crystopteries bubblera)       Reditors Spake-rush (Eleocharis enthropode)         With-haze (If ex verticibiet)       Spin: Wood Ferm (Dryopteris caritusiana)       Reditors Spake-rush (Eleocharis enthropode)         Stimet (Judgians cincrea)       Marginal Wood Ferm (Dryopteris marginals)       Reditors Spake-rush (Eleocharis enthropode)         Stimet (Judgians cincrea)       Oryopteris       Marginal Wood Ferm (Dryopteris insignals)       Soft-stem Buhush (Schupa strutush) (Sc			Cyperus					Rattlesnake Fern (Botrychium virginianum)	~	1		s nigra)	Hack Ash (Fraxin
Witch-Dazis (Institutions: Variable)       Spin. Wood Pem (Drycoters cratiusiana)       Electors         Suitemotry (Lyulens cinerea)       Construction (Drycoters cratiusiana)       There-square Bulnush (Sch. bundens)         Sattemot (Lyulens cinerea)       Construction (Drycoters cratiusiana)       Three-square Bulnush (Sch. bundens)         Splick Wainut (Lyulens cinerea)       Sont Stem Bulnush (Sch. bundens)       Sch stem Bulnush (Sch. bundens)         Splick Wainut (Lyulens cinerea)       Sont Stem Bulnush (Sch. bundens)       Sch stem Bulnush (Sch. bundens)         Splick Wainut (Lyulens cinerea)       Sont Stem Bulnush (Sch. bundense)       Sch stem Bulnush (Sch. bundense)         Splick Wainut (Lyulens cinerea)       Sont Stem Bulnush (Sch. bundense)       Sch stem Bulnush (Sch. bundense)         Splick Wainut (Lyulens cinerea)       Sont Stem Bulnush (Sch. bundense)       Sch stem Bulnush (Sch. bundense)         Roval Fern (Osmunda cinytoniana)       Roval Fern (Osmunda cinytoniana)       Sch stem Bulnush (Sch. bundense)         Roval Fern (Osmunda cinytoniana)       Roval Fern (Osmunda cinytoniana)       Sch stem Bulnush (Sch. bundense)         Sweet Gale (Myrica ade)       Wool-grass (Scrpus cyperinus)       Sch stem Bulnush (Sch. bundense)         Sweet Gale (Myrica ade)       Sont Read Reade Sch (Populus Bulnense)       Sch ana Sch (Populus Sch			Redroot Spike-rush (Eleocharis ervthropoda)					Bulbet Bladder Fern (Cystopteris bulbifera)		11		us pennsylvanica)	Green Ash (Fraxi
andterruti, (Lingelins singre)       Marginal Wood Fem (Dryopheris marginalis)       Marginal Wood Fem (Dryopheris marginalis)       Marginal Wood Fem (Dryopheris marginalis)         Black Wainut (Lingers benzon)       Problemics       Soft-stem Bulnush (Sch. Bungens)         Sprechush (Linders benzon)       Soft-stem Bulnush (Sch. Bungens)       Soft-stem Bulnush (Sch. Bungens)         Sprechush (Linders canadensis)       Benztive Fem (Oncoles seriabilis)       Soft-stem Bulnush (Sch. Bungens)         Glaucous Honeysucke (Lonicera diocia)       Chinatmas Fem (Delytopheris marginalis)       Wood-grass (Scinus cyperinus)         Ommore Y-Honeysucke (Lonicera diocia)       Chinatmas Fem (Polytochinare)       Wood-grass (Scinus cyperinus)         Marsh Fem (Mersuche Lanicera diocia)       Chinatmas Fem (Polytopheris marginalis)       Marsh Fem (Thelytopheris palustris)         White Multerry (Morus alba)       Kastem Bracken-tem (Peterdum acrosticholides)       Eastem Bracken-tem (Peterdum acrosticholides)         Romove Honeysucke (Lonicera diatarce)       Vul       Vul       Reset Ball (Equisetum arvense)       Broad leaved Cattal (Typha atficia)       D         Ninebark (Physocarpus opulificius)       Balsam Polytic (Poulus Betamifere)       Vul       Vul       Valiagated Honsetail (Equisetum arvense)       Broad leaved Cattail (Typha atficia)       D         Easter Cotonwood (Populus detiodes)       Field Honsetail (Equisetum arvense)       Soft Rush (Juncus a			Eleocharis					Spin. Wood Fern (Dryopteris carthusiana)				entelis virginiana) erticilata)	Vitch-hazei (Han
Black Wainut (Judians nigra)       F       K       Dryopteris         Spicebush (Linders benzoin)       F       K       Dryopteris         Spicebush (Linders benzoin)       Spicebush (Linders benzoin)       Dark remer Buinush (Sch labernæmmstan)         Spicebush (Linders benzoin)       Spicebush (Linders benzoin)       Dark remer Buinush (Sch labernæmmstan)         Spicebush (Linders benzoin)       Spicebush (Linders benzoin)       Dark remer Buinush (Sch labernæmmstan)         Spicebush (Linders benzoin)       Spicebush (Linders benzoin)       Dark remer Buinush (Sch labernæmmstan)         Marrow's Honeysucke (Lonicera tararca)       Common Apple (Malus pumle)       Dark remer Buinush (Sch labernæmmstan)         Ravial Ferri (Dsmunda cinvioname)       Ravial Ferri (Dsmunda cinvioname)       Dark remer Buinush (Sch labernæmmstan)         Common Apple (Malus pumle)       Marrow's Honeysucke (Lonicera tararca)       Dark remer Buinush (Sch labernæmmstan)         Common Apple (Malus pumle)       Marrow's Honeysucke (Lonicera tararca)       Dark remer Buinush (Sch labernæmmstan)         Common Apple (Malus pumle)       Marrow's Honeysucke (Lonicera tararca)       Dark remer Buinush (Sch labernæmmstan)         Common Apple (Malus pumle)       Marrow's Honeysucke (Lonicera tararca)       Dark remers Buinush (Sch labernæmmstan)         Common Ference Buinush (Sch labernæmmstan)       Marrow's Honeysucke (Lonicera tararca)       Darea			Three-square Bulrush (Sch. pundens)					Marginal Wood Fern (Dryopteris marginalis)	0			cinerea)	Sutternut (Juglan
Common Privet (Ligustrum vulgare)  Solicibush (Lindera banzoin)  FN Honeysuckie (Lonicera canadensis)  Gaucous Honeysuckie (Lonicera canadensis)  Cinnamon Fem (Osmunda cinamonnee)  Intempted Fem (Osmunda cinamonnee)  Intempted Fem (Osmunda cinamonnee)  Royal Fem (Polybochum acrostichoides)  Royal Fem (Polybochum sertel)  Narow-leaved Cattail (Pyoha angustifolia)  Royal Fem (Polybochum sertel)  Royal Fem (Polyboch			Soft-stern Bulrush (Sch. tabernaemontani)					Dryopteris	K	UI	F	lans nigra)	Black Walnut (Ju-
Discretion       Discretion       Contract of the control of the interval of			Dark-green Bulrush (Scirpus atrovirens)			-	-	Ostrich Fern (Matteuccia struthiopteris)				igustrum vulgare)	Common Privet (
Glaucous Honevsuckie (Lonicera dioca)       Interrupted Fem (Osmunda claytoniana)         Morrow's Honevsuckie (Lonicera talanca)       Roval Fem (Osmunda claytoniana)         Tartahan Honevsuckie (Lonicera talanca)       U.U.U.U.         Common Apple (Malus pumila)       Construas Fem (Perjustichum acrostichoides)         Common Apple (Malus pumila)       Broad Bur-reed (Sparganium eurycarpum)         Sweet Gale (Myrica gale)       Field Horsetail (Equisetum arvense)         Field Horsetail (Equisetum noverse)       Broad leaved Cattail (Typha angustificile)         Broad leaved Cattail (Typha angustificile)       Broad leaved Cattail (Typha angustificile)         Broad leaved Cattail (Typha Stattole)       Variegated Horsetail (Equisetum variegatum)         Balsam Poplic (Populus balsamilera)       Ground-cuba (Lucucus effusus)         Easter Cotonwood (Populus deltoides)       Equisetum inverse)         Easter (Prunus pansylvanica)       Ground-cubar (Lycopodium digitatum)         Prior Centry (Prunus pansylvanica)       Ground-cubar (Lycopodium digitatum)         Pin Centry (Prunus pansylvanica)       Ground-cubar of status (Lincus effusus)         Black Cherw (Prunus strainian)       Ground-cubar of status (Lincus effusus)         Promitis Cherry (Prunus pansylvanica)       Ground-cubar of status (Lincus effusus)         Black Cherw (Prunus pansylvanica)       Ground-cubar or >25% wegetalion sover in any one stratuiti			vvool-grass (Scirpus cyperinus)			1		Cinnamon Fem (Osmunda cinnamomea)				Lonicera canadensis)	Fiv Honevsuckle
Morrow's Honeysucké (Lonicera morrowii)       I       Roval Fern (Osmunda requis)         Tartánian Honeysucké (Lonicera tatarica)       U       U       Constitua Sem (Polytichum acrostichoides)         Common Apple (Malus pumile)       Marsh Fern (Ostrum acrostichoides)       Broad Bur-reed (Sparganium eurycarpum)         Sweet Gale (Myrica alae)       Marsh Fern (Ostrum acrostichoides)       Broad Bur-reed (Sparganium eurycarpum)         Ninebark (Physocarpus opulifolius)       Field Horsetail (Equisetum arvense)       Broad-leaved Cattail (Typha angustifolie)       D         Balsam Poplar (Populus balsamifera)       U       Varieqated Horsetail (Equisetum varieqatum)       Souring-rush (Equisetum nacrostichum)       Articulated Rush (Juncus articulatus)       D         Balsam Poplar (Populus balsamifera)       U       Varieqated Horsetail (Equisetum varieqatum)       Solf Rush (Juncus articulatus)       Solf Rush (Juncus articulatus)       D         Balsam Poplar (Populus balsamifera)       U       Varieqated Horsetail (Equisetum varieqatum)       Solf Rush (Juncus articulatus)       D         Sweet Cherry (Prunus service)       Shining Clubmoos (Lycopodium digitatum)       Path Rush (Juncus ternuis)       Juncus         Sweet Cherry (Prunus poins/Varice)       Ground-courr or >25%, wepstaion sover in any one stratum       Juncus       D         Pututes transponded by large numbers, generally forming >10% ground courr or >25%, wepstaion sov								Interrupted Fern (Osmunda claytoniana)				uckle (Lonicera dioica)	Glaucous Honey
Tananan Hoherystickie (Lohicera taranca)       M. M. O. M. Olimbarhas references provide matching activities of the models of the								Royal Fern (Osmunda regalis )		1.1	tent	ickle (Lonicera morrowi	Morrow's Honeys
White Mulberry (Morus alba)       Marsh Fem (Thei/ypteris palustris)       Other Graminoids         Sweet Gale (Myrice gale)       Broad Bur-reed (Sparganium eurycarpum)       Broad Bur-reed (Sparganium eurycarpum)         Thicket-creeper (Parthenocissus inserte)       Scounng-rush (Equisetum arvense)       Broad Bur-reed (Sparganium eurycarpum)         Balsam Popiar (Populus balsamifera)       Variegated Horsetial (Equisetum variegetum)       Broad-leaved Cattail (Typha antifolia)       D         Balsam Popiar (Populus defoides)       Scounng-rush (Equisetum variegetum)       Articulated Rush (Juncus articulatus)       Broad-leaved Cattail (Typha Xilaus)       D         Balsam Popiar (Populus defoides)       Scounnd-rush (Equisetum variegetum)       Articulated Rush (Juncus articulatus)       Broad-leaved Cattail (Typha Xilaus)       D         Balsam Popiar (Populus defoides)       Ground-cedar(Lycopodium digitatum)       Soft Rush (Juncus effusus)       Soft Rush (Juncus effusus)       D         Broad Back Cherry (Prunus ensylemice)       Broad-leaved Cattail (Typha Xilaus)       Soft Rush (Juncus effusus)       Soft Rush (Juncus effusus)       D         Black Cherry (Prunus ensylemice)       Broad-leaved Cattail (Typha Xilaus)       Soft Rush (Juncus effusus)       Juncus         Black Cherry (Prunus ensylemice)       Broad-leaved Cattail (Typha Xilaus)       Soft Rush (Juncus effusus)       Juncus       Juncus       Juncus <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Eastern Bracken-fern (Pteridium acrostichoides)</td><td>N IN</td><td>- W</td><td>14</td><td>ickle (Lonicera tatarica) Italus numila)</td><td>Common Apple</td></td<>								Eastern Bracken-fern (Pteridium acrostichoides)	N IN	- W	14	ickle (Lonicera tatarica) Italus numila)	Common Apple
Sweet Gale (Myrics cale)       Field Horsetal (Equisetum arvense)       Broad Bur-reed (Spargamium eurycarpum)       Narrow-leaved Cattal (Typha angustifolia)         Ninebark (Physocarpus opulifolius)       Scouring-runsh (Equisetum arvense)       Broad-leaved Cattal (Typha angustifolia)       Diod Horsetal (Equisetum arvense)         Balsam Poplar (Populus balsamifera)       Scouring-runsh (Equisetum neurycarpum)       Broad-leaved Cattal (Typha angustifolia)       Diod Horsetal (Equisetum arvense)         Balsam Poplar (Populus balsamifera)       Ground-ceded(Typha)       Articulated Rush (Juncus articulatus)       Articulated Rush (Juncus articulatus)         Large-tooth Aspen (Populus grandidentata)       Equisetum       Ground-cedea(Typha)       Path Rush (Juncus articulatus)         Sweet Cherry (Prunus pensylvanica)       Black Cherry (Prunus pensylvanica)       Black Cherry (Prunus verginiana)       Juncus         Pinod Bur reed (Spargamium eurycarpum)       Ground-cedea(Typha)       Ground-cedea(Typha)       Juncus         Provenus (Cherry (Prunus pensylvanica)       Ground-cedea(Typha)       Juncus       Juncus         Black Cherry (Prunus verginiana)       Unicus article to the individual cumps, usably forming > 10% ground cover or >26% vegetation sover in any one stratum       Juncus         Provent       Field Horsetal (Individual cumps, usably forming > 10% ground cover or >26% vegetation sover in any one stratum       Juncus         Provent       Field Y	111		Other Graminoids					Marsh Fern (Thelypteris palustris)				lorus alba)	White Mulberry (
Iformwood (Ostry a vrginiana)       Image: the second of the product of			Broad Bur-reed (Sparganium eurycarpum)									a gale)	Sweet Gale (Myr
Interded (Physocarpus opullifolius)       Indicating (Paysocarpus opullifolius)       Indicating (Paysocarpus opullifolius)         Balsam Poplar (Populus balsamifera)       Variegated Horsetail (Equisetum ivernale)       Endicating (Paysocarpus opullifolius)         Balsam Poplar (Populus balsamifera)       Variegated Horsetail (Equisetum ivernale)       Anticulated Rush (Juncus articulatus)         Eastern Cottonwood (Populus deltoides)       Equisetum       Equisetum interded (Interded Interded Int	PIF	1	Narrow-leaved Cattail (Typha angustifolia)			-		Field Horsetail (Foursetum arvense)				Virginiana)	Ironwood (Ostry
Balsam Poplar (Populus balsamifera)       Varieqated Horsetail (Equisetum varieqatum)       Anticulated Rush (Juncus articulatus)         Eastern Cottonwood (Populus delitoides)       Varieqated Horsetail (Equisetum varieqatum)       Soft Rush (Juncus articulatus)         Large-tooth Aspen (Populus tremuloides)       Sining Clubmoss (Lycopodium lucidulum)       Soft Rush (Juncus articulatus)         Sweet Cherry (Prunus sirum)       Ground-bine (Lycopodium abscurum)       Juncus         Pin Cherry (Prunus servium)       Ground-bine (Lycopodium abscurum)       Juncus         Pin Cherry (Prunus servium)       Ground-bine (Lycopodium abscurum)       Juncus         Phant Rush full (Lincus tenuis)       Juncus       Juncus         Black Cherry (Prunus servium)       Ground-bine (Lycopodium abscurum)       Juncus         Prunus       Soft Rush (Juncus articulatus)       Juncus         Pointamt represented by large numbers generally forming >10% ground cover or >25% vegetation cover in any one stratum       Juncus         P- Denitamt represented by large numbers generally forming >10% ground cover or >25% vegetation cover in any one stratum       Vulcus ground cover         V Uncommon (#Abundant in ELC) present as widenpreds cattered individuals or represented by one or more clumps of many individuals (most species will full into this patergory)         R Rave represented in the polygon by less than about five individuals or small clumps       Math 2       Math 2			Broad-leaved Cattall (Typha (attrolia)					Scouring-rush (Equisetum hyemale)			M	arpus opulifolius)	Ninebark (Physe
Eastern Cottonwood (Populus deltoides) Large-tooth Aspen (Populus grandidentate) Trembling Aspen (Populus grandidentate) Trembling Aspen (Populus tremulaides) Shining Clubmoss (Lycopodium lucidulum) Ground-bine (Lycopodium lucidulum) Ground-bine (Lycopodium abscurum) Uncus Uncus Path Rush (Juncus effusus) Juncus Juncus Juncus Juncus Uncus Path Rush (Juncus tenuis) Uncus Path Rush (J			Articulated Rush (Juncus articulatus)				2	Variegated Horsetail (Equisetum variegatum)	V	V		opulus balsamifera)	Balsam Poplar (
Binds Cherry (Prunus avium)     Path Rush (Juncus tenuis)     Shining Clubmoss (Lycopodium lucidulum)     Juncus		-	Soft Rush (Juncus effusus)			-		Equiselum Groupd-cedar// vconodium dipitatum)				n (Populus deltoides)	Eastern Cottony
Sweet Cherry (Prunus avium)       Ground-pine (Lycopodium obscurum)       Juncus         Pin Cherry (Prunus pensylvanica)       Black Cherry (Prunus serotina)       Juncus         Black Cherry (Prunus serotina)       Ground-pine (Lycopodium obscurum)       Juncus         Provest       Prunus serotina)       Ground-pine (Lycopodium obscurum)       Juncus         Prunus Serotina       Ground-pine (Lycopodium obscurum)       Juncus         Prunus Serotina       Ground-pine (Lycopodium obscurum)       Juncus         U. Groommon («Occasional in ELC) persent as widespread represented by represented b		1	Juncus (Juncus tenuis)					Shining Clubmoss (Lycopodium lucidulum)	e			(Populus tremuloides)	Trembling Aspe
Pin Cherry (Prunus perisylvenica) Black Cherry (Prunus serofina) Choke Cherry (Prunus serofina) Choke Cherry (Prunus virginiana) Prunus ** Prunus			Juncus					Ground-pine (Lycopodium obscurum)			1	runus avium)	Sweet Cherry //
Black Cherry (Phones storma) Choke Cherry (Phones storma) Prunts 5 2 Dominant represented by large numbers, generally forming >10% ground cover or >25% vegetation sover, in any one stratum. F - Fairly common (=Abundant in ELC) present as widespread scattered individuals or represented by one or more clumps of many individuals (most species will fail into this catergory) R - Rare represented in the polygon by less than about five individuals or small clumps Project Discot Herbs - Asteracea Discot Herbs - Matteracea Discot Herbs - Ma												us perisylvanica)	Pin Cherry (Pru
Prunts 50 Prunts						-	-					runus virginiana)	Black Cherry (P
Dominant represented by large numbers, generally forming >10% ground cover or 22% vegetation cover in any one stratum.     F. Fairly common (*Abundant in ELC) generally widespread represented by fairly large numbers of individual cumps, usually forming >10% ground cover     U - Uncommon (*Abcasional in ELC) present as widespread scattered individuals or more clumps of many individuals (most species will fail into this catergory)     R. Rare, represented by the other as widespread scattered individuals or more clumps of many individuals (most species will fail into this catergory)     R. Rare, represented in the polygon by less than about five individuals or small clumps     Project     Discotter as widespread scattered individuals or small clumps     Discotter as a scattered individuals     Discotter as a scattered individual as or small clumps     Discotter as a scattered individual as or scattered individual as a scattered     Discotter as a scattered individual as or scattered ind									U U		1	and the second function of the	Prunus 58
Project     Orcommon (#Occasional in ELC) present as widespread scattered individuals or impresented by one or more clumps of many individuals (most species will fail into this patergory)     A - Rare ingresented in the polygon by less than about five individuals or small clumps     Project     Occasional in the polygon by less than about five individuals or small clumps     Project     Occasional in the polygon by less than about five individuals or small clumps     Project     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional in the polygon by less than about five individuals or small clumps     Occasional indite individuals     Occasional individuals     Occasional individua							104	Cover or >25% vegetation cover in any one stratum	2 >10% ground	ming >10	ally form	esented by large numbers, get Abundant in ELCL	D - Dominant rep
R - Rare: represented in the polygon by less than about five individuals or small clumps      repect:     Diance:     Dia			nto this cateroory)	will fail	SCIONE SCIONE	s (mas	luais	y rainy large numbers of many data clumps, detailing forming > induals or represented by one or more clumps of many individ	scattered indivi	ead scan	idespre	ccasional in ELC) present a	F - Fairly common
Project Glancasterikla s CLIMI-1/MAMA s CLIMI-1 Date Grand 20 s CLIMI-1/MAMA s CLIMI-1 surveyore State aceas 11213 4 5 6 Digot Herbs 123 4 5 6 Digot Herbs 133 4 5 6 Digot Her			no ma calo ga yi	Control control	agentati	I MICES		Il clumps	viduals or small	Individua	ut five .	in the polygon by less than	B - Rare represer
Date: Oct Le 120 2 MA2-1 CUMI-12 CUMI-12 CUMI-12 CUMI-12 MAM INCLU			CLANAI-I		0	4		CUMI-1/MAM2			5	ACOSTERRA	Project: (3)0
Dicot Herbs - Asteraceae 11213141516 Dicot Herbs 11213			CUMI-IN MAMINEL			6		MAS2-1			2	0120	Date: OC+
Dicot Herbs - Asteraceae 11213141516 Dicot Herbs 11213141516 Dicot Herbs 11213141516 Dicot Herbs 11213141516			MAM2-2			6		I CUTI/CUMI-1?			3	se'u prokumon	Surveyors: XC
Charge (Achilles millefolium)	21.2.2.2	-	Dicot Herbs	1.510	1.3.1.2	110	T	61 Direct Hartin	1314151	1212	11	Herbs - Asteraceae	500
Common Failer States Cabsene burse Cabsene burse	3 4 5	-+-	Kidney-leaf Buttercup (Ranunculus abortivus)	1210		-	1	Shepherd's Purse (Capsella bursa-pastoris)		1	1	w (Achillea millefolium)	Common Yarr
White Snakeroot (Aderatina altissima) Cultercub (Ranunculus actiss) Tall Buttercub (Ranunculus actiss) Tall Buttercub (Ranunculus actiss) Hocked Buttercub (Ranunculus actiss)			Hooked Buttercup (Ranunculus acris )			-	41-1	Cutleaf Toothwort (Cardamine concatenata)				ot (Aderatina altissima) I (Ambrosia artemisitolia	White Snaken
Giant Raoweed (Ambrosia billide) Penn. Bitter-cress (Cardamina bensvivanica) Ranunculus		-	[Ranunculus	11	11	1	) [	Penn. Bitter-cress (Cardamine pensylvanica)	1111	11		(Ambrosia trifida )	Glant Ragwer

Filmer Diversities (Lettermarks marked)	1.0				Plant Species List		÷				
American Suntana (Andum maria)	1.1	Ť.	1		Bue Cohosh (Caulophyllum shalesmakes)	11	11	i r	4	Sheep Somel (Ruman academic)	Page to etc
Devil's Secondicks, Science cernue)	1.3		1		Unterhead (Chelone platea)					Curty-leaf Dock (Rumex crispus)	1111
Scotted Nationeed Centeuree Sectorsteini	1 1	1		- f	Water-bemicck (Cicuta maculata)					Bloodroot (Sandinaria canadense)	1 1 1
Chaon (Ochanum envous I	-11.	1		-	Enchanter's Nightshade (Circaea lutatiana)	10E				Bouncing Bet (Saponaria offernado)	
Sull Thete (Croum vulcare)		-		1	Viruina Spring Beauty (Claytonia caroliniana)					Marsh Skullcap (Scuteliaria galericulata)	
Horseweed (Convize canadensis) Dalisy Flyathons (2007)		÷		-1-	Virgin's-bower (Clematis virginiana)				1	White Campion (Silene latifolia)	
Philadelphia Peabane (End. philadelphinus)		1	1		Dog-stranging Vine (Cynanchum rossinum)					Bladder Campion (Silene vulgaris)	
DROPON JOB-OVE-WEAK   Functional and a second strategy	11	1			Wild Carrot (Daucus carota)	E		e	-	Bitter Nightshade (Solanum duicamara)	
Boneset (Euclidonum certoliatum)	1	1		1	Sourrel-com (Dicentra canadensis)					Grassleaf Stitchwort (Stellars	- WA
Laroe-leaved Aster (Eurybla macrophylla)	La!	1		-	Wild Tensel (Dicentra cucullaria)			+		Common Chickweed (Stellaria media)	
Orande Hawkweed (Hieracium aurantiecum	1 KAK	4		-	Wild Cucumber (Echinocystis lobata )	F		E		Tall Meadow-rue (Thalictrum dioicum)	
meracum	-	1			Northern Willow-berb (Englishum siling					Field Penny-cress (Thlaspi arvense)	
Elecampane (Inula helenium)		-		-	Hairy Willow-herb (Epilobium hirsutum)	1	-			Star-flower (Trientalis borealis)	
Lactuca	1	1			Epilobium					White Clover (Trifolium pratense)	
Ux-eve Claisy (Leucanthemum vulgare)		1		-	Worm Mustard (Ervsimum cheirenthoides)				-	Trifolium Stinging Nettle (Using 1	
Tal White Lettuce (Prenenthes albssime)		1			Viroinia Strawberry (Fragaria viroiniana)					Greater Bladderwort (Utricularia vulgaris)	
fall Goldenrod   Solitarn altroime	L	1			Hemo Nettle (Galeoosis tetrahit) Wild Madder (Galeon mollows)				-	Common Mullein (Verbascum thaosus)	
Blue stem Goldenrod (Solidado caesie )	Di	4	D		Marsh Bedstraw (Galium palustre)					White Vervain (Verbena urticifolia)	
Did-zao Goldenrod (Solidado canadensis)				1	Galium					Common Speedwell (Veron: anagailis-aquatica)	
Sant Goldenrod / Soldago gigantea		1		-	Spotted Geranium (Geranium maculatum)					Veronica	
Grav Goldenrod (Solidado Juncea)		-		1	Yellow Avens (Geum aleppicum)					Vicia	
Solidado Suo Field Somethics and Solidado		in		DIT	White Avens (Geum canadense)					Perwinkle (Vinca minor) Dog Viglet (Vigle conservation)	
Sonchus	1	1		1	Dame's Rocket (Hesperis matronalis)					Yellow Violet (Viola pubescens)	
reart-leat Aster (Symph. cordifolium)					Com St. John's-wort (Hungersum virginianum)				1	Viola	
Tal White Aster (Symph. lanceolatum)				-	Spotted Jewelweed (Impatiens capensis)	F		-	ele		
Vew England Aster (Symphyotrichum laterifiorum)		1.			Motherwort (Leonurus candiaca)				1		
Purple-stem Aster (Symph. puniceus)		14	1	Nin	Field Pepperarass (Lepidium campestre)				1		
Common Lansy (Lanacetum vulgare.)				1	Butter & Eggs (Linaria vulgaris)				1		
Com. Goatsbeard (Tracopogon pratensis)					Great Lobelia (Lobelia siphilitica )					Monocot Herbs	
solisiou() (ussiedo renere )	FI			-	Cut-leaf Bugleweed (Lycopus americanus)			1	-	Water-plantain (Alisma plantago-aquatica)	
ariston at	FI	F	F	FIF	Finged Loosestrife (Lycopus unifiorus)					Jack-in-the-pulpit (Arisaema triphyllum)	
Enclarin Sig	ul				Moneywort (Lysimachia nummularia)				1	Asparadus (Asparadus officinalis) Wild Calla (Calla palustris)	
Carsham So	0		e		Purple Loosestrife (Lythrum salicaria)					Bluebead-lilv (Clintonia borealis)	
The second se				1	Alfalfa (Medicago sativa)			- Ľ		Yel Ladv's Slipper (Cvpripedium parviflora)	
		1			White Sweet-clover (Melilotus alba)			1		Canada Waterweed (Elodea canadensis)	
Other Dicot Herbs					Wild Mint (Mentha arvensis)					Yellow Trout Lilv (Ervthronium americanum)	
Red Baneberry (Actaea rubra )		1			Wild Bergamot (Monarda fistulosa)					Orange Day Lilv (Hemerocallus fulva)	
Garlic Mustard (Alliana petiolara)		1			Forget-me-not (Mvosotis scoroloides)				-	Lesser Duckweed (Lemna minor)	
Green Amaranth (Amaranthus retroflexus)					Com. Evening-primrose (Depothera biegnis)					Wild Liv-of-valley (Maianthemum canadense)	
Pearly Everlasting (Anaphalis margaritacea)				-	Sweet-cicely (Osmorhiza berterii)					Star False Solomon (Majanthemum racemosum)	
Canada Anemone (Anemone canadensis)					Wild Parsnip (Pastinaca sativa)				-	True Solomon Seal (Polyaonatum pubescens)	
Thimbleweed (Anemone virginiana)		1		-	English Plantain (Plantago lanceolata)					Curly-leaf Pondweed (Potamogeton crispus)	
rurple Angelica (Angelica atropurpurea)					Rugel's Plantain (Plantago rugelii)					Sago Pondweed (Potamogeton pectinatus)	
Nild Sarsaparilia (Aralia nudicaulis )					Pale Smartweed (Polygonum lapathifolium)				1	Potamogeton	
Vild Ginger (Asarum canadense )					Ladv's-thumb (Polygonum persicaria)					Blue eved arrowhead (Sagittaria latifolia)	
Swamp Milkweed (Asclepias incernate)					Polygonum				-	Herb. Camon Flower (Smilax herbacea)	
(ellow Rocket (Barbarea vulgaris)	M			N	Polygonum Rough Cinquefoil (Potentilla norveoice)					Nodding Ladies' Tresses (Spiranthes cernua)	
raise Nettle (Boehmerie cylindrice) Black Mustard (Brassica piece)		1		-	Rough-fruited Cinquefoil (Potentilla recta)				+	Rose Twisted-stalk (Streptopus lanceolatus)	
Marsh-manoold (Calthe palustris)		1			Potentilla		-		1	Purple Trillium (Trillium erectum)	
creeping beimower (Campanula rapunculoid	(es)	1			Heal-all (Prunella vulgaris)					Large-flowered Bellwort (Uvularia grandiflora)	
					Original ("Viola emplica")				1		
		10			barren sp	F		1	4		
		1			Menths aquiotica	W	=		1		
					A		1				
		1		-			1				
		1							+		
		1									
D - Dominant represented by large numbers general	y formin	1 >1/	196.00	Dund	werny >25% upperation				1		
F - Fairly common (=Abundant in ELC) generally with	desprea	drep	asen	ted by	arry large numbers of Individual clumps: usually formers to	Mi circu	and an	ins .			
U - Uncommon (=Occasional in ELC) present as wid	lespread	f scat	tered	individ	als or represented by one or more clumps of many individua	els (mos	st spec	ies wi	ll fall i	to this catergory)	_
R - Rare represented in the polygon by less than about	five ind	Invidua	als or	small	hamps	- Inches	and the state				
Mancaskx R.d.	1-1-	5	YY	11-	1 MANIL	4	CA	IN	IFI		
- OCT 50 20	1	P	142	2	1	5	CL	In	1-1	w MAMinch	
BUTVEYORS ZATI MCKENZU	1 1	0	LX	TI	/ CULM-1		M	TA	10	2	
							-	-	-		

Trees & Shrubs	1	2	3	4	5 6	Tree & Shrubs	1	2	3	4	5 6	Graminolds	1 2	2 3	4	5
Conifers						Deciduous						Grasses				
Baisam Fir (Abies baisamea) Common Juniper (Juniperus communis) Eastern Red Cedar (Juniperus virginiana) Temarack (Lanz Janchas)						White Oak (Quercus alba) Bur Oak (Quercus macrocarpa) Red Oak (Quercus rubra)	U		D	X		Glant Redtop (Agrostis gigantea) Redtop (Agrostis stolonifera) Awniess Brome (Bromus inermis)			X	
Norway Spruce (Picea abies) White Spruce (Picea glauca) Black Spruce (Picea glauca)						Alder Buckthom (Rhamnus athifolia) Common Buckthom (Rhamnus cathartica) Smooth Sumac (Rhus glabra)	F	E	F	X		Bromus Blue-joint Grass (Calamagrostis canadensis) Orchard Grass (Dactylis glomerata)			X	
Jack Pine (Pinus banksiana) Red Pine (Pinus resinosa)			0			Staghom Sumac (Rhus hirta) Wild Black Currant (Ribes americanum) Prickly Gooseberry (Ribes cynosbati)				X		Poverty Oat Grass (Danthonia spicata) Quack Grass (Elymus repens) Virginia Wild Rye (Elymus virginicus)				
Eastern White Pine (Pinus strobus) Scotch Pine (Pinus sylvestris) Canada Yew (Taxus canadensis)		×-	×			Swamp Black Currant (Ribes lacustre) Red Currant (Ribes rubrum) Ribes			V			Elymus Fowl Manna Grass (Glyceria striata) Glyceria				
Eastern White Cedar (Thuja occidentalis) Eastern Hemlock (Tsuga canadensis)					-	Black Locust (Robinia pseudo-acacia) Prickly Rose (Rosa acicularis) Smooth Rose (Rosa blanda)	NA.		*			Rice Cut Grass (Leersia oryzoides) Tall Fescue (Lolium arundinaceum) Muhlenbergia				
Deciduous						Multiflora Rose (Rose multiflora)						Witch-grass (Panicum capillare)	-			
Manitobe Maple (Acer negundo)						Com. Blackberry (Rubus allegheniensis)	M	W				Reed Canary Grass (Phalaris arundinacea)	1		X	
Norway Maple (Acer nigrum)						Wild Red Raspberry (Rubus idaeus)						Timothy (Phleum pratense)			12	
Red Maple (Acer rubrum)						Purple-fl. Raspberry (Rubus occidentalis)	V			_		Common Reed (Phragmites australis) Canada Blue Grass (Poa compressa)			PS-	
Silver Maple (Acer saccharinum) Freeman's Maple (Acer X memanii)						Dwarf Raspberry (Rubus pubescens)						Fowl Meadow Grass (Poa palustris)			1	
Sugar Maple (Acer saccharum)		100	D			Peach-leaved Willow (Salir amundaloides)						Kentucky Bluegrass (Poa pratensis)		-	1×	
Mountain Maple (Acer spicatum) Speckled Alder (Algue income)						Bebb's Willow (Salix bebbiana)	- 22					Green Foxtail (Setana viridis)				
Downy Serviceberry (Amelanchier arborea)				2.3		Pussy Willow (Salix discolor) Missouri Willow (Salix encompain)							-		-	
Serviceberry (Amelanchier sanguinea)						Sandbar Willow (Salix exigua)							1		t	1
White Birch (Betula papyrifera)			-			Shining Willow (Salix Jucida)										
European Birch (Betula pendula)						Siender Willow (Saix nigra)									t	-
Bittemut hickory (Carva continana)	10		1			Salix		R								
Shagbark Hickory (Carya ovata)	K		te	1		Black-berried Elder (Sambucus niora)									-	1
Climbing Bittersweet (Celastrus scandens)			1			Red-berried Elder (Sambucus racemosa)										
Buttonbush (Cephalanthus occidentalis)						Eur Mountain Ash (Sorbus aucunaria)						Sedges	-		1	-
Alt -leaved Dogwood (Comus alternifolia)			1	1		Narrow Meadow-sweet (Spiraea alba)						Golden-fruited Sedge (Carex arctata)			÷	-
Bunchberry (Comus canadensis)	+	-	1	+		Common Lilac (Syringa vulgaris)			1			Graceful Sedge (Carex gracillima)				
Gray dogwood (Cornus racemosa)	U	1	JFF	X		Poison-ivy (Toxicodendron rydbergii)	N		H			Inland Sedge (Carex interior) Bladder Sedge (Carex intumescens)			-	-
Round-leaved Dogwood (Comus rugosa)		1	1	K		Climbing Poison-ivy (Toxicodendron radicans)		ø	1			Lake-bank Sedge (Carex lacustris)			t	1
American Hazel (Corvius americana)	19	1	1	P		Siberian Fim (Ulmus americana)	1	1	*			Hop Sedge (Carex lupulina)			T	
Beaked Hazel (Corylus cornuta)						Slippery Elm (Ulmus rubra)			8			Awi-fruited Sedge (Carex stipata)			+	-
Sockspur Thom (Crataegus crus-galii) English Hawthom (Crataegus monogyna)		1	1	+		Low Blueberry (Vaccinium angustifolium)	-					Fox Sedge (Carex vulpinoidea)				
arge-fruited Thorn (Crataegus punctata)	1	1	1	1		Hobblebush (Vibumum lantanoides)			-			Carex Sp	F	F		1
Crataegus 🖘 p			U	9		Nannyberry (Viburnum lentago)						Carex			1	
Jrataegus Rush Honevsuckle (Diervilla Ionicera)		-	-			Guelder-Rose (Viburnum opulus)		N.				Carex			1	
Russian Olive (Elaeagnus angustifolia)						Riverbank Grape (Vitis npana)	F	F	N	X		Carex			-	1
Autumn Olive (Elaeagnus umbellata)		-	1	1		Am. Prickly-ash (Zanthoxylum americanum)					11	Carex			+	1
American Beech (Facus grandifolia)		-	+	1		Minurgingtyilde		0			11	Carex				
Glossy Buckthorn (Frangula alnus)						Vicesti uni cuativi		T	-			Carex			-	1
Virginia strawberry (Frageria virginiana)		0	+	-		Ferns & Allies						Carex			1	
Black Ash (Fraxinus americana)		MS.	Ŧ			Rattlesnake Fern (Botrychium virginianum)	+	H	l.		11	Carex	1			
Green Ash (Fraxinus pennsylvanica)	1					Bulbet Bladder Fern (Cystopteris bulbifera)				T		Redroot Spike-rush (Eleocharis ervthropoda)	-		-	+
Witch-hazel (Hamamelis virginiana)		-		-		Spin. Wood Fem (Dryopteris carthusiana)		-			11	Eleocharis				1
Butternut (Jugians cinerea)	R	1	t	1		Marginal Wood Fern (Dryopteris marginalis)	+			+	++	Three-square Bulrush (Schoenoplectus acutus)				
Black Walnut (Juglans nigra)	143		R			Dryopteris	U		1			Soft-stem Bulrush (Sch. tabernaemontani)	+		-	1
Common Privet (Ligustrum vulgare)	1	-	1			Sensitive Fern (Onoclea sensibilis)	1.1				11	Dark-green Bulrush (Scirpus atrovirens)				
Fly Honeysuckle (Lonicera canadensis)						Cinnamon Fern (Osmunda cinnamomea)	ľ	1			11	(voorgrass (Scarpus cypennus)	+			1
Glaucous Honeysuckle (Lonicera dioica)		-				Interrupted Fern (Osmunda claytoniana)		-	1	1	11			11	ŧ	+
Tartarian Honeysuckle (Lonicera tatarica)	E		F	$\pm x$		Christmas Fern (Polystichum acrostichoides)		+	1	-						
Common Apple (Malus pumila)			1			Eastern Bracken-fern (Pteridium aquilinum)							-		-	-
White Mulberry (Morus alba)		-	-			Marsh Fern (Thelyptens palustns)		+	-	+	11	Other Graminoids				
Ironwood (Ostrya virginiana)			1				1	1	1			Narrow-leaved Cattail (Typha angusticita)	1	11		1
Thicket-creeper (Parthenocissus inserta)	10					Field Horsetail (Equisetum arvense)		1				Broad-leaved Cattall (Typha latifolia)		M		1
Ninebark (Physocarpus opulifolius) Baisam Poplar (Populus baisamifera)	*	-				Scouring-rush (Equisetum nyemale) Varienated Horsetail (Equisetum varienatum)		1	+			Broad-leaved Cattall (Typha X glauca)		11		
Eastern Cottonwood (Populus deltoides)			1			Equisetum	1	1	1	1	11	Soft Rush (Juncus effusus)				
Large-tooth Aspen (Populus grandidentata)		-	10			Ground-cedar(Lycopodium digitatum)	1	1	1	-		Path Rush (Juncus tenuis)				
Sweet Cherry (Prunus avium)		+	1×	4		Ground-pine (Lycopodium obscurum)		t	+	-	++	Juncus P	1	D		
Pin Cherry (Prunus pensylvanica)	1	1	1	1				1	1		11		+	11		
Black Cherry (Prunus serotina)	-	-	1	-			1	-	1	-						
Prunus 20	1		N	1				-	1	1	1					-
D - Dominant' represented by large numbers; general	Hy for	mtiin	gŚ	10%	ground	f cover or >25% vegetation cover in any one stratum	-	-	-	-	-	and a second	_	1		-
F - Fairly common ("Abundant in ELC), generally wi U - Uncommon ("Occasional in ELC), present as with	despr	1990	scall act	vese ittere	nted b	y fainy farge numbers of individual clumps, usually forming > iduals or represented by one or nove clumps of mon	10%	gro	und	COV	er los unit	fall late, this contemporal				
R - Rere represented in the polygon by less than abo	ut five	o ind	livid	luais	or smu	ill clumps	-undis	fund		poc	os will				-	-
Project: (Mancaster Rd	1		1			F004-1		4	-			KON 2	T	11	T	T
Date: Oct- 6190	10		1	1.	1 1	SINITO INANAO	100	100		-			T	TT	-	1
and the second sec	100	1	-	1	1 de	IN A MANY		5				0		1. 1.	1.81	

Dicot Herbs - Asteraceae	111213	141516	Dicot Herbs	11121	3141516	Dicot Herbs	11 21 31 71 5	51.61
Common Yarrow (Achillea millefolium)	111	XI	Shepherd's Purse (Capsella bursa-pastoris)			Kidney-leaf Buttercup (Ranunculus abortivus)		T
Com. Requeed (Ambrosia artemisifolia)			Toothwort (Cardamine diphylla)			Hooked Buttercup (Ranunculus acris)		1
Giant Ragweed (Ambrosia trifida)			Penn Bitter-cress (Cardamine pensylvanica)			Ranunculus		
Artemisia			Blue Cohosh (Caulophvilum thalictroides)			Curly-leaf Dock (Rumex crispus)		-
Common Burdock (Arctium minus)		XII	Mouse-ear Chickweed (Cerastium fontanum)	133		Bitter Dock (Rumex obtusifolius)		
Nodding Beggar-ticks (Bidens cemue) Devil's Reggar-ticks (Bidens frondose)		+	Spotted Water-bemlock (Cicula maculata)			Bloodroot (Sanginaría canadense)		-
Spotted Knapweed (Centaurea biebersteinii			Water-hemlock (Cicuta virosa)			Bouncing Bet (Saponaria officinalis)		
Brown Knapweed (Centaurea jacea)			Enchanter's Nightshade (Circaea lutetiana)			Marsh Skullcap (Scutellaria galericulata)		
Canada Thistie (Cirsium arvesnse)			Virginia Spring Beauty (Clavtonia caroliniana)			Mad Dog Skullcap (Scuteliaria laterifiora)		-
Bull Thistie (Cirsium vulgare)			Virgin's-bower (Clematis virginiana)			Bladder Campion (Silene vulgaris)		
Daisy Fleabane (Engeron annus)			Field Bindweed (Convolvulus arvensis)			Hemlock Water-parsnip (Sium suave)		
Philadelphia Fleabane (Eng. philadelphicus)			Wild Carrot (Daucus carota)	F		Black Nightshade (Solanum ducamara)		
Loe-ove-weed (Funatorium maculatum)			Deptford Pink (Dianthus armena)			Grassleaf Stitchwort (Stellaria graminea)		
Boneset (Eupatorium perfoliatum)			Dutchman's-breeches (Dicentra cucultaria)			Common Chickweed (Stellaria media)		
Large-leaved Aster (Eurybia macrophylla)			Wild Teasel (Dipsacus fullonum)		X	Tall Meadow-rue (Thalictrum pubescens)		
Orange Hawkweed (Hieracium aurantiacum			Vilid Cucumber (Echinocystis lobata)	111		Field Penny-cress (Thlaspi arvense)		
Field Hawkweed (Hieracium caespitosum)			Northern Willow-herb (Epilobium ciliatum)			Star-flower (Trientalis borealis)		
Elecampane (Inula helenium)		111	Hairy Willow-herb (Epilobium hirsutum)			Red Clover (Trifolium pratense)		
Prickly Lettuce (Lactuca serriola)			Epilobium			Trifolium		
Lactuce	111	1 1	Worm Mustard (Erysimum cheiranthoides)			Stinging Nettle (Urtica dioica)	R	
Pineapple-weed (Matricana discoidea)			Virginia Strawberry (Fragada virginiana)	le il		Greater Bladderwort (Utnculana vuigans)		
Tail White Lettuce (Prenanthes altissima)			Hemp Nettle (Galeopsis tetrahit)	N.		Blue Vervain (Verbena hastata)		
Tall Goldenrod (Solidado altissima)			Wild Madder (Galium mollugo)	N		White Vervain (Verbena urticifolia)		1
Blue-stern Goldenrod (Solidago caesia)		114	Sweet-scented Bedstraw (Galium triflorum)			Common Speedwell (Veronica officinalis)		
Canada Goldenrod (Solidago canadensis)			Galium			Veronica		
Giant Goldenrod (Solidago gigantea)			Herb-robert (Geranium mbertianum)			Cow Vetch (Vicia cracca)		
Early Goldenrod (Solidago juncea)			Yellow Avens (Geum aleppicum)	TV I		Periwinkle (Vinca minor)		
Solidago Solidago nemoralis )	1 1	MI	White Avens (Geum canadense)			Dog Violet (Viola conspersa)		1
Field Sow-thistle (Sonchus arvensis)	1		Dame's Rocket (Hesperis matronalis)			Com Blue Violet (Viola sororia)		
Sonchus			Virg Water-leaf (Hydrophyllum virginianum)			Viola		
Heath Aster (Symphyotrichum encoides)		111	Spotted Jewelweed (Impatiens capensis)	tul 1		Smithuso	0	
Tall White Aster (Symph. lanceolatum)			Wood Nettle (Laportea canadensis)	1 mg		Print of		
Calico Aster (Symphyotrichum latenflorum) New Eppland Aster (Symphy povae-appliae	E	21	Motherwort (Leonurus cardiaca)					
Purple-stem Aster (Symph puniceus)	R	11	Eur. Gromwell (Lithospermum officinale)					
Common Tansv (Tenacetum vulgare)		11	Butter & Eggs (Linaria vulgaris)					
Com. Goatsbeard (Tracopodon pratensis)	+ + +	141	Lobelia			Water-plantain (Alisma plantago-aquatica)		
Coltstoot (Tussilago farfara)			Cut-leaf Bugleweed (Lycopus americanus)			Wild Leek (Allium tricoccum)		
Curlway	11		Northern Bugleweed (Lycopus unifiorus)			Jack-in-the-pulpit (Arisaema triphyllum)		
Autor to	IN I		Moneywort (Lysimachia nummularia)			Wild Calla (Calla palustris)		-
			Lysimachia	110		Bluebead-lily (Clintonia borealis)		
			Black Medick (Medicago lupulina)	T		Garden Lily-of-valley (Convallana majalis)		
			Alfalfa (Medicago sativa)			Canada Waterweed (Elodea canadensis)		
		111	White Sweet-clover (Melliotus alba)			Helleborine (Epipactis helleborine)		
Other Dicot Herbs		111	Wild Mint (Mentha arvensis)			Blue-flag Iris (Iris versicolor)		
White Baneberry (Actaes pachypoda)			Wild Bergamot (Monarda fistulosa)	F		Orange Day Lily (Hemerocallus fulva)		
Red Baneberry (Actaea rubra)	11		Forget-me-not (Myosotis scorpioides)			Starry Duckweed (Lemna trisulca)		
Garlic Mustard (Alliaria petiolata)	P		Water-cress (Nasturtium officinale)			Wild Lilv-of-valley (Maianthemum canadense		
Green Amaranth (Amaranthus retroflexus)		+++	Sweet-cicely (Osmorbiza berterii)			Star False Solomon (Malanthemum racemosun		
Pearly Everlasting (Anaphalis margaritacea			Yellow Wood-sorrel (Oxalis stricta)			True Solomon Seal (Polygonatum pubescens	s)	
Canada Anemone (Anemone canadensis)			Wild Parsnip (Pastinaca sativa)			Pickerel-weed (Pontederia cordata)		
Try Hepatica (Anemone acutiloba)		111	Common Plantain (Plantago maior)			Sago Pondweed (Potamogeton pectinatus)		1
Purple Angelica (Angelica atropurpurea)			Rugel's Plantain (Plantago rugelli)			Potamogeton		
Indian Hemp (Apocynum cannabinum)			May-apple (Podophyllum peltatum)			Potamogeton Broad-leaved Arrowhead (Sadittaria latifolia)		
Wild Sarsapanila (Aralia nudicaulis)			Lady's-thumb (Polygonum persicaria)			Blue-eved-grass (Sisyrinchium montanum)		
Wild Ginger (Asarum canadense)			Virginia Knotweed (Polygonum virginianum)			Herb. Carrion Flower (Smilax herbacea)		-
Swamp Milkweed (Asclepias incarnata)		V	Polygonum	-		Nodding Ladies' Tresses (Spiranthes cernua		
Yellow Rocket (Barbarea vulgaris)		NI	Rough Cinquefoil (Potentilla norvegica)			Rose Twisted-stalk (Streptopus lanceolatus)		
False Nettle (Boehmeria cylindrica)			Rough-fruited Cinquefoil (Potentilla recta)	11		Skunk-cabbage (Symplocarpus foetidus) Purple Trillium (Trillium erectum)	+	
Black Mustard (Brassice nigra)			Potentilla	M		White Trillium (Trillium grandiflorum)		
Creeping Beliflower (Campanula rapunculo	ides)		Heal-ali (Prunella vulgaris)			Large-flowered Bellwort (Uvularia grandiflora	0, 11	
Angenes & all	10		Shinleaf (Pyrola elliptica)				++++	
Linenson to	K I		Foitoals Avairuana	KA.				
Meparaques afficinatio	8		Et	0				
			Enountwins operations	N				-
		111	CELLIN SO	F	INI			+
		111	Decempa willowa		181			1
			Langener Auroan		13			
							1111	1
								1
D - Dominant represented by large numbers, gener	ally forming	>10% ground	l cover or >25% vegetation cover in any one stratum		and doub			
F - Fairly common ("Abundant in ELC) generally v	widespread n	apresented b	y fairly large numbers of individual clumps, usually forming >	10% grou	ind cover			
R - Rare represented in the polygon by large these	ndespread si	attered indiv	nouses or represented by one or more clumps of many individ all clumps	Juais (mo	st species will i	all into this catergory)		-
Project:	Tell	TO CONTRACT		1.11	20m			1
The October 100	7	TC 22	1 1/10-10		LON	×	++++	
A AND A PAR	D	TUNE	L/ MANL	5	11	8	+-+-+-+-+-	1
aniveryora 2024 HARDUS D	49	Fab	2-2-	0		0		

### **Plant Species List**

						Plant Species List			P	age 2 of	2
Field Pussyloes (Artenneria nediecla) Arternisia Common Burdock (Arctum minus) Nodina Bedat-ticks (Bidens kondoss) Devil's Beadar-ticks (Bidens kondoss) Spotted Knaoweed (Centauree lacea) Chicory (Cehorium intybus) Canada Thistle (Crisum arcesnse) Bull Thistle (Crisum arcesnse) Bull Thistle (Crisum arcesnse) Bull Thistle (Crisum arcesnse) Philadelphia Fleabane (Eric philadelphicus) Enderon Joe-eve-weed (Eucatorium maculatum) Boneset (Eucatorium maculatum) Boneset (Eucatorium maculatum) Boneset (Eucatorium maculatum) Boneset (Eucatorium maculatum) Boneset (Eucatorium aeroliatum) Larae-leaved Aster (Eurybia macrophylia) Fat-top Goldenrod (Euthamia araminfolia) Dance Hawkweed (Hieracium caespitosum) Herabum Teckly Lettuce (Lactuca seriola) actuca Dr. eve Dasy (Leucanthemum vulgare) Theapole-weed (Matricaria discoidea) all White Lettuce (Prenanthes altissima) Black eved Susan (Rudbeckie hirta) all Goldenrod (Solidado caesia) anada Goldenrod (Solidado caesia) anada Goldenrod (Solidado caesia) Siarty Goldenrod (Solidado caesia) Sonchus tean-teal Aster (Symph, tanceolatum) Hew Encland Aster (Symph, novae-andliae) Urble-stem Aster (Symph, novae-andliae) Ormon Dandelion (Taraxecum officinae) Somon Dandelion (Taraopoon oratensis) Contoso			D F	103 W		Cardamine       Bue Cohosh (Caulophyllum thailchoides)       Sheep Sorrel (Rumex acetosella)         Bue Cohosh (Caulophyllum thailchoides)       Curk-leat Dock (Rumex crispus)         Mouse-ear Chickweed (Cerastium fontanum)       Bitter Dock (Rumex cultural marking)         Sotted Water-hemock (Cicuta maculata)       Bitack Toock (Rumex cultural marking)         Water-hemock (Cicuta virosa)       Bitack Sonakeroot (Sancia)         Viroin's Boatty (Clavtonia vironica)       Mad Dock (Rumex cultural marking)         Viroin's bower (Clemais vironia vironica)       White Camoion (Sterne latifolia)         Viroin's bower (Clemais vironia vironica)       White Camoion (Sterne latifolia)         Viroin's bower (Clemais vironia vironica)       White Camoion (Sterne latifolia)         Viroin's bower (Clemais vironica)       White Camoion (Sterne latifolia)         Viroin's bower (Clemais) vironacy aronica)       Hemlock Water camoion (Sterne vironica)         Wild Carrot (Daucus carota)       Early Meadow-rue (Thalicitum dioka)         Boutchman Sterne Bauty (Clavonium)       UL F         Wild Cacumber (Echicopy viroina)       Early Meadow-rue (Thalicitum dioka)         Star-foreer (Fridoum particita)       Star-foreer (Tridoum partense)         Wild Cacumber (Echicopy viroina)       Star-foreer (Viroina viroina)         Baide Willow-herb (Epidobium dilatum)       Star-foreer (Tridolium partense)	lica) ilata) ilata) iflora) ire) irea) inea) inea) irea) inea)	U.			
Other Dicot Herbs         Thite Baneberry (Actaea pachyboda)         ed Baneberry (Actaea rubra)         al Acrimon (Actaea rubra)         al Acrimon (Actaea rubra)         al Acrimon (Actaea rubra)         al Acrimon (Actaea rubra)         octobate retroflexus)         octobate retroflexus)         octobate retroflexus)         octobate retroflexus)         octobate retroflexus)         octobate retroflexus)         octobate Alliane petiolata)         anada Anemone (Anemone canadensis)         virtic Anecica (Anemone canadensis)         virtic Anecica (Anecica et courburge a)         dian Hemp (Acocvnum canadense)         virtic Aralia rudicaulis)         pikenard (Aralia nudicaulis)         pikenard (Aralia nudicaulis)         pikenard (Aralia nudicaulis)         pikenard (Aralia nudicaulis)         pikenard (Bacheas svriaca)         eathy Cocker (Bacheas svriaca)         eathy Cocker (Bacheas svriaca)         eathy Cocker (Bacheas svriaca)         alse Nettle (Boehmeria c	es)	ming : ead o	-10% atto	E 5 grot sente red in	and cox	Lysimachia       Enclosestrife (Lythrum salicaria)       U       F       Garden Lilk-of-vallev (Convalleria m Yel, Lady's Slipper (Convalleria m Yel, Lady's Venterceality fully Wild Lilk-of-vallev (Maranthemum ra False Solom Seal (Maianthemum ra False Solom (Maianthemum ra False Solom (Maianthemum ra False Solom (Maianthemum ra False Solom Seal (Polyaonatum p Polyaonatum p Save Foodwed (Polyaonatum p Polyaonatum p Polyaonum Pale Smartweed (Polyaonum lapatholium)) Fale Smartweed (Polyaonum lapatholium)) Fale Smartweed (Polyaonum kantholium)) Fale Smartweed (Polyaonum kantholium))	aialis ) rviflora) ensis ) canum ) a ) inadense ) cemosum ) stellatum ) stellatum ) tinatus ) (atifolia ) tanum ) cea ) scornua ) rolatus ) idufolia ) andiflora )				
Project: <u>Approximate in the polygon by less than about</u> Project: <u>Approximate Approximate Approximat</u>	-220-		1.f	11	11- 2-1 11-	MAM (PCLIMI-) CLIMI-) = MAM inclu?					

Page 1 of 2

### Plant Species List

Trees & Shrubs	111	2 3	1415	6	Tree & Shrubs	11	21	3 4	1 5	6	Graminoids	1	2	3	4	5 6
Conifers		1			Deciduous	t			1		Grasses	1		-	-	+
Balsam Fir (Ables balsamea)		1	TT	T	White Oak (Quercus alba)						Glant Redtop (Agrostis gigantea)	-	+	-	+	+
Common Juniper (Juniperus communis)		-			Bur Oak (Quercus macrocarpa)	-				-	Redtop (Agrostis stolonifera)		1	-		
Eastern Roo Cenar (Juniperus virginiana)				1	Alder Buckthom (Rhamous alrufolia)	-					Awniess brome (brombs merma)	1	1			
Norway Spruce (Picea abies)	1.3	1		1	Common Buckthorn (Rhamnus cathartica)	t.		1			Blue-joint Grass (Calamagrostis canadensis)		-		-	1
White Spruce (Picea glauca)			R		Smooth Sumac (Rhus alabra)	1.4					Orchard Grass (Dactylis glomerata)	- 1	+	++	2	1
Black Spruce (Picea mahana)				+	Staghom Sumac (Rhus hirta)	W-	1	4			Ouack Grass (Elymus recens)					
Red Pine (Pinus resinosa)					Prickly Gooseberry (Ribes cynosbati)				1 3		Virginia Wild Rye (Elymus virginicus)			-		
Eastern White Pine (Pinus strobus)			1		Swamp Black Currant (Ribes lacustre)						Elymus	_			10	
Scotch Pine (Pinus sylvestris)		+	11	1	Red Currant (Ribes rubrum)	0			1		Fowl Manna Grass (Glyceria striata)		1		P	
Eastern White Cedar (Thuia occidentalis)		di i		1	Black Locust (Robinia pseudo-acacia)	T:=					Rice Cut Grass (Leersia oryzoides)				1	1-
Eastern Hemlock (Tsuga canadensis)					Prickly Rose (Rosa acicularis)	18					Tall Fescue (Lolium arundinaceum)		-1-		4	-1
					Smooth Rose (Rosa blanda)	-					Muhlenbergia Witch cross (Panicum canillare)				1	
Deciduous					Rosa						Panicum					
Manitoba Maple (Acer negundo)		1	R		Com. Blackberry (Rubus allegheniensis)	1		3			Reed Canary Grass (Phalaris arundinacea)	1	1	1 U	μł	P
Black Maple (Acer nigrum)		4		-	Wild Red Raspberry (Rubus idaeus)	11			1		Timothy (Phleum pratense)	-	= 1			F
Red Maple (Acer platenoides)					Pumle-fl. Raspherry (Rubus occidentalis)	N.		1	1		Canada Blue Grass (Poa compressa)				1	
Silver Maple (Acer saccharinum)					Dwarf Raspberry (Rubus pubescens)					1	Fowl Meadow Grass (Poa palustris)	_		10	+	1
Freeman's Maple (Acer X freemanii)					Rubus					1	Kentucky Bluegrass (Poa pratensis)		+	1	Ť	1
Sugar Maple (Acer saccharum) Mountain Maple (Acer saicatum)				-	Peach-leaved Willow (Salix amygdaloides) Bebh's Willow (Salix hebbiana)						Green Foxtall (Setaria viridis)					
Speckled Alder (Alnus incana)					Pussy Willow (Salix discolor)					1	This white the little			-	+	-
Downy Serviceberry (Amelanchier arborea)					Missouri Willow (Salix eriocephala)						LEONINOCH DA CIUSGAIL		+	-	+	
Serviceberry (Amelanchier sanguinea)		-			Sandbar Willow (Salix exigua)					-	by way way				1	
White Birch (Betula alregnamensis)					Black Willow (Salix ridera)						o child ideal ide			82	1-	-
European Birch (Betula pendula)					Slender Willow (Salix petiolaris)			3			toasp		-	-	14	1
Blue Beech (Carpinus caroliniana)				1	Salix Sp	M	U	-			l l		1	1	1	
Shachark Hickory (Carva ovata)				-	Black-berried Elder (Sambucus niora)							2			1	
Climbing Bittersweet (Celastrus scandens)				1	Red-berried Elder (Sambucus racemosa)										1	
Common Hackberry (Celtis occidentalis)			1	1	Buffaloberry (Shepherdia canadensis)				1		Sedges				-	1
Buttonbush (Cephalanthus occidentalis)				1	Eur. Mountain Ash (Sorbus aucuparia)			-			Golden-fruited Sedge (Carex aurea)				1	
Silky Dogwood (Cornus anomum)				1	Common Lilac (Svringa vulgaris)						Graceful Sedge (Carex gracillima)		-	1	1	
Bunchberry (Cornus canadensis)	1.1				Basswood (Tilia americana)			-			Inland Sedge (Carex Interior)	-+	+	+	ł	
Gray dogwood (Cornus racemosa)	W.	1		-	Poison-ivy (Toxicodendron rydbergii)						Lake-bank Sedge (Carex Incomescens)					
Round-leaved Llogwood (Cornus rugosa)	FI	K		1	White Elm (Ulmus americana)						Hop Sedge (Carex lupulina)					42
American Hazel (Corvius americana)		1			Siberian Elm (Ulmus pumila)						Pennsylvania Sedge (Carex pensylvanica)	-	-	1	-	
Beaked Hazel (Corylus cornuta)				-	Slippery Elm (Ulmus rubra)			-		-	Fox Sedge (Carex supara)					
Cockspur Thorn (Crataegus crus-galli)				1	Manle-leaf Viburnum (Viburnum acerifolium)						Carex a				F	
ame-fruited Thom (Crataegus monodyna)					Hobblebush (Viburnum lantanoides)			1			Carex M	-	-			
Crataegus					Nannyberry (Viburnum lentago)	0					Carex				1	
Crataegus		-			Guelder-Rose (Viburnum opulus)	2					Carex					
Bush Honeysuckie (Diervilla Ionicera)		1			Riverbank Grape (Vitis riparia)	U		FU			Carex	-	+		1	1
Autumn Olive (Elasagnus umbellata)					Am. Prickly-ash (Zanthoxylum americanum)			-	1 1		Carex		-		t	1
Run. Strawberry-bush (Euonymus obovata)					a second s			1			Carex	28	1			
American Beech (Fagus grandifolia)		1									Carex				1	
Viminia strawberry (Fragaria virginiana)					Ferns & Allies			-			Carex			-	1	1
White Ash (Fraxinus americana)		-			Lady Fem (Athyrium filix-temina)			1			Cvperus		1		t	1
Black Ash (Fraxinus nigra)		1		i	Bulbet Bladder Fern (Cystopteris bulbifera)						Redroot Spike-rush (Eleocharis erythropoda)			1	1	
Green Ash (Fraxinus perinsylvanica) Wach-hazel (Hamamelis virginiana)					Spin. Wood Fern (Dryopteris carthusiana)			-			Eleocharis	-	+	6	1	
Winterberry (Ilex verticilata)		-			Crested Wood Ferr (Dryopteris cristata)						Three-square Bulrush (Sch. pungens)					
Buttemut (Juglans cinerea)	11	-			Dryopteris						Soft-stem Bulrush (Sch. tabernaemontani)					
Black Walnut (Jugrans riigra)	NA:				Ostrich Fern (Matteuccia struthiopteris)						Dark-green Bulrush (Scirpus atrovirens)		1		+	1
Spicebush (Lindera benzoin)					Sensitive Fem (Onoclea sensibilis)						Sch con				10	L
Fly Honeysuckle (Lonicera canadensis)		1		-	Interrupted Fern (Osmunda claytoniana)								1		1	
Giaucous Honeysuckie (Lonicera dibica)	198	1			Roval Fern (Osmunda regalis )								-		1	
Tartarian Honeysuckle (Lonicera tatarica)	U	-			Christmas Fern (Polystichum acrostichoides)								1	1	1	
Common Apple (Malus pumila)		1			Marsh Fem (Thelvpteris palustris )						Other Graminoids				1	
White Mulberry (Morus alba)											Broad Bur-reed (Sparganium eurycarpum)	1	1	0	1	F
Ironwood (Ostrya virginiana)		1									Broad-leaved Cattali (Typha angustifolia)	1	4	K	1	T
Thicket-creeper (Parthenocissus inserta)		1			Scouring-rush (Equisetum arvense)						Broad-leaved Cattail (Typha X glauca)				1	
Ninebark (Physocarpus opulitolius) Balsam Poplar (Populus balsamilera)					Variegated Horsetall (Equisetum variegatum)						Articulated Rush (Juncus articulatus)	-	-	-	1	
Eastern Cottonwood (Populus deltoides)					Equisetum			-			Path Rush (Juncus tenuis)		1	1	1	1
Large-tooth Aspen (Populus grandidentata)	-	1	1		Shining Clubmoss (Lycopodium digitatum)						Juncus So		1	1	U	4
Sweet Cherry (Prunus avium)			-		Ground-pine (Lycopodium obscurum)						Juncus	-	-		1	
Pin Cherry (Prunus pensylvanica)							-						1		1	
Black Cherry (Prunus serotina)				3												
Prunus		1						1				1	1	1	1	1
D - Dominant represented by large numbers: generally	formin	g >10 d rmo	% groun	by fa	ver or >25% vegetation cover in any one stratum why large numbers of individual clumps: usually forming >10	% pro	ound a	over								
U - Uncommon (=Occasional in ELC), present as wide	spread	scatt	ered ind	Widu	als or represented by one or more clumps of many individual	is (mo	ost sp	ecies	will to	all int	to this catergory)					
R - Rare represented in the polygon by less than about,	live ind	vidua	is or sm	uli ch	mps T 1 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	51		1 1	-	C1110/1-1	T	1	T	T	T
Projecti	1-1-	+	-		LANT MAMA	e	25-		+	-	Citital > - Mara 7		-+-	-	+-	+
Date:	P h					1º	<	-	+		CLIPIT-I & FIATELING. :			-	+	+
Surveyors	2	1			CALMFT / CUTT	-	21	1	1	_	THE A	-	1	1	1	1
Dicot Herbs - Asteraceae	112	13	4 5	6	Dicot Herbs	1	213	3 4	151	6.	Dicot Herbs	1	213	14	15	6
Common Yarrow (Achilea millefolium)		1			Snepherd's Purse (Capsella bursa-pastoris) Cutleaf Toothwort (Cardamine concatenata)						Tall Buttercup (Ranunculus acris)				1	
Com, Ragweed (Ambrosia artemisiifolia)		1			Toothwort (Cardamine diphvlla)			1			Hooked Buttercup (Ranunculus recurvatus)		1		1	1
Giant Radwood (Ambrosia trifida )	1	1		11	renn, Bitter-cress (Cardamine bensvivanica)			1	_	1	nanunculus	1	-		1	-

Plant Species List

A

Trees & Shrubs	1	121	3 4	516	Tree & Shrubs	T	12	3	4	5 6	6 Graminolds	1	2	3	4 1	0
Conifers	+	-			Deciduous	T	T	-	11		Grasses		-	-	+	-
Balsam Fir (Ables balsamea)	+	1	11	1	White Oak (Quercus alba)	1	1	T		-	Giant Redtop (Agrostis gigantes)				+	1-
Common Juniper (Juniperus communis)					Bur Oak (Quercus macrocarpa)	1					Redtop (Agrostis stolonifera) Awaless Brome (Bromus inermis)					
Eastern Red Cedar (Juniperus virginiana)	+	14			Red Oak (Quercus rubra) Alder Buckthorn (Rhamous aloifolia)	1	3	1			Bromus					-
Norway Spruce (Picea abies)	t				Common Buckthom (Rhamnus cathartica)	19	F				Blue-ioint Grass (Calamagrostis canadensis)	1				
White Spruce (Picea glauca)					Smooth Sumac (Rhus alabra)	1					Poverty Oat Grass (Dactylis gioma ata)					
Black Spruce (Picea mariana)		1 1	11	-	Wild Black Currant (Ribes americanum)			1			Quack Grass (Elymus repens)	-		-		
Red Pine (Pinus resinosa)	1				Prickly Gooseberry (Ribes cynosbati)						Virginia Wild Rye (Elymus virginicus)					
Eastern White Pine (Pinus strobus)	×	1		1	Swamp Black Currant (Ribes lacustre)						Elymus Fowl Manna Grass (Glyceria striata)		F			
Scotch Pine (Pinus sylvestris)	-				Ribes Sala	10	d -	1			G/yceria	-				1
Eastern White Cedar (Thuia occidentalis)					Black Locust (Robinia pseudo-acacia)	1	1				Rice Cut Grass (Leersia oryzoides)					
Eastern Hemlock (Tsuga canadensis)		11	11	110	Prickly Rose (Rose acicularis)		1	1			Muhlenbergia			_		
					Smooth Kose (Rosa bianda) Multiflora Rose (Rosa multiflora)	T					Witch-grass (Panicum capillare)				t	
Deciduous					Rosa					1	Panicum		F			
Manitoba Maple (Acer negundo)		11			Com, Blackberry (Rubus allegheniensis)	P	4				Timothy (Phieum pratense)					
black Maple (Acer marum) Norway Maple (Acer platanoides)					Black Raspberry (Rubus occidentalis)		13				Common Reed (Phragmites australis)	-				
Red Maple (Acer rubrum)					Purple-fl. Raspberry (Rubus odoratus)						Canada Blue Grass (Poa compresse)			-		
Silver Maple (Acer sacchannum)	-	11	11		Dwart Raspberry (Rubus pubescens)	1		1			Kentucky Bluegrass (Poa pratensis)			-		
Sugar Maple (Acer saccharum)					Peach-leaved Willow (Salix amvgdaloides)						Yellow Foxtail (Setaria pumila)					
Mountain Maple (Acer spicatum)					Bebb's Willow (Salix bebbiana)		-				Green Poxtall (Setand Vinus)					
Speckled Alder (Alnus incana)	-	1 1	11	-	Pussy Willow (Salix discolor) Missouri Willow (Salix priocephala)	+								-		
Serviceberry (Amelanchier sanguinea)					Sandbar Willow (Salix exigua)											
Yellow Birch (Betula alleghaniensis)					Shining Willow (Salix lucida)					-					_	
White Birch (Betula papyr/fera)	P				Slender Willow (Salix nigra)								-		+	
Blue Beech (Carpinus caroliniana)					Salix =0		U									
Bitternut hickory (Carya cordiformis	F				Hybrid Creck Willow (Salix X rubens)		-									
Shaqbark Hickory (Carva ovata)	10	4-1			Red-berried Elder (Sambucus nigra)						6. Jun			-		
Common Hackberry (Celtis occidentalis)					Buffaloberry (Shepherdia canadensis)						Drooping Wood Sedge (Carex arctata)					
Buttonbush (Cephalanthus occidentalis)	-				Eur. Mountain Ash (Sorbus aucupana)						Golden-fruited Sedge (Carex aurea)			1		
Alt. leaved Dogwood (Cornus alternitolia)	-	+ +	11		Common Lilac (Syringa vulgaris)						Graceful Sedge (Carex gracillima)		-i		+	
Bunchberry (Cornus canadensis)					Basswood (Tille americana)	N	1				Bladder Sedge (Carex Interior)			1		
Srav dogwood (Cornus racemosa)	-	L		-	Poison-ivv (Toxicodendron ryabergii) Climbing Poison-ivv (Toxicodendron radicans)	1	1 LA				Lake-bank Sedge (Carex lacustris)			- 1	+	
Round-leaved Dogwood (Cornus rugosa)	H	11	+++	1	White Elm (Ulmus americana)	V	U.				Hop Sedge (Carex lupulina)			-		
American Hazel (Corvius americana)					Sibenan Eim (Ulmus pumila)						Awi-fruited Sedge (Carex stipata)					
Beaked Hazel (Corvius cornuta)	-	11			Slippery Elm (Ulmus rubia) Low Bloeberry (Vaccinium angustifolium)						Fox Sedge (Carex vulpinoidea)		-	-		
Cockspur Thom (Crataeous crus-geili)					Maple-leaf Viburnum (Viburnum acerifolium)	1					Carex	F	F	-		
arge-fruited Thom (Crataegus punctata)					Hobblebush (Viburnum lantanoides)	1					Carex					
Grataegus	-		-1-1-	1	Guelder-Rose (Viburnum opulus)						Carex				+	
Crataegus					Downy Arrow-wood (Vib. rafinesquianum )	-	-				Carex	1 13				
Russian Olive (Elaeagnus angustifolia)					Riverbank Grape (Vitis ripana)	1	T.			-	Carex					
Autumn Olive (Elaeagnus umbellata)		1+		-	Am. Phickly-ash (Zannoxylan and Solard)						Carex					
Run. Strawberry-bush (Euonymus obovela)	0										Carex	1		-		
Glossy Buckthorn (Frangula alnus)					Ferns & Allies						Carex					
Virginia strawberry (Fragaria virginiana)	n	1.1		1	Lady Fern (Athyrium filix-femina )						Carex	}				
White Ash (Fraxinus americana) Black Ash (Fraxinus ni0ra)	~	- Sal			Rattlesnake Fern (Botrychium virginianum)					1	Redmot Spike-rush (Fleocharis erythropoda)	-		-		1
Green Ash (Fraxinus pennsylvanica)			11		Spin Wood Fem (Dryopteris carthusiana)	1					Eleocharis					
Witch-hazel (Hamamelis virginiana)	100		++	1	Crested Wood Fern (Dryopteris cristata)	×	~				Hard-stern Bulrush (Schoenoplectus acutus)					
Butterout (Judians cinerea)	R			1	Marginal Wood Fern (Dryopteris marginalis)						Soft-stem Bulrush (Sch. tabernaemontani)			-		
Black Walnut (Juglans nigra)				1	Dryopteris Detrich Fern (Matteuccia struthiopteris)						Dark-green Bulrush (Scirpus atrovirens)	13				
Common Privet (Ligustrum vulgare)			++		Sensitive Fern (Onoclea sensibilis)	16	F				Wool-grass (Scirpus cyperinus)		U	_		
Fiv Honevsuckie (Lonicera canadensis)					Cinnamon Ferri (Osmunda cinnamomea)						oun op		y	-1		
Glaucous Honeysuckle (Lonicera dioica)					Royal Fem (Osmunda regalis )											
Morrow's Honeysuckle (Lonicera morrowii)	F	E			Christmas Fern (Polystichum acrostichoides)											
Common Apple (Malus pumila)				1	Eastern Bracken-fern (Ptendium aquilinum)					1 1	Other Graminoids	-				
White Mulberry (Morus alba)	-			1	Aarsh Fem (Theryptens paraters )						Broad Bur-reed (Sparganium eurycarpum)					1
Sweet Gale (Myrica gale)	D										Narrow-leaved Cattail (Typha angustifolia)		P			
Thicket-creeper (Parthenocissus inserta)		U		1	Field Horsetail (Equisetum arvense)						Broad-leaved Cattail (Typha lautolia) Broad-leaved Cattail (Typha X diauca)					-
Ninebark (Physocarpus opulifolius)			++		/ariegated Horsetail (Equisetum variegatum)						Articulated Rush (Juncus articulatus)					
Balsam Poplar (Populus belsamiliera) Eastern Cottonwood (Populus deltoides)				1	Equisetum						Soft Rush (Juncus effusus)					
Large tooth Aspen (Populus grandidentata)	-				Sround-cedar(Lycopodium digitatum)						Path Rush (Juncus tenuis)		11	_		
Trembling Aspen (Populus tremuloides)	U		1 1	1	Ground-pine (Lycopodium obscurum)						Juncus		-			
Pin Cherry (Prunus pensylvanica)																
Black Cherry (Prunus serotina)	R							-		-		-				
Choke Cherry (Prunus virginiana)	-															
D - Dominant represented by large numbers, generally	form	< gnia	10% grou	nd cov	er or >25% vegetation cover in any one stratum	-	2153	10007	~							
F - Fairly common (=Abundant in ELC) generally wide	spre	ad rep	tered ind	by fail	ny large numbers or individual clumps, usually forming >10 s or represented by one or more clumps of many individual	is (n	ound out a	speci	es wil	tall in	nto this catergory)					_
0 - Uncommon (=Occasional in ELC) present as wides R + Rare (represented in the polygon by less than about the colygon by	KR II	ndividu	net ou ma	all clu	npš	-malik										
Project Glancasteral (B	H				F004-1	4										
Date Aug 51/20	8	1		1	SW12/MAM2	5									T	T
surveyors IV M	P	1				6				1		100			1	1
Black	-	-	1777		Dirot Herbs	T	21	31	415	TAT	Dicot Herbs		- 27	27	117	TAT
Common Yarrow (Achilea millefolium)	-	4	4 0	S	hepherd's Purse (Capsella bursa-pastoris)						Kidney-leaf Buttercup (Ranunculus abortivus		-	-	1	T
White Snakeroot (Ageratine altissime)				C.	utiest Toothwort (Cardamine concatenata)					12	Hooked Buttercup (Ranunculus recurvatus)		1	1	1	11
Giant Ragweed (Ambrosia trifida )	-	1		I IP	enn. Bitter-cress (Cardamine pensylvanica)		1	1	1		Ranunculus	1	1	1	1	11

Page 1 of 2

-1

#### Plant Species List

Page 2 of

Field Pussylbes (Antennaria neglecta.) Artemistia Common Burdock (Arctium minus.) Common Burdock (Arctium minus.) Devil's Bequar-ticks (Bidens condosa.) Bown Knaoweed (Centaurea bebersteinii) Brown Knaoweed (Centaurea iacea.) Chicory (Cahorium mivbus.) Canada Thistie (Crisium arvesnse.) Bull Thiste (Crisium valgare.) Bull Thiste (Eugenon annus.) Philadelphia Fleabane (Erio, philadelphicus.) Ericeron Joe pwe-weed (Eugenonum perfoliatum.)	a k	Cardamine         Blue Cohosh (Caulophvllum thalictroides)         Mouse-ear Chickweed (Cerastium fontanum)         Turtlehead (Cheione olabra)         Spotted W ater-hemlock (Cicuta maculata)         Water-hemlock (Cicuta virosa)         Enchanter's Niahtshade (Circaee lutetiana)         Carolina Sorina Beautv (Clavtonie caroliniana)         Viraini's-bower (Clematis virainiana)         Field Bindweed (Convolvulus arvensis)         Doa-stranaling Vine (Covnanchum rossicum)         Wild Carrot (Daucus carota)         Deutord Pink (Dianthus armeria)         Soutimel-com (Dicentra canadensis)         Dutchman's-breeches (Dicentra cucullana)		Sheep Sorrel (Rumex acetosella)         Curiv-leat Dock (Rumex crispus)         Bitter Dock (Rumex crispus)         Bitter Dock (Rumex crispus)         Bitter Dock (Rumex consultant)         Bitter Dock (Rumex consultant)         Bitter Dock (Rumex consultant)         Bitter Dock (Sanaria: canadense)         Bitter Dock (Sanaria: canadense)         Bitter Skale (Sanaria: canadense)         Bouncing Bet (Sanaria: canadense)         Bouncing Bet (Sanaria: canadense)         Marsh Skullcan (Scutellaria calericulata)         Mad Dog Skullcan (Scutellaria lateriflora)         White Campion (Silene tatifolia)         Bladder Campion (Silene tuidaris)         Hemlock Water-parsnic (Sium suave)         Bitter Nightshade (Solanum dulcamara)         Black Nightshade (Solanum duchamara)         Grassleaf Stitchwort (Stellaria graminea)         Common Chickweed (Stellaria media)         Early Meadow-rue (Thalictrum dubescens)	
Larce-leaved Aster (Eurobie macrophylla) Fai-too Goldennod (Euthamia oraminifolia) Orange Hawkweed (Hieracium aurantiacum) Field Hawkweed (Hieracium caespitosum) Hieracium Elerampane (Inula helenium) Prokly Lettuce (Lactuca serriola) Lactuca Ox-eve Daisy (Leucanthemum vulgare) Pineapole-weed (Matricaria discoidea) Tail White Lettuce (Prenanthes altissima) Black-eved Susan (Rudbeckia hirta) Tail Goldennod (Solidado caesia) Canada Goldennod (Solidado caesia) Canada Goldennod (Solidado caesia)		Wild Cucumber (Echinocxstis lobata)         Wild Cucumber (Echinocxstis lobata)         Viper's Budloss (Echinocxstis lobata)         Northern Willow-herb (Ecilobium ciliatum)         Hairy Willow-herb (Ecilobium hirsutum)         Small-fl, Willow-herb (Ecilobium barviflorum)         Epilobium         Worm Mustard (Erysimum cheiranthoides)         Euchorbia         Virginia Strawberry (Fragaria virginiana)         Hemp Nettle (Galeoosis tetrahit)         Wild Madder (Galium mollugo)         Marsh Bedstraw (Galium palustre)         Sweet-scented Bedstraw (Galium triflorum)         Galium         Sotted Geranium (Geranium maculatum)	U F	Field Penny-cress (Thiaspi arvense)         Foamflower (Triarella cordifolia)         Star-Rower (Trinolium pratense)         Red Clover (Trifolium repens)         Trifolium         Stinging Nettle (Urtica dioica)         Greater Bladderwort (Utricularia vulgaris)         Common Multein (Verbascum thaosus)         Blue Vervain (Verbena hastata)         Whate Speedwell (Veron anadallis-aquatica)         Common Speedwell (Veronica officinalis)         Veronica         Cow Vetch (Vicia cracca)	
Gant Goldenrod (Solidado gidantea) Early Goldenrod (Solidado gidantea) Gray Goldenrod (Solidado nemoralis) Solidado Field Sow-thistle (Sonchus arvensis) Sonchus Heart-leaf Aster (Symph. cordifollum) Heart-leaf Aster (Symph. cordifollum) Calico Aster (Symph.novae-andiae) Tall White Aster (Symph. novae-andiae) Purple-stem Aster (Symph. novae-andiae) Purple-stem Aster (Symph. novae-andiae) Common Tansv (Tanacetum vulgare) Common Dandelion (Taraxacum officinate) Common Dandelion (Taraxacum officinate) Common pandelion (Taraxacum officinate)	μF	Herb-robert (Geranium robertianum)         Yellow Avens (Geum eleopicum)         White Avens (Geum urbanum)         Dame's Rocket (Hesperis matronalis)         Viron Water-leaf (Hvdrophvllum virainianum)         Com. St. John's wort (Hvbericum perforatum)         Sotted Jewelweed (Impatiens capensis)         Wood Nettle (Laportea canadensis)         Motherwort (Leonurus cardiaca)         Field Peoperarass (Lepidium campestre)         Eur Gromwell (Lithospermum officinale)         Butter & Eogs (Linaria vulgaris)         Great Lobelia (Lobelia siphilitica)         Lobelia		Worke       Viola         Pertwinkle (Viola conspersa)       Dog Violet (Viola pubescens)         Com. Blue Violet (Viola soronia)       Viola         Viola       Wild         Wild       Water-plantain (Alisma plantago-aduatica)         Wild Leek (Alium tricoccum)       Viola	
Other Dicot Herbs White Baneberry (Actees rubra)		Cut-leat Bualeweed (Lvcobus americands) Northern Bualeweed (Lvcobus uniforus) Fringed Loosestrife (Lvsimachia ciliata) Moneywort (Lvsimachia numimularia) Lysimachia Purple Loosestrife (Lythrum salicaria) Black Medick (Medicado saluvia) Altafa (Medicado sativa) White Sweet-clover (Melliotus alba) Yellow Sweet-clover (Melliotus alba) Wild Bengamot (Monarda fistulosa) Small Forget-me-not (Mvosotis laxa) Eorget-me-not (Mvosotis scorpioides)	α.	Jack-in-the-pulpit (Arisaema tribhvllum) Asparacus (Asparacus officinalis) Wid Calla (Calla palustris) Bluebead-lilv (Clintonia borealis) Garden Lilv-of-vallev (Convallaria maialis) Yel Lady's Siloper (Cvoriedium parvillora) Canada Waterweed (Elodea canadensis) Helleborine (Epipactis helleborine) Yellow Trout Lilv (Ervthronium americanum) Blue-flao Ins (Iris versicolor) Oranoe Dav Lilv (Hemerocallus fulva) Lesser Duckweed (Lemna trisulca)	
I all Animony (Admonie drvbosecele) Gartic Mustard (Alliarie petiolata) Green Amaranth (Amaranthus retroflexus) Hoc-peanut (Amphicaroa bracteata) Pearly Everlasting (Anaphalis maraaritacea) Canada Anemone (Anemone canadensis) Ivy Hepatica (Anemone acutilobe) Thimbleweed (Anemone viralinana) Purole Angelica (Angelica atropurpurea) Indian Hemp (Agocynum cannabinum) Wild Sansaparlia (Aralia nudicaulis) Spikenard (Aralia naciaulis) Spikenard (Aralia naciaulis) Spikenard (Aralia racemosa) Wild Ginger (Asarum canadense) Swamo Milkweed (Asclepias syriaca) Yellow Rocket (Barbarea vulgaris) Faise Nettle (Boehmeria cvlindrica)		Water-cress (Nasturtium officinale)           Com. Evening-primrose (Oenothera biennis)           Sweet-cicely (Osmorhiza berterii)           Yellow Wood-sorrel (Oxalis stricta)           Wild Parsnip (Pastinace sativa)           English Plantanin (Plantago Inaceolata)           Common Plantain (Plantago maior)           Rugel's Plantain (Plantago maior)           Rugel's Plantain (Plantago maior)           Rugel's Plantain (Plantago maior)           Nav-sopie (Podophyllum peltatum)           Pale Smartweed (Polyagonum lapathifolium)           Ladv's-thumb (Polyagonum persicaria)           Virainia Knotweed (Polyagonum virainianum)           Polyagonum           Rough-fruited Cinguefoil (Potentilla norvegica)           Rough-fruited Cinguefoil (Potentilla recta)	u	Faise Solom Seal (Maianthemum racemosum)         Star Faise Solomon (Maianthemum stellatum)         True Solomon Seal (Polyaonatum pubescens)         Pickerel-weed (Pontederia cordata)         Curtv-leaf Pondweed (Potamodeton crispus)         Sado Pondweed (Potamodeton cordata)         Potamodeton         Potamodeton         Potamodeton         Blue-eved-arass (Sisvrinchium montanum)         Herb. Carmon Flower (Smilax herbacea)         Bristiv Greenbrer (Smilax herbacea)         Bristiv Greenbrer (Smilax herbacea)         Rose Twisted-stalk (Strectoous lanceolatus)         Puole Truilium (Trillium erectum)	
Black Mustard (Brassica nicra) Marsh-manoold (Caithe palustris) Creeping Bellflower (Campanula rapunculoid	98.	Potentila Heal-all (Prinella vuldaris) Shinleat (Pirola elliotica) Court Sp Persicon a virginiana	FU FD	White Trillium (Trillium arandiflorum) Large-flowered Bellwort (Uvularia arandiflora)	
D - Dominant represented by large numbers, generally F - Fairly common (=Abundant in ELC) generally wide U - Uncommon (=Occasional in ELC) present as wide R - Rare represented in the polygon by use then about fi	forming >10% spread represe spread scattere ive individuals	ground cover or >25% vegetation cover in any one stratum inted by fairly large numbers of individual clumps, usually forming >10 d individuals or represented by one or more clumps of many individual x small clumps	% ground cover Is (most species will	fail into this catergory)	
Project	1		4		
	3				A

Plant Species	Lis
2012	

11995 6 019 000		4	-	10	Tree & Shrubs	4	31	-1-	Graminoids	2	3 4	4 5
Conifers	+	+	+	H	Deciduous	1		1	Oranses			T
ommon Aniner (Junicerus communis)					Bur Oak (Quercus mace	+	H	+	Retton (Agrostis gigantes)	-	+	+
astern Red Cadar (Junicerus virginiana)					Red Oak (Quercus rubra)	48			Avoies Broosts stolonifers)		1	de
amarack (Larix laricina)		_		120	Alder Buckthorn (Rhemnus electricat	-	H		Bromus	9	41	40
orway Spruce (Pices abies)	1	RI.			Common Buckthom (Rhamous catherida)	12	E	T	Blue joint Grass // stampton as a drawn	+	+	+
White Spruce (Pices plauce)		1	+		Smooth Sumac (Rhus glabra)		11	6.11	Orchard Grass (Cardina character)	-	27	\$0
lack Spruce (Picea meriane)	-	+	+		Staghorn Sumac (Rhus hirte)			RT	Powerty Out Grass (Denthonia sociate)	ť	4	T
ack Pine (Pinus banksiana)	-	+	+		Wild Black Currant (Ribes emericanum)	IR		T	Queck Grass (Elymus monost		+	+
ted Pine (Pinus resinces)	-	+	4	-	Prickly Gooseberry (Febes cynosbat)	18		1	Virginia Wild Rye (Elymus virginia)	+	+	+
astern White Pine (Pinus strobus)	-	+	+	+ 1	Swamp Black Currant (Ribes lecustre)	1			Elymus	+	t	+
colch Pine (Pinus sylvestris)	-+	+	+	++	Red Current (robes ruorum)	1	11	-			T	T
anada Yew (Taxus canadensis)	-	+	+		Plack Locust /Doblets starts	-		-	Fowl Manna Grass (Glyceria striate)			Т
astern White Cedar (Thuja occidentalis)	-	+	+	-	Disck Locust (Robins pseudo-acada)	+		-	Glycene		T	T
astern Hemlock (Tsuga canadensis)	-	+	+		Smooth Bose (Bose blands)	10	11	4	Rice Cut Grass (Leense oryzoides)	1		
	+	+	+		Multifiora Rose (Rose multifiore)	-	- 1	-	Tall Fescue (Lolium arundinaceum)			4
	-	+	+	+	Rose	+	+ +	-	Witch and Carlos		+	+
Deciduous	-	+	+		Com Blackberry (Rubus ellephoniogais)	+	+ +	-	Onercom		+	4
Hack Maple (Acer negurou)		+	+		Wild Red Raspberry (Rubus ideeus)		+ +	+	Reed Conery Grass (Phalast and the		$\mathbf{t}$	at
inner Marie (Acer plateroidet)	1	$\uparrow$	T		Black Raspberry (Rubus occidentalis)		H		Timothy (Phileum protected)	-	<b>a</b> #s	44
Red Manle (Acer ruhrum)		T	1		Purple-fl. Raspberry (Rubus odoratus)		H		Common Reed (Phragmiles australia)	5	2	-h
Silver Maple (Acer asocherinum)					Dwarf Raspberry (Rubus pubescens)	15	Н		Canada Blue Grass (Pos comomana)	М	+	ť
Freeman's Maple (Acer X freemanii)				1	Rubus	10			Fowl Meedow Grass (Poe palustris)	Н		+
Sugar Maple (Acer saccharum)		1	T	T	Peach-leaved Willow (Safx amygdeloides)	T			(Kentucky Bluegrass (Pos pratensis)	0	A	A
Mountain Maple (Acer spicetum)					Bebb's Willow (Salix bebbiane)	T			Yellow Foxtail (Setana pumila)	1	T	T
Speckled Alder (Alnus Incene)					Pussy Willow (Salx discolor)	IF	1		Green Fostall (Setaria winds)			
Downy Serviceberry (Amelanchier arborea)			T	T	Missouri Willow (Salix eriocephale)	T			FRAGVIR		0	a
Serviceberry (Amelanchier sanguines)					Sandbar Willow (Salix augua)	11			163 7 28			
fellow Birch (Betula alleghanionsis)					Shining Willow (Salix Jucide)	T			129 C. B.	1		
Mhite Birch (Betula papynlara)				-	Black Willow (Saltz nigre)			1	10 MM	+		
European Birch (Betula pendula)					Slender Willow (Salx petiolaria)	13				+	Ц	
Blue Beech (Cerpinus caroliniana)					Salx X tragieis	10			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-	Н	-
sittemut hickory (Carya cordiformis	14		4	+	Hybrid Cratck Willow (Saltx X rubens)	1	-	-		+	-	-
shagbark Hickory (Carys ovate)				-	Black-berried Elder (Sembucus nigra)	1		-		÷	H	
ambing Bittersweet (Celastrus scandens)	-		-	-	Red-berried Elder (Sambucus racamosa)	+	+ 1	-	Sadoas	÷	H	-
Control Hackberry (Cents occodentaits)	-		Н	+	Buttaloberty (Shepherdia canadensis)	-	+	-	Departing Wood Sering (Cares arritate)	+	+	
sutionousin (Caphalanthus occidentais)	+	-	H	+	Eur. Mountain Ash (Sorbus aucupana)	+	+	1	Calified Series (Carter autea)	+		-
diversion of Comut amonum	+		H	-	Common Line (Contract region and a	-	++	H	Gracehil Serice (Cares gracilima)	+	1	t
anchberry (Comus canadeosis)	+			-	Poison in (Topodenting adhemi)	+		12	Inland Sedge (Carex Interior)	T	T	t
stav dogenod (Comus recemose)		Þ	Ы	p	Climbing Poison in /Traingeoding (adicant)	+			Bladder Sedge (Carex intumescens)	t	+	t
Round-Issved Dogwood (Cornus ruposa)		P	14	-	White Eim (Ulmus americana)	-			Lake-bank Sedge (Carex lacustris)	T	Т	Г
Red-osier Dogwood (Cornus serices)				2 2	Siberian Fim (Ulmus pumile)		10		Hop Sedge (Carex lupulina)			T
American Hazel (Corvlus americana)			H		Slippery Elm (Ulmus rubre)			H	Pennsylvania Sedge (Carex pensylvanica)		13	T
Beaked Hazel (Confus comute)					Low Blueberry (Vaccinium angustifolium)				Awl-fruited Sedge (Carex stpate)		12	Т
Cockspur Thorn (Crataegus crus-gall)					Maple-leaf Viburnum (Viburnum ecentfolium)				Fox Sedge (Carex vulpinoidea)			
Inglish Hawthorn (Crateogus monogyne)			R		Hobblebush (Viburnum lantanoides)				Carex			1
arge-fruited Thorn (Crataegus punctata)					Nannyberry (Vibumum lentago)	1	_		Carex	_	1	1
Crataegus					Guelder-Rose (Viburnum opulus)	1			Carex	1	1	1
Salaagus					Downy Arrow-wood (Vib. rafinesquienum)	-			Comm		+	4
Bush Honeysuckie (Dierville Ionicere)		-		-	Riverbank Grape (Vills riparia)	K	20	-	Carex	-	4	+
Russian Olive (Eleeegnus engustifole)		-			Am. Prickly-ash (Zanthoxylum americanum)	-	1	11	Cerez	-	4	+
utumn Olive (Eleeagnus umbellata)		-		+		-	+		Carex		+	+
tun. Strawberry-bush (Euonymus obovata)	-	-		+	and the second second	-	+		Carex		+	+
merican Beech (Fagus grandifolia)		-		-			-		Carex		4	+
Bossy Buckshorn (Frangula alnus)	+	-	$\vdash$	+	Farmer & Allies	-	+	+ +	Carax	$\square$	-	+
White Ash (Fraxinus amencana)	-			+	Lady Earn (Althonium Sty Anning )		+		Carex		+	+
lack Ash (Frakinus nigra)	+	-	-	+	Rationake Sam (Retarthium viminianum)	-	1	H	Ceret		+	-
sten Ash (Prasinus pennsylvarica)	+		H	+	Bubel Bladder Fern (Custophila hulbfers)	++	+	+ +	Redmod Salar and ISt		+	+
Michinatel (Mainamens Viginaria)			H	+	Soin Wood Fern (Domoter's certhuriane)	H		+ 1	Fleashering Electrent entropode)			-
vinierberry (nex vencesta)	H		H	-	Created Wood Fern (Dryppleria cristele)		+	+ 1	March stars Dubrat /Cabaran hat and		-	+
fact Maland / Justana protect	+	2	H	+	Maminal Wood Fem (Orypoteris meminalis)		+	11	There an an Rids (Schoenoplectus eculus)	-		+
Common Privet (Listustrum vukam)	H	1		+	Oryopteria		1		Soft-stem Bulauth (Sch. tatemagenetter)	-	H	-
nicebush // indexs hastoin)	H		H	+	Ostrich Fern (Metteuccia struthiopteria)				Dark great Bullaut (Companyonian)	H		-
ly Honeytuckie (Lonicera canadamis)	H				Sensitive Fern (Onocles sensibilis)	H	T.		Wool-grass (Solinus generative)	+	+	1
aucous Honeysuckle // opice/a diginal	H	-	H	+	Cinnamon Fem (Osmunda cinnamomea)	H	t	11	The sea for the changes	+		1
(anow's Honeysuckie (Lonicers morrowi)	H			1	Interrupted Ferr (Osmunda deytoniana)	11	T.	1		+	H	1
ertarian Honeysuckie // onicere taterica)		A	R	P	Royal Fern (Osmunde regalis )	T		1	10	1	H	
ommon Apole (Malus pumila)	H	-	1	1	Christmas Fern (Polystichum acrostichoidea)	H	1	1	Part and the state of the	+	H	
Inte Mulberry (Morus alba)					Eastern Bracken-fern (Ptericlium aquilinum)		1		14 Hz	+	H	1
weet Gale (Myrice gale)	H				Marsh Fern (Thelypteris palustris )		T	1	Other Graminoida	1	H	
onwood (Ostrya virginiana)								T	Broad Bur-reed /Spamanium auroramum)	1	$\square$	-
hicket-creeper (Parthenocissus inserta)					Contraction of the second second second			T	Narrow-leaved Cattail (Typha appueticula)	t	H	
inebark (Physocarpus opulfolius)		R	8		Field Horsetail (Equisitum arvense)		1	D	O Broad-leaved Cattail (Typha latifola)	1	D	
alsam Poplar (Populus belsemifera)					Scouring-rush (Equisetum hyemale)		T	1	Broad-Isaved Cattail (Typha X glauca)	t		
astern Cottorwood (Populus deltoides)					Variegated Horsetail (Equisetum variegatum)	11	0		Articulated Rush (Juncus articulatus)	1		-
arge-tooth Aspen (Populus grandidentate)					Equisefum			F	Soft Rush (Juncus effusus)	1		
rembling Aspen (Populus tremuloides)					Ground-cedar(Lycopodium digitatum)		3	1	Path Rush (Juncus fenuis)	1		1
weet Cherry (Prunus avium)					Shining Clubmoss (Lycopodium lucidulum)	1	1	+	Juncus			
in Cherry (Prunus pensylvanica)					Ground-pine (Lycopodium obscurum)		1	1	Juncus	1		F
lack Cherry (Prunus serotine)				R	and the second sec	L		1		t		-
hoke Cheny (Prunus virginiana)			R	Б	4	H	-	+	44	t		F
Tunue		1						1	1.	+	t	t
<ul> <li>Dominant, represented by large numbers, paneral</li> </ul>	ly for	ming	> 10	% prov	na cover or + 20% vegetaron dover in any one atratum			-	Accel while		-	-
Fairty common (withundant in ELC) : generally as	Te apro	bee	ne pre	aerre-	sy nery any surger numbers or monitors cumpt, usually forming surgers or represented by one or more clumes of	+ 10%	grou	00 00	tion will fail one that caleman :	-	-	-
- United and a second of the polynom by less than along	18.00	ind	10.0	it of a	nal dunct			1		_		-
- Clampacter D.J	T	1		T	CUM1-1 /MAND	Te	21	T	aurij-1		-	-
	-	-	+	-		1240	-	-1-		1	1.5	1
- 10/05/101	5				I MASI - AI	m	N I	100		and the second	-	4

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1	Q	<b>.</b>		

Page 2 of 2

Dicot Herbs - Asteraceae	1.1	-	-	_		2012				_			1.2	14	4	5
Common Yarrow (Achilles millefolium)	6	쉶	4	4	5	Dicot Herbs	1	2	3	4	5	Dicot Herbs	+*	1	-	ř
White Snakeroot (Ageratine altisaime)		1	-#	ч	-	Tutinal Tooltworl (Cardamine concatenata)	-		-	+	÷	Call B diarroup (Ranunculus acris)	t			×
Con Ragweed (Ambrosis artemistifole)				1		Toottiwort (Cardattine diphylle)				+	-1	Hooked Buttercup (Renunculus recurvatus)	T			
Field Pussyloes (Antennetia periode)		-				Penn. Bitter-gress (Cardiamine pensylvanice)				1	-ti	Renunculus	T			-
Artemisia	$\vdash$	-	4	4		Sardamina						Sheep Sorrel (Rumex acetosets)	1	-		-
Common Burdock (Arctium minus )	H	-	+	+	4	Blue Cohosh (Caulophyllum theictroides)						Curly-leaf Dock (Rumex crispus)	+	+		-
Nodding Beggar-ticks (Bidena cemue)		+	+	1	1	Dutishand Thaloos data )	-			-	-	Bitter Dock (Rumex obtus/follut)	+	+		-
Devil's Beggar-ticks (Bidens frondose)		-		1	1	Spotted Water-hamlock (Cicute maculate )	H				+	Bloodroot (Sanginana canadanse)	+	t		
Spotted Knapweed (Centauree biebersteinii)			1			Water-hemiock (Cicute virose)					t	Bouncino Bet (Seconaria officinata)	$^{+}$			3
Stown Khapweed (Centaures Jaces)		11	1	0		Enchanter's Nightshade (Circase lutetiens )	t			H	-1	Marsh Skulicap (Scutellaria galericulata)	T			
Canada Thistia (Croium anasasa)		-	4	4		Carolina Spring Beauty (Claytonia caroliniana)						Mad Dog Skulicep (Scutellarie latentifora)	T			_
Bull Thistie (Graium vulgare)	н	+	+	4	-1	Virginia Spring Beauty (Claytonia virginica)				1		White Campion (Silene latifolia)				14
Horseweed (Conyza canadensis)	Н	+	+	+	-	(Irgin's-bower (Clematic virginiane)	⊢	1		4	4	Bladder Campion (Silane vulgaria)	+-	-		-
Daisy Fleabane (Erigeron annus)	H	+	+	+	+	Field Bindweed (Convolvulus arvensis)	⊢	+		$\square$	-	Hemlock Water-parsnip (Sium sueve )	10	-		-
Philadelphia Fleabane (Erig. philadelphicus)			+	+	1	Wid Carrot (Deucus camta)	to	-	0	d	~	Bitter Nightshade (Solanum obichanthum)	+	t		
Erigeron	17	6.			1	Deptford Pink (Dianthus armeria)	۳	1	4	М	9	Grassleaf Stitchwort (Stellaria graminea)	$^{+}$	t		F
Joe-pye-weed (Eupatonum maculatum)		11			信	Squirrel-com (Dicentra cenadensis)	T	r		H		Common Chickweed (Stellaria media )	T			
Boneset (Eupatonum perioliatum )				_	8	Dutchman's-breeches (Dicentra cucultaria)	Ι.					Early Meadow-rue (Thalictrum dioicum)	T			
East top Coldenaed (Eutronia macrophysia)		-	4	-	11	Wild Teasel (Dipsecus fullonum)	0	0	0	9	Q	Tail Meadow-rue (Thelictrum publecens)	+	1	$\vdash$	1
Orange Hawtoward (Haracium Auranticeus)		-	+	-	-	Wild Cucumber (Echinocystis lobata)			1			Field Penny-cress (Thlespi arvense)	+	+	$\vdash$	1
Field Hawkwood (Hieracium cessoitosum)		-	4	1	4	Viper's Bugloss (Echum vulgare)	-			$\square$	-	Foamflower (Travelle corditole )	+	÷	-	⊢
Heracium	H		+	-	1	Haine Willow bash (Epilobium cilietum)	+	-	$\vdash$	$\vdash$	-	Star-hower (Inentais boreans)	+	+	H	H
Elecampane (Inula helenium)	H		+	đ	2	Small-fL Willow-herb (Epilobium nirsutum)	+	1	H	H		White Clover (Trifoium repent)	+	t	H	t
Prickly Lettuce (Lactuca serriola)			1	1		Epilobium	t	+	H	H		Trifolum	t	t		Г
Lacluca						Worm Mustard (Erysimum cheirenthoides)		t				Stinging Nettle (Unica dioica)				Г
Ox-eye Daisy (Leucanthemum vulgare)	11	1				Euphorbia						Greater Bladderwort (Utricularia vulgaris)	1	F	F	L
Pineapple-weed (Metricaria discoidea)		5	1			Hemp Nettle (Galaopsis tetrahit)						Common Mullein (Verbascum Ihapsus)	+	F	+	F
Tall White Lettuce (Prenanthes altissime)	12		_	-		Wild Madder (Galium mollugo)	1					Blue Vervain (Verbena hastata)	+	+	+	ł
Tall Coldensed (Soldano allineira)			-	-		Marsh Bedstraw (Galum paluetre)	+	H		1	1	Wrise Vervain (Vernene urticifolia)	+	1	+	f
Rive stem Goldenrod (Soldago allissinia)		-	+	-		Sween-scented Bedstraw (Galum tilforum)	+	+		+	-	Common Sciencial (Veron, anagairs-aquadoce)	-14	4	+	t
Canada Goldenrod (Solidago canadagais)	11					Spotled Geranium (Geranium maculatum)	+	t		H	-	Varonica	+	t	t	t
Zig-zag Goldenrod (Solidago flexicaulis)	1					Herb-robert (Geranium robertienum )	1	t	F	R		Cow Vetch (Vicis cracce)	T	T	Г	Г
Giant Goldenrod (Solidago gigantea)	1					Yellow Avens (Geum aleppicum)	T	T	Г	T1		Vicia	T		F	I
Early Goldenrod (Solidago juncea)				0		White Avens (Geum canadense )					-3	Perminkle (Vince minor)				I
Gray Goldenrod (Solidego nemonalis )						Urban Avens (Geum urbanum)	T					Dog Violet (Viole consperse )	-	1	+	ŧ
Saldego SP	0		0	0	U	Dame's Rocket (Hesperis matronalis)	+	+	1	4	1	Yellow Violet (Viola pubascens)	+	+	+	ŧ
Field Sow-thistle (Sonchus arvensis)	+		1		13	Virg. Water-leaf (Hydrophyllum virginianum)	+	÷	-	Н	-	Com. Blue Violet (Viole sorona)	+	+	÷	ł
Sonchus	╋		-	-	-	Com. St. John's-wort (Hypencum performan)	+	1	+	Ы	2	Visa	+	+	÷	ŧ
Heart-Bart Aster (Symph. Cordiolum)	÷			-	10	Wood Natile (Leoortes canadentis)	+	r	-	P	2		+	t	t	t
Tall White Aster (Symph Janceolatum)	t			-		Motherwort (Leonurus cardiaca)		t	t		17		T	T	T	t
Calico Aster (Symphyotrichum latenflorum)	1					Field Peppergrass (Lepidium campeatre)		11			13					Т
New England Aster (Symph. novae-angliae	2		1			Eur. Gromwell (Lithospermum officinale)					2			-	+	4
Purple-stern Aster (Symph. puniceus)						Butter & Eggs (Linaria vulgaris)	+	1	1				+	+	+	+
Common Tansy (Tanacetum vulgare)	10	0		2	0	Great Lobelia (Lobelia siphilitice)	+	+	+	+	-	Monocot Harbs	+	+	+	$^{+}$
Common Dandelion (/araxacum onicinale)	P	K	ч	-	2	Cid leaf Bunjaward // uconus americanus \	+	t	t	H		Water-clantain (Alisma plantaco-aquatica)	+	+	t	t
Collaford (Turnilato farfara)	h	7	e	R		Northern Buolewood (Lycopus unificrus)	t	t	t	Ħ		Wild Leek (Allum tricoccum )	+	t	$^{+}$	1
Contractor (1 page of a minute)	۲	1			95	Fringed Loosestrile (Lysimechia ciliata)	T					Jack-in-the-pulpit (Ariseems triphyllum)	Т	Т	T	Т
					12	Moneywort (Lysimachia nummularia)						Asparagus (Asparagus officinalis)				1
			21		0	Lysimechia	1	+				Wild Calla (Celle palustris)	-	4	4	4
				1		Purple Loosestrife (Lythrum salicaria)	+	+	1	-	1	Bluebead-lily (Clintonia borealis)	+	+	+	4
	-			-	_	Black Medick (Medicego lupuline)	+	+	+	+	⊢	Garden Lily-of-valley (Convellana mayers)	+	+	+	4
	+		-	-	-	Allana (Medicego serva)	+	÷	÷	+	H	Capada Wateruned (Endes canadensis)	H	+	+	+
	+	H		-	1	Yellow Sweet-clover (Mellotus afficinete)	+	+	t	1	1	Helieborine (Epipactis heliaborine )		+	$^{+}$	1
	t		H			Wild Mint (Menthe ervensis)	+	t	t	+	t	Yellow Trout Lily (Enthronium americanum)	H	1	t	f
Other Dicot Herbs	1	Н				Wild Bergamot (Monarda fistulosa)	1	1	T	T	T	Blue-flag tris (Iris versicolor)			T	1
White Baneberry (Actana pachypode)	1	12				Small Forget-me-not (Myosofis laxe)	T	T	T			Orange Day Lity (Hemerocellus fulva)		1	T	1
Red Baneberry (Actaes rubra )		15		8	1	Forget-me-not (Myosotis scorpioides)	T	I				Lesser Duckweed (Lemna minor)		1	4	1
Tall Agrimony (Aprimonia gryposepale)		6				Water-cress (Nasturtium officinale)	T	T	T	1	L	Starry Duckweed (Lemna trisuice)	1	-	4	
Garlic Mustard (Aliana petiolata)	10	0	0	V	0	Com. Evening-primrose (Oenothers biennis)	4	+	+	+	+	Wild Lity-of-valley (Malanthemum canadense	4	+	+	4
Green Amaranth (Amaranthus retroflexue)	-			1	13	Sweet-cicely (Osmortiza berteni)	+	+	+	+	1	Place Solom Seal (Malanthemum recemosur	11	+	+	-
Hog-peanut (Amphicerpe bracteete)	1			2		Tellow Wood-sorrel (Oxalis stricte)	+	+	+	+	t	Tau Solomon Seal ( Pohonostum autoson	5	+	+	-
Pearly Everlasting (Anaphalis margaritacea	4	H	-			vviid Parsnip (Pasonaca sativa)	+	÷	+	+	+	Pickerelweed (Pontedane pordeta)	ř-		+	-
her Henatica (Anemone acutions)	+	H			1	Common Plantain (Plantano maior)	+	t	t	+	t	Curty-leaf Pondweed (Potemogeton crispus)			1	7
Thimbleweed (Anemone viminiana)	1			1	1	Rugel's Plantain (Plantaco rugeli )	1	t	t		T	Sago Pondweed (Potamogeton pectinatus)				1
Purple Angelica (Angelica atropurpurea)	T	O		12		May-apple (Podophyllum pettatum)		T	T	T	T	Potamogeton			1	1
Indian Herro (Apocynum cannabinum)				7		Pale Smartweed (Polygonum lapathilolium)		T	T	1	L	Potamogeton	1		2	2
Wild Sarsaparilla (Aralia nudicaulis)		5.0				Ledy's-thumb (Polygonum persicaria)	1	1	4	+	+	Broad-leaved Arrowhead (Segittarie latifolia)	+		4	1
Spikenard (Aralia racemosa )					10	Virginia Knotweed (Polygonum virginianum)	+	+	+	-	+	Bus-eyed-grass (Sisynnchum montanum)	+	-	-	2
Wild Ginger (Asarum canadense )	1				14	Polygonum	+	+	+	+	t	Bristly Greenbrier (Smiles hisside )	+		$\square$	F
Swamp Milkweed (Asciepias incamate)	-			3		Polygonum	+	+	÷		t	Noticing Lacies' Trasses (Spiraphae comus	1	-	+	ř
Common Milkweed (Asciepias synace)	5		-	~	~	Rough Cinquetor (Potentile norvegice)	+	t	+	t	+	Rose Twisted-stalk (Streptopus lancedatus	á-	1		F
Teliow Rocket (Barbares vulgens)	۲	Q	<i>u</i>	9	U	Common Cinquefoi (Potentilla simplex)	+	t	t	1	t	Skunk-cabbage (Symplocarpus foetidus)	+	Ó		h
Disck Mustard (Brassics niers)		H	+	-	-	Botactille	1		T		T	Purple Trillium (Trillium erectum)	T	1		Г
Marsh-maricold (Celthe pelustris)			1		-	Haal all (Prunella vulgaris)			T	T	T	White Trillium (Tritlum grandifiorum)	T			Г
Creeping Belflower (Cempenule repuncishing	den	H	+	1	-	Shinleaf (Pyrole elliptics)	1	T	T	T	T	Large-flowered Bellwort (Uvularia grandifion	2)			Γ
	T		t			10	T	1	1	1	1	The second residence of the second	1		L	ſ
D - Dominant' represented by large numbers, general	y fam	who i	101	¥ gr	040	I cover or >25% vegetation cover in any one stratum		-		-	-	0.000 55	_	_	_	
F - Fairly common ("Abundant in ELC): generally set	espre	ed n	pret	-	ed a	y fairty large numbers of individual clumps; usually forming	1 × 1	1.7%	100	10 00	-	will fail into this colormond	_	_	_	
U - Uncommon («Occasional in ELC) : propert as wide	ton	ed as		ned.	ndi	iduals or represented by one or more olymps of many in	avad	-	- 01			and the second s		_	_	_
R - Rare represented in the polygon by less then about	-	odvi	dusi		-	dumps	1	4	7	11	1	11-1	-		-	÷
momon or ancaster and	1	10	C	2	4	1-1 (MAM2-2	+	+	-6	1	4		-	1	1	1
a 20/05/2021	5	102	ii	1	LC	1 -1	1	1		ú	14	11-1/MAMZZ		1	1	1
Surveyore N/S	1	-1	*	#	7	11-1 ICUNT	1	6	_	N	1	2-0	T	T	T	Т
	P I		CA	а.	n		-	-	-				-		-	-

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Plant Species List

Spring flora - 2021 mains

Taxas & Sharks					2012	111	21	SI AT	6 Araminoida	1	2
Cosifera	P	2	3	4 5	Tree & Shrubs	H	4		Granes		Ĩ
Comments	Н		+	+-	Decidoods	H	+	* 1	Guest Radion (Annabia picantea)		
Select for (Automation)			+	-	White Oak (Quercus aiba)	H	+	11	Redon (Armata shinglers)		
Common Sunger (Sungrende Commonal)			-	-	Bur Dak (Quercus macrocarpe)	1.	-1	6	Augulasa Disoma (Decemus insermin)		
Castern red Ceber (Aureperus wightenta)			+	+	Heg Oak (Quercus /UD/8)	15	-#	-	Deserves		1
amarack (Lanx Iancine)	-	1	4	+	Alder Buckthom (Rhamnus ainfora)	-			Brownus	+	+
forway Spruce (Picea ables)		10.3	-	+	Common Buckthorn (Rhamnus catharoca)	18.1	Rļ	9	Blue-joint Grass (Caramagrosos caracterist)		+
White Spruce (Picea glauca)			-	-	Smooth Sumac (Rhus glabra)	1	-	+	Orchard Grass (Decryss giomerata)	-	+
Black Spruce (Pices manana)	12	12	5.1	1	Staghorn Sumac (Rhus Nirta)		51	11	Poverty Oat Grass (Danthorva spicata)	+	+
ack Pine (Pinus banksiene)					Wild Black Currant (Ribes americanum)		0		Quack Grass (Elymus repens)	-	+
Red Pine (Pinus resinose)			Т		Prickly Gooseberry (Ribes cynosbet)	П	Т		Virginia Wild Rye (Elymus virginicus)	-	-
astern White Pine (Pinus strobus)	R			T	Swamp Black Currant (Rihes Incustre)				Elymus		-
South Pine (Pinus sylveshis)	10			12	Red Current (Riber (Anam)	t t		ы	and the second se		_
anada Yan (Taxin canadannia)	-	-	-	+	Dans	+ +	-#	41	East Manon Grass (Glycodia striata)		
anega few (rakes carnesenaus)		-	-	+	/cces	++	-		Pow marks class [cryclass strain]		
astern white Cecar (Thigs occoentails)	Б	1	-	+	Black Locust (Robinia pseudo-acecia)		-	++	Giycena di suma contoidanti		
sistem Hemiock (/suga canadensis)		1	-	-	Prickly Rose (Rose aciculate)	-	-	++	PROB CUI Grass [Literials or / rooms)	H	-
			-	-	Smooth Rose (Rosa blanda)	-	_		Tall Fescue (Lolum anundinaceum)	-	
Contraction of the second s	1		-		Multifiora Rose (Rose multifiora)	R		11	Muhlanbergia	-	-
Deciduous					Rosa				Witch-grass (Panicum capillare)	-	-
Manitoba Maple (Acer negundo)					Com Blackberry (Rubus alleghenie/isis)	R	2		Panicum	-	-
Black Maple (Acer nigrum)			-	-	Wid Red Raspherry (Rubus ideeus)	D			Reed Canary Grass (Phalaris arundinacea)		9
Innum Manie (Acer sistencides)	t		-	-	Disck Daspharny (D. Jus and tastais)	171			Timothy (Phleum pratense)		1
Bud March (Acar ash a mi	ŧ.,	-	-	+	Catch Responsive (notes occourrante)	+ +	-	11	Common Reed (Phraomiles australia)		
Red maps (Aber rubrum)	+ -	-	-	+	Purple-IL Raspoerty (Rubus booracus)	++	+	++	Canada Blue Grass (Pos compresse)		
Silver Maple (Ader Secchannum)	-		-	-	Dwart Raspberry (Rubus pubescens)	-	-+	++	Faul Mandow Gross (Pos salustris)		
Freeman's Maple (Acer X freemanii)			-		Kubus	++	-	++	Kantucky Chargeness (One contential)		
Sugar Maple (Acer saccharum)	10	10	0	3	Peach-leaved Willow (Salx amygolakoides)		-	+	Kenucky Boegrass (Foe pretends)	H	
Mountain Maple (Acer spicetum)	Ľ				Bebb's Willow (Salt bebblans)			11	Yellow Foxtail (Secana pumua)	H	1
Speckled Alder (Alnus Incane)				T	Pussy Willow (Saltx discolor)	11			Green Foxtail (Setena vindis)		-
Downy Serviceberry (Amelanchier actoma)					Missouri Willow (Satx enoceshale)					H	-
Serviceberry (Amelanchier sanou/neal	t				Sandbar Willow (Salix exigua)		RT	T	73	1	-
Vallow Birch (Refula elleshaniacia)	t		H	-	Shining Willow (Sets (words)		1				-
White Direct (Detuine all privational)	t		H	-	Black Wilcow (Salt nings)	11		11			
mile oron (Borus papymera)	+	-	H	-	Clander Willow /Sale national	++	+	++			
European Brch (Berula pendula)	+	1	+	-	Contract Thirdw (Contraction Performance)	+ +	+	++			
Blue Beech (Carpinus caroliniana)	+	1		-		++	+	++			
Bitternut hickory (Carya conditormis	1		-	20	Hyong Crack Willow (Saltx X n/bens)	+ +	+	++			
Shagbark Hickory (Carys ovata)	IR	1	0	11	Black-berried Elder (Sambucus nigra)	11	-				
Climbing Bittersweet (Celastrus scandens)				12	Red-berried Elder (Sambucus racemosa)		-	++	0.4		
Common Hackberry (Celts occidentalis)		12		15	Buffaloberry (Shepherdia cahadanaia)	11	_	++	Seoges		
Ruttorbush (Cenhelanthus occidentalis)		1		8.1	Eur. Mountain Ash (Sorbus aucuparia)	1.1	1.1		Drooping Wood Sedge (Carex arctata)	IK I	
All Jasved Domood (Comus allerations)	1	1			Narrow Meadow-sweet (Spiraes albs)				Golden-fruited Sedge (Carex sures)		
Situ Domond (Comus enominal	t	t		+	Common Lilac (Swinga vulgans)				Graceful Sedge (Carex gracilima)		
Sarry Cognood (Corriso arranging)	+	1		-	Poison-by (Toxicodendroc ostbergii)				Inland Sedge (Carex interior)	R	
Bunchberry (Comus canadenara)	10	1	d	+	Cimbing Baison by (Toringtoning micros)	P		++	Riadder Sedge (Cerex infumescens)		
Gray dogwood (Cornus racemosa)	1K	12	Р	-	Marine Fordering (Total and South	TB	+	0	Lake hank Sedge (Carex lacustris)		
Round-leaved Dogwood (Comus rugosa)	+	-	$\rightarrow$	-	Write Eve (Centos anen.ana)	P	-	9	Non Sados (Camer (unidos)		
Red-osier Dogwood (Cornus sences)	-	1	$\square$	-	Siderian Eim (Omnus pumaia)	+ +	-		Desta Austin Sarba (Carer sectodyanca)	n	
American Hazel (Corylus americane)	-		$\square$	-	Slippery Elm (Ulmus rubra)	++	+	++	And faciling Earling (Carrow philoster)	1	D
Beaked Hazel (Corylus comute)				-	Low Blueberry (Vaccinium angustrolum)	++	-	++	Awarding Souge (Carex supara)		12
Cockspur Thorn (Crateegus crus-gall)		2.1			Maple-leaf Viburnum (Viburnum acentoium)		-		Fox Sedge (Carex vulpinoxoea)	10	2
patish Hawthorn (Crataegus monogyna)		12		10	Hobblebush (Viburnum lantanoides)		-		Carox albursina	IK.	-
Pos-Inited Thom (Crategous sunctata)	R	ĸ	2		Nannyberry (Viburnum lentago)		24	11	CAMER SEFICTA		0
infeature .	1				Guelder-Rose (Viburnum opulus)			_	Carex		
Cataonia		1.1		2.	Downy Arrow-wood (Vib. rafinesquianum)	1.1	1		Carex		
and Manager and a Changer in the second	+		H		Riverbank Grape (Vitis riperia)	R	리	RI	Carex		
Carrier Olive / Constant and the fail	t		H		Am Prickly-ash (Zanthoxylum americanum)	П			Carex		
Russian Olive (Elaeegnus angustiona)	+	-	-	-	TTITAMED	15	1	0	Carny		
Altumn Olive (Elseagnus umbeliata)	1			-	1 LUL TIMES	10		4	Came		
Run, Strawberry-bush (Euonymus obovata)	ĮQ	0	<b>/</b> 1	2		++			Care	-	H
American Beech (Fague grandifolia)	IR		4	24		+ 1		-	1Canax	-	$\vdash$
Glossy Buckthorn (Frangula alnus)				2				-	Carex		
White Ash (Fravinus americane)	0		O		Ferns & Allies				Carex		
Black Ash /Frazious giore)	1				Lady Fern (Athyrium Mix-ferrine )				Gerex		
Green Ash /Fravinus panamituncica)	t		H	1	Rattlesnake Fem (Botrychium viminianum)				Cyperus		
Count Part (Presence permay variacity	t		+	-	Rulbet Biedder Fern (Custonteris hulbifers)				Redroot Spike-rush (Eleocharis erythropoda)	1	
visco-nazel (Hamamers viginiaria)	1	-	+	+	Sain Wood Farn (Opposing cardburgers)			++	Electraria		
Winterberry (ilex verboliete)	ł	-	pi	+	Created Wood Fam (Created a containe)			0	Hard-stem Bultush (Schoeopolectus acutus)		
Butternut (Jugiana cinarae)	10	1	2	-	Crested Wood Pern (Cryopterie Cristere)	+	-	P I	Three course Butsuch (Sch aussian)		
Black Walnut (Juglans nigra)	15		5	-	Marginal Wood Fem (Oryoptens margineta)	+	-	1	Call stars B driah (Sch. fabarnar monian)	H	
Common Privet (Liguatrum volgare)	1P	ιK	N	1	Cryopierta	+		+	Den alem buruan (36h. Isbernaemunian)	+	
Spicebush (Lindens benzoin)					Ostrich Fern (Metteuccia struthiopteris)	1		-	Dark-green Burush (Scripus arrowens)	++	
Fty Honeysuckle (Lonicera canadensis)				1	Sensitive Fern (Onoclea sensibilits)	R	0	5	Wool-grass (Scirpus cyperinus)	-	
Glaucous Honeysuckie (Lonicera dioica)	1		T	T	Cinnamon Fern (Osmunde cinnamomea)				buzula acuminate	1	
Morrow's Honeysuckie (Lonicers morrowi)		1.1		1	Interrupted Fern (Osmunda claytoniana)				general and the BEAM work of the have been a fully and		
Total and Management of A and a second statement	P	0	0	1	Royal Fem (Osmunda recaits )						
I AFTA TAT PROPARED AND THE ATA ATA ATA	4 P.	1	-	+	Christmas Fem (Polystichum acrostichoides)						
Common Apple (Malus oumila)		20 A 4		-	Eastern Bracken fem (Desidium anufficum)	1			and the second sec		
Common Apple (Malus pumila)	H		H		Construction of the second second second second second		-	-	Other Graminoida		
Common Apple (Malus pumila) White Mulberry (Morus alba)	F			+	March Face (Thebolaris salustris)				the second s		
Common Apple (Malus pumila) White Mulberry (Morus alba) Sweet Gale (Myrica gale)		-	B	+	Marsh Fern (Thelypteris palustris )	F		-	Broad Bur-reed (Spamanium eurocerpum)		
Common Apple (Malus pumila) Amia Mulberry (Korus alba) Sweet Gale (Myrica gale) ronwood (Ostrys virginiana)	A		Ŗ	-	Marsh Fern (Thelypteris palustris )	-			Broad Bur-reed (Sparganium eurycerpum) Namow leaved Cattali (Typhe anousticial		
Common Apple (Malus pumila) Common Apple (Malus pumila) White Mulberry (Morus alba) Sweet Gale (Myrica gale) romwood (Cotrys virginiana) romwood (Cotrys virginiana)	AR	e	Dies		Marsh Fern (Thelypteris paluatris )		-		Broad Bur-reed (Spargenium eurycerpum) Narrow-leaved Cattail (Typha engustifolie) Read Insteed Cattail (Typha (Minta)		P
arterian Horsysceae (Londer Hanke) Common Apple (Malus pumila) White Mulberry (Morus elbe) Sweet Gale (Myrica gale) Ironwood (Cetrys virginiane) Thicket-creeper (Parthenocessus inserts) Vinebark (Physocarpus opulifolius)	ARE	e Q	RINO		Marsh Fern (Thelypteris palustris ) Field Horsetail (Equisatum arvense)			-	Broad Bur-reed (Sparganium eurycarpum) Narrow-leaved Cattail (Typhe angustitolie) Broad-leaved Cattail (Typhe latitolie)	F	R
arterian Horespeccia (Constant Antonia) Cormon Apple (Malus pumilia) White Mubery (Morus alba) Sweet Gale (Myrica gale) romewood (Ostryw vigniniae) Thicket-orresper (Parthenocissus inserta) Winebark (Physicaarpus oguitfoliut) Galsam Popia: (Populus balsamilere)	ARE	23	RINO		Marsh Fern (Thelypteris paluatris ) Field Horsetail (Equisatum arvense) Socuring-rush (Equisetum hyemale)				Broad Bur-reed (Sparganium eurycarpum) Narrow-leaved Cattail (Typhe angustitolie) Broad-leaved Cattail (Typhe laitole) Broad-leaved Cattail (Typhe X glauce)		R
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I araman robergoods an anne anne anne anne anne anne anne	ARE	8 R R	RINO		Marsh Fern (Thelypteris paluatris ) Field Horsetall (Equisetum ervense) Souring-rub (Equisetum hysmale) Variogated Horsetal (Equisetum veriegatum) Equisetum Ground-adata(scopodium digitatum)		0		Broad Bur-reed (Sparganium surgostrum) Narrow-leaved Cattal (Typhe angusthola) Broad-leaved Cattal (Typhe left) Broad-leaved Cattal (Typhe left) Articulated Rush (Juncus anticulatus) Soft Rush (Juncus anticulatus) Part Rush (Juncus anticulatus) Part Rush (Juncus fusua)		R
I arturan rodery took in the service and main team of the service of the service and the servi	ANN O	e R R	DINO		Mareh Fern (Thelypteris paluatris ) Fald Honsetat (Equisatum anvense) Socuring-nah (Equisatum hyernale) Variegatetat Honsetat (Equisatum variegatum) Equisatum Ground-coder (J.vopodum digitatum) Sonuc (Chimera (J.vopodum digitatum)		0		Broad Bur-reed (Seargenium surpacepum) Narrow-leared Cattal (Typhe angustitotie) Broad-exered Cattal (Typhe initiotie) Broad-exered Cattal (Typhe initiotie) Ansualate Ruin (Juncus angustitotie) Soft Rush (Juncus effusus) Path Rush (Juncus effusus) Juncus		R
La dana no observa (London a manua) Vinte Multerry (Mona adu) Vinte Multerry (Mona adu) Vinte Multerry (Mona adu) Viene Cate (Vinte adu) Vinte Antone (Pertherocotas inserta) Notad category (Pertherocotas aduations) Salam Pogia (Pertherocotas aduations) Salam Pogia (Pertherocotas) Salam Pogia (Pertherocotas) Salam Pogia (Pertherocotas) registion Aspen (Pepula Internationa) remaing Aspen (Pepula Internationa) weat Cherry (Perusa Aduation)	ARE O	e R R	RMO		Marah Fern (Thelystenis paluatris ) Field Horsetati (Egusetum arventes) Socarreputs) (Egusetum hystmäs) Veringetest Horsetati (Egusetum hystmäs) Egustatum Ground court, (Exception digitatum) Ground court, (Exception digitatum) Ground courter, (Exception digitatum)		0		Broad Bur-reed (Sparganium surgeopym) Narrow-leaved Catali (Typhe angustitola) Broad-leaved Catali (Typhe Xelexca) Arriculate Rush (Juncus efficial) Soft Rush (Juncus efficial) Part Rush (Juncus efficial) Juncus Juncus		R
I araman rodowycodaw Common Apple (Malu a pomia) White Mulberry (Morus abe) Sweet Gale (Write gale) I molecu creaper (Parthenodosau inserfa) Tinolaut creaper (Parthenodosau inserfa) Salaam Pojar (Parpulus ablasmifan) Eastern Costorwood (Populus ablasmifan) and Cherry (Punus ablam) an Cherry (Punus pensylvanice)	RRR	e R R	PMO N		Mareh Fern (Thelypteris paluatris ) Fiald Honsetall (Equisatum antense) Souring-nuth (Equisatum hyernale) Variogateum Ground-coder (Lycopodium dgitatum) Shning Chubmose (Lycopodium dgitatum) Shning Chubmose (Lycopodium obscurum)		0		Broad Bur-reed (Searganium surgeopum) Narrow-leaved Catall (Typhe angustifolia) Broad-leaved Catall (Typhe angustifolia) Broad-leaved Catall (Typhe angustifolia) Son Rush (Uniccus effausa) Soft Rush (Uniccus effausa) Juncus Juncus		R
I atanan Indergruben (London analine) I atanan Indergrup (Mala pumla) Viha Mulatarri (Morus aba) Seeni Gala (Waltara gula) Indeac carego (Cathyra vigniana) I atanan Pogla (Cathianostasa inserta) Tiobala carego (Cathianostasa inserta) Tiobala carego (Cathianostasa) Sastem Costonwood (Populus adetocitas) arge toot Aspen (Populus adetocitas) arge toot Aspen (Populus atentina) Seet Cherry (Purusa plangthanico) Pin Cherry (Purusa plangthanico) Sack Cherry (Purusa settina)	RREOR	e R R	2000		Marah Fern (Thelyotenis paluatris ) Field Honsetal (Egusetum arvense) Sociing-rush (Egusetum hytenale) Variegand Honsetai (Egusetum hytenale) Round codari ("socpodum dollafarm) Shing Cubmoras (Licopodum dollafarm) Ground-pine (Licopodum dollarm)		0		Broad Bur-reed (Sangranium surpcerpum) Narrow-leaved Catali (Typhe angustitolia) Broad-leaved Catali (Typhe Antoleia) Broad-leaved Catali (Typhe X pleuca) Articulate Rush (Juncus effutus) Soft Rush (Juncus effutus) Pam Rush (Juncus finuus) Juncus Juncus		R
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I aruman robery tooking a same a same a common Apple (Male a pormite) white Multerry (Morus alte) seed: Gale (Write gale) increased (Cathya virginiana) Tholada creaper (Parthenodosau inserfa) inclease (Parthenodosau inserfa) Salaam Popie (Parthenodosau inserfa) arge-tooth Aspen (Populus atematica) arge-tooth Aspen (Populus atematica) arge-tooth Aspen (Populus atematica) in Cherry (Prunus Advin) in Cherry (Prunus Advin) in Cherry (Prunus Advin) in Cherry (Prunus Advin) in Cherry (Prunus Advin) Dicke Cherry (Prunus Virginiana) horizet - Deeteet: norsested by large number; pendid	ARE O RO D	e R R	ALCO OQ 15	Gerou	Marah Fern (Thelystenis paluatris ) Field Horsetall (Equisatum anvantes) Socuryo-puth (Equisatum hysmale) Voriegated Honsetal (Equisatum variegatum) Equisatum Ground-ceder (Lycopodium digitatum) Shning Clubmost (Lycopodium digitatum) Ground-pine (Lycopodium digitatum) dowe or v234 wegetation cover in any one atteam		0		Broad Bur-read (Sparganium surgeopym) Narrow-lawed Cattall (Typhe angustitolia) Broad-lawed Cattall (Typhe angustitolia) Broad-lawed Cattall (Typhe Antolia) Son Roah (Juncus effaus) Son Roah (Juncus effaus) Jancus Juncus		R
I aturan roberg took in a same a common Apple (Malus pormis) White Multern' (Korus abu) Sweet Gale (White guide) I aturan a same a same a Sweet Gale (White guide) Salasm Popie (Parthenocisus inserta) Tricholar creege (Parthenocisus inserta) Salasm Popie (Parthenocisus Salas Cherry (Puruna selfgiriana) Print Salask: Tempreseted Ji urge nurser, peneda Party (Parthenocisus)	DARK O RO	e R R	DO DO	G proce	Marah Fern (Thelyotenis paluatins ) Fiald Honsetal (Egusetum hyetmäb) Soouring-rush (Egusetum hyetmäb) Variegated Honsetal (Egusetum variegatum) Ground-ocider (Jocopodum digitatum) Ground-ocider (Jocopodum Acidutum) Ground-pine (Lycopodum obscurum) dower or >255 wigetatun cover in any ona stetum wing hyeta sunsan of intriktikal danga usub firmen		0		Broad Bur-read (Spanganium eurgeapyum) Narrow-leaved Catali (Typhe angustitola) Broad-seaved Catali (Typhe latitola) Broad-seaved Catali (Typhe latitola) Soft Rush (Juncus effnus) Soft Rush (Juncus effnus) Juncus Juncus		R
I a dama in Ordery Look a pumile) Vinite Multicerry (Mona pumile) Vinite Multicerry (Mona pub) Seed: Cale (Winter pub) I convexed (Cality v Vipulated) Vinite Multicerry (Perstand) Visite and (Propose pub expeliation) Salern Color (Popula statutement) Salern Color (Popula statutement) Salern Color (Popula statutement) Visite Cerry (Popula statutement) Virobard Cerry (Popula statutement) Salern Color (Popula statutement) Virobard Cerry (Popula statutement) Saler (Popula statutement) (Popula statutement) Saler (Popula statutement) Saler (Popula statutement) (Popula statutement) Saler (Popula statutement) Saler	ARE O RO	e R R	DOO DO	G prour	Marah Fern (Thelystenis paluatins ) Field Horsetall (Egusetum arvense) Socurro-prath (Egusetum hyernale) Varingettal Horsetal (Egusetum hyernale) Varingettal (Horsetal (Egusetum hyernale) Ground-caded (Hospodum datatum) Ground-caded (Hospodum datatum) Ground-gene (Lycopodum bacarum) drower or 12% eigenston cover in any ona artestm ty any says avrean of hishdat dimps, usadj formy status or garassessi to on o mot dimps di mary had	p > 109	0		Broad Bur-read (Sparganium surgeopym) Narrow-leaved Cattall (Typhe angustitolia) Broad-leaved Cattall (Typhe angustitolia) Broad-leaved Cattall (Typhe Antolia) Son Roah (Juncus effaus) Son Roah (Juncus effaus) Jancus Juncus effaust Juncus at an di ritej ihu categooy)		R
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I a dama no organizada (condens samina) vinis Multerry (Alorus alea) venes Automatives (Condense alea) seven Gala (Subys vignalizad) increased Calabys vignalizad) increased (Calabys vignalizad) increased (Calabys vignalizad) increased (Charlon Collamentaria) alatem Collow (Calabas adatacias) arge toom Aspan (Capalus atomicas) increasing Aspan (Capalus atomicas) Tools Cherry (Prunus adatacias) Tools Cherry (Prunus adatacias) - Devine represented to targe surface (Capalus atomicas) - Devine (Capalus atomicas) - De	ARE 0 80 5 5 200	ER K Prist	DO DO	6 procession	Marah Fern (Thelystein's paluatris ) Field Horsetal (Egusetum erventee) Socurro-push (Egusetum hyemae) Veringettei (Horsetal (Egusetum hyemae) Egusetum Ground carder (J. kopodum datatum) Shning Cubrinds (L. pogodum hoddulum) Ground gene (L. pogodum datatum) down or +2%, regestion ower in ety ore atteam by any age sursan of initiation datage of any too attack or generative to or or non datage of many too attack or generative to or or non datage of many too attack or generative to or or non datage of many too attack or generative to or or non datage of many too attack or generative to or or non datage of many too Switch 24 (1997)	p > 107			Broad Bur-read (Spanganium surgeopym) Narrow-lawed Cattall (Typha angustitolia) Broad-lawed Cattall (Typha angustitolia) Broad-lawed Cattall (Typha angustitolia) Son Roah (Juncus effaus) Son Roah (Juncus effaus) Jancus Juncus Juncus effaustitolia (Juncus tenus) Juncus Juncus		R

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Plant Species List Spring flora-2021

	11	Τp	13	1417	2012	Ti	2	317	1.	and the second sec	1.11	51	17	141
Common Yarrow (Achiles milefolum)	÷	+*	13		Dicot Herbe	ť	÷	31.	13	Digot Herbs	- 4	4	<u>31-</u>	12
Mula Sosternol (Aneratos allissina)	t	t	H		Cident Terre (Capsele burse-pestoris)	+	÷.	-	+	Noney-leaf Butteroup (Manufacture abouteda	<del>(  </del>	-15	4	
Sem Demand (Amhristia actemisticite)	+	t	+		Conten Tootrwort (Cardamine concetenate)	-	r - 1	-	+-	Tall Buttercup (Manunculua acria)	++	+	+-	
com Regweed (Ambroale artematices)	+-	÷	-		Toothwort (Cardamine diphylla)	+	16	-	-	Hooked Buttercup (Ranunculus recurverus)		+	+	-
Sunt Regwood (Amorosa minoa)	+-	+-	4		Penn. Biller-cress (Cendamine pensylvanice)		1			Ranunculus		_	-	
ield Pussytoes (Antennaria neglecta)	⊢	1	1		Cardamine		1	1.1		Shaep Sorrei (Rumex acetoselle)				
Artemisia	_				Blue Cohosh (Caulophyllum thallotroides)		1			Custo Janf Dock (Rumax crispus)			T	
Common Burdock (Arctium minut)					Mouse-ear Chickward (Carashun Instantin)			-	+-	Rame Dock (Rumex obtuation)			T	
Interioro Renover Jicks (Ridens comus)	-				Turtishead (Chabos alabas)		-	-+-	+-	Disational (Canadanas)		-	<del></del>	-
and a Depart links (Dideas Boordone)	t		H		Spotlard Water heating (Contraction	++	-	-	+-	Bloodroot (Sarger and and and and and	++	- P	4	<del></del>
eves Beggar-ocks (Boens noncos)	-	÷	H		Sported water-nemioox (Cicute mecurete)			_		Black Snakerook (Senicula mervanoca)	1	+	4	
potted Knapweed (Centeuree twedersnam	4-	+-	H		vvator-hemiock (Cicute virose)					Bouncing Bet (Seponene officinete)	1		1	
rown Knapweed (Centaurse jaces)	_	_			Enchanter's Nightshade (Circaes /utetiona)					Marsh Skulicap (Soutelena galenculata)			T	
(hicory (Cichonum intybus)					Carolina Spring Beauty (Clautine)a carolinana			-	-	Mad Dog Skulicep (Scutellane letenflore)			T	H
anada Thutle (Cimium arvasose)					Virginia Spring Beauty (Clautonia virginica)	4		+	+	Make Company (Silena latifola)		+	+-	
di Thiatle (Cantum tationen )	1				Venin's Jones / Clemete designed	+	-	+	+	Printe Campion (Silana unitaria)	++	+	+	-
uit Thiste (Cratum vulgere)	-	-	-	-	Fille Dectron (Coloridate Arginane)	-	-	-	-	Bladder Campion (Seeme voyana)		+	+	
orseweed (Conyze canadensis)	+-	-	-	-	Field Bindweed (Convolvulus arvensis)			1		Hemiock Water-parsnip (Sium suave)				1.1
aisy Fleabane (Engeron annus)					Dog-strangling Vine (Cynanchum rossicum)					Bitter Nightshade (Solanum dukamara)		T	T	1
hiladelphia Fiesbane (Erio, philadelphicus)					Wild Carrot (Deucus carota )					Black Nightshade (Solanum ptychanthum)				
20400					Deption Pink (Canthus armede)		-	- 11	+	Greening Startwort (Stellaria gramines)		+	+	-
( this wood /Eurotosium merulatum)		1			Science Loom (Dicenting and a static)	+	-	-	+	Compare Chickwood ( Stallana mada )	+	+	+	
e pye weed (Euperchain medicine)	+	+	++	-	D colorista ( Colorita Canadantea )	-	-	-	-	Common Criscovers (Cristiana macia)	-+	-	+	
onaset (Eupatonum periosarum)	-	-	$\mapsto$		Dutchman s-oreeches (Dicentra cucularia)				-	Early Meadow-rue (Theictrum dioicum)	-	-	+	н.
rge-leaved Aster (Eurybia mecrophylia)		_		_	Wild Teasel (Dipsecus fullonum)		1.5			Tall Meadow-rue (Thelictrum pubeacens)		1	-	-
at-too Goldenrod (Euthamia graminitolia)			11		Wild Cucumber (Echinocystia Jobata )					Field Penny-cress (Thiaspi arvence)				12
anne Hawkweed (Heracium aurantiacum)	)				Viper's Budioss (Echium vulners)					Foardiower (Tiarella condicia)	П	Т	T	
In the found of the section committee and	T	1			Nothern William hash (California)	+	-	-	+	Circ Course / Transfelle bases for 1			T	
in many weed (managem caraphingum)	1	-	+	-	(Coloring Coloring Coloring and	+	-	-	1	ous inter (Internant Dorbers)	++	+	+	1
eracium	-	-	$ \rightarrow $	-	mary willow-herb (Epilobium hirsutum)	1	_1	1		(Ked Clover (Intoium pratense)	++	+	+	HI.
ecampane (Inute helenium)	1	1			Small-ft. Willow-herb (Epilobium pervillorum)	11	1		1	White Clover (Trifolium mpens)		+	+	11
ickly Lettuce (Lectuce serricle )	1	L	11		Epilobium		1			Trifolium	1	1	1	
chuce	1	1			Worm Mustard / Freeiman chaireatholder 1	1	-			Stinging Nettle (Unice dicice)		1		
ana Daire II auranthamum underer	1	t	-		Fun boohin	++	-	-	+	Granter Binddersent (/ Minutaria unitaria)			T	
ore classy (Leocarshemum vulgare)	-	1-	-	-	in the second seco	1	-	-	1	Greater Diauder wort ( Unit Literie regione )	++	+	+	H.
neapple-weed (Matricena discoldes)	1	1-		1	Hemp Nettle (Galecpsis tetrahit)		1			Common Mullein (Verbalcum mapsus)	++	+	+	H.
all White Lettuce (Prenenthes altissime)	L	1			Wild Madder (Galium mollugo)	$\square$	1	1		Blue Vervain (Verbena hastete)	-	+	+	++
ack-eyed Susan (Rudbeckie hirte)	1	17	1		Marsh Bedstraw (Galum palustre)	П	T	T	1	White Vervain (Verbene unticifole)		-	+	11
all Goldenrod (Soldeno altissime)	1	Г			Sweet-scented Bedstrew (Galum Inflorum)			1		Water Speedwell (Veron. anagalla-aguatica)		1		
and the Coldensed / Coldens or and	t	t	H	-	Calum OA Ohm vit the	H	-	D	H	Common Scentrall (Verneire officials)	-	1	T	
Coldenad (Sciencego ceesie)	+	+	+	-	Contraction -		-1	RI-	+		H	+	+	
anada Goldenrod (Soldago canadensis)	1	1	1	-	Sponeo Geranium (Geranium meculatum)	M	1	2	1	Veronica	-	+	+	H
g-zag Goldenrod (Solidago flexicaulis)	1	1			Herb-robert (Geranium robertienum)	R	1	RI		Cow Vetch (Vicis cracce)	++	+	+	-
ant Goldenrod (Solidago gigantea)	Г			111	Yellow Avens (Geum aleppicum)	R		R		Vicia	1	1	1	
why Goldenrod (Solidano Juncea)	t		H		White Avens (Gourn canadanse )	17	-1			Perminkle (Vince minor)				
Coldenad (Coldens comments)	+	۰	H		Libro Autor (Course at an and	H	-+	-	++	Des Maint (Male conservers)		-	+	
ay Guiderrod (Scirclago namorais )	+	+-	H		Cibari Avena (Geom urbanum)	H	+	-		Dog violet (viola conspersa )	++	÷	+	
adego	1	-		_	Dame's Rocket (Hesperis matronalis)		-	- 10		Yellow Violet (Viola pubescens)	+	+	+	-
nid Sow-thistle (Sonchus arvanais)	1				Virg. Water-leaf (Hydrophyllum virginianum)	R	1	KI_	1.1	Com. Blue Violet (Viola soronia)	_	-	+	
anchus					Com. St. John's-wort (Hypericum perforatum)					Viola		1	1	
art-leaf Aster (Symph. controlum)	1				Spotted Jewelweed (Impatiens capanais)		A	R		(T) EGHED	1	81 J	1	
all Astar / Sumphisture administra 1	+	t	H		Wood Nettle (Lanortea canadiantis)		-	1		HODAL VES	P	17	<u>a</u>	
and reter (Symphytonic norm encoders)	+	÷	H		Mathemat // converte confere)	+ +	+	1	H	Dioceana Villaca	2	12	9	
ill White Aster (Symph: Ianceolatum)	+	-	H	-	Momerwort (Leonurus cardisce)		+	-		DIOSCOFER VINUSA	+	-15	9	-
alico Aster (Symphyotrichum lateriflorum)	1	_	$\square$	-	Field Pappergrass (Lepidium campesire)		+	-		Aluga repteus	-	18	4	
w England Aster (Symph. novae angline)	1	1			Eur. Gromwell (Lithospermum officinele)				11	0 0 1		P.	1	- B
role stem Aster (Sumph auguraum)					Butter & Ecos (Lineria vulcaria)			1					$\mathbf{T}$	
A pre-statin / soon [of mpril: providence]	+	-	H		Count Labella (Labela sinhittica)	-	-	-	-			-	1	
pmmon Tansy (Tanacetum vulgare)	-	-	$\vdash$		Great Lobella (Lobella sipranca)	++	+	-	+ +	Management	+	-	+	-
mmon Dandelion (Teraxecum officinale)		1	_	_	Locele		-	-		Monocot Herbs	-	+-	+	
om. Goatsbeard (Tragopogon pretensis)					Cut-leaf Bugleweed (Lycopus americanus)		_	10		Water-plantain (Alisme plantago-equatics)	1	-		
Infoot (Tunningo farfara)					Northern Bugleweed (Lycopus unifiorus)			1.5		Wild Leek (Allium tricocoum)	11			
FUETAAAC	D	1	0		Frinced Loosestrife (Lysimachia cillata)		Т			Jeck-in-the-pulpit (Ariseema triphyllum)	o	10	2	
E WALMING	10	-	1	-	Management () unimachia nummularia)		ρħ	P		Asparantin (Asparantin officinata)	-	-1-	-	
		-	+	-	maney wort ( Cyannacina mananiana)	-	PH-	4	H	USId Calls (Calls saturation)	-	+	1	
				-	Lysumachua		4	-		who cana (cave parustris)	-	+	+	-
					Purple Loosestrife (Lythrum salicena)		_			Bluebead-Illy (Cantonia borealis)	-	-	-	
					Black Medick (Medicago Jupuina)		1	1.1		Garden Lily-of-valley (Convallaria majaits)				
		1	1		Alfalfa (Medicego sative)		T	T		Yel Lady's Slipper (Cypripedium parvillors)	T	T	1	
	H	H	-+	-	White Suppl. circuity / Malintus alta		+	1		Canada Waterweed (Elodes canadanas)	-	1	1	
		-	1	-	Volter Const closer (Malicius and )	H	+	+	+	Hallahorine (Eninactis hallahorine)	+	+	+-	
			1	-	Tenow Sweet-clover (Metholus officinalis)		-	+	+ +	remotive (cppaces heliabonine )		1	+	
-					Wild Mint (Menthe arvensis)		-	1		Yellow Trout Lify (Erythronium emericanum)	OI.	A	g_	
Other Dicot Herbs				T	Wild Bergamot (Monarda fistulose)		1	1		Blue-flag Iris (Iris versicolor)	1	1B	1	
has Banaham (Actana cashunota)	P	-	O	-	Small Forget-me-not (Myosotis Jaxa )		T			Orange Day Lily (Hemerocallus fulve)	T	T	1	
the canebarry (nurade pachypooe)	PA 1	-	-	+	Event me and (Manada econocidae)		1	K		Lesser Duckweed (Lemne minor)	-	T	T	
o Baneberry (Actees rubre)			+	+	sugar the two (mpowers scorptions)	-	+	-	+	Stany Durbunget (Lamona Inizidra)	-	+	+	
I Agrimony (Agrimonia gryposepala)			1	-	water-cress (Naeturbum officinale)	+	+	+-	-	ciar y courreou (Lenna mauce)		10	4	H
rtic Mustard (Allerie peticiate)	0	D	0		Com. Evening-primrose (Oenothers biennis)		4	-	1	Wind Lity-ot-Valley (Malanthemum canadense)	H	18	a	
een Amaranth (Amaranthus retroflexus)		-	T	T	Sweet-cicely (Damorhiza bertenii)		1	1		False Solom Seal (Melanthemum recemosum	XO.	10	1	
			1	T	Yellow Wood-sorrel (Oxelia stricta)	IRI	KI	U		Star False Solomon (Malanthemum stellstum)		1	11	
no-neary # (Amobiceme bracinate)	-	H	-	+-	Wild Parsnin (Pastoace satirs)	11	T			True Solomon Seal (Polygonatum pubescens)	11	T		
g-peanut (Amphicerpe bracteate)				1.8.1	Fastick Displain (Displace incesting)		+	1		Pickerel-weed (Pontederia cordata)	-	T	11	
g-peanut (Amphicerpe bracteate) any Evenasting (Anaphalis marganitacea)	-		$\rightarrow$		English Fiantain (Mantago Iancaolata)		+	-	++	Curte last Poortugat (Potemoralos offerent)	-	+	++	
sg peanut (Amphicarpe bracteate) arly Everlasting (Anaphala mergeritacee) anada Anemone (Anemone canadensis)				1	A REAL PROPERTY AND A REAL			11.1	- 1	curry-lear Ponoweed (Potemogeton crispus)	-+-	+	++	H
sg-peanut (Amphicarpe bracteale) any Evertasting (Anaphala marganitacea) anada Anemone (Anemone canadensis) y Hepatica (Anemone acutiloba)	-	-	1	-	Common Plantain (Plantago major)		-	-		France Donationand / Data monators nactination 1			+	
g-peanut (Amphicarpe bractesta) any Eventasting (Anaphalis margaritaces) mada Anemone (Anemone canadensis) Hepatica (Anemone ecutiloba) imbleweet (Anemone virbitiene 1	-	-	4	+	Common Plantain (Plantago major) Rugal's Plantain (Plantago rugali )		+			Sago Portometro (Potanogetor potenaros)	-	_	1.1	
g-peanut (Amphicarpe bracteate) arty Evertasting (Anaphata marganitacea) nada Anemone (Anemone canadensis) Hepatica (Anemone ecutioba) imbleweed (Anemone virginisma) met Anosta (Anemone virginisma)				+	Common Plantain (Plantago major) Rugal's Plantain (Plantago rugali) Mav-apple (Podophyllum selfatum)	0		0	Н	Potemogeton			4-2	
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Page 2 of 2



# C.4 Amphibian Surveys



## Amphibian - Frog - Data Form

		2	
Date(yyyy-mm- Field Staff (full )	dd): 1	021-04-15	Visit #(1-3)
Time Started:	C.	Mary Marenz	The First A
Description of the second	- <u>1</u> _1	Lapan	Time Finished: 9:30pm
Beautort Wind	Scale (0-	6): 2	Cloud Cover (%): 957
Procipitation (N	ise Scale	(0-4): 5	Temperature Celcius
rieupitation (N	one, tog	, drizzle, or rain)	e/
Species	IN		Direction Facing
NONE	IN		On exclose racing
AMTO			
BULL			
CHFR	1		
MIFR			
GRTR			
GRFR			
NLFR			
NLFR PIFR		$\square$ /	
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NLFR PIFR SPPE WOFR			
NLFR PIFR SPPE WOFR Code 1 - not simulta code 2 - some call s Code 3 - full chorus, Beaufort Wind Scale	aneous, nu imultaneo , call conti 1: 3-5 ki 2: 6-11k 3: 12-15	100m Jumber of Individuals can be a pous, but number of Individuals nuous, numbers of Individual multiple air movement multiple air movement kmultiple breeze - can feel o 9 kmultiple breeze - leaves r	A: 20-30 km/hr -moderate breeze -small branch moves 5 : 31-38 km/hr - fresh breeze - moderate branch moves m face 6: 39-49 km/hr - strong breeze - large branch moves move on twigs
NLFR PIFR SPPE WOFR Code 1 - not simulta code 2 - some call s code 3 - full chorus, Beaufort Wind Scale Background Noise	aneous, nu imultaneo , call conti 0; 0-2 ki 1: 3-5 ki 2: 6-11ki 3: 12-15	100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m 100m	A: 20-30 km/hr - moderate breeze - small branch moves 5 : 31-38 km/hr - fresh breeze - moderate branch moves 6 : 39-49 km/hr - strong breeze - large branch moves move on twigs 3 - serious - continuous traffic nearby (6-10 cars)
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NLFR PIFR SPPE WOFR Code 1 - not simulta code 2 - some call s code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	aneous, nu imultaneous, call conti 0: 0-2 ki 1: 3-5 ki 2: 6-11k 3: 12-13 0 - no a 1 - sligh 2 - moo	100m Imber of Individuals can be a bus, but number of Individuals nuous, numbers of Individual m/hr - calm m/hr - light air movement km/hr - slight breeze - leaves r appriciable effect nt - distant traffic (1 car) derate - distant traffic (2-5 cal MIFR - Mink Froi GRTR-Gray Treef	A: 20-30 km/hr -moderate breeze -small branch moves s can be reliable estimated A: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves s : 31-38 km/hr - strong breeze - large branch moves move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continous traffic passing rs) g NLFR-N.Leopard Frog PIFR-Pickeral Frog

## Amphibian - Frog - Data Form

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GPS: (NAD 83)	17T AN	AP-02	
Water Present (Y	(/N) (\)		
Date(yyyy-mm-d	d): 202	1-04-15	Visit #(1-3)
Field Staff (full na	ame): Kas	of M. Marines	N
Time Started:	P1:35pn	N,	Time Finished: 8 21 april
Beaufort Wind S	cale (0-6):	2	Cloud Cover (%):
Background Nois	e Scale (0-4):	3	Temperature Celcius
Precipitation (No	one, fog, drizzl	le,or rain) Mary	
Canadian			Direction Facing
Species	IN OUT		
AMTO	1-4-	-	
BULL		-	
CHER			
MIFR			
GRTR		- /	
GRFR		- /	
NLFR	1		1 > 1
NLFR PIFR	X	-	
NLFR PIFR SPPE			
NLFR PIFR SPPE WOFR			
NLFR PIFR SPPE WOFR			
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NLFR PIFR SPPE WOFR Code 1 - not simultar	neous, number o	100m	Lurately counted
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si	neous, number o multaneous, but	100m findividuals can be acci number of individulas c	100 surately counted can be reliable estimated
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus,	neous, number o multaneous, but call continuous, r	100m findividuals can be accu number of individulas c numbers of individuals o	turately counted can be reliable estimated cannot be reliably estimated
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca	100m findividuals can be acco number of individuals o numbers of individuals o alm	100 curately counted can be reliable estimated cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig	100m findividuals can be accur number of individulas c numbers of individulas c alm ght air movement	100 surately counted can be reliable estimated cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig 2: 6-11km/hr - si	100m If individuals can be accu number of individuals of numbers of individuals of alm ght air movement light breeze - can feel on fa	100 curately counted can be reliable estimated cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves face 6: 39-49 km/hr - strong breeze - large branch moves
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig 2: 6-11km/hr - si 3: 12-19 km/hr-	100m f individuals can be acco number of individuals c numbers of individuals c numbers of individuals c alm ght air movement light breeze - can feel on fa gentle breeze - leaves move	100 curately counted can be reliable estimated cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves face 6: 39-49 km/hr - strong breeze - large branch moves we on twigs
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr -ca 1: 3-5 km/hr -lig 2: 6-11km/hr - si 3: 12-19 km/hr- 0 - no appriciab	100m if individuals can be accu- number of individuals of numbers of individuals of alm ght air movement light breeze - can feel on fa gentle breeze - leaves mon- ble effect	100 Lurately counted can be reliable estimated cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves face 6: 39-49 km/hr - strong breeze - large branch moves we on twigs 3 - serious -continuous traffic nearby (6-10 cars)
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig 2: 6-11km/hr - si 3: 12-19 km/hr- 0 - no appriciab 1 - slight - dista	100m f individuals can be accu- number of individuals c numbers of individuals c numbers of individuals c alm ght air movement light breeze - can feel on fa gentle breeze - leaves mon ble effect int traffic (1 car)	100         curately counted         can be reliable estimated         cannot be reliably estimated         4: 20-30 km/hr -moderate breeze -small branch moves         5: 31-38 km/hr - fresh breeze - moderate branch moves         face         6: 39-49 km/hr - strong breeze - large branch moves         ve on twigs         3 - serious -continuous traffic nearby (6-10 cars)         4- profound -continous traffic passing
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig 2: 6-11km/hr - si 3: 12-19 km/hr 0 - no appriciab 1 - slight - dista 2 - moderate -d	100m f individuals can be acci- number of individulas c numbers of individulas c numbers of individulas c alm ght air movement light breeze - can feel on fa gentle breeze - leaves mov ble effect int traffic (1 car) distant traffic (2-5 cars)	100 Surately counted can be reliable estimated can be reliable estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves face 6: 39-49 km/hr - strong breeze - large branch moves we on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continous traffic passing
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig 2: 6-11km/hr - si 3: 12-19 km/hr- 0 - no appriciab 1 - slight - dista 2 - moderate - d Toad	100m if individuals can be accu- number of individuals c numbers of individuals c numbers of individuals c alm ght air movement light breeze - can feel on fa gentle breeze - leaves more ble effect int traffic (1 car) distant traffic (2-5 cars) MIFR - Mink Frog	2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 200 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American BULL- Bullfrog	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig 2: 6-11km/hr - si 3: 12-19 km/hr- 0 - no appriciab 1 - slight - dista 2 - moderate - d	100m of individuals can be accu- number of individuals can alm ght air movement light breeze - can feel on far gentle breeze - leaves more ble effect int traffic (1 car) distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefro	100 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 2
NLFR PIFR SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American BULL- Bullfrog CHFR - Chorus Frog	neous, number o multaneous, but call continuous, r 0: 0-2 km/hr - ca 1: 3-5 km/hr - lig 2: 6-11km/hr - si 3: 12-19 km/hr- 0 - no appriciab 1 - slight - dista 2 - moderate - d	100m if individuals can be accu- number of individuals c numbers of individuals c numbers of individuals c alm ght air movement light breeze - can feel on fa gentle breeze - leaves mov- ole effect and traffic (1 car) distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRFR-Green Frog	Image: Serious - continuous traffic nearby (6-10 cars)         4 - profound - continuous traffic passing         Image: Serieus - continuous traffic passing

## Amphibian - Frog - Data Form

8 1		1	
Date(yyyy-mm-d	Id): 2	221-04-15	Visit #(1-3)
Time Started	ame):	Kasey Makhare	
rune starteu.	0 7.	epm 1	Time Finished: 8.95.pm
Beaufort Wind S	cale (0-6	5): 2	Cloud Cover (%):
Background Nois	se Scale	(0-4): 3	Temperature Celcius
Precipitation (No	one, fog,	, drizzle, or rain) May	
Species	IN	OUT	Direction Facing
NONE			
AMTO			
BULL			
CHFR			
MIFR			
GRTR			SPPE
GRFR			2-4
NLFR			
PIFR			
SPPE	X		
SPPE WOFR	X		
SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19	100m mber of individuals can be accurate us, but number of individulas can b nuous, numbers of individulas cann n/hr - calm n/hr - light air movement m/hr - slight breeze - can feel on face km/hr- gentle breeze - leaves move on	10 ely counted e reliable estimated ot be reliably estimated 4: 20-30 km/hr - moderate breeze - small branch moves 5 : 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves n twigs
SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise	neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a	100m mber of individuals can be accurate us, but number of individulas can b nuous, numbers of individulas cann n/hr - calm n/hr - light air movement m/hr - slight breeze - can feel on face km/hr - gentle breeze - leaves move on ppriciable effect	20-30 km/hr -moderate breeze -small branch moves 5 : 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves n twigs 3 - serious -continuous traffic nearby (6-10 cars)
SPPE WOFR ode 1 - not simultar ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a 1 - sligh	100m mber of individuals can be accurate us, but number of individuals can b nuous, numbers of individuals cann n/hr - calm n/hr - light air movement m/hr - slight breeze - can feel on face t km/hr- gentle breeze - leaves move on ppriciable effect t - distant traffic (1 car)	10 ely counted re reliable estimated ot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 9 twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing
SPPE WOFR Fode 1 - not simultar ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a 1 - sligh 2 - mod	100m mber of individuals can be accurate us, but number of individuals can b nuous, numbers of individuals cann n/hr - caim n/hr - light air movement m/hr - slight breeze - can feel on face i km/hr- gentle breeze - leaves move on ppriciable effect t - distant traffic (1 car) erate -distant traffic (2-5 cars)	10 ely counted er eliable estimated of be reliably estimated 4: 20-30 km/hr - moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: strong 6: serious - continuous traffic nearby (6–10 cars) 4- profound -continous traffic passing
SPPE WOFR ode 1 - not simultar ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a 1 - sligh 2 - mod Toad	100m mber of individuals can be accurate us, but number of individuals can b nuous, numbers of individuals cann n/hr - calm n/hr - light air movement m/hr - slight breeze - can feel on face tekm/hr- gentle breeze - leaves move on ppriciable effect t - distant traffic (1 car) lerate -distant traffic (2-5 cars) MIFR - Mink Frog	10 ely counted er eliable estimated of be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 9 twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog
SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American BULL - Bullfrog	neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a 1 - sligh 2 - mod Toad	100m mber of individuals can be accurate us, but number of individuals can b nuous, numbers of individuals canno n/hr - caim n/hr - light air movement m/hr - slight breeze - can feel on face i km/hr- gentle breeze - leaves move on ppriciable effect t - distant traffic (1 car) erate -distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog	10 ely counted er reliable estimated of be reliably estimated 4: 20-30 km/hr - moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 7 - strong breeze - large branch moves 7 - strong breeze - large branch moves 8 - strong breeze - large branch moves 8 - strong breeze - large branch moves 9 - strong breeze - large bran
SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American BULL - Bullfrog CHFR - Chorus Fro,	neous, nu multaneo call contii 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a 1 - sligh 2 - mod Toad	100m mber of individuals can be accurate us, but number of individuals can be nuous, numbers of individuals canno n/hr - calm m/hr - light air movement m/hr - slight breeze - can feel on face km/hr-gentle breeze - leaves move on ppriciable effect t - distant traffic (1 car) erate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRFR-Green Frog	10 ely counted er eliable estimated of be reliably estimated 4: 20-30 km/hr - moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - fresh breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 7 km/hr - fresh breeze - large branch moves 8 km/hr - fresh breeze - large branch moves 9 km/hr - fresh branch moves 9 km/hr - fresh branch moves 9 km
SPPE WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American SULL- Bullfrog CHFR - Chorus Fro, General Comme	neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a 1 - sligh 2 - mod Toad g nts:	100m mber of individuals can be accurate us, but number of individuals can b nuous, numbers of individuals cannon n/hr - calm n/hr - light air movement m/hr - slight breeze - can feel on face is km/hr- gentle breeze - leaves move on ppriciable effect t - distant traffic (1 car) lerate -distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRFR-Green Frog	10 ely counted are reliable estimated of be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves 6: 39-49 km/hr - strong breeze - large branch moves 9: twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frog

Scanned with CamScanner

## Amphibian - Frog - Data Form

Water Present (N	17T	append & d	
Date(yyyy-mm-d Field Staff (full n	ld <u>): 2</u> ame): 4	ary Hemile	Visit #(1-3)
Time Started:	8:20	en l	Time Finished: 8.53 pm
Beaufort Wind S Background Nois Precipitation (No	cale (0-6): se Scale (0 one, fog, d	H4): 2 Irizzle,or rain) NOM	Cloud Cover (%): Temperature Celcius
Species	IN	OUT	Direction Facing
NONE			200
AMTO	T		SPPE
BULL			
CHFR			
MIFR		- /	
GRTR		- /	
GRFR		- /	
NLFR			
PIFR			
232.45			
SPPE			
SPPE WOFR			
SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	neous, num imultaneous call continu 0: 0-2 km/ 1: 3-5 km/ 2: 6-11km, 3; 12-19 kr	100m ber of individuals can be accurate , but number of individulas can be ous, numbers of individuals canno hr - calm hr - light air movement /hr - slight breeze - can feel on face m/hr - gentle breeze - leaves move on	100 ely counted e reliable estimated ot be reliably estimated 4: 20-30 km/hr -moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs
SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise	neous, num imultaneous call continu 0: 0-2 km/ 1: 3-5 km/ 2: 6-11km, 3: 12-19 kr 0 - no app	100m ber of individuals can be accurate , but number of individulas can be ous, numbers of individulas canno hr - calm hr - light air movement /hr - slight breeze - can feel on face m/hr- gentle breeze - leaves move on riciable effect	100 ely counted e reliable estimated ot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6: 10 cours)
SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, num imultaneous call continu 0: 0-2 km/ 1: 3-5 km/ 2: 6-11km/ 3: 12-19 kr 0 - no app 1 - slight - 2 - moder.	100m ber of individuals can be accurate , but number of individulas can be ous, numbers of individulas canno hr - calm hr - light air movement /hr - slight breeze - can feel on face m/hr- gentle breeze - leaves move on riciable effect distant traffic (1 car) ate - distant traffic (2-5 cars)	100 ely counted e reliable estimated ot be reliably estimated 4: 20-30 km/hr -moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing
SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, num imultaneous call continu 0: 0-2 km/ 1: 3-5 km/ 2: 6-11km, 3: 12-19 kr 0 - no app 1 - slight - 2 - moder. Toad	100m ber of individuals can be accurate , but number of individulas can be ous, numbers of individulas canno hr - calm hr - light air movement /hr - slight breeze - can feel on face m/hr- gentle breeze - leaves move on riciable effect distant traffic (1 car) ate - distant traffic (2-5 cars) MIFR - Mink Frog	10 ely counted e reliable estimated ot be reliably estimated 4: 20-30 km/hr -moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continous traffic passing NLFR-N.Leopard Frog
SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, num imultaneous call continu 0: 0-2 km/ 1: 3-5 km/ 2: 6:11km, 3: 12-19 kr 0 - no app 1 - slight - 2 - moder. Toad	100m ber of individuals can be accurate , but number of individulas can be ous, numbers of individulas canno hr - calm hr - light air movement /hr - slight breeze - can feel on face m/hr- gentle breeze - leaves move on riciable effect distant traffic (1 car) ate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog	10 ely counted e reliable estimated ot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog
SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American 3ULL - Bullfrog CHFR - Chorus Frog	neous, num imultaneous call continu 0: 0-2 km/ 1: 3-5 km/ 2: 6-11km/ 3: 12-19 kr 0 - no app 1 - slight - 2 - moder Toad	100m ber of individuals can be accurate , but number of individulas can be ous, numbers of individulas canno hr - calm hr - light air movement /hr - slight breeze - can feel on face m/hr- gentle breeze - leaves move on riciable effect distant traffic (1 car) ate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRFR-Green Frog	100 ely counted e reliable estimated ot be reliably estimated 4: 20-30 km/hr -moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper

## Amphibian - Frog - Data Form

Study Area: GPS: (NAD 83)	( 	SlancasterRd AMP-05	
Date(yyyy-mm-d Field Staff (full as	(/N) d): Q	221-04-15	Visit #(1-3)
Time Started:	$\frac{me}{\sqrt{1}}$	Lasey Malenzie	Time Finished. (9, 25/2)
Beaufort Wind C	2.54	an	Time Finished: 9 00000
Background Nois Precipitation (No	e Scale ine, fog	(0-4): <u>3</u> , drizzle,or rain) <u>OCA</u>	Cloud Cover (%): 95
Empeire	1		
NONE	IN	OUT	Direction Facing
ANATO			SPPE
RUU	-		
CHER	-		
MIED			
GRTP	-		
GRED	-		
NIER	+		
PIER	1		
SPPF	-		
WOFR			
Code 1 - not simultar Code 2 - some call si Code 3 - full chorus,	neous, nu multanec call conti	100m Imber of individuals can be accurately bus, but number of individulas can be nuous, numbers of indiviudals cannot	y counted reliable estimated t be reliably estimated
Beaufort Wind	0: 0-2 k	m/hr-calm	4: 20-30 km/hr -moderate breeze -small branch moves
Scale	1: 3-5 k	m/hr - light air movement	5 : 31-38 km/hr - fresh breeze - moderate branch moves
	2: 6-11) 3: 12-19	tm/hr - slight breeze - can feel on face 9 km/hr- gentle breeze - leaves move on t	6: 39-49 km/hr - strong breeze - large branch moves wigs
Background Noise Scale	0 - no a 1 - sligh 2 - mod	ppriciable effect t - distant traffic (1 car) erate -distant traffic (2-5 cars)	<ul> <li>3 - serious -continuous traffic nearby (6-10 cars)</li> <li>4- profound -continous traffic passing</li> </ul>
AMTO - American 1	Foad	MIFR - Mink Frog	NLFR-N.Leopard Frog
BULL- Bullfrog		GRTR-Gray Treefrog	PIFR-Pickeral Frog
CHFR - Chorus Frog		GRFR-Green Frog	SPPE-Spring Peeper
			MOEP Mood From

1

AECOM

## Amphibian - Frog - Data Form

Date(yyyy-mm-o	dd): 2021	- 0+-15 Visit #(1-3)	
Field Staff (full n	iame): <a)< th=""><th>eximplify is</th><th></th></a)<>	eximplify is	
Time Started: C	1:03pm	Time Finished: 9:08 p.0	M
Beaufort Wind S	Scale (0-6):	Cloud Cover (%): 957	
Background Noi	se Scale (0-4)	2 Temperature Celcius 4 °C	/
Precipitation (N	one, fog, driz	le,or rain)	
			- Fratas
Species	IN OU		on Facing
NONE			
AMTO			
BULL			
CHFR			
MIFR			
SRTR			\ -
SRFR			$\mathbf{i}$
NEFR			
1FR			( ) <b>(</b> )
DDC	57		1
SPPE VOER	- X		
NOFR	- X		
SPPE WOFR	X	100m	
SPPE WOFR Code 1 - not simulta	neous, number	100m of individuals can be accurately counted	1
SPPE WOFR Code 1 - not simulta	neous, number multaneous, bu	100m of individuals can be accurately counted number of individulas can be reliable estimated	1
OPPE VOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus,	neous, number multaneous, bu call continuous,	100m of individuals can be accurately counted number of individulas can be reliable estimated numbers of individuals cannot be reliably estimated	1
OPPE WOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - c	100m of individuals can be accurately counted number of individulas can be reliable estimated numbers of individuals cannot be reliably estimated alm 4: 20-30 km/hr -moderate breeze -small	1
OPPE VOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - c 1: 3-5 km/hr - l	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm         4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate	1 branch moves e branch moves
PPE VOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - i 1: 3-5 km/hr - i 2: 6-11km/hr -	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm       4: 20-30 km/hr -moderate breeze -small         ght air movement       5 : 31-38 km/hr - fresh breeze - moderate         light breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br	l branch moves e branch moves ranch moves
OPPE VOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - c 1: 3-5 km/hr - l 2: 6-11km/hr 3: 12-19 km/hr	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm         4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate         slight breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs	L branch moves e branch moves ranch moves
SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - 0 1: 3-5 km/hr - 1 2: 6-11km/hr 3: 12-19 km/hr 0- no appricia	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individulas cannot be reliably estimated         alim         4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate         sight breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs       3 - serious -continuous traffic nearby	l branch moves e branch moves ranch moves
OPPE NOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - i 2: 6-11km/hr 3: 12-19 km/hr 0- no appricia 1 - slight - dist	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm         4: 20-30 km/hr -moderate breeze -small         ght air movement         5: 31-38 km/hr - fresh breeze - moderate         alight breeze - can feel on face         6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs         ole effect         3 - serious -continuous traffic nearbu         ont traffic (1 car)	l branch moves e branch moves ranch moves y (6-10 cars)
PPE VOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - 0 1: 3-5 km/hr - 1 2: 6-11km/hr 3: 12-19 km/hr 0- no appricia 1 - slight - disto 2 - moderate -	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm       4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate         light breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs       ole effect         3 - serious -continuous traffic nearby         int traffic (1 car)       4- profound -continous traffic passir         distant traffic (2-5 cars)	l branch moves e branch moves ranch moves y (6-10 cars) ng
PPE VOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Scale Scale	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - 0 1: 3-5 km/hr - 1 2: 6-11km/hr 3: 12-19 km/hr 0 - no appricia 1 - slight - dist 2 - moderate -	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm       4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate         alght breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs       3 - serious -continuous traffic nearbor         oble effect       3 - serious -continuous traffic nearbor         att traffic (1 car)       4- profound -continous traffic passir         distant traffic (2-5 cars)       NLEP, N Lessend 5	l branch moves e branch moves ranch moves y (6-10 cars) ng
SPPE WOFR VOFR ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American 1 ULL- Bullfrog	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - 0 1: 3-5 km/hr - 1 2: 6-11km/hr 3: 12-19 km/hr 0 - no appricia 1 - slight - dist 2 - moderate - Toad	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm       4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate         sight breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs       0e effect         3 - serious -continuous traffic nearbin       4- profound -continous traffic passir         distant traffic (1 car)       4- profound -continous traffic passir         MIFR - Mink Frog       NLFR-N.Leopard Frog         MIFR - Mink Frog       PIEP. Pickocal Frog	l branch moves e branch moves ranch moves y (6-10 cars) ng
SPPE WOFR Code 1 - not simulta code 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American T ULL- Bullfrog HFR - Chorus Froe	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - d 1: 3-5 km/hr - l 2: 6-11km/hr 3: 12-19 km/hr 0 - no appricia 1 - slight - dist 2 - moderate - Toad	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individulas cannot be reliably estimated         alm       4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate         alght breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs	l branch moves e branch moves ranch moves y (6-10 cars) ng
SPPE WOFR Code 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American T ULL- Bullfrog HFR - Chorus Frog	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - i 2: 6-11km/hr 3: 12-19 km/hr 0- no appricia 1 - slight - dist 2 - moderate -	100m         of individuals can be accurately counted         number of individulas can be reliable estimated         numbers of individuals cannot be reliably estimated         alm       4: 20-30 km/hr -moderate breeze -small         ght air movement       5: 31-38 km/hr - fresh breeze - moderate         alght breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br         gentle breeze - leaves move on twigs       3 - serious -continuous traffic nearbor         oble effect       3 - serious -continuous traffic passir         distant traffic (1 car)       4- profound -continous traffic passir         distant traffic (2-5 cars)       MIFR - Mink Frog         MIFR - Mink Frog       NLFR-N.Leopard Frog         GRTR-Gray Treefrog       PIFR-Pickeral Frog         GRFR-Green Frog       SPPE-Spring Peeper         WOER       Woolf	l branch moves e branch moves ranch moves y (6-10 cars) ng
SPPE WOFR Code 1 - not simulta Code 2 - some call si code 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American T ULL- Bullfrog HFR - Chorus Frog	neous, number multaneous, bu call continuous, 0: 0-2 km/hr - 0 1: 3-5 km/hr - 1 2: 6-11km/hr 3: 12-19 km/hr 0 - no appricia 1 - slight - dist 2 - moderate - Toad	100m         of individuals can be accurately counted number of individulas can be reliable estimated numbers of individulas cannot be reliably estimated         alm       4: 20-30 km/hr -moderate breeze -small ght air movement         si 31-38 km/hr - fresh breeze - moderate light breeze - can feel on face       6: 39-49 km/hr - strong breeze - large br gentle breeze - leaves move on twigs         ble effect       3 - serious -continuous traffic nearbi- distant traffic (1 car)         MIFR - Mink Frog GRTR-Gray Treefrog       NLFR-N.Leopard Frog SPPE-Spring Peeper WOFR - Wood Frog	l branch moves e branch moves ranch moves y (6-10 cars) ng

1

AECOM



Amphibian - Frog - Data Form

Date(yyyy-mm-o	dd): 202	F1-20-17	Visit #(1-3)_2
Time Started:	1 02 00	Next YORN S P	Time Finished: 9:050m
Beaufort Wind S	Scale (0-6)	: D	Cloud Cover (%):
Background Noi	se Scale (C	0-4): 3	Temperature Celcius (8
Precipitation (Ne	one) tog. a	drizzle,or rain)	
~	1	<u></u>	
Species	IN	OUT	Direction Facing
NONE	X	-	/
AMTO			
BULL			
CHFR			
MIFR			
GRTR	-		
GRFR			
11 00			
ILFR			
NLFK PIFR		= /	
PIFR PIFR PPE		$\equiv$ /	
PIFR PIFR PPE VOFR			
NLFR PIFR SPPE WOFR Code 1 - not simult Code 2 - some call s Code 3 - full chorus, Beaufort Wind Scale	aneous, nun imultaneou , call continu 0: 0-2 km 1: 3-5 km 2: 6-11km 2: 6-11km	100m nber of Individuals can be s, but number of Individu uous, numbers of Individu /hr - light air movement /hr - light air movement /hr - light berze - hore - an feel m/r - can feel m/r - can feel	e accurately counted las can be reliable estimated dats cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves
NLFR PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call s Code 3 - full chorus, Beautort Wind Scale	neous, num imultaneou, call continu 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 k	100m nber of Individuals can be s, but number of Individu uous, numbers of Individu /hr - light air movement n/hr - light air movement m/hr - stight breeze - can feel um/hr - gentle breeze - leaves	e accurately counted alas can be reliable estimated dats cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - tresh breeze - moderate branch moves s move on twigs
VUFR PIFR SPPE WOFR Code 1 - not simulti Code 2 - some call s Code 3 - full chorus, Beaufort Wind Scale Background Noise	neous, nun imultaneou, call continu 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 k 0 - no api	100m nber of individuals can be s, but number of individu uous, numbers of individu uous, numbers of individu /hr - slight air movement /hr - slight breeze - ean feel im/hr-gentle breeze - leaves priclable effect	e accurately counted las can be reliable estimated dats cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves s move on fw/gs 3 - serious -continuous traffic nearby (6-10 cars)
VUFR 201FR 201FR 2006 1 - not simult 2006 2 - some call s 2006 3 - full chorus, Beautort Wind Scale Background Noise Scale	aneous, nun imultaneous, call continu 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 k 0 - no app 1 - slight 2 - mode	100m nber of Individuals can be s, but number of Individu uous, numbers of Individu /hr - light air movement hr - slight breeze - leaves m/hr - slight breeze - leaves priclable effect - distant traffic (1 car) rate - distant traffic (2-5 c	s accurately counted ulas can be reliable estimated dals cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves s move on fw/gs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continous traffic passing cars)
VULTR 201FR 201FR 2006 2 - some call is 2006 2 - some call is 2006 3 - full chorus, 2006 3 - full chorus, Beautort Wind Scale Background Noise Scale	Ineous, nun imultaneou , call continu 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 k 0 - no app 1 - slight 2 - mode	100m nber of Individuals can be s, but number of Individu uous, numbers of Individu /hr - light air movement /hr - light air movement /hr - slight breeze - leave priclable effect - distant traffic (1 car) rate - distant traffic (2-5 o MIFR - Mink Fr	e accurately counted Jas can be reliable estimated dals cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - tresh breeze - moderate branch moves 5: 31-38 km/hr - strong breeze - large branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing cars) 00 NLFR-N.Leopard Frog
VLFR 201FR 201FR 2006 1 - not simult 2006 2 - some call s 2006 3 - full chorus, Beautort Wind Scale Background Noise Scale AMTO - American BULL- Builfrog	aneous, nun imultaneou call contini 0: 0-2 km 1: 3-5 km 3: 12-19 k 0 - no ap 1 - slight 2 - mode	100m nber of Individuals can be s, but number of Individu uous, numbers of Individu /hr - light air movement /hr - light air movement /hr - slight breeze - leaves priclable effect - distant traffic (1 car) rate - distant traffic (2-5 o MIFR - Mink Fr GRTR-Gray Tre	s accurately counted ulas can be reliable estimated dats cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 5: 31-38 km/hr - strong breeze - large branch moves s move on fw/gs 3 - serious - continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing cars) og NLFR-N.Leopard Frog efrog PIFR-Pickeral Frog
VLFR PIFR SPPE WOFR Code 2 - some call s Code 3 - full chorus, Beautort Wind Scale Background Noise Scale AMTO - American BULL- Bullfrog CHFR - Chorus Fro	Ineous, num imultaneous, call contini 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 k 1: 0-no api 1 - slight 2 - mode Toad	100m her of Individuals can be s, but number of Individuals but number of Individuals but numbers of Individu /hr - calm /hr - slight air movement n/hr - ginthe breeze - can feel mr/hr- gentle breeze - leave priclable effect - distant traffic (1 car) rate - distant traffic (2-5 of MIFR - Mink Fr GRTR-Gray Tre- GRTR-Green Fr	accurately counted Jas can be reliable estimated dats cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move 5: 31-38 km/hr - fresh breeze - moderate branch move 5: 31-38 km/hr - strong breeze - large branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- protound -continuous traffic nearby (6-10 cars) 4- protound -continuous traffic passing tars) 00 NLFR-Ni.Leopard Frog efrog PIFR-Pickeral Frog og SPPE-Spring Peeper

Pg t of 1

Amphiblan - Frog - Data Form

Date(yyyy-mm-d	d): 2021-05-1	7 Visit #(1-3)
Field Staff (full n	ame): () Allogia	tint W. Reid
Fime Started: 4	7:12 cm	Time Finished: 9:15 0m
Beaufort Wind S	cale (0-6): 1	Cloud Cover (%):
Backoround Nois	e Scale (0-4): 3	Temperature Celcius 17
Precipitation (No	ne fog, drizzle or rai	in)
C		
Species	IN OUT	E C Direction Facing
NONE	V	
AMTO		
BULL		
CHFR		
MIFR		
GRTR		
GRFR		
NLFR	2	
NLFR PIFR	N	
NLFR PIFR SPPE		
NLFR PIFR IPPE NOFR	1	
NLFR PIFR SPPE WOFR 20de 1 - not simulta 20de 2 - some call si 20de 3 - full chorus, Beaufort Wind Scale	1 neous, number of individu multaneous, but number call continuous, numbers 0: 0-2 km/hr- calm 1: 3-5 km/hr - light air mov 2: 6-11 km/hr - slight breez 3: 12-19 km/hr- nenth fbr	00 uisis can be accurately counted of individulas can be reliable estimated of individulas cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move vement 5: 31-38 km/hr - fresh breeze - moderate branch move ze - can feel on face 6: 39-49 km/hr - strong breeze - large branch moves tear- leaves move on twiss
NLFR PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	1 neous, number of individu multaneous, but number call continuous, numbers 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air mov 2: 6-11km/hr - slight breez 3: 12-19 km/hr- gentie bre	00m uisis can be accurately counted of individuias can be reliable estimated of individuias cannot be reliably estimated 4: 20-30 km/hr -moderate breeze - small branch move vement 5: 31-38 km/hr - fresh breeze - moderate branch move ze - can feel on face 6: 39-49 km/hr - strong breeze - large branch moves seze - leaves move on twigs
NLFR PIFR SPPE WOFR Sode 1 - not simulta Sode 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise	1 neous, number of individu multaneous, but number call continuous, numbers 0: 0-2 km/hr- call 1: 3-5 km/hr- light air mov 2: 6-11 km/hr- sight breez 3: 12-19 km/hr- gentle bre 0 - no appriciable effect	00 uils can be accurately counted of individulas can be reliable estimated of individulas cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move vement 5: 31-38 km/hr - fresh breeze - moderate branch move ze - can feel on face 6: 39-49 km/hr - strong breeze - large branch moves neze - leaves move on twigs 3 - serious - continuous traffic nearby (6-10 cars)
NLFR PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	11 neous, number of individu multaneous, but number call continuous, number call continuous, number call continuous, number call continuous, number call continuous, number call continuous call km/hr - slight breez call km/hr - slight breez call km/hr - gentle bree o - no appriciable effect 1 - slight - distant traffic c - moderate - distant traffic	00m vals can be accurately counted of individuals can be reliable estimated of individuals can be reliably estimated 4: 20-30 km/hr -moderate breaze -small branch move wement 5: 31-38 km/hr - fresh breaze - moderate branch move re - can feel on face 6: 39-49 km/hr - strong breaze - large branch moves ezze - leaves move on twigs 3 - serious -continuous traffic nearby (6-10 cars) c (1 car) 4 - profound -continous traffic passing affic (2-5 cars)
VLFR JFR JFR SPPE NOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American	11 neous, number of individu multaneous, but number call continuous, number call continuous, number call continuous, number call continuous, number call continuous, number call continuous, number call continuous call conti	00m bals can be accurately counted of individuals can be reliable estimated of individuals can be reliably estimated 4: 20-30 km/hr -moderate breaze -small branch move sevent 5: 31-38 km/hr - fresh breaze - moderate branch move re - can feel on face 6: 39-49 km/hr - strong breaze - large branch moves reze - leaves move on twigs 3 - serious -continuous traffic nearby (6-10 cars) c (1 car) 4 - profound -continuous traffic passing affic (2-5 cars) - Mink Frog NLFR-N.Leopard Frog
NLFR PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American BULL- Bullfrog	11 neous, number of individu multaneous, but number call continuous, numbers 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air mov 2: 6-11 km/hr - sight breez 3: 12-19 km/hr- gentle bre 0 - no appriciable effect 1 - slight - distant traffic 2 - moderate -distant traffic 2 - moderate -distant traffic GRTR-	00m bals can be accurately counted of individulas can be reliable estimated of individulas cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move wement 5: 31-38 km/hr - fresh breeze - moderate branch move re- can feel on face 6: 39-49 km/hr - strong breeze - large branch moves seze - leaves move on twigs 3: - serious - continuous traffic nearby (5-10 cars) 4: (1 car) 4- profound - continuous traffic passing affic (2-5 cars) - Mink Frog NLFR-Ni.Leopard Frog -Gray Treefrog PIFR-Pickeral Frog
NLFR PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale AMTO - American BULL- Bullfrog CHFR - Chorus Fro	11 neous, number of individu multaneous, but number call continuous, numbers 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air mov 2: 6-1 km/hr - sight freez 3: 12-19 km/hr- gentle bre 0 - no appriciable effect 1 - slight - distant traffic 2 - moderate - distant traffic 2 - moderate - distant traffic 9 GRTR-	00m- vals can be accurately counted of individulas can be reliable estimated 4: 20-30 km/hr -moderate breeze -small branch move vement 5: 31-38 km/hr - fresh breeze - small branch move re- can feel on face 6: 39-49 km/hr - strong breeze - large branch moves ezez - leaves move on twige 3 - serious - continuous traffic nearby (6-10 cars) (1 car) 4 - profound - continuous traffic passing affic (2-5 cars) - Mink Frog NLFR-NLeopard Frog -Gray Treefrog PIFR-Pickeral Frog -Green Frog SPPE-Spring Peeper

Pg 1 of 1






Pg tof 1



Date(yyyy-mm-c	10): 2021-05-17	Visit #(1-3)
Field Statt (full n	ame): (', p.t/////or	Time Finished: 9:42 pro
Thine blance.	11 54 UM	Cloud Course (M):
Beautort wind 5	cale (0-0).	Temperature Celcius
Precipitation (No	ne in drizzle or rain)	
Tecipitation (inc		ALC: IN ERMAN
Species		M - Direction Facing
NONE		
AMTO	and the second sec	
BULL		(0)0 1902
HFR		side(a)
MIFR		
IRTR		
BRFR		
ILFR		
IFR		
17657		
PPE	2(2)	I = I
PPE VOFR	ə(2)	
PPE VOFR ode 1 - not simultat de 2 - some call si ode 3 - fuil chorus, Beaufort Wind Scale	1007 neous, number of Individuals - multaneous, but number of Individuals call continuous, numbers of Ir 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air moveme 2: 6-11 km/hr - slight breeze - c 3: 12-19 km/hr - gentle breeze	n can be accurately counted dividulas can be reliable estimated dividulas cannot be reliably estimated 4: 20-30 km/hr - moderate breeze - small branch moves ent 5: 31-38 km/hr - fresh breeze - moderate branch moves an feel on face 6: 39-49 km/hr - strong breeze - large branch moves leaves move on twigs
PPE VOFR ode 1 - not simultat ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise	1007 neous, number of individuals - multaneous, but number of individuals - call continuous, numbers of in 0: 0-2 km/hr - catm 1: 3-5 km/hr - light air moveme 2: 6-11 km/hr - slight breeze - 3: 12-19 km/hr - gentle breeze 0 - no appriciable effect	n can be accurately counted dividulas can be reliable estimated dividulas can be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch moves ent 5: 31-38 km/hr - fresh breeze - moderate branch moves an feel on face 6: 39-49 km/hr - strong breeze - large branch moves -leaves move on fwigs 3 - serious - continuous traffic nearby (6-10 cars)
PPE VOFR de 1 - not simultat de 2 - some call sil de 2 - full chorus, / Beautort Wind Scale Background Noise Scale	100n reous, number of individuals multaneous, but number of in all continuous, numbers of in 0: 0-2 km/hr - catm 1: 3-5 km/hr - light air moveme 2: 6-11 km/hr - slight breeze - 6 3: 12-19 km/hr - gentle breeze 0 - no appriciable effect 1 - slight - distant traffic (1 c	n can be accurately counted dividulas can be reliable estimated dividulas cannot be reliably estimated 4: 20-30 km/hr - moderate breeze -small branch moves ent 5: 31-38 km/hr - fresh breeze - moderate branch moves an feel on face 6: 39-49 km/hr - strong breeze - large branch moves -leaves move on twigs 3 - serious -continuous traffic nearby (6-10 cars) ar) 4 - profound -continous traffic passing
PPE VOFR ode 1 - not simultat ode 2 - some call sil ode 3 - full chorus, / Beaufort Wind Scale Background Noise Scale	100n reous, number of individuals multaneous, but number of in call continuous, numbers of in ci -0-2 km/hr - calm 1: 3-5 km/hr - light air moveme 2: 6-11 km/hr - slight breeze - c 3: 12-19 km/hr - gentle breeze 0 - no appriciable effect 1 - slight - distant traffic (1 c 2 - moderate - distant traffic	n can be accurately counted dividulas can be reliable estimated dividulas cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves ent 5: 31-38 km/hr - fresh breeze - moderate branch moves an leel on face 6: 39-49 km/hr - strong breeze - large branch moves -leaves move on twigs 3 - serious -continuous traffic nearby (6-10 cars) ar) 4- profound -continous traffic passing (2-5 cars)
PPE VOFR ode 1 - not simultai ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale	1000 reous, number of individuals multaneous, but number of in call continuous, numbers of in ci. 0-2 km/hr - light air moveme 2: 6-11km/hr - slight breeze - 6 3: 12-19 km/hr - gentle breeze 0 - no apprictable effect 1 - slight - distant traffic 2 - moderate - distant traffic Toad MIFR - Mi	n can be accurately counted for the accurately counted dividuals can be reliable estimated dividuals cannot be reliably estimated 4: 22-30 km/hr - moderate breaze - small branch moves ent 5: 31-38 km/hr - fresh breaze - moderate branch moves an leet on face 6: 39-49 km/hr - strong breaze - large branch moves - leaves move on twigs 3 - serious - continuous traffic nearby (6-10 cars) ar) 4 - profound -continous traffic passing (2-5 cars) nk Frog NLFR-N.Leopard Frog
IPPE VOFR def 1 - not simultai def 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American ULL - Bullfrog	1000 reous, number of individuals multaneous, but number of in call continuous, numbers of in 0: 0-2 km/hr - light air moveme 2: 6-118 km/hr - slight breeze - 6 3: 12-19 km/hr - gentle breeze - 0 - no apprictable effect 1 - slight - distant traffic (1 c 2 - moderate - distant traffic Toad MIFR - Mi GRTR-Gra	n can be accurately counted dividuals can be reliable estimated dividuals cannot be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch moves ent 5: 31-38 km/hr - fresh breeze - moderate branch moves an feel on face 6: 39-49 km/hr - strong breeze - large branch moves - leaves move on twigs 3 - serious - continuous traffic nearby (6-10 cars) ar) 4 - protound -continuous traffic passing (2-5 cars) nk Frog NLFR-N.Leopard Frog y Treefrog PIFR-Pickeral Frog
IPPE VOFR ode 1 - not simultar ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American ULL - Bullfrog HFR - Chorus Frog	1000 neous, number of individuals multaneous, but number of in call continuous, numbers of in c. 0-2 km/hr - salm 1: 3-5 km/hr - light air moveme 2: 6-11km/hr - slight breeze - c 3: 12-19 km/hr - gentle breeze 0 - no apprictable effect 1 - slight - distant traffic (1 c 2 - moderate - distant traffic Foad MIFR - Mil GRTR-Gra 0 - GRFR-Gre	n can be accurately counted dividuals can be reliable estimated dividuals cannot be reliably estimated estimated an feel on face an feel on face as 5: 31-38 km/hr - fresh breeze - small branch moves an feel on face 5: 31-38 km/hr - fresh breeze - large branch moves - leaves move on twigs 3 - serious - continuous traffic nearby (6-10 cars) ar) 4 - profound -continuous traffic passing (2-5 cars) nk Frog y Treetrog mk Frog y Treetrog mk Frog SPPE-Spring Peeper

Pg 1 of 1



a a ca	1.	at the second		
Field Staff (full n Time Started:	a <u>me): (*</u> 3 52	0.000	Time Finished: 9 55 000	_
Beaufort Wind S	cale (0-6	i): 0	Cloud Cover (%):	_
Background Nois	e Scale	(0-4): 2	Temperature Celcius	
Precipitation (No	one, tog.	drizzle,or rain	)	
	/	40		at an
Species	IN	OUT	VN Concertion Fa	cing
NONE				
AMTO	200			
BULL	10.04121			
CHFR			INTOQUI SPPE	
MIFR			APR: 2(3)	
GRTR				
SRFR				
NLFR				8
	1			<b>`</b>
PIFR				
PIFR	3(3)			
PIFR SPPE WOFR	9(3)	10		
PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	Q(-3) meous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19	10 mber of Individus us, but number o nuous, numbers o nu/hr - calm m/hr - sight air move m/hr - sight air move m/hr - sight breeze km/hr- gentle breeze	n can be accurately counted dividulas can be reliable estimated dividulas cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branci ent 5: 31-38 km/hr - fresh breeze - moderate branc an feel on face 6: 39-49 km/hr - strong breeze - large branch n - leaves move on twigs	h moves
PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Baskground Noise	0(-3) neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a	10 mber of Individua us, but number o nuous, numbers o nuhr - calm m/hr - sight air mov m/hr - sight breeze km/hr- gentle bree poriciable effect	n Can be accurately counted dividulas can be reliable estimated dividulas cannot be reliably estimated 4: 20-30 km/hr - moderate breeze - small branci ent 5: 31-38 km/hr - fresh breeze - moderate branc an feel on face 6: 39-49 km/hr - strong breeze - large branch n - leaves move on twigs 3 - serious - continuous traffic nearby (6-11	h moves th moves
PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beautort Wind Scale Background Noise Scale	2(-3) neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0- no aj 1 - sligh	10 mber of Individuz us, but number o m/hr - calm m/hr - saim m/hr - saimt air movy m/hr - saight breeze km/hr- gentle breez km/hr- gentle breez t distant traffic (	n can be accurately counted dividulas can be reliable estimated dividulas cannot be reliably estimated ent 5: 31-38 km/hr - fresh breeze - small branci ant 6: 31-38 km/hr - fresh breeze - underate branch an feel on face 6: 39-49 km/hr - strong breeze - large branch n - teaves move on twigs 3 - serious - continuous traffic nearby (6-10 4 - profound - continuous traffic nearby (6-10	h moves th moves
PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	0(-2) neous, nu multaneo call contin 0: 0-2 ki 1: 3-5 ki 2: 6-11k 3: 12-19 0- no aj 1- sligh 2 - mod	10 mber of Individua us, but number o nuous, numbers o nu/hr - calm m/hr - slight air mov m/hr - slight air mov m/hr - slight breeze km/hr-gentle breez km/hr-gentle breez t-distant traffic ( erate -distant traffic (	n Can be accurately counted dividulas can be reliable estimated dividulas cannot be reliably estimated 4: 20-30 km/hr - moderate breeze -small branch ent 5: 31-38 km/hr - fresh breeze - moderate branch in 5: 31-38 km/hr - fresh breeze - targe branch in eaves move on twigs 3 - serious -continuous traffic nearby (6-10 ar) 4- profound -continous traffic passing (2-5 cars)	h moves
VIFR VOFR VOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	0(12) neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no aj 1 - sligh 2 - mod Toad	10 mber of Individue us, but numbers o nuous, numbers o nu/hr - slight air mov m/hr - sl	n can be accurately counted dividulas can be reliable estimated 4: 20-30 km/hr -moderate breeze -small branci ent 5: 31-38 km/hr - fresh breeze - moderate branch an feel on face 6: 39-49 km/hr - strong breeze - large branch m -teaves move on twigs 3 - serious -continuous traffic nearby (6-10 ar) 4- profound -continuous traffic passing (2-5 cars) Ink Frog NLER-NL Leonard From	h moves th moves ) cars)
VIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale MMTO - American SULL- Bullfrog	0(-2) neous, nu multaneo call contin 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no a; 1 - sligh 2 - mod Toad	10 mber of Individua us, but number o nuous, numbers o nuous, numbers o nu/hr - calm m/hr - slight air mov m/hr - slight breeze km/hr- gentle breez ppriciable effect t - distant traffic ( erate - distant traffic ( GRTR-C	n Can be accurately counted Can be accurately counted Can be accurately counted Can be reliable estimated dividuals cannot be reliably estimated 4: 20-30 km/hr - moderate breeze -small branch ent 5: 31-38 km/hr - fresh breeze - moderate branch in fiel on face 6: 39-49 km/hr - strong breeze - targe branch in -teaves move on twigs 3 - serious -continuous traffic nearby (6-10 ar) 4: profound -continous traffic passing (2-5 cars) Ink Frog NLFR-N.Leopard Frog PIFR-Pickeral Fron	h moves
PIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beautort Wind Scale Background Noise Scale Background Noise Scale	0(12) meous, nu multaneo call contil 0: 0-2 kr 1: 3-5 kr 2: 6-11k 3: 12-19 0 - no aj 1 - sligh 2 - mod Toad	100 mber of individua us, but number o nuous, numbers o m/hr - sight air mow m/hr - sight air mow m/hr - sight breeze km/hr- gente breez ppriciable effect t - distant traffic ( erate - distant traffic GRTR-G GRTR-G	n	h moves
DIFR SPPE WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beautort Wind Scale Background Noise Scale Background Noise Scale	0 - ro aj 1 - sligh 2 - mod	100 mber of individua us, but number o nuous, numbers o m/hr - sight air mov m/hr - sight air mov m/hr - sight air mov m/hr - sight breeze km/hr-gentle bree ppriciable effect t - distant traffic ( erate - distant traffic GRTR-C GRTR-C	n can be accurately counted dividuals can be reliable estimated fdividuals cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch ant 5: 31-38 km/hr - fresh breeze - moderate branch an feel on face 6: 39-49 km/hr - strong breeze - large branch n -leaves move on twigs 3 - serious -continuous traffic nearby (6-10 art) 4: profound -continous traffic nearby (6-10 art) 4: profound -continous traffic nearby (6-10 art) 4: profound -continous traffic nearby (6-10 art) 9: profound -continous traffic nearby (6-10 art)	h mover hoves

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Date(yyyy-mm- Field Staff (full i	dd): <u>30</u> name): (*	AHARADAS N 1	Visit #(1-3)
time started:	10.011	(a)	Time Finished. 10-10
Beaufort Wind Background No Precipitation (N	Scale (0-6) ise Scale (0 one, log, d	rizzle,or rain)	Cloud Cover (%): O Temperature Celcius <u>15</u>
Species	I IN I	OUT	N
NONE			
AMTO	1000		
BULL	1000		
CHFR			-005 2(4)
MIFR			
GRTR		$\neg$ /	ALATO
CDED		- /	
GREN			37.36
NLFR		$\neg$ /	9(3)
NLFR		$\exists$ /	ANTS A
NLFR PIFR SPPE	2(4)	╡ /	N ^N ² O
NLFR PIFR SPPE WOFR	2(4)	100m	(056)
NLFR PIFR SPPE WOFR Code 1 - not simult Code 2 - some call Code 3 - full chorus Beautort Wind Scale	2(4) 2(4) 2(4) 2(4) 2(4) 2(4) 2(4) 2(4)	100m ber of Individuals can be accurr, but number of Individuals can ous, numbers of Individuals can hr - calm hr - fight air movement /hr - slight breeze - can feet on face m/hr- gentle breeze - leaves move	ately counted to be reliable estimated not be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves e 6: 39-49 km/hr - strong breeze - large branch moves on twigs
NLFR PIFR SPPE WOFR Code 1 - not simult Code 2 - some call Code 3 - full chorus Beautort Wind Scale Background Noiss	2(4) 2(4) 2(4) 2(4) 2(4) 2(4) 2(4) 2(4)	100m ber of Individuals can be accurr, but number of Individuals can ous, numbers of Individuals can hr - calm hr - light air movement /hr - slight breeze - can feet on face m/hr- gentle breeze - leaves move riciable effect	ately counted to be reliable estimated not be reliable estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves e 6: 39-49 km/hr - strong breeze - large branch moves on twigs 3 - serious -continuous traffic nearby (6-10 cars)
NLFR PIFR SPPE WOFR Code 1 - not simulit Code 2 - some call Code 3 - full chorus Beautort Wind Scale Background Noiss Scale	2)(4) 2)(4) 2)(4) 2)(4) 2)(5)(4)(4) 2)(5)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)(4)	100m ber of Individuals can be accurr, but number of Individuals can br - calm br - light air movement /hr - slight breeze - can feel on face m/hr-gentie breeze - leaves move rriciable effect distant traffic (1 car) ate - distant traffic (2-5 cars)	ately counted ately counted to be reliable estimated anot be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves et 8: 39-49 km/hr - strong breeze - large branch moves on twigs 3 - serious - continuous traffic nearby (6-10 cars) 4- profound -continous traffic passing
NLFR PIFR SPPE WOFR Code 1 - not simulit Code 2 - some call Code 3 - full chorus Beautort Wind Scale Background Noiss Scale AMTO - American	2)(4) 2)(4) 2)(4) 2)(4) 2)(4) 2)(5)(4) 2)(5)(4) 2)(5)(4) 2)(6)(1)(6) 2)(6)(1)(6) 2)(6)(1)(6) 2)(4)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(6)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)	100m ber of Individuals can be accurr, but number of Individuals can br - calm br - light air movement /hr - slight breze - can feel on face m/hr- gentle breze - leaves move riciable effect distant traffic (1 car) ate - distant traffic (2-5 cars)	A (3 ) A (3 )
NLFR PIFR SPPE WOFR Code 1 - not simulit Code 2 - some call Code 3 - fulle thorus Beautort Wind Scale Background Noiss Scale AMTO - American BULL- Builfrog	2)(4) aneous, num simultaneous c, call continu 0: 0-2 km/ 1: 3-5 km/ 3: 12-19 k 0 - no app 1 - slight - 2 - moder Toad	100m ber of Individuals can be accurr, but number of Individuals can br - calm br - light air movement /hr - slight breeze - can feel on face m/hr- gentle breeze - leaves move rriciable effect distant traffic (1 car) ate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog	A (3 ) A (3 )
Code 1 - not simuli SPPE WOFR WOFR Code 2 - some call Code 3 - full chorus Beaufort Wind Scale Background Noise Scale AMTO - American BULL- Builfrog CHFR - Chorus Fr	2 (4) 2 (4) 2 (4) 2 (4) 2 (4) 2 (4) 3 (2) 3 (2) 4 (4) 2 (4) 3 (2) 4 (4) 2 (4) 4 (4) 2 (4) 2 (4) 1 (3) 5 (4) 2 (4) 1 (3) 5 (4) 1 (3) 1	100m ber of Individuals can be accur, t, but number of Individuals can ous, numbers of Individuals can hr - alim hr - sight breze - can feet on face nhr- sight breze - can feet on face nhr- gente breze - leaves move inclable effect distant traffic (1 car) ate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRFR-Green Frog	A (3 ) A (3 )

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Date(yyyy-mm-c	HECE :(bt	00-15	Visit #(1-3) 3
Field Staff (full n	ame): 0. PM	NUMON TU, REM	
Time Started:	9:33 pm		Time Finished: 9:36 Dry
Beaufort Wind S	icale (0-6): 0		Cloud Cover (%): D
Background Nois	se Scale (0-4):	3	Temperature Celcius 19
Precipitation (No	one, Jog, drizzle	e,or rain)	
Species	IN OUT		W Direction Facing
NONE	X		
AMTO			
BULL		D	
CHFR			
MIFR	/		\\
GRTR	1		
3RFR /			T
ILFR (			
PIFR		1 /	
PIFR PPE			
PIFR PPE NOFR		100m	
PIFR SPPE WOFR Code 1 - not simulta code 2 - some call s code 3 - full chorus, Beaufort Wind Scale	aneous, number of imultaneous, but call continuous, n 0: 0-2 km/hr - cal 1: 3-5 km/hr - lig 2: 6-11 km/hr - sil 3: 12-19 km/hr - sil	100m Individuals can be accurate number of individuals and umbers of individuals and umbers of individuals and m ht air movement ight breeze - can feel on face pentile breeze - feaves move on	Ay counted a reliable estimated to be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move 5: 31-38 km/hr - tresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves twigs
PIFR SPPE WOFR Code 1 - not simulta code 2 - some call s code 3 - full chorus, Beaufort Wind Scale Background Noise	neous, number of imultaneous, but call continuous, n 0: 0-2 km/hr - cal 1: 3-5 km/hr - lig 2: 6-11 km/hr - sil 3: 12-19 km/hr - g 0 - no appriciab	100m Individuals can be accurate number of individuals can bu umbers of individuals can bu umbers of individuals canno im ht air movement ight breeze - can feel on face pentile breeze - feaves move on le effect	Ay counted reliable estimated to be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - trosh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars)
PIFR SPPE WOFR Sode 1 - not simulta Sode 2 - some call s Sode 3 - full chorus. Beaufort Wind Scale Background Noise Scale	neous, number of imultaneous, but n call continuous, n 0: 0-2 km/hr -cal 2: 6-11km/hr -sil 3: 12-19 km/hr-(c 0 - no appriciab) 1 - slight - distan 2 - moderate -d	100m Individuats can be accurate number of individuals can be umbers of individuals canno m ht air movement ight breeze - can feel on face pentie breeze - leaves move on le effect ht traffic (1 car) istant traffic (2-5 cars)	Ay counted reliable estimated ob the reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - tresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (5-10 cars) 4- profound -continuous traffic passing
VIFR IPPE VOFR ode 1 - not simulta ode 2 - some call s ode 3 - full chorus. Beaufort Wind Scale Background Noise Scale MTO - American	neous, number of imultaneous, but n call continuous, n 0: 0-2 km/hr -cal 1: 3-5 km/hr -gi 2: 6-11 km/hr -gi 3: 12-19 km/hr -gi 0 - no appriciab 1 - slight - distar 2 - moderate -d Toad	100m Individuats can be accurate number of individuals can be umbers of individuals canno m ht air movement ight breeze - can feel on face pentie breeze - reaves move on le effect nt traffic (1 car) istant traffic (2-5 cars)	Ay counted reliable estimated ob the reliably estimated 4: 20-30 km/hr -moderate breeze - small branch moves 5: 31-38 km/hr - tresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious - continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing NLFR-N.Leopard Frog
DIFR SPPE WOFR Code 1 - not simulta code 2 - some call s code 3 - full chorus. Beaufort Wind Scale Background Noise Scale MITO - American BULL- Bullfrog	neous, number of imultaneous, but n call continuous, n 1: 3-5 km/hr - cal 3: 12-19 km/hr - gi 3: 12-19 km/hr - gi 1: stight - distan 2 - moderate - d	100m Individuals can be accurate number of individuals can be umbers of individuals can be umbers of individuals canno m th air movement ight breeze - can feel on face pentle breeze - feaves move on le effect istant traffic (2-5 cars)	Ay counted reliable estimated ot be reliably estimated 4: 20:30 km/hr -moderate breeze - moderate branch move 5: 31:38 km/hr - tresh breeze - moderate branch move 6: 39:49 km/hr - strong breeze - large branch moves twigs 3 - serious - continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog
PIFR SPPE WOFR Code 1 - not simulta code 2 - some call s code 3 - full chorus. Beaufort Wind Scale Background Noise Scale MMTO - American SULL- Bullfrog CHFR - Chorus Fro	neous, number ol imultaneous, but n call continuous, n 1: 3:55 km/hr - tal 2: 6-11 km/hr - tal 3: 12-19 km/hr - tal 1 - slight - distan 2 - moderate - d Toad	100m 100m 100ividuals can be accurate number of individuals can be numbers of individuals canno m th air movement ight breeze - can feel on face pentie breeze - feaves move on le effect at traffic (1 car) istant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRTR-Gray Treefrog GRTR-Green Frog	A counted e reliable estimated 4: 20-30 km/hr -moderate breeze -small branch move 5: 31-38 km/hr - tresh breeze - moderate branch move 5: 33-38 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper

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Scanned with CamScanner



Date(yyyy-mm-d	d): Ont	21-010-15	Visit #(1-3) 3
Field Staff (full na	ame): C	Allegon + M. Re.	10
Time Started: 0	140 0	W1	Time Finished: 9:43.0m
Beaufort Wind So	cale (0-6	): D	Cloud Cover (%):
Background Nois	e Scale (	0-4): 2	Temperature Celcius 19
Precipitation (No	nà, fog.	drizzle,or rain)	
		14.0.0	1 / 1 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 /
Species	IN	OUT	SE Cirection Facing
NONE	X	5	
AMTO			
BULL	-		$\frown$
CHFR			
MIFR			
GRTR	/		
GRFR	1		
NLFR	1		
PIFR			
SPPE	1		
WOFR		100m	
WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	neous, nur multaneou call contin 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19	100m her of individuals can be accurately s, but number of individuals can be uous, numbers of individuals canno u/br - calm u/br - light air movement n/hr - slight breze - can feel on face im/hr - gentie breze - leaves move on t	y counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves wigs
WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise	neous, nur multaneou call contin 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 0 - no ap	100m her of individuals can be accurately so but number of individuals can be uous, numbers of individuals canno u/br - calm u/br - light air movement n/hr - slight breze - can feel on face im/hr - gentie breze - leaves move on t priciable effect	y counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves wigs 3 - serious -contlinuous traffic nearby (6-10 cars)
WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, nur multaneou call contin 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 0 - no ap 1 - slight 2 - mode	100m her of individuals can be accurately s, but number of individuals can be uous, numbers of individuals canno h/hr - slight air movement n/hr - slight breze - can feel on face km/hr - gentle breze - leaves move on t priciable effect - distant traffic (1 car) rate - distant traffic (2-5 cars)	y counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-35 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves wigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing
WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, nur multaneou cali contin 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19 0 - no ap 1 - slight 2 - mode Foad	100m her of individuals can be accurately sous, numbers of individuals can be uous, numbers of individuals canno h/hr - slight air movement n/hr - slight air movement m/hr - slight breeze - can feel on face im/hr - gentle breeze - leaves move on t priciable effect - distant traffic (2-5 cars) MIFR - Mink Frog	y counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - freeh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves wigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing NLFR-N.Leopard Froo
WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, r Beaufort Wind Scale Background Noise Scale AMTO - American ⁷ BULL- Bullfrog	neous, nur multaneou cali contin 0: 0-2 km 1: 3-5 km 2: 6-11km 3: 12-19/ 0 - no ap 1 - slight 2 - mode Toad	100m her of Individuals can be accurated is, but number of individuals can be uous, numbers of individuals canno i/hr - calm h/hr - slight breze - can feel on face km/hr- gentle breze - leaves move on t priclable effect - distant traffic (1 car) irate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog	y counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move 6: 39-49 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves wigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog
WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, r Beautort Wind Scale Background Noise Scale AMTO - American BULL- Bullfrog CHFR - Chorus Frog	neous, nur multaneou call contin 0: 0-2 km 1: 3-5 km 2: 6-11 km 3: 12-19 0 - no ap 1 - slight 2 - mode	100m nber of individuals can be accurate is, but number of individuals can be uous, numbers of individuals canno u/hr - calm u/hr - slight breeze - can feel on face km/hr- gentle breeze - leaves move on t priciable effect - distant traffic (1 car) trate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treetrog GRTR-Green Frog	y counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves wigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper
WOFR Code 1 - not simultar Code 2 - some call si Code 3 - full chorus, i Beautort Wind Scale Background Noise Scale AMTO - American 7 BULL- Bullfrog CHFR - Chorus Frog	heous, nur multaneou call contin 0: 0-2 km 1: 3-5 km 2: 6-11 km 3: 12-19 0 - no ap 1 - slight 2 - mode	100m her of Individuals can be accurateli s, but number of Individuals can be uous, numbers of Individuals canno yhr - slight air movement n/hr - slight breeze - can feel on face km/hr- gentle breeze - leaves move on t priclable effect - distant traffic (1 car) yrate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treetrog GRFR-Green Frog	y counted reliable estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves wigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frop

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## AECOM

### Amphibian - Frog - Data Form

Field Staff (full n	10: 21-0( IC	Visit #(1-3) 3	
	ame): C. Allocido a 1 11 Veix		
Time Started: 0	9154 pm	Time Finished: 9:57 0m	
Beaufort Wind S	cale (0-6): 0	Cloud Cover (%):	
Background Nois	se Scale (0-4): 2	Temperature Celcius 19	
Precipitation (No	one, log, drizzle,or rain)		
<u> </u>		NW - Direction Facing	
Species	IN   OUI		
NUNE			
AMIO			
BULL			
UNIT	+	LOCE	
MIRK		0560	
ODED			
ANT			
NLFR			
		· · · · · · · · · · · · · · · · · · ·	
NOTE .			
ode 2 - some call si ode 3 - full chorus,	multaneous, but number of individulas can be call continuous, numbers of individulas cannot	reliable estimated be reliably estimated	
Beautort Wind	0: 0-2 km/hr - calm	4: 20-30 km/hr -moderate breeze -small branch moves	
Scale	1: 3-5 km/hr - light air movement	5 : 31-38 km/hr - tresh breeze - moderate branch moves	
	2: 6-11km/hr - slight breeze - can feel on face 3: 12-19 km/hr- centle breeze - leaves move on face	6: 39-49 km/hr + strong breeze - large branch moves	
	a re re name ponte en		
Restances of Males	0 se seculable offect	3 - serious -continuous traffic nearby (6-10 cars)	
Background Noise	0 - no appriciable effect	3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuus traffic passion	
Background Noise Scale	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate -distant traffic (2-5 cars)	3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continous traffic passing	
Background Noise Scale AMTD - American	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate -distant traffic (2-5 cars) Toad MIFR - Mink Frog	3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog	
Background Noise Scale AMTO - American BULL- Bullfrog	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 cars) Toad MIFR - Mink Frog GRTR-Gray Treefrog	3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog	
Background Noise Scale MTD - American JULL- Builfrog XHFR - Chorus Frog	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 cars) Toad MIFR - Mink Frog GRTR-Gray Treefrog GRFR-Green Frog	3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog PJFR-Pickeral Frog SPPE-Spring Peeper	
Background Noise Scale AMTO - American 3ULL- Bullfrog XHFR - Chorus Frog	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 cars) Toad MIFR - Mink Frog GRTR-Gray Treefrog 9 GRFR-Green Frog	3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog PJFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frog	
Background Noise Scale AMTO - American BULL- Bullfrog CHFR - Chorus Frog General Comme	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 cars) Toad MIFR - Mink Frog GRTR-Gray Treefrog 9 GRFR-Green Frog nts:	3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frog	
Background Noise Scale AMTO - American BULL- Builtrog CHFR - Chorus Froj General Comme	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 cars) Toad MIFR - Mink Frog GRTR-Gray Treefrog 9 GRFR-Green Frog 11 - 12 - 12 - 12 - 12 - 12 - 12 - 12 -	3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frog	
Background Noise Scale AMTO - American BULL- Bullfrog CHFR - Chorus Frog General Comme	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 cars) Toad MIFR - Mink Frog GRTR-Gray Treefrog 9 GRFR-Green Frog 115:	3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frog	
Background Noise Scale AMTO - American BULL- Bullfrog CHFR - Chorus Frog General Comme	0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate -distant traffic (2-5 cars) Toad MIFR - Mink Frog GRTR-Gray Treefrog g GRFR-Green Frog nts:	3 - serious-continuous traffic nearby (6-10 cars) 4 - profound -continous traffic passing NLFR-N.Leopard Frog PJFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frog	

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ate(yyyy-mm- ield Staff (full r	10): 2021-00-15	Visit #(1-3) <u>5</u>
Ime Started:	10:02 m	Time Finished: 10:05 0m
eaufort Wind S	cale (0-6): ()	Cloud Cover (%):
ackground Noj recipitation (N	se Scale (0-4): Q one) fog, drizzle,or rain)	Temperature Celcius 16
		ANN C Direction Facing
pecies	IN TOUL	
UNE		
MIO		
HFR		
ITA		1 D
116		T
rn co		
.FR	+ $1$	
je 1 - not simulta	100m neous, number of individuals can be	accurately counted
ode 1 - not simulta ode 2 - some call s ode 3 - full chorus,	100m neous, number of individuals can bi multaneous, but number of individu call continuous, numbers of individu	e accurately counted las can be reliable estimated dals cannot be reliably estimated 42 - 20-30 km/br - moderate keese -tmail branch mouse
de 1 - not simulta de 2 - some call s de 3 - full chorus, Beaufort Wind	100m neous, number of individuals can bi multaneous, but number of individu call continuous, numbers of individu D: 0-2 km/hr - calm 1: 3.5 km/hr - calm	s accurately counted las can be reliable estimated dals cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-33 km/hr - fresh breeze - small branch moves
e 1 - not simulta e 2 - some call s e 3 - full chorus, leaufort Wind Scale	100m neous, number of individuals can bi muttaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light alt movement 2: 6-11km/c, sticht brease, can be	s accurately counted itas can be reliable estimated das cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves
ode 1 - not simulta ode 2 - some call s ode 3 - full chorus, Beaufort Wind Scale	100m neous, number of individuals can bi multaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11 km/hr - slight breeze - can fee 3: 12-19 km/hr - gentie breeze - leave	e accurately counted tas can be reliable estimated dals can be reliably estimated 4: 20:30 km/hr - moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves ton face 6: 39-49 km/hr - strong breeze - large branch moves s move on twigs
ode 1 - not simulta ode 2 - some call s ode 3 - full chorus, Beaufort Wind Scale Background Noise	100m neous, number of individuals can bi multaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11 km/hr - slight breeze - can feel 3: 12-19 km/hr - gentie breeze - leave 0 - no appriciable effect	accurately counted as can be reliable estimated dals cannot be reliably estimated 4: 20:30 km/hr - moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars)
de 1 - not simulta de 2 - some call s de 3 - full chorus, Beaufort Wind Scale ackground Noise Scale	100m neous, number of individuals can bi muttaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11km/hr - slight breeze - can feel 3: 12-19 km/hr-gentle breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car)	a accurately counted las can be reliable estimated dals cannot be reliably estimated 4: 20-30 km/hr-moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves ton face 6: 39-49 km/hr - strong breeze - large branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing
ode 1 - not simulta ode 2 - some call s ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale	100m heous, number of individuals can bi muttaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11km/hr - slight breaze - can feel 3: 12-19 km/hr-gentie breaze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate -distant traffic (2-5 c	a accurately counted las can be reliable estimated dals cannot be reliably estimated 4: 20-30 km/hr-moderate breeze - small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves ton face 6: 39-49 km/hr - strong breeze - large branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing ars)
ode 1 - not simulta ode 2 - some call s ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American	100m heous, number of individuals can bi muttaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11km/hr - slight breeze - can fee 3: 12-19 km/hr-gentle breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate -distant traffic (2-5 c Toad MIFR - Mink Fr	a accurately counted las can be reliable estimated data cannot be reliably estimated 4: 20-30 km/hr-moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves ton face 6: 39-49 km/hr - strong breeze - large branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing cars) Og NLFR-N.Leopard Frog
ode 1 - not simulta ode 2 - some call s ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale MTO - American JLL- Bullfrog	100m heous, number of individuals can bi multaneous, but number of individu call continuous, numbers of individu D: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11km/hr - sight breeze - can feel 3: 12-19 km/hr- gentie breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 c Toad MIFR - Mink Fr GRTR-Grav Tre	e accurately counted las can be reliable estimated date cannot be reliably estimated 4: 20-30 km/hr -nderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves i on face 6: 39-49 km/hr - strong breeze - large branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing ars) og NLFR-NLeopard Frog PIFR-Pickeral Frog
de T - not simulta de 2 - some call s de 3 - full chorus, Beaufort Wind Scale ackground Noise Scale ATO - American ILL- Bullfrog IER - Chorus Fro	100m neous, number of individuals can bi multaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light alr movement 2: 6-11 km/hr - sight breeze - can feel 3: 12-19 km/hr-gentie breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 of Toad MIFA - Mink Fr GRTR-Gray Tre 0 GRFF-Green Fr	s accurately counted las can be reliable estimated dals cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing ars) og NLFR-NLeopard Frog piFR-Pickeral Frog og SPEF-Soring Peeper
ie 1 - not simulta le 2 - some call s le 3 - full thorus, Beaufort Wind Scale ckground Noise Scale ITO - American LL- Bullfrog FR - Chorus Fro	100m neous, number of individuals can be multaneous, but number of individu cell continuous, numbers of individu 0: 0-2 km/hr - clight air movement 2: 6-11km/hr - slight air movement 3: 12-19 km/hr - gentie breeze - can fee 3: 12-19 km/hr - gentie breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 of Toad MIFR - Mink Fr GRTR-Gray Tre 0 GRFR-Green Fr	accurately counted accurately counted tals cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 5: 31-38 km/hr - strong breeze - large branch moves smove on twigt 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing ars) Og NLFR-NLeopard Frog PIFR-Pickeral Frog og SPPE-Spring Peeper WOFR - Wood Frog
de T - not simulta de 2 - some call s de 3 - full chorus, Beaufort Wind Scale ackground Noise Scale 1TO - American LL- Bullfrog FR - Chorus Fro meral Comme	100m neous, number of individuals can be multaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11km/hr - slight breeze - can fee 3: 12-19 km/hr - gentie breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 of Toad MIFR - Mink Fr GRTR-Gray Tre 0 GRFR-Green Fr nts:	s accurately counted as accurately counted tals cannot be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 5: 31-38 km/hr - strong breeze - large branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing ars) Og NLFR-NLeopard Frog piFR-Pickeral Frog SPPE-Spring Peeper WOFR - Wood Frog
de 1 - not simulta de 2 - some call s de 3 - full chorus, Beaufort Wind Scale ackground Noise Scale MTO - American JLL- Bullfrog IFR - Chorus Fro eneral Comme	100m neous, number of Individuals can bi multaneous, but number of Individu call continuous, numbers of Individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - light air movement 2: 6-11 km/hr - slight breeze - can fee 3: 12-19 km/hr - gentie breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2 - 5 c Toad MIFR - Mink Fr GRTR-Gray Tre 9 GRFR-Green Fr nts:	s accurately counted accurately counted tals cannot be reliable estimated dats cannot be reliably estimated 4: 20:30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- protound -continuous traffic nearby (6-10 cars) 4- protound -continuous traffic passing tars) Og NLFR-N.Leopard Frog PIFR-Pickeral Frog og SPPE-Spring Peeper WOFR - Wood Frog
de 1 - not simulta de 2 - some call s de 3 - fuil thorus, Beaufort Wind Scale ackground Noise Scale TTO - American LL- Bullfrog FR - Chorus Fro	100m neous, number of individuals can bi muttaneous, but number of individu call continuous, numbers of individu 0: 0-2 km/hr - calm 1: 3-5 km/hr - slight air movement 2: 6-11 km/hr - slight breeze - can feel 3: 12-19 km/hr - gentie breeze - leave 0 - no appriciable effect 1 - slight - distant traffic (1 car) 2 - moderate - distant traffic (2-5 c Toad MIFR - Mink Fr GRTR-Gray Tre 0 GRFR-Green Fr 1 - slight - distant traffic (2-5 c) 0 - no appriciable effect	A securately counted as courately counted tas can be reliable estimated data cannot be reliable estimated 4: 20:30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - firsh breeze - moderate branch moves s move on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing ears) og NLFR-NLeopard Frog PIFR-Pickeral Frog og SPPE-Spring Peeper WOFR - Wood Frog

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Date(yyyy-mm-c	d): 20	21-100-15	Visit #(1-3) 3
Field Staff (full n	ame): (	Athenton * N.	Reid
Time Started:	11:01	000	Time Finished: 10:14 0m
Beaufort Wind S	cale (0-6	SI: ()	Cloud Cover (%):
Background Noi	se Scale	(0-4): 2	Temperature Celcius
recipitation (No	one, fog.	drizzle,or rain)	
~	/		
species	IN	OUT	NW Direction Facing
NONE	X		
MTO			
ULL <			
HFR			
MIFR			
RTR	/		
IRFR /			
ILFR /			
IFR	4		
PPE	1		
UOFD			
VOFR		100m	
WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beaufort Wind Scale	neous, nu imultaneo call contir 0: 0-2 km 1: 3-5 km 2: 6-11ko 3: 12-19	100m mber of individuals can be accura us, but number of individuals can nuous, numbers of individuals can n/hr - sight air movement m/hr - slight breaze - can feel on face km/hr - gent breaze - can feel on face	tely counted be reliable estimated not be reliable estimated 4: 20-30 km/hr-moderate breeze - small branch move 5: 31-38 km/hr - fresh breeze - large branch move 6: 39-49 km/hr - strong breeze - large branch moves on twige
WOFR Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beautort Wind Scale Background Noise	neous, nu imultaneo call contin 0: 0-2 kn 1: 3-5 kn 2: 6-11ko 3: 12-19 0 - ne au	100m mber of Individuals can be accura us, but number of Individuals can nuous, numbers of Individuals can n/hr - slight air movement m/hr - slight air movement m/hr - sight breze - can feel on face m/hr /sc-gentle breze - leaves move o nordclable effect	tely counted be reliable estimated not be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves in twigs 3 - serious -continuous traffic nearby (6-10 care)
ode 1 - not simulta ode 2 - some call si ode 3 - full chorus, Beaufort Wind Scale Background Noise Scale	neous, nu imultaneo call contin 0: 0-2 km 1: 3-5 km 2: 6-11k 3: 12-19 0 - no ag 1 - sliphi	100m mber of Individuals can be accura us, but number of Individuals can nuous, numbers of Individuals can n/hr - slight air movement m/hr - slight breaze - can feel on face km/hr - gentle breaze - leaves move of opriciable effect t - distant traffic (1 car)	tely counted be reliable estimated not be reliable estimated 4: 20-30 km/hr-moderate breeze -small branch move 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves on twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic nearby (6-10 cars)
VOFH Code 1 - not simulta code 2 - some call si code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	ineous, nu imultaneo call contir 0: 0-2 km 1: 3-5 km 2: 6-11k 3: 12-19 0 - no ar 1 - slight 2 - mode	100m mber of Individuals can be accura us, but number of Individuals can nuous, numbers of Individuals can n/hr - calm n/hr - sight air movement m/hr - sight air movement m/hr - sight breeze - can feel on face km/hr-gentle breeze - leaves move o opriciable effect t - distant traffic (1 car) erate - distant traffic (2-5 cars)	tely counted be reliable estimated not be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch move 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves in twigs 3 - serious - contlinuous traffic nearby (6-10 cers) 4- profound - contlinuous traffic passing
NOFR Code 1 - not simulta code 2 - some call si code 3 - full chorus, Beaufort Wind Scale Background Noise Scale	ineous, nu imultaneo call contir 0: 0-2 km 1: 3-5 km 2: 6-11k 3: 12-19 0 - no aç 1 - slight 2 - mode	100m mber of Individuals can be accura us, but number of Individuals can nuous, numbers of Individuals can n/hr - calm n/hr - sight air movement m/hr - sight breze - can feel on face km/hr- gentle breze - leaves move of opriciable effect t - distant traffic (2-5 cars) NUCD Mink 5 cars	tely counted be reliable estimated not be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch move 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves in twigs 3 - serious - contlinuous traffic nearby (6-10 cers) 4- profound - contlinuous traffic passing
NOFR Code 1 - not simulta code 2 - some call si code 3 - full chorus, Beautort Wind Scale Background Noise Scale MITO - American	neous, nu imultaneo call contin 0: 0-2 km 1: 3-5 km 2: 6-11k 3: 12-19 0 - no ag 1 - slight 2 - mode Toad	100m mber of Individuals can be accura us, but number of Individuals can nuous, numbers of Individuals can nubr - taim n/hr - tight air movement m/hr - tight air movement m/hr - sight hrezz - can feel on face km/hr-gentle brezz - leaves move o ppriciable effect t - distant traffic (1 car) erate - distant traffic (2-5 cars) MIFR - Mink Frog Down To the form	tely counted be reliable estimated not be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch move 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves in twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing NLFR-N_Leopard Frog DIFD Distance Frog
NOFR Code 1 - not simulta code 2 - some call si code 3 - full chorus, Beautort Wind Scale Background Noise Scale MMTO - American ULL Builfrog	ineous, nu imultaneo call contif 1: 3-5 km 2: 6-11k 3: 12-19 0 - no aç 1 - slight 2 - mode Toad	100m mber of Individuals can be accura us, but number of Individuals can nuous, numbers of Individuals can nuhr - slight air movement m/hr - slight threaze - can feel on face km/hr-gentle breaze - leaves move o ppriciable effect t - distant traffic (1 car) erate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRTR-Gray Treefrog	tely counted be reliable estimated not be reliable estimated 4: 20-30 km/hr -moderate breeze -small branch move 5: 31-38 km/hr - fresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves in twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog 2005 Conten Device Device
NOFH Code 1 - not simulta Code 2 - some call si Code 3 - full chorus, Beautort Wind Scale Background Noise Scale AMTO - American BULL- Builfrog HFR - Chorus Fro	ineous, nu imultaneo call contif 0: 0-2 km 1: 35 km 2: 6-11k 3: 12-19 0 - no ar 1 - slight 2 - mode Toad g	100m mber of Individuals can be accura us, but number of Individuals can nurous, numbers of Individuals can m/hr - light air movement m/hr - sight air movement m/hr - sight hreeze - can feel on face km/hr- gentle breeze - leaves move o ppriciable effect t- distant traffic (1 car) erate - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRTR-Gray Treefrog GRTR-Green Frog	tely counted be reliable estimated not be reliable estimated 4: 20-30 km/hr - moderate breeze - small branch move 5: 31-38 km/hr - tresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves in twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper W/DED. Wood Frog
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Pg t de l



e Started: 10: 01 C pm ufort Wind Scale (0-6): 1 kground Noise Scale (0-4): 2 cipitation (None, fog, drizzle, or rain) Cies IN OUT NE Direction Facing NE Direction Facing	eld Staff (full name): C. Allerton & U. Cer			Light Time Fieldered	
ufort Wind Scale (0-6): 1 kground Noise Scale (0-4): 2 cipitation (None); tog, drizzle, or rain)	lime Started:	10:1% pr	n	Time Finished: 10:21 0m	
Cles       IN       OUT         NE       NE       Direction Facing         TO       Image: Clear Structure S	Beaufort Wind S Background Nois Precipitation (No	cale (0-6): se Scale (0-4) one, fog, driz	1 zle,or rain)	Cloud Cover (%): Temperature Celcius	
NE       NE         TO       Image: Constraint of the second	Species		T]	N - Direction Facing	
TO       Image: Constraint of the second secon	NONE				
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R       Image: Constraint of the second	300		-		
R       Image: Constraint of the second	HFR				
R       Image: Constraint of the second	VIER		/		
R       Image: Constraint of the second	BRTR		1 7		
R       100m         IFR       100m         e1 - not simultaneous, number of individuals can be accurately counted       e         2 - some call simultaneous, but number of individuals can be reliable estimated       e         3 - full chorus, call continuous, numbers of individuals can be reliable estimated       e         eaufort Wind       0: 0-2 km/hr - calm       4: 20-30 km/hr -moderate breeze -small branch mow         Scale       1: 3-5 km/hr - light air movement       5: 31-38 km/hr - fresh breeze - moderate breaze - traderate breaze - traderate breaze - large branch move         2: 6-11km/hr - slight breeze - can teel on face       6: 39-49 km/hr - strong breeze - large branch moves         3: 12-19 km/hr - gentle breeze - leaves move on twigs       5: 31-38 km/hr - strong breeze - large branch moves	BRFR		$\exists$ /		
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E IFR 100m 1 - not simultaneous, number of individuals can be accurately counted 2 - some call simultaneous, but number of individuals can be reliable estimated 2 - some call simultaneous, numbers of individuals cannot be reliable estimated eaufort Wind Scale 1: 3-5 km/hr - slight air movement 5: 31-38 km/hr - fight air movement 5: 31-38 km/hr - fight air movement 5: 31-38 km/hr - fight air movement 5: 31-38 km/hr - strong breeze - inarge branch moves 3: 12-19 km/hr - gentle breeze - leaves move on twigs	DIER		- /		
Intervention       100m         Image: Intervention of Individuals can be accurately counted         Image: Intervention of Individuals can be reliable estimated         Image: Intervention of Individuals (Intervention	10.11				
100m         e 1 - not simultaneous, number of Individuals can be accurately counted         e 2 - some call simultaneous, but number of Individuals can be reliable estimated         e 3 - full chorus, call continuous, numbers of individuals cannot be reliably estimated         eaufort Wind       0: 0-2 km/hr - calm         Scale       1: 3-5 km/hr - light air movement       5: 31:38 km/hr - fight air movement         2: 6-11 km/hr - slight breeze - can feel on face       6: 39-49 km/hr - strong breeze - large branch move         3: 12-19 km/hr-gentle breeze - leaves move on twigs       0: 14-19 km/hr - strong breeze - large branch move	SPPE				
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ekoround Noise 0 - no appriciable effect 3 - serious -continuous traffic parchy (6.10 area	SPPE WOFR Code 1 - not simult Code 2 - some call s Code 3 - full chorus Beaufort Wind Scale	aneous, numbe imultaneous, b , call continuou 0: 0-2 km/hr 1: 3-5 km/hr 2: 6-11km/hr 3: 12-19 km/l	100m r of Individuals can be accurately ut number of Individuals can be s, numbers of Individuals canno calm -light air movement - slight breeze - can feel on face hr-gentie breeze - leaves move on t	y counted reliable estimated it be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - fresh breeze - moderate branch moves 6: 39-49 km/hr - strong breeze - large branch moves wigs	
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Scale         1 + slight - distant traffic (1 car)         4- profound -continous traffic passing           2 - moderate - distant traffic (2-5 cars)         4- profound -continous traffic passing           TO - American Toad         MIFR - Mink Frog         NLFR-N.Leopard Frog           L-Builfrog         GRTR-Gray Treefrog         PIFR-Pickeral Frog           R - Chorus Frog         GRFR-Green Frog         SPPE-Spring Peeper	ode 1 - not simult ode 2 - some call s ode 3 - full chorus. Beaufort Wind Scale Background Noise Scale MTO - American UUL- Bullfrog :HFR - Chorus Fro	aneous, numbe simultaneous, b , call continuou 0: 0-2 km/hr 1: 3-5 km/hr 2: 6-11km/hr 3: 12-19 km/l 1: - 11 km/hr 3: - 12-19 km/l	100m r of Individuals can be accurated ut number of Individuals can be s, numbers of Individuals can be s, numbers of Individuals canno - calm - sight air movement - sig	ly counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch moves 5: 31-38 km/hr - tresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - targe branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper	
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Scale         1 + slight - distant traffic (1 car)         4- profound -continous traffic passing           2 - moderate -distant traffic (2-5 cars)         4- profound -continous traffic passing           TO - American Toad         MIRR - Mink Frog         NLFR-N.Leopard Frog           L- Bullfrog         GRTR-Gray Treefrog         PIFR-Pickerat Frog	PPE PPE Sode 1 - not simult Sode 2 - some call s Sode 3 - full chorus Beaufort Wind Scale Background Noise Scale Scale AMTO - American BULL- Builfrog	aneous, numbe simultaneous, b call continuou 0: 0-2 km/hr 1: 3-5 km/hr 2: 6-11km/hr 3: 12-19 km/l 1 - slight - di 2 - moderate	100m r of Individuals can be accurated ut number of individuals can be s. numbers of individuals canno calm - slight air movement - slight air movement - slight breeze - can feel on face hr-gentle breeze - leaves move on t liable effect stant traffic (1 car) a -distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treetrog	y counted reliable estimated t be reliably estimated 4: 20-30 km/hr -moderate breeze -small branch move 5: 31-38 km/hr - tresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4- profound -continuous traffic passing NLFR-NLeopard Frog PIFR-Pickeral Frog	
Scale         1 + slight - distant traffic (1 car)         4- profound -continous traffic passing           2 - moderate -distant traffic (2-5 cars)         4- profound -continous traffic passing           TO - American Toad         MIRR - Mink Frog         NLFR-N.Leopard Frog           L- Builtrog         GRTR-Gray Treetrog         PIFR-Pickerat Frog           R - Chorus Frog         GRFR-Green Frog         SPPE-Spring Peeper	PPE VOFR ode 1 - not simult ode 2 - some call s ode 3 - full chorus Beaufort Wind Scale Background Noise Scale Scale MMTO - American BULL- Bullfrog CHFR - Chorus Fro	aneous, numbe simultaneous, b call continuou 0: 0-2 km/hr 1: 3-5 km/hr 2: 6-11km/hr 3: 12-19 km/l 1 - slight - di 2 - moderate Toad	100m r of Individuals can be accurated ut number of individuals can be s, numbers of individuals can be s, numbers of individuals canno - calm - light air movement - slight air movement - slight breeze - can teel on face hr-gentle breeze - leaves move on t liable effect stant traffic (1 car) a - distant traffic (2-5 cars) MIFR - Mink Frog GRTR-Gray Treefrog GRTR-Green Frog	y counted reliable estimated 4: 20-30 km/hr -moderate breeze -small branch move 5: 31-38 km/hr - tresh breeze - moderate branch move 6: 39-49 km/hr - strong breeze - large branch moves twigs 3 - serious -continuous traffic nearby (6-10 cars) 4 - profound -continuous traffic passing NLFR-N.Leopard Frog PIFR-Pickeral Frog SPPE-Spring Peeper	

Pg 1 0 1



## C.5 Breeding Bird Surveys

F.tzbzw

Temperature: 8°C	Wind: 0 - 1	Cloud: 0%	Precipitation: Klowe
Start Time: 5.51	End Time: 5.56	43.209848 Easting: Northing: 79.929005	Slope: Vertical Steep Gentle Flat XQ Direction slope faces (Asp (ex. NE):
Comments: Light traffic sin accessional	E		List Flyovers Below ନ୍ନାର୍ପ ଏ
sr (	RUBL (A) Ama Auguan Ama Auguan	RUBLAN HOWR (S) Am (20 (S) Hillow Alder Finaldor (M)	
	EUST(S)	RUBLAN	Road.
CLASSIFY HABITAT (within	2003 (5) 100 m):		
	* ->		

Point ID: BBS - 01

Breeding Bird Survey Point Count

Round #:



Project: 60637047

Site Details

Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically.
1	1-5	Light air	Direction of wind shown by smoke drift, but not wind vanes
2	6 - 11	Light breeze	Wind felt on face. Leaves rustle. Ordinary vane moved by wind
3	12 - 19	Gentle breeze	Leaves and small twigs in constant motion. Wind extends light flag
4	20 - 28	Moderate breeze	Raises dust and loose paper. Small branches are moved
5	29 - 38	Fresh breeze	Small trees with leaves begin to sway. Crested wavelets form on inland waters
6	39 - 49	Strong breeze	Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.

## Breeding Evidence Codes:

#### Observed

X – Species observed in its breeding season (no evidence of breeding).

#### Possible

H – Species observed in its breeding season in suitable nesting habitat.

S – Singing male present, or breeding calls hears, in its breeding season in suitable nesting habitat.

#### Probable

P - Pair observed in their breeding season in suitable nesting habitat

T – Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart, at the same place.

D – Courtship or display between a male and a female or 2 males, including courtship feeding or copulation.

V - Visiting probable nesting site

A - Agitated behaviour or anxiety calls of an adult

B - Brood patch on adult female or cloacal

protuberance on adult male

N - Nest-building or excavation of nest hole.

#### Confirmed Breeding

DD - Distraction display or injury feigning

NU – Used nest or egg shell found (occupied or laid within the period of the study)

FY – Recently fledged young or downy young, including young incapable of sustained flight

AE - Adults leaving or entering a nest site in

circumstances indicating occupied nest.

FS - Adult carrying fecal sac

CF - Adults Carrying Food for Young

- NE Nest containing eggs.
- NY Nest with young seen or heard.

### SAR Observations:

## 





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- FS Adult carrying fecal sac
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

### SAR Observations:

Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, decide	uous forest, etc.):
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, decide	uous forest, etc.):
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, decide	uous forest, etc.):





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#### Probable

 ${\rm P}-{\rm Pair}$  observed in their breeding season in suitable  $_{\rm c'l}$  nesting habitat

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B - Brood patch on adult female or cloacal

protuberance on adult male

N - Nest-building or excavation of nest hole.

#### Confirmed Breeding

1.31

DD - Distraction display or injury feigning

NU - Used nest or egg shell found (occupied or laid within the period of the study)

FY – Recently fledged young or downy young, including young incapable of sustained flight

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Location of Observation (UTM):	_
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc	:): <u>Yan</u>
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc	a.):
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc	ג.):

1. 10





Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically
1	1-5	Light air	Direction of wind shown by smoke drift, but not wind vanes.
2	6-11	Light breeze	Wind felt on face. Leaves rustle. Ordinary vane moved by wind.
3	12 - 19	Gentle breeze	Leaves and small twigs in constant motion. Wind extends light flag.
4	20 - 28	Moderate breeze	Raises dust and loose paper. Small branches are moved.
5	29 - 38	Fresh breeze	Small trees with leaves begin to sway. Crested wavelets form on inland waters.
6	39 - 49	Strong breeze	Large branches\in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.

### Breeding Evidence Codes:

#### Observed

X – Species observed in its breeding season (no evidence of breeding).

#### Possible

H – Species observed in its breeding season in suitable nesting habitat.

S – Singing male present, or breeding calls hears, in its breeding season in suitable nesting habitat.

#### Probable

P - Pair observed in their breeding season in suitable nesting habitat

T – Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart, at the same place.

D – Courtship or display between a male and a female or 2 males, including courtship feeding or copulation.

- V Visiting probable nesting site
- A Agitated behaviour or anxiety calls of an adult
- B Brood patch on adult female or cloacal

protuberance on adult male

N - Nest-building or excavation of nest hole.

#### **Confirmed Breeding**

DD – Distraction display or injury feigning NU – Used nest or egg shell found (occupied or laid within the period of the study)

FY - Recently fledged young or downy young,

including young incapable of sustained flight

AE - Adults leaving or entering a nest site in

- circumstances indicating occupied nest.
- FS Adult carrying fecal sac
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

SAR Observations: (Special Concern)

Observed in suitable Habitat (Y/N)_

General Habitat Description (i.e. meadow, deciduous forest, etc.):

Species: ____

Location of Observation (UTM): _____ Observed in suitable Habitat (Y/N)

General Habitat Description (i.e. meadow, deciduous forest, etc.):





Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically
1	1-5	Light air	Direction of wind shown by smoke drift, but not wind yapper
2	6 - 11	Light breeze	Wind felt on face Leaves rustle. Ordinary yang moved by wind
3	12 - 19	Gentle breeze	Leaves and small twins in constant motion. Wind extende light flag
4	20 - 28	Moderate breeze	Raises dust and loose paper. Small branches are moved
5	29 - 38	Fresh breeze	Small trees with leaves begin to sway. Crosted would be form on inland water
6	39 - 49	Strong breeze	Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty

## Breeding Evidence Codes:

#### Observed

X – Species observed in its breeding season (no evidence of breeding).

#### Possible

H – Species observed in its breeding season in suitable nesting habitat.

S – Singing male present, or breeding calls hears, in its breeding season in suitable nesting habitat.

#### Probable

P - Pair observed in their breeding season in suitable nesting habitat

T – Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart, at the same place.

D – Courtship or display between a male and a female or 2 males, including courtship feeding or copulation.

V - Visiting probable nesting site

A - Agitated behaviour or anxiety calls of an adult

B – Brood patch on adult female or cloacal protuberance on adult male

Notaberance on adult male

N – Nest-building or excavation of nest hole.

#### Confirmed Breeding

DD – Distraction display or injury feigning NU – Used nest or egg shell found (occupied or laid within the period of the study)

FY – Recently fledged young or downy young, including young incapable of sustained flight

AE - Adults leaving or entering a nest site in

circumstances indicating occupied nest.

FS - Adult carrying fecal sac

CF - Adults Carrying Food for Young

NE - Nest containing eggs.

NY - Nest with young seen or heard.

#### SAR Observations: Species: Fostern Wood Parker (SC)

species. rastern war reader	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduo	us forest, etc.):
Species: Wood Thrush (SC)	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduo	us forest, etc.): FOD
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduo	ous forest, etc.):
/	- 1 22 albert 1 1 1 1





Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically.
1	1-5	Light air	Direction of wind shown by smoke drift, but not wind vanes.
2	6 - 11	Light breeze	Wind felt on face. Leaves rustle. Ordinary vane moved by wind.
3	12 - 19	Gentle breeze	Leaves and small twigs in constant motion. Wind extends light flag.
4	20 - 28	Moderate breeze	Raises dust and loose paper. Small branches are moved.
5	29 - 38	Fresh breeze	Small trees with leaves begin to sway. Crested wavelets form on inland waters.
6	39 - 49	Strong breeze	Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.

#### Breeding Evidence Codes:

#### Observed

X – Species observed in its breeding season (no evidence of breeding).

Possible

H – Species observed in its breeding season in suitable nesting habitat.

S - Singing male present, or breeding calls hears, in its breeding season in suitable nesting habitat.

#### Probable

P - Pair observed in their breeding season in suitable nesting habitat

T – Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart, at the same place.

D – Courtship or display between a male and a female or 2 males, including courtship feeding or copulation. V - Visiting probable nesting site

A - Agitated behaviour or anxiety calls of an adult

B - Brood patch on adult female or cloacal

protuberance on adult male

N - Nest-building or excavation of nest hole.

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FY - Recently fledged young or downy young,

including young incapable of sustained flight

AE – Adults leaving or entering a nest site in circumstances indicating occupied nest.

Circumstances indicating occup

FS - Adult carrying fecal sac

CF - Adults Carrying Food for Young

NE - Nest containing eggs.

NY - Nest with young seen or heard.

### SAR Observations:

Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous for	rest, etc.):
Species:	
Location of Observation (UTM):	<u> </u>
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous for	rest, etc.):
	2
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	warmen was game
General Habitat Description (i.e. meadow, deciduous for	rest, etc.): /////
/	





Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically.
1	1 - 5	Light air	Direction of wind shown by smoke drift, but not wind vanes.
2	6 - 11	Light breeze	Wind felt on face. Leaves rustle. Ordinary vane moved by wind.
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A - Agitated behaviour or anxiety calls of an adult

B – Brood patch on adult female or cloacal

protuberance on adult male

N - Nest-building or excavation of nest hole.

#### Confirmed Breeding

DD – Distraction display or injury feigning NU – Used nest or egg shell found (occupied or laid

Sharp you and

within the period of the study)

- FY Recently fledged young or downy young,
- including young incapable of sustained flight
- AE Adults leaving or entering a nest site in
- circumstances indicating occupied nest.
- FS Adult carrying fecal sac
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

## SAR Observations:

## 

## AECOM



Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically.
1	1 - 5	Light air	Direction of wind shown by smoke drift, but not wind vanes.
2	6 - 11	Light breeze	Wind felt on face. Leaves rustle. Ordinary vane moved by wind.
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## **Breeding Evidence Codes:**

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X – Species observed in its breeding season (no evidence of breeding).

## Possible

H – Species observed in its breeding season in suitable nesting habitat.

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AE – Adults leaving or entering a nest site in circumstances indicating occupied nest.

- FS Adult carrying fecal sac
- CE Adulte Complian Food for Ve
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

## SAR Observations:

Species:	A		
Location of Observation (UTM):		/	
Observed in suitable Habitat (Y/N)			
General Habitat Description (i.e. mea	adow, deciduous	s forest_etc.):	
	1		
Species:			
Location of Observation (UTM):			
Observed in suitable Habitat (Y/N)			
General Habitat Description (i.e. meg	adow, deciduous	s forest, etc.):	
Species:			
Location of Observation (UTM):			
Observed in suitable Habitat (Y/N)			
General Habitat Description (i.e. mea	adow, deciduous	s forest, etc.):	

## AECOM



Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
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N - Nest-building or excavation of nest hole.

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- AE Adults leaving or entering a nest site in
- circumstances indicating occupied nest.
- FS Adult carrying fecal sac
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

## SAR Observations:

#### Species:

Location of Observation (UTM):

Observed in suitable Habitat (Y/N)_

General Habitat Description (i.e. meadow, deciduous forest, etc.): _

Species:

Location of Observation (UTM): _

Observed in suitable Habitat (Y/N)_

General Habitat Description (f.e. meadow, deciduous forest, etc.):

## Species:

Location of Observation (UTM): ___

Observed in suitable Habitat (Y/N)_

General Habitat Description (i.e. meadow, deciduous forest, etc.):

## AECOM



Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
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- circumstances indicating occupied nest.
  - FS Adult carrying fecal sac
  - CF Adults Carrying Food for Young
  - NE Nest containing eggs.
- NY Nest with young seen or heard.

## SAR Observations:

Species: Barn Swallow 43 200947 - 79 031 76	d	
Observed in suitable Habitat (Y/N)	1	
General Habitat Description (i.e. meadow deciduous forest. etc.):	forgaine	manda
		medicad
Species:	•	
Location of Observation (UTM):	_	
Observed in suitable Habitat (Y/N)		
General Habitat Description (i.e. meadow, deciduous forest, etc.):		
Species:		
Location of Observation (UTM):		
Observed in suitable Habitat (Y/N)		
General Habitat Description (i.e. meadow, deciduous forest, etc.):		

# AECOM



Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
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5	29 - 38	Fresh breeze	Small trees with leaves begin to sway. Crested wavelets form on inland waters.
6	39 - 49	Strong breeze	Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.

## Breeding Evidence Codes:

## Observed

X – Species observed in its breeding season (no evidence of breeding).

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H – Species observed in its breeding season in suitable nesting habitat.

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AE - Adults leaving or entering a nest site in

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- FS Adult carrying fecal sac
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

## SAR Observations:

Location of Observation (UTM): Observed in suitable Habitat (Y/N) General Habitat Description (i.e. meadow, decidueds forest, etc.): Species:	
Observed in suitable Habitat (Y/N) General Habitat Description (i.e. meadow, deciduous forest, etc.): Species:	
General Habitat Description (i.e. meadow, decidueds forest, etc.):	
Species:	
Species:	
Location of Observation (UTM):	
Dbserved in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc.):	
Species:	
ocation of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc.):	

## AECOM



Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land	
0	Less than 1	Calm	Smoke rises vertically.	
1	1 - 5	Light air	Direction of wind shown by smoke drift, but not wind vanes.	
2	6 - 11	Light breeze	Wind felt on face. Leaves rustle. Ordinary vane moved by wind.	
3	12 - 19	Gentle breeze	Leaves and small twigs in constant motion. Wind extends light flag.	
4	20 - 28	Moderate breeze	Raises dust and loose paper. Small branches are moved.	
5	29 - 38	Fresh breeze	Small trees with leaves begin to sway. Crested wavelets form on inland waters.	
6	39 - <mark>4</mark> 9	Strong breeze	Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.	

## **Breeding Evidence Codes:**

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- AE Adults leaving or entering a nest site in
- circumstances indicating occupied nest.
- FS Adult carrying fecal sac
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

## SAR Observations:

Species: Eastern Wood Pewee		
Observed in suitable Habitat (Y/N)		
General Habitat Description (i.e. meadow, deciduous forest, etc.):	FOD	
Species:		
Location of Observation (UTM):		
Observed in suitable Habitat (Y/N)		
General Habitat Description (i.e. meadow, deciduous forest, etc.): _		
Species:		
Location of Observation (UTM):		
Observed in suitable Habitat (Y/N)		
General Habitat Description (i.e. meadow, deciduous forest, etc.): _		

## AECOM


### **Beaufort Wind Speed Codes:**

Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically.
1	1-5	Light air	Direction of wind shown by smoke drift, but not wind vanes
2	6 - 11	Light breeze	Wind felt on face, Leaves rustle. Ordinary vane moved by wind
3	12 - 19	Gentle breeze	Leaves and small twigs in constant motion. Wind extends light flag
4	20 - 28	Moderate breeze	Raises dust and loose paper. Small branches are moved
5	29 - 38	Fresh breeze	Small trees with leaves begin to sway. Crested wavelets form on inland waters
6	<u> 39 - 49</u>	Strong breeze	Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.

## Breeding Evidence Codes:

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X – Species observed in its breeding season (no evidence of breeding).

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H – Species observed in its breeding season in suitable nesting habitat.

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- A Agitated behaviour or anxiety calls of an adult
- B Brood patch on adult female or cloacal

protuberance on adult male

N – Nest-building or excavation of nest hole.

#### Confirmed Breeding

DD – Distraction display or injury feigning

NU – Used nest or egg shell found (occupied or laid within the period of the study)

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- AE Adults leaving or entering a nest site in circumstances indicating occupied nest.
- FS Adult carrying fecal sac
- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

### SAR Observations:

Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, de	eciduous forest, etc.):

Species:

Location of Observation (UTM):

Observed in suitable Habitat (Y/N)

General Habitat Description (i.e. meadow, deciduous forest, etc.):

#### Species:

Location of Observation (UTM): ____

Observed in suitable Habitat (Y/N)_

General Habitat Description (i.e. meadow, deciduous forest, etc.):

## AECOM

**Breeding Bird Survey Point Count** 



## **Beaufort Wind Speed Codes:**

Code	Wind Speed Km/h	Descriptive Term	Effects Observed on Land
0	Less than 1	Calm	Smoke rises vertically.
1	1-5	Light air	Direction of wind shown by smoke drift, but not wind varies.
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- CF Adults Carrying Food for Young
- NE Nest containing eggs.
- NY Nest with young seen or heard.

## SAR Observations:

Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc.): _	
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc.): _	
Species:	
Location of Observation (UTM):	
Observed in suitable Habitat (Y/N)	
General Habitat Description (i.e. meadow, deciduous forest, etc.):	
	<ul> <li>4 - 18</li> </ul>



## C.6 Reptile Encounter Surveys



Project Name Jancaster Rd	Date Ang 21/20	Visit # (1-5)	Temp (C)	_ Cloud Cover (%)
Wind	Precipitation none	$\sim$		

Field Staff Kascy Makempie

Property / Location Searched	Habitat / Vegetation	Time Start	Time End	Species Observed	UTM	Notes
Parcel 170810039 (Hghischool property) by Cornerted)	MAM/MAS/CUM	9 am	9-30an	ront		
POUREN 170820033 (N OF BOOLEDE)	Fa04-1	2:15pm	3:30pm	royk		
Parcel 190820033 SNT2/MAM2 (Not BOOLRdE)	SNT2/MAM2	3:30pm	4:00pm	non		

Additional Notes



Project Name (Aloncoserfic)	Date October 6 2020	Visit # (1-5)	Temp (C) = > 19 Cloud Cover (9) 50
Wind	Precipitation		

Field Staff Kase 1 Mak main + first notions monitor

Property / Location Searched	Habitat / Vegetation	Time Start	Time End	Species Observed	UTM	Notes
Parcel MOBROOBS						
FOD4-1	Fa04-1	1.00pm	1:20pm	male		
(Not Booked E)	(Beech forst)			1		
Parcel 17082003	SINTE/MANE					
ENT2/MAM2	thicket marsh	1:30pm	2:00pm	none		
(NOT BOOKREDE)						
Harrel 1708/0029	MAM/MAD CUM					
(High School green	harrow strip	8:50am	9:30 pm	nonf		
free francis	along Notercaire			(		
				1		

### Additional Notes

party claudy + windy



Project	Name Glancaster	Rd Date April	7/21
Wind	3	Precipitation	none

Visit # (1-5)

Temp (C) 8 - 16 Cloud Cover (%) 01

Field Staff Kosey McKenzie

Property / Location Searched	Habitat / Vegetation	Time Start	Time End	Species Observed	UTM	Notes
(Fign school piperty) (Fign school piperty) by Garmer Rd)	MAM /MAS/CUM	9:00am	9:30aux	s nave		
FORMEN 170820032 FORM-1 (Net board E)	F004-1	11.15am	12:15pm	ngle		
Porcel MO820033 SNT2/MAM2 (Not Bonced E)	SINTZ/MAM2	12:15pm	1:00pm	nave		

Additional Notes perfect weather for make basing (just signify windy).

AECOM

Project Name: () Temp (C): Precipitation: Time Start:	Glancastertd 17°C → 27°C None 8:250m	Field Staff: Cloud Cover % Canopy Co Time End:	Nataliy (%): 1009 wer: 5%	a Simonora		Date: <b>\$0/05/\$04</b> , Wind Scale: <b>1</b> Visit # (1-5+): 4
Property/Location Searched	Habitat/Vegetation	Time Start	Time End	Species Observed	UTM	Notes
Parcel 170810039 (High School Property	MAM/MAS/CH	8:25am	9:30 am	nove	1. Arrest	
Parcel 17082033 (NOL BOOKROLE)	F004-1	10:30an	11:00 00	Garter Sugar	43. 126005 /-79.9352/6	
Parcel 17080033 (NOL BOOKROLE)	SWT2/MAN2	11; 000m	11:25au	none	~	
			/			
		/				
	/					
						<u> </u>

#### Notes:

Beaufort Wind Scale

- 0: 0-2 km/hr calm 1: 3-5 km/hr - light air movement 2: 6-11km/hr - slight breeze - can feel on face 3: 12-19 km/hr - gentie breeze - leaves move on twigs
- 4: 20-30 km/hr -moderate breeze -small branch moves
- 5:31-38 km/hr fresh breeze moderate branch moves
- 6: 39-49 km/hr strong breeze large branch moves



Project Name:	Glance	aster		Distance t	to open canpoy (m)				
Slope (degree)		/		- % Canopy	Cover				
Surrounding Landus	e Descriptio	n: Upersie	di ac	ricultur	ral, residen!	tial me	adan,	thicket 4	Forest
Temp (C):	- 11	Cloud Cove	er (%):	40%	10				280
Wind (from):	1-2	Precipitatio	on:	None	2				
Material Description	n:								
Date (dd/mm/yyyy)	June	77 1071-1	visit X 5		¥	isit 2		-visit	:3
Staff (full name)	H. Hugt	es N. D	e Carlo.						
Snake Species	Length	Search Type	Distance	Length	Search Type	Distance	Length	Search Type	Distance
				-				/	-
×.	1		/	1				/	-
1)-00			-						
NOW						/	r		
mo	enen	/				/			
00						X			
					/				-
/					/				
/					/			_	_
/									
No Species Seen				, j	/				1.25
<ul> <li>Material Description</li> <li>Search Type can inclose</li> <li>Distance of snake if s</li> </ul>	n includes ma ude binocular search type w	terial/composition, s/observation/ove ith binoculars or ol	/dimensions rturned rock : oservation	and for woo	d				
Beaufort Wind	0: 0-2 km/hr -	calm		4: 20-30 km	/hr -moderate breeze -sma	all branch moves			
Scale	1: 3-5 km/hr -	light air movement	1	5 : 31-38 km/hr - fresh breeze - moderate pranch moves					
	2: 6-11km/hr	<ul> <li>slight breeze - can feel</li> </ul>	on face	<b>6:</b> 39-49 km	ynr - strong breeze - large	Dignetrinoves			
	<ol> <li>12-19 km/hr- gentle breeze - leaves move on twigs</li> </ol>						_		



## Appendix D

## Photographic Log

- D.1 Aquatic Photo Log
- D.2 Terrestrial Photo Log



## D.1 Aquatic Photo Log





City of Hamilton

Project No. 60637047





Photograph 1. ↑ WC-01. Upstream side of the crossing facing NW

Photograph 2. ↑ WC-01. Downstream of crossing facing SE



Photograph 3. ↑ WC-01. Upstream view of the watercourse. Riparian buffer between agricultural fields



Photograph 4. ↑ WC-01. Water present at culvert inlet pool







Photograph 5. ↑ WC-02. Culvert inlet on west side of Glancaster road

Photograph 6. ↑ WC-02. Culvert inlet west side of Glancaster Road. Erosion present on right bank





Photograph 7. ↑ WC-02. Culvert outlet on east side of Glancaster Road

Photograph 8. ↑ WC-03. Looking upstream of road crossing on west side of Glancaster Road.



Photographic Log

Report Name Natural Environment Report Project No. 60637047





Photograph 9. ↑ WC-03. Slightly Perched Outlet.

Photograph 10. WC-03. Culvert Outlet



Photograph 11. ↑ WC-04. Looking upstream from downstream end. On east side of Glancaster Road. Photograph 12. ↑ WC-04. Looking upstream from downstream end on west side of Glancaster Road.



Project No. 60637047





Photograph 13. ↑ WC-05. Culvert Inlet

Photograph 14. ↑ WC-05. Riparian habitat on west side of Glancaster Road.



Photograph 15. ↑ WC-05. Water trickling out of culvert outlet.

Photograph 16. ↑ WC-05. Downstream of vegetated swale.



City of Hamilton





Photograph 17. ↑ WC-06. Looking upstream of road crossing.

Photograph 18. **↑** WC-06. Culvert inlet





Photograph 19. ↑ WC-06. Culvert outlet.

Photograph 20. ↑ WC-06. Looking downstream from culvert outlet.



## **Photographic Log**

Report Name Natural Environment Report Project No. 60637047



#### Photograph 21. ↑ WC-07. Feature is not visible from fence of neighbouring property due to dense vegetation. There was no permission to enter.



Photograph 22. ↑ WC-08. Looking upstream at swale on west side of Glancaster Road.



Photograph 23. ↑ WC-08. Looking upstream at roadside ditch.

Photograph 24. ↑ WC-09. Looking upstream from culvert inlet on west side of Glancaster Road.



City of Hamilton

60637047

Photograph 25. ↑ WC-09. Water present at culvert inlet



Photograph 26. ↑ WC-09. Water present at culvert outlet.





Photograph 27. ↑ WC-06. Downstream of culvert outlet facing downstream (east)

Photograph 28. ↑ WC-09. Brook Stickleback caught and released at WC-09.



## **D.2 Terrestrial Photo Log**



## **Photographic Log- Terrestrial**

Report Name Natural Environment Report Project No. 60637047



Photograph 1. ↑ MAS2-1 Cattail Mineral Shallow Marsh

Photograph 2. 
↑
MAS2-1 Cattail Mineral Shallow Marsh



Photograph 3. ↑ CUM1-1/CUT1 – Dry-Moist Old Field Meadow/ Mineral Cultural Thicket.

Photograph 4. ↑ CUM1-1/CUT1 – Dry-Moist Old Field Meadow/ Mineral Cultural Thicket.



## **Photographic Log- Terrestrial**

City of Hamilton

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Photograph 5. ↑ CUM1-1 - Dry-Moist Old Field Meadow

Photograph 6. ↑ FOD4-1 - Dry – Fresh Beech Deciduous Forest



Photograph 7. ↑ SWT2/MAM2-2 – Mineral Thicket Swamp with Reed Canary Grass Mineral Meadow Marsh

Photograph 8. SWT2/MAM2-2 – Mineral Thicket Swamp with Reed Canary Grass Mineral Meadow Marsh



## **Photographic Log- Terrestrial**

Project No. 60637047



Photograph 9. ↑ FOD2-2 - Dry – Fresh Oak – Hickory Deciduous Forest

Photograph 10. ↑ FOD2-2 - Dry – Fresh Oak – Hickory Deciduous Forest



Photograph 11. ↑ FOD2-2 - Dry – Fresh Oak – Hickory Deciduous Forest – understory vegetation.

Photograph 12. ↑ FOD2-2 - Dry – Fresh Oak – Hickory Deciduous Forest – pooling in understory.



# Appendix E

**Plant List** 

											RECIONAL											
								COSEWIC	SARA		STATUS 7E -	LOCAL	INVASIVE									
	_		COEFFICIENT OF	WETNESS	WEEDINES	PROVINCIAL	ESA	STATUS	STATUS (2020	GLOBAL	CAROLINIAN	STATUS	SPECIES		CUM1-1/	CUM1-1/	5002.2	5004.4	MAMOO	MASSA	BOW	SWT2/
BUTANICAL NAM			CONSERVATISM	INDEX	SINDEX	KANK	STATUS	(2020-04-21)	04-21)	KANK	Oldham 2017	Oldham 2017	UNTARIO	COM1-1	COTT	IVIAIVIZ	FUD2-2	F0D4-1	IVIAIVIZ-Z	WA52-1	ROW	WAWZ-Z
PTERIDOPHYTES		FERNS & ALLIES																				
Dryopteridaceae		Wood Fern Family																				
Dryopteris Dryopteris	sp. cristata	Crested Wood Fern	7	-5		S5				G5	U	C					x	x				
Equisetaceae		Horsetail Family	,	-0		00				00	0	0					^	~				
Equisetum	arvense	Field Horsetail	0	0		S5				G5	С	С		x		x			x			
Equisetum	variegatum	Variegated Horsetail	5	-3		S5				G5	U	С								x		x
Onocleaceae		Ostrich Fern Family																				
Onoclea	sensibilis	Sensitive Fern	4	-3		S5				G5	С	С					x	х				x
GYMNOSPERMS Cuprosososo		CONIFERS																				
Thuia	occidentalis	Eastern White Cedar	4	-3		S5				G5	с	с						x				
Pinaceae	ocondernans	Pine Family		-								-						~				
Picea	abies	Norway Spruce		5	-1	SE3				G5	IX	IR								x		
Picea	glauca	White Spruce	6	3		S5				G5	U	С		х								-
Pinus	strobus	Eastern White Pine	4	3		S5				G5	С	С		х			х	х				х
DICOTYLEDONS		DICOTS																				
Adoxaceae		Moschatel Family													~							
Viburnum	sp.	European Cranberrybush	5	-3	-1	S5				G5					^	×						
Viburnum	opulus var. americanum	American Cranberrybush	5	-3		S5				G5TNR	С	C				~						x
Anacardiaceae		Sumac or Cashew Family																				-
Toxicodendron	radicans var. radicans	Eastern Poison-ivy	2	0		S5				G5T5	С	С						x				
Toxicodendron	radicans var. rydbergii	Western Poison-ivy	2	0		S5				GT5	С	С					x	x				х
Rhus	typhina	Staghorn Sumac	1	3		S5				G5	С	С		х	х	х				x	х	x
Apiaceae	- free	Carrot or Parsley Family	6	6		<u> </u>				CF.	0											
Angelica	atropurpurea	Purplestem Angelica	6	-5		55 542				G5 G5	C	U				×				X		
Daucus	carota	Wild Carrot		-5	-2	SNA				GNR	IC	IC		x	x	x			x		x	x
Sium	suave	Water Parsnip	4	-5		S5				G5	C	C	3							x		
Apocynaceae		Dogbane Family																				-
Asclepias	syriaca	Common Milkweed	0	5		S5				G5	С	С		х		х			х		х	
Asteraceae		Composite or Aster Family				0550				0.5												
Acnillea	minerollum	Common Yarrow		3	-1	SE5?				G5 GNR	IX IC			X		X				X	X	
Symphyotrichum	sn.	Aster species		3	-2	SE3				GINIX	10	10		x	x	×		x	x		^	
Eurybia	macrophylla	Large-leaved Aster	5	5		S5				G5	С	С					x	x				
Symphyotrichum	novae-angliae	New England Aster	2	-3		S5				G5	С	С		х	x	х	x		x		х	x
Symphyotrichum	puniceum	Purple-stemmed Aster				S5				G5	С	С						x				
Bidens	sp.	Beggar-ticks species	-								-	-				x						
Bidens	frondosa	Devil's Beggar-ticks	3	-3		S5				G5	С	C				X						-
Centaurea	jacea	Chicony		5	-1	SE5				GNR	IC	IC		X	×							
Cirsium	sp.	Thistle species				020				ONIX	10	10		x	^	x						
Cirsium	arvense	Canada Thistle		3	-1	SE5				G5	IC	IC	1	x		х			x			-
Eupatorium	perfoliatum	Boneset	2	-3		S5				G5	С	С						x				
Euthamia	graminifolia	Grass-leaved Goldenrod	2	0		S5				G5	С	С				х				х		
Solidago	sp.	Goldenrod species												х	х	x	x	x	x		х	
Solidago	altissima	Tall Goldenrod	1	3		S5				G5	C	C		X		x				x		
Tarayacum	officinale	Common Dandelion		3		SE5				GNK				×	×	~			v	~	~	+
Tussilago	farfara	Coltsfoot		3	-2	SE5				GNR	IC	IX		x	x	X			^	x	Χ.	+
Balsaminaceae		Touch-me-not Family		Ť	-				-				+	† ^	^ 	~			1	~		+
Impatiens	capensis	Jewelweed	4	-3		S5				G5	С	С		x		x	x	x	x	x		x
Berberidaceae		Barberry Family																				
Podophyllum	peltatum	May-apple	5	3		S5				G5	С	С					х	х				

											REGIONAL											
								COSEWIC	SARA		STATUS 7E -	LOCAL	INVASIVE		CUM1-1/	CUM1_1/						SWT2/
			COEFFICIENT OF	WETNESS		PROVINCIAL	ESA	STATUS	STATUS (2020-	GLOBAL	CAROLINIAN		SPECIES		CUIT4	MAM2	E0D2 2	EOD4 1	MAM2.2	MAS2 1	POW/	MAM2 2
BOTANICAL NAME		Birch Family	CONSERVATISM	INDEX	SINDER	KANK	STATUS	(2020-04-21)	04-21)	RANK	20NE - 2017	HAMILTON	UNTARIO	COMIT	COTT	IVIAIVIZ	FOD2-2	F0D4-1		WA32-1	ROW	WAWZ-Z
Ostrva	virginiana	Ironwood	4	4		S5				G5	C	C					×	×				+
Boraginaceae	inginana -	Borage Family								00							~	~				
Myosotis	scorpioides	True Forget-me-not		-5	-1	SE5				G5	IX	IX	4				×					
Brassicaceae		Mustard Family		-	-								-									
Alliaria	petiolata	Garlic Mustard		0	-3	SE5				GNR	IC	IC	1	×		×	×	x	×	x		×
Barbarea	vulgaris	Garden Yellowrocket		0	-1	SE5				GNR	IC	IX	3	x	x	x	x	x	x	x		×
Caprifoliaceae		Honevsuckle Family								-												-
Lonicera	tatarica	Tartarian Honeysuckle		3	-3	SE5				GNR	IC	IX	1		x	x	x	x	x	x	x	×
Celastraceae		Staff-tree Family																				-
Euonymus	obovatus	Running Strawberry-bush	6	5		S4				G5	С	С					x	x				x
Cornaceae		Dogwood Family																				-
Cornus	racemosa	Gray Dogwood	2	-2		S5				G5	С	С		x	x	x	x	x	x	х	х	x
Cornus	rugosa	Round-leaved Dogwood	6	5		S5				G5	С	С										x
Cornus	sericea	Red-osier Dogwood	2	-3		S5				G5	С	С		x	x	х		х	x		х	x
Dipsacaceae		Teasel Family																				
Dipsacus	fullonum	Fuller's Teasel		5	-1	SE5				GNR	IC	IX	3	х	х	x			х	х	х	
Fabaceae		Pea Family																				
Lotus	corniculatus	Bird's-foot Trefoil		1	-2	SE5				GNR	IC	IC	2	х								
Vicia	cracca	Cow Vetch		5	-1	SE5				GNR	IX	IC	2			x					х	
Fagaceae		Beech Family																				
Fagus	grandifolia	American Beech	6	3		S4				G5	С	С					x	x				
Quercus	rubra	Red Oak	6	3		S5				G5	С	С		x	x		x	x			х	
Geraniaceae		Geranium Family																				
Geranium	maculatum	Spotted Geranium	6	3		S5				G5	С	С					x	x				
Geranium	robertianum	Herb-robert		5	-2	S5				G5	С	С		x			x	x				
Grossulariaceae		Currant Family																				
Ribes	sp.	Currant species														х	x	х				
Ribes	americanum	American Black Currant	4	-3		S5				G5	С	С								х		x
Ribes	rubrum	Red Currant		5	-2	SE5				G4G5	IX	IX					x					
Hydrophyllaceae		Water-leaf Family																				
Hydrophyllum	virginianum	Virginia Water-leaf	6	-2		S5				G5	С	С					x	x				
Juglandaceae		Walnut Family																				
Carya	cordiformis	Bitternut Hickory	6	0		S5				G5	С	С						x				
Carya	ovata	Shagbark Hickory	6	3		S5				G5	C	С			x		x	x				
Juglans	cinerea	Butternut	6	2		\$2?	END	END	END	G3	U	C					×	x				
Juglans	nigra	Black Walnut	5	3		S4?				G5	C	C				x	×	x	x	x		
Lamiaceae		Mint Family				050				0.15												
Ajuga	reptans	Common Bugie		5	-1	SE2		-		GNR	IR	10	4	-			x	-				-
Glechoma	nederacea	Ground IVy		5	-2	SE5				GNR	IC	IC	4				x					X
Monordo	fictuloco	Wild Pergement				SEI				GINK						X				X		
Inthraces	listuiosa	Viid Bergamot								G5	C	C										X
Lythrum	policorio	Durple Lessestrife		5	2	SE6				CE	10	IC	1	~	~	~			~	v		
Lyunum	Salicalia	Mallow Family		-5	-3	3E3				65	ic		1	-	*	*			^	*		^
Tilio	omorioono	American Basswood	4	3		85				C5	<u> </u>	C			×		×	×				
Oloacoao	amendana	Olivo Family	4	5						00	U U	Ŭ			^		^	^				
Fravinus	americana	White Ash	4	3		S4				G5	C	C			×		×	×				- ×
Liqustrum	vulgare	Furopean Privet	-	1	-2	SE5				GNR	IX	IX	4	-	~		×	×				×
Opagracoao	vugare	European river			-2	313				ONIX			4				^	^				^
Circaea	canadensis	Canada Enchanter's Nightshade	3	3		\$5				G5	C	C		-				×				+
Orobanchaceae	Canadonaia	Broom-rape Family	5	0		00				00		Ű						~				+
Epifagus	virginiana	Beechdrops	6	5		<b>S</b> 5				G5	C	C.	+					¥				+
Oxalidaceae		Wood Sorrel Family																~				+
Oxalis	stricta	Common Yellow Oxalis	0	3		S5				G5	С	С	-				x	x				x
Papaveraceae		Poppy Family	-	-							-	-	1	<u> </u>		1						+
Sanguinaria	canadensis	Bloodroot	5	4		S5				G5	С	С	+				x					+
Plantaginaceae		Plantain Family				-					-	-										+
	1	· · · ·	1		1	1	1	1	1		1	1	1	1		1		1				

										REGIONAL											
			COFFEICIENT OF	WETNESS	WEEDINES	PROVINCIAL	FSA	STATUS	SARA STATUS (2020, GLOBAL	STATUS 7E -	STATUS	SPECIES		CUM1-1/	CUM1-1/						SWT2/
BOTANICAL NAME		COMMON NAME	CONSERVATISM	INDEX	SINDEX	RANK	STATUS	(2020-04-21)	04-21) RANK	ZONE - 2017	HAMILTON	ONTARIO	CUM1-1	CUT1	MAM2	FOD2-2	FOD4-1	MAM2-2	MAS2-1	ROW	MAM2-2
Linaria	vulgaris	Butter-and-eggs		5	-1	SE5			GNR	IC	IC	4	х								
Veronica	anagallis-aquatica	Water Speedwell		-5	-1	SE			G5	IX	IX								х		
Polygonaceae		Smartweed Family																			
Persicaria	virginiana	Virginia Knotweed	6	0		S4			G5	С	С						x				
Rumex	crispus	Curly-leaf Dock		-1	-2	SE5			GNR	IC	IX			х	x						
Primulaceae		Primrose Family																			
Lysimachia	nummularia	Creeping Jenny		-4	-3	SE5			GNR	IC	IX	2				x					х
Ranunculaceae		Buttercup Family																			
Actaea	pachypoda	White Baneberry	6	5		S5			G5	С	С					x	x				
Ranunculus	abortivus	Littleleaf Buttercup	2	-2		S5			G5	С	С					x					
Rhamnaceae		Buckthorn Family																			
Rhamnus	cathartica	Common Buckthorn		3	-3	SE5			GNR	IC	IC	1		х	x	x	x			х	х
Rosaceae		Rose Family																			
Agrimonia	sp.	Agrimony species															x				
Agrimonia	gryposepala	Tall Hairy Agrimony	2	2		S5			G5	С	С										х
Crataegus	sp.	Hawthorn species	4	5										х		x					
Crataegus	monogyna	English Hawthorn		5	-1	SE4			G5	IU	IX	3		х							<u> </u>
Crataegus	punctata	Dotted Hawthorn	4	5		S5			G5	C	C					x	x				x
Fragaria	vesca	Woodland Strawberry				S5			G5	U	C					x	x				ļ
Fragaria	virginiana	Wild Strawberry	2	1		S5			G5	С	С		x	х	x		x	x			
Geum	sp.	Avens species									-				x		x			х	
Geum	aleppicum	Yellow Avens	2	-1		S5			G5	С	C					x	x				
Physocarpus	opulifolius	Ninebark	5	-2		S5			G5	U	C			x		x	x		x		x
Potentilla	recta	Rough-fruited Cinquetoil		5	-2	SE5			GNR	IC	IX					x					
Potentilla	simplex	Old-field Cinquefoil	3	4		\$5			G5	C	C						x				
Prunus	sp.	Cherry species		0		05			07	-	-				x	x					
Prunus	serouna	Black Cherry	3	3		35			GS	C	C		X			X	x				
Prunus	virginiana		2	1		55			G5	ι L	C		x	x		x	x				
Rosa	Sp.	Rose species		2	2	SEE			CNP	10	10	1		X	x		x				X
Rosa	nunnora		2	2	-3	3E5			GINK	IC C	IC C	· ·					×				~
Rubus	ideous	American Red Rasphern/	2	2		55			GS	C	0						×				*
Rubus	occidentalis	Black Baspherny	2	-2		55			65	C	- -				×		×				
Rubiaceae	occidentalis	Madder Family	2	5					65	0	U U				^		^				
Galium	mollugo	Smooth Bedstraw		5	-2	SE5			GNR		IX	2					×				
Galium	odoratum	Sweet-scented Bedstraw		5	-2	SE1			GNR	IR	IR	2				×	^				-
Salicaceae	odoratam	Willow Family				021										~					-
Populus	balsamifera	Balsam Poplar	4	-3		S5			65	U	C			x							
Populus	tremuloides	Trembling Aspen	2	0		S5			G5	C	C C		x	~		×	×				x
Salix	sp.	Willow species	-	-	1		1			-	-	1			x			x	x		x
Salix	discolor	Pussy Willow	3	-3		S5			G5	С	С								x		
Salix	exigua	Narrow-leaf Willow	3	-5		S5			GNR	С	С	1									x
Salix X	rubens	Hybrid Crack Willow		-4	-3	hyb			HYB	hyb	hyb				x				x		
Sapindaceae		Soapberry Family																			
Acer	negundo	Manitoba Maple	0	0		S5			G5	С	С	1	х								
Acer	saccharum	Sugar Maple	4	3	l	S5			G5	С	С				l	х	х	l			
Solanaceae		Nightshade Family																			
Solanum	dulcamara	Bittersweet Nightshade		0	-2	SE5			GNR	IC	IC	3			x				x		
Ulmaceae		Elm Family																			
Ulmus	americana	American Elm	3	-2		S5			G4	С	С					х	х				x
Urticaceae		Nettle Family																			
Urtica	dioica ssp. dioica	Stinging Nettle		-1	-1	SE2			G5T5?	IR	IX	3					x				
Verbenaceae		Vervain Family																			
Verbena	hastata	Blue Vervain	4	-4		S5			G5	С	С				х						
Vitaceae		Grape Family																			
Parthenocissus	quinquefolia	Virginia Creeper	6	1		S4?			G5	U	С				x	x	x			<u>_</u>	x
Vitis	riparia	Riverbank Grape	0	-2		S5			G5	С	С		x	х	х	x	х	х	х	х	х
MONOCOTYLEDONS		MONOCOTS																			

					1		1						1		1							
											REGIONAL											
								COSEWIC	SARA		STATUS 7E -	LOCAL	INVASIVE		0.000	0						OWTO
			COEFFICIENT OF	WETNESS	WEEDINES	PROVINCIAL	ESA	STATUS	STATUS (2020-	GLOBAL	CAROLINIAN	STATUS	SPECIES	0.004	CUM1-1/	CUM1-1/	5050.0	50544			DOW	SW12/
			CONSERVATISM	INDEX	SINDEX	RANK	STATUS	(2020-04-21)	04-21)	RANK	ZONE - 2017	HAMILION	ONTARIO	COM1-1	CUI1	MAM2	FOD2-2	FOD4-1	MAM2-2	MAS2-1	ROW	MAM2-2
Asparagaceae	officinalia	Asparagus Family		2	1	SEE.				CE2	10	IX										~
Asparagus	onicinans	Garden Asparagus		5	-1	SED				G5?	IC IX		2									X
Convaliana	majalis	European Lity-or-the-valley	5	5	-2	SED				G5 CE	IX C	iA C	3			X	v	~	x			-
Maianthemum	canadense	Large False Solomon's Seal	3	3						G5	С С	C C					×	×				
	racemosum	Arum Eamily	4	3						65	C	C					*	*				
Ariaceae	triphyllum	lack in the pulpit	5	-2		\$5				C5	<u> </u>	<u> </u>					×	×				
Symplocarpus	foetidus	Skunk Cabbage	7	-2		55 55				G5	0	С С					^	^		×		
Cyneraceae	10611003	Sedge Family	'	-5						00	0	- U								^		
Carey	50	Sedge ranny														×		×				
Carex	sp.	White Bear Sedge	7	5		\$5				C5	<u> </u>	C C				^	×	×				^
Carex	arctata	Drooping Wood Sedge	5	5		55 55				G5	C C	0					×	×				
Carex	interior	Inland Sedge	6	-5		S5				65	C C	U U					×	×				+
Carey	nensylvanica	Pennsylvania Sedge	5	-0		S5				G5	C C	C C					×	×				+
Carex	stinata	Awl-fruited Sedge	3	-5		S5				G5	C C	C C					^	~				×
Carey	stricta	Tussock Sedge	4	-5		S5				G5	C C	C C										×
Carex	vulninoidea	Fox Sedge	3	-5		S5				G5	C C	C C										×
Schoenonlectus	so	Bulrush species		v						00	-					×						×
Scirpus	cyperinus	Wool-grass	4	-5		S5				G5	C	C				~						×
Dioscoreaceae	ojponnao	Yam Family		v						00												-
Dioscorea	villosa	Wild Yam	7	1		S4				G4G5	С	С					x					-
Iridaceae		Iris Family									-	-										
Iris	versicolor	Harleguin Blue-flag	5	-5		S5				G5	С	с				x	x		x			
Juncaceae		Rush Family		-																		+
Juncus	SD.	Rush species														x						×
Luzula	acuminata	Hairy Woodrush	6	1		S5				G5	с	с					x					-
Liliaceae		Lily Family																				+
Erythronium	americanum	Yellow Trout-lily	5	5		S5				G5	С	С					x	x				
Lilium	sp.	Lily species										-				x						+
Melanthiaceae		Bunchflower Family																				1
Trillium	grandiflorum	White Trillium	5	5		S5				G5	С	С					x	x				
Poaceae		Grass Family																				-
Bromus	inermis	Smooth Brome		5	-3	SE5				G5	IC	IC	4	x	x	х			x	x	х	-
Dactylis	glomerata	Orchard Grass		3	-1	SE5				GNR	IC	IC	3	x	x	x			x		х	
Glyceria	striata	Fowl Manna Grass	3	-5		S5				G5	С	С				х						x
Phalaris	arundinacea	Reed Canary Grass	0	-4		S5				G5	С	С		x	x	x			x	x	x	x
Phragmites	australis	Common Reed	0	-4		S4?				G5		С	1	x	x	x			x	x	х	
Poa	sp.	Blue Grass species												x	x	x						
Poa	pratensis ssp. pratensis	Kentucky Blue Grass	0	1		SE5				G5T5	IC	IC	2	x	x	x			x	x	х	-
Smilacaceae		Catbrier Family																				
Smilax	sp.	Greenbrier species															x					1
Typhaceae		Cattail Family																				
Typha	angustifolia	Narrow-leaved Cattail	3	-5	1	SE5	1			G5	IC	IX		x		х			х	x	х	x
Typha	latifolia	Broad-leaved Cattail	3	-5		S5				G5	С	С				х			х	x		x

			CUM1-1/	CUM1-1/						SWT2/
FLORISTIC SUMM	IARY & ASSESSMENT	CUM1-1	CUT1	MAM2	FOD2-2	FOD4-1	MAM2-2	MAS2-1	ROW	MAM2-2
Species Diversity										
Total Species		42	36	59	65	72	29	34	23	48
Native Species		21	17	25	48	55	15	19	11	33
Nalive openes.		50.0%	47.2%	42.4%	73.8%	76.4%	51.7%	55.9%	47.8%	68.8%
Exotic Species		17	14	21	13	9	11	14	10	10
		40.5%	38.9%	35.6%	20.0%	12.5%	37.9%	41.2%	43.5%	20.8%
Total Taxa in Regio	on (List Region, Source)	1000	1000	1000	1000	1000	1000	1000	1000	1000
% Regional Taxa F	Recorded	4.2%	3.6%	5.9%	6.5%	7.2%	2.9%	3.4%	2.3%	4.8%
Regionally Significa	ant Species	/0	0	0	0	0	0	0	0	0
S1-S3 Species		0	0	0	0	0	0	0	0	0
S4 Species		0	1	0	4	4	0	0	0	2
S5 Species		19	13	19	41	49	11	15	8	29
Co-efficient of Co	nservatism and Floral Quality Index									
Co-efficient of Con	servatism (CC) (average)	1.90	2.59	2.29	4.40	4.08	1.87	2.89	1.45	3.16
CC 0 to 3	lowest sensitivity	17	10	18	11	18	12	11	10	18
	······	40.5%	27.8%	30.5%	16.9%	25.0%	41.4%	32.4%	43.5%	37.5%
CC 4 to 6	moderate sensitivity	4	7	6	33	33	3	7	1	14
	····· <b>·</b>	9.5%	19.4%	10.2%	50.8%	45.8%	10.3%	20.6%	4.3%	29.2%
CC 7 to 8	hiah sensitivity	0	0	0	0	0	0	0	0	0
	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CC 9 to 10	highest sensitivity	0	0	0	0	0	0	0	0	0
	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Floral Quality Inde	ex (FQI)	6.32	6.63	7.57	14.54	14.97	5.29	7.42	4.00	10.21
Presence of Weed	dy & Invasive Species									
mean weediness		-1.69	-1.92	-1.95	-2.08	-2.22	-2.00	-2.00	-1.90	-2.30
weediness = -1	low potential invasiveness	8	5	7	3	2	4	5	4	2
		19.0%	13.9%	11.9%	4.6%	2.8%	13.8%	14.7%	17.4%	4.2%
weediness = -2	moderate potential invasiveness	5	4	7	5	3	3	3	3	3
	·	11.9%	11.1%	11.9%	7.7%	4.2%	10.3%	8.8%	13.0%	6.3%
weediness = -3	high potential invasiveness	3	4	6	4	4	4	5	3	5
		7.1%	11.1%	10.2%	6.2%	5.6%	13.8%	14.7%	13.0%	10.4%
Presence of Wetla	and Species									
average wetness v	alue	1.24	1.13	0.11	1.47	1.47	0.04	-0.88	1.29	-0.71
upland		8	6	7	15	13	5	3	5	5
		19.0%	16.7%	11.9%	23.1%	18.1%	17.2%	8.8%	21.7%	10.4%
facultative upland		11	10	11	18	21	5	7	8	9
		26.2%	27.8%	18.6%	27.7%	29.2%	17.2%	20.6%	34.8%	18.8%
facultative		9	5	9	11	14	5	5	1	6
		21.4%	13.9%	15.3%	16.9%	19.4%	17.2%	14.7%	4.3%	12.5%
facultative wetland		7	8	11	11	12	7	10	6	13
		16.7%	22.2%	18.6%	16.9%	16.7%	24.1%	29.4%	26.1%	27.1%
obligate wetland		2	1	6	4	2	4	7	1	9
		4.8%	2.8%	10.2%	6.2%	2.8%	13.8%	20.6%	4.3%	18.8%

EXPLANATION OF TERMINOLOGY (See the following pages for addition detailed information on terms.)

Botanical and Common Name: From Newmaster et. al, 1998. Species requiring confirmation noted (cf).

Co-efficient of Conservatism: This value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific habitat integrity.

Wetness Index: This value, ranging from -5 (obligate wetland) to 5 (upland) provides the probability of a species occurring in wetland or upland habitats.

Weediness Index: This value, ranging from -1 (low) to -3 (high) quantifies the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, it can be used as an indicator of disturbance.

*Provincial Status:* Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario.

#### DETAILED EXPLANATION OF TERMS

Floral Quality Index and Coefficient of Conservatism Values

Vegetation species and community sensitivity was assessed through the application of coefficient of conservatism values (CC), assigned to each native species in southern Ontario (Oldham, et. al, 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to specific habitat integrity. The occurrence of species with a CC of 9 or 10 can be good indicators of undisturbed conditions such as mature forests, fens or bogs.

General habitat values associated with the CC values are:

0-3: species found in a wide variety of communities, including disturbed sites

4-6: species associated with a specific community, but tolerate moderate disturbance

7-8: species associated with a community in an advanced successional stage, tolerant of minor disturbances

9-10: species with a high degree of fidelity to a narrow range of synecological parameters

The floristic quality of an area is reflected in the mean value of CC. For example, an old field or grazed woodlot would tend have a low mean CC; these habitats are dominated by opportunistic species that occur in a wide range of site conditions and are

tolerant of disturbance. A bog, prairie or intact forest would have a higher value, reflecting the specific habitat requirements of many of the species and a generally undisturbed condition. The following provides an example of interpretation of CC values:

mean CC value / % spp CC >8 / Condition of the Landscape 5/27 / intact 3.5 / 19 / slightly degraded 1.3 / 2 / severely degraded

The FQI accounts for the species diversity of the area by equating the number of native species with the mean CC value. The FQI is generally used for comparing natural areas. The CC value and FQI of the study area were calculated for the entire study area.

Weediness Index

The sensitivity of natural areas can be assessed through application of the Weediness Index. The Weediness Index quantifies the potential invasiveness of non-native plants, and, in combination with the percentage of non-native plants can be used as an indicator of disturbance. Values (ranging from 1- to -3) have been assigned to most non-native species based on the potential impact each species can have in natural areas:

-1: little or no impact on natural areas (most non-native plants are in this category)

-2: occasional impacts on natural areas, generally infrequent or localized

-3: major potential impacts on natural areas

#### Wetness Index

All plants in southern Ontario have been assigned a wetland category, based on the designations developed for use by the United States Fish & Wildlife Service. Plants are designated into the following categories:

OBL (Obligate Wetland): occurs almost always in wetlands under natural conditions (estimated >99% probability)

FACW (Facultative Wetland): usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67-99% probability)

FAC (Facultative): equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability)

FACU (Facultative Upland): occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated 1-33% probability)

UPL (Upland): occurs almost never in wetlands under natural conditions (estimated <1% probability)

Further refinement of the Facultative categories are denoted by a "+" or "-" to express exaggerated tendencies for those species. The "+" denotes a greater estimated probability occurring in wetlands than species in the general indicator category, but a lesser probability than species occurring in the next higher category. The "-" denotes a lesser estimated probability of occurring in wetlands than species in the general indicator category, but a greater probability than species occurring in the next higher category. The "-" denotes a lesser estimated probability of occurring in wetlands than species in the general indicator category, but a greater probability than species occurring in the next lower general category.

Each wetland category has been assigned a numerical value to facilitate the quantification of the wetness index. The wetland categories and their corresponding values are as follows:

OBL : -5 FACW+: -4 FACW: -3 FACW-: -2 FAC+: -1

Provincial Status

Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. The ranks are:

S1: Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province

S2: Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province S3: Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation

S4: Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5:Secure—Common, widespread, and abundant in the nation or state/province

SH: Possibly Extirpated (Historical)—Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences

SNR Unranked—Nation or state/province conservation status not yet assessed

SX: Presumed Extirpated—Species or community is believed to be extirpated from the 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 SNA Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

SU: Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends

Rank ranges, e.g. S2S3, indicate that the rank is either S2 or S3, but that current information is insufficient to differentiate.

S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

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## Appendix

## **Breeding Bird Survey Results**

			Hamilton	MBCA	SADA	ESA	BBS	S-01	BB	S-02	BBS	6-03	BBS	6-04	BB	S-06	BBS	6-07	BBS	3-08
Common Name	Scientific Name	S-Rank ¹	Abundance Codes ²	Protected (Yes/No) ³	SARA Status ⁴	ESA Status⁵	Visit 1	Visit 2												
Bitterns, Herons & Allies (ARDEID	DAE)																			
Great Blue Heron	Ardea herodias	S4	N, U	Yes	-	-			FO											
Ducks, Geese, & Swans (ANATID)	AE)																			
Canada Goose	Branta canadensis	S5	N, C	Yes	-	-			FO											
Plovers and Lapwings (CHARADE	RIIDAE)																			
Killdeer	Charadrius vociferus	S5B,S5N	N, C	Yes	-	-													Α	
Gulls & Terns (LARIDAE)											•									
Ring-billed Gull	Larus delawarensis	S5B,S4N	N, C	Yes	-	-	FO	FO											FO	
Pigeons & Doves (COLUMBIDAE)											•									
Mourning Dove	Zenaida macroura	S5	N, C	Yes	-	-												S		
Woodpeckers & Allies (PICIDAE)																				
Red-bellied Woodpecker	Melanerpes carolinus	S4	N, C	Yes	-	-												S		
Northern Flicker	Colaptes auratus	S4B	N, C	Yes	-	-						S								
Flycatchers (TYRANNIDAE)	,								1						1					
Eastern Wood-Pewee	Contopus virens	S4B	N, C	Yes	-	SC									S	Т				
Alder Flycatcher	Empidonax alnorum	S5B	N, U	Yes	-	-	S		S										S	
Great Crested Flycatcher	Mviarchus crinitus	S4B	N, C	Yes	-	-									S					
Swallows (HIRUNDINIDAE)							<u> </u>	<u> </u>	I							<u> </u>				
Barn Swallow	Hirundo rustica	S4B	N.C	Yes	-	THR						Х								
Javs & Crows (CORVIDAE)			, -																	
Blue Jay	Cvanocitta cristata	S5	N.C	No	-	-					X		X		FO	FO	X	X		
American Crow	Corvus brachyrhynchos	S5B	N. C	No	_	_					~		~	X	10	10	FO	FO		
Chickadees & Titmice (PARIDAE)	Convas brachymynenes	008	, •											~			10	10		
Black-capped Chickadee	Poecile atricanillus	95	NC	Yes	-	-						9						S		
White breasted Nutbatch	Sitta carolinonsis		N, C	Yes	_	_						3						3		
Wrops (TROGI ODVTIDAE)	Sitta carolinensis		11, 0	100								5								
House Wren	Tradadutes aedan	S5B	NC	Ves	_		9											9		9
	Troglodytes action	000	Π, Ο	105	-	-	5											5		
Wood Thrush	Hylocicla mustolina	S/R	NII	Ves	-	80	[ ]	[ ]	[	1	1	[	S		9	[ ]				
American Behin		54D 86P	N, C	Ves		30			6	6	6		5	т	0	6		0	6	<b>–</b>
Mockingbirds, Thrashors & Allias	(MIMIDAE)	336	Ν, Ο	103	_	-			3	5	3		3	-	3	5		3	5	
Croy Cathird		S4P	NC	Ves						[	1		6				٨	т		6
		54D	N, C	Yes	-	-							3				A	1		3
Sterlinge (STUDNUDAE)	Toxostoma ruium	54B	Ν, Ο	165	-	-												3		
Starlings (STURNIDAE)	Chumpus y u deservis	CNIA		No							1						0			
	Sturnus vulgaris	SINA		INO	-	-	5			<u> </u>							3			5
		0.5 D	NC	Vee								1								
Red-eyed Vireo	Vireo olivaceus	S5B	N, C	fes	-	-								5		5				I
	Developing vertexhis	0.5 D	N C	Vee			[ ]	[ ]	[	1	1		0		[	[ ]		0		
Yellow Warbler	Dendroica petechia	S5B	N, C	res	-	-							5					S		i
Cardinals, Grosbeaks & Allies (CA	ARDINALIDAE)		N O			1							1							
Northern Cardinal	Cardinalis cardinalis	S5	N, C	Yes	-	-				S				S						L
New World Sparrows & Allies (El	MBERIZIDAE)		<b></b>		1	-	r		-	r.	T	_			-	r				
Eastern Towhee	Pipilio erythrophthalmus	S4B	N, U	Yes	-	-						S								<b> </b>
Chipping Sparrow	Spizella passerina	S5B	N, C	Yes	-	-				ļ										<b> </b>
Field Sparrow	Spizella pusilla	S4B	N, C	Yes	-	-			S											ļ
Song Sparrow	Melospiza melodia	S5B	N, C	Yes	-	-		Р	S	S		S					S		S	Т
Dark-eyed Junco	Junco hyemalis	S5B	-	Yes	-	-								S						L
Blackbirds & Allies (ICTERIDAE)																				
Red-winged Blackbird	Agelaius phoeniceus	S4	N, C	No	-	-	A	Т	S	Α	A	Т					S		S	1

## **Appendix F: Breeding Bird Survey Results 2021**

		Hamilton	MBCA	SADA	SARA ESA -	BBS	6-01	BBS	6-02	BB	S-03	BBS	S-04	BBS	S-06	BB	S-07	BBS	S-08
Scientific Name	S-Rank ¹	Abundance Codes ²	Protected (Yes/No) ³	Status ⁴	Status ⁵	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2
Quiscalus quiscula	S5B	N, C	No	-	-		S		S	S	CF								
Molothrus ater	S4B	N, C	No	-	-				Х										
lcterus galbula	S4B	N, C	Yes	-	-			S	Т	D		S					S	S	
									-							-			
Cardeulis tristis	S5B	N, C	Yes	-	-	S		S	S	S		S					S	S	
4 <i>E)</i>																			
Passer domesticus	SNA	E	No	-	-						Х							Х	
	Scientific Name Quiscalus quiscula Molothrus ater Icterus galbula Cardeulis tristis AE Passer domesticus	Scientific NameS-Rank1Quiscalus quisculaS5BMolothrus aterS4BIcterus galbulaS4BCardeulis tristisS5BCardeulis tristisS5BPasser domesticusSNA	Scientific NameS-Rank1Hamilton Abundance Codes2Quiscalus quisculaS5BN, CMolothrus aterS4BN, CIcterus galbulaS4BN, CCardeulis tristisS5BN, CPasser domesticus	Scientific NameS-Rank1Hamilton Abundance Codes2MBCA Protected (Yes/No)3Quiscalus quisculaS5BN, CNoMolothrus aterS4BN, CNoIcterus galbulaS4BN, CYesCardeulis tristisS5BN, CYesPasser domesticusSNAE	Scientific NameS-Rank1Hamilton Abundance Codes2MBCA Protected (Yes/No)3SARA Status4Quiscalus quisculaS5BN, CNo-Molothrus aterS4BN, CNo-Icterus galbulaS4BN, CYes-Cardeulis tristisS5BN, CYes-Cardeulis tristisS5BN, CYesPasser domesticusSNAENo-	Scientific NameS-Rank1Hamilton Abundance Codes2MBCA Protected (Yes/No)3SARA Status4ESA Status5Quiscalus quisculaS5BN, CNoMolothrus aterS4BN, CNoIcterus galbulaS4BN, CYesCardeulis tristisS5BN, CYesPasser domesticusSNAENo	Scientific NameS-Rank1Hamilton Abundance Codes2MBCA Protected (Yes/No)3SARA Status4ESA Status5BBS Visit 1Quiscalus quisculaS5BN, CNoMolothrus aterS4BN, CNoIcterus galbulaS4BN, CYesCardeulis tristisS5BN, CYesSMaterS4BN, CYesIcterus galbulaS4BN, CYesSMaterS5BN, CYesSPasser domesticusSNAENo	Scientific NameS-Rank1Hamilton Abundance Codes2MBCA Protected (Yes/No)3SARA Status4ESA Status5BBS-01Quiscalus quisculaS5BN, CNoVisit 2Quiscalus quisculaS5BN, CNoSMolothrus aterS4BN, CNoISIcterus galbulaS4BN, CYesIICardeulis tristisS5BN, CYesSIPasser domesticusSNAENoII	Scientific NameS-Rank1Hamilton Abundance Codes2MBCA Protected (Yes/No)3SARA Status4ESA Status4BBS-01BBS Usit VisitVisit Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Visit 2Visit 1Disit 2Visit 2Visit 2Visit 2Disit 2Visit 2Visit 2Disit 2Vi	Scientific NameS-Rank1Hamilton Abundance Codes2MBCA Protected (Yes/No)3SARA Status4ESA Status4BBS-01BBS-02Quiscalus quisculaS5BN, CNo1212Quiscalus quisculaS5BN, CNoSSSMolothrus aterS4BN, CNoISXIcterus galbulaS4BN, CYesISTCardeulis tristisS5BN, CYesSSSMAENYesSSSSardeulis tristisS5BN, CYesSSSMAENYesSSSSMaterSAAENoIIIMaterSAAENoIIIIMaterSAAENoIIIIIIMaterSAAENoIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII<	Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status4ESA Status4BBS-01BBS-02BBS BBS-02BBS-01BBS-02BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-01BBS-0	Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status4ESA Status5BBS-01BBB-02BBS-03 $Visit$ $1$ $Visit$ $2$ <td>Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status⁴BBS-01BBS-02BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04&lt;</td> <td>Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status4ESA 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Status4BBS-01BBS-02BBS-03BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04<t< td=""><td>Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)3SARA Status4ESA Status4BBS-01BBS-02BBS-03BBS-04BBS-04BBS-06$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$<t< td=""><td>Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status4ESA 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Status⁴BBS-01BBS-02BBS-03BBS-04BBS-06BBS-07BBS-07$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$<td< td=""><td>Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status⁴ESA Status⁴BBS-01BBS-02BBS-03BBS-04BBS-04BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07BBS-07<t< td=""></t<></td></td<></td></t<></td></t<></td></t<></td>	Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status⁴BBS-01BBS-02BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-03BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04<	Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status4ESA Status4BBS-01BBS-02BBS-03BBS-04 $Visit$	Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status4ESA Status4BBS-01BBS-02BBS-03BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04BBS-04 <t< td=""><td>Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)3SARA Status4ESA Status4BBS-01BBS-02BBS-03BBS-04BBS-04BBS-06$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$$Visit$<t< td=""><td>Scientific NameHamilton Abundance Codes²MBCA Protected (Yes/No)³SARA Status4ESA 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OBBA Highest Breeding Evid	<u>lence (2001)</u>	
OBSERVED		
x		Species observed in its breeding season (no evidence of breeding).
POSSIBLE BREEDING		
Н		Species observed in its breeding season in suitable nesting habitat.
S		Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat.
PROBABLE BREEDING		
Р		Pair obsered in their breeding season in suitable nesting habitat.
Т		Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart, at the same place
D		Courtship or display between a male and a female or 2 males, including courtship, feeding or copulation.
V	Visiting probably nest site.	
A		Agitated behaviour or anxeity calls of an adult.
В		Brood patch on adult female or cloacal protuberance on adult male.
Ν		Nest-building or exacation of nest hole.
CONFIRMED BREEDING		
DD		Distraction display or injury feigning.
NU		Used nest or egg shell found (occupied or laid within the period of the study).
FY		Recently fledged young or downy young, including young incapable os sustained flight.
AE		Adults leaving or entering nest site in circumstances indicating occupied nest.
FS	Adult carrying faecal sac. Adult carring food for	
CF	young.	
NE	Nest containing eggs.	
NY		Nest with young seen or heard.

¹ S rank: The natural heritage provincial ranking system (provincial S-rank) is used by the MNRF Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. The following status definitions were taken from NatureServe Explorer's (2015) National and Subnational Conservation Status Definitions available at <a href="http://explorer.natureserve.org/nsranks.htm">http://explorer.natureserve.org/nsranks.htm</a>:

S3 – Vulnerable—Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 – Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

**S5** – Secure—Common, widespread, and abundant in the nation or state/province.

SNR – Unranked—Province conservation status not yet assessed.

SU – Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.



SNA – Not Applicable — A conservation status rank is not applicable because the species is not a suitable target for conservation activities. S#S# - Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., S2S3) is used rather than S1S4). **S#?** – Rank uncertain

**Breeding Status Qualifiers** 

B – Breeding—Conservation status refers to the breeding population of the species in the province.

N – Nonbreeding—Conservation status refers to the non-breeding population of the species in the province.

²Hamilton Abundance Codes (2013) available from: https://conservationhamilton.ca/images/PDFs/Planning/Birds_print.pdf

#### **Residency Codes**

Exotic (E) – not indigenous to Ontario Native (N) – Indigenous to Ontario

#### Abundance Codes

Rare (R) - Highly significant to Hamilton area Uncommon (U) - Moderately significant in Hamilton area Common (C) - Present in many locations across Hamilton

³MBCA Protected (Yes/No) – Migratory birds that are protected under the Migratory Birds Convention Act, 1994 (MBCA).

⁴ESA Status: The Endangered Species Act 2007 (ESA) protects species listed as Threatened and Endangered on the Species at Risk in Ontario (SARO) List on provincial and private land. The Minister lists species on the SARO list based on recommendations from the Committee on the Status of Species at Risk in Ontario (COSSARO), which evaluates the conservation status of species occurring in Ontario. The following are the categories of at risk: **END** (Endangered) – A species facing imminent extinction or extirpation in Ontario.

THR (Threatened) – Any native species that, on the basis of the best available scientific evidence, is at risk of becoming Endangered throughout all or a large portion of its Ontario range if the limiting factors are not reversed. SC (Special Concern) – A species that may become Threatened or Endangered due to a combination of biological characteristics and identified threats.

#### ⁴SARA Sched. 1 Status:

The SARA protects and ensures the recovery of SAR listed on Schedule 1 as Extirpated, Endangered and Threatened, and their critical habitats at a federal level. Schedule 1 of the SARA classifies SAR as follows: Extirpated (EXP) – a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild (SARA Registry, 2012).

Endangered (END) – a wildlife species that is facing imminent extirpation or extinction (SARA Registry, 2012).

Threatened (THR) – a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction (SARA Registry, 2012). Special Concern (SC) – a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats (SARA Registry, 2012).





## **SAR Habitat Assessment**

## Appendix G. Species at Risk Screening

Glancaster Road Municipal Class Environmental Assessment Phases 3 and 4

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{[1][2]}	Known Species Range ²	Source Identifying Species Record	Probabili
Amphibians	Jefferson Salamander Ambystoma jeffersonianum	END	END Schedule 1	END	Adult Jefferson Salamanders, throughout their range, are found within deciduous or mixed upland forests containing, or adjacent to, suitable breeding ponds. Breeding ponds are normally ephemeral, or vernal, woodland pools that dry in late summer. Terrestrial habitat is in mature woodlands that have small mammal burrows or rock fissures that enable adults to over-winter underground below the frost line.	In Canada, the species is found only in isolated populations that are mostly associated with the Niagara Escarpment and Carolinian forest regions in Ontario.	ORAA 2019	Low - Pools long enough
Birds	Bank Swallow Riparia riparia	THR	THR	THR	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. The birds breed in colonies ranging from several to a few thousand pairs.	In Canada, the species is found only in isolated populations that are mostly associated with the Niagara Escarpment and Carolinian forest regions in Ontario.	OBBA	Low - nc
Birds	Barn Owl Tyto alba	END	END Schedule 1	END	The Barn Owl cannot tolerate severe winter temperatures, and southern Ontario is the northern limit of its range. Breeding sites in Ontario seem to be restricted to areas with the moderating effects of the Great Lakes (within 50 kilometres of the lakes). In southern Ontario, this adaptable owl nests and roosts in barns and abandoned buildings. It may also use natural cavities in trees or holes in cliff faces, as it did before the arrival of Europeans in North America. It lives year round at its nest site and hunts for rodents over orchards, and grasslands such as farmlands, fallow fields, and meadows. TPO, TPS, CUM, CUS and CUW where suitable nesting habitat is present.	In the Western Hemisphere, the Barn Owl is found from extreme southern Canada to southern South America and the West Indies. In Canada, the Barn Owl is at the northern limit of its range, and breeds only locally in southern British Columbia, southern Ontario, and possibly in southern Quebec. Barn Owl numbers in Ontario and Quebec were probably never very large, although the species possibly inhabited oak-savannah vegetation adjacent to tall grass prairie prior to European settlement. Colonization of southern Canada is attributed to clearance of forests for agriculture, which created open habitats supporting high rodent populations. In Ontario, Barn Owls may potentially breed on the Niagara Peninsula, in adjacent Halimand-Norfolk, in the Thousands Island area of Kingston, at Long Point, and in several other localities in the southwestern part of the province. Today, there are fewer than five pairs of Barn Owls in Ontario.	OBBA	Low - no su pre
Birds	Barn Swallow Hirundo rustica	THR	THR	THR	Before European colonization, Barn Swallows nested mostly in caves, holes, crevices, and ledges in cliff faces. Following European settlement, they shifted largely to nesting in and on artificial structures, including barns and other outbuildings, garages, houses, bridges, and road culverts. Barn Swallows prefer various types of open habitats for foraging, including grassy fields, pastures, various kinds of agricultural crops, lake and river shorelines, cleared rights-of way, cottage areas and farmyards, islands, wetlands, and subarctic tundra.	<ul> <li>The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist.</li> <li>The Barn Swallow has become closely associated with human rural settlements. It breeds across much of North America south of the treeline, south to central Mexico. In Canada, it is known to breed in all provinces and territories.</li> </ul>	MNRF	High - Sui within the stu p

y of Occurrence within the Study Area	Species Observed During Field Investigations							
n woodlands did not hold water to support salamander breeing	No							
suitable habitat is present.	No							
itable nesting structures were sent in the Study Area	No							
able foraging habitat present Idy area and structures with the otential to hold nests	Yes							
Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{[1][2]}	Known Species Range ²	Source Identifying Species Record	Probabili
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					TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1; containing or adjacent structures that are suitable for nesting.			
Birds	Bobolink	THR	THR	THR	Most of this prairie was converted to agricultural land over a century ago, and at the same time the forests of eastern North America were cleared to hayfields and meadows that provided habitat for the birds. Since the conversion of the prairie to cropland and the clearing of the eastern forests, the Bobolink has nested in forage crops (e.g., hayfields and pastures dominated by a variety of species, such as clover, Timothy, Kentucky Bluegrass, and broadleaved plants). The Bobolink also occurs in various grassland habitats including wet prairie, graminoid peatlands, and abandoned fields dominated by tall grasses, remnants of uncultivated virgin prairie (tall-grass prairie), no-till cropland, small-grain fields, restored surface mining sites, and irrigated fields in arid regions. It is generally not abundant in short-grass prairie, Alfalfa fields, or in row crop monocultures (e.g., corn, soybean, wheat), although its use of Alfalfa may vary with region.	The Bobolink breeds across North America. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the north where suitable habitat exists. The breeding range of the Bobolink in North America includes the southern part of all Canadian provinces from British Columbia to Newfoundland and Labrador and south to the northwestern, north-central and northeastern U.S.	OBBA	Low - Cul support this dominate
	Dolichonyx oryzivorus		Schedule 1		TPO, TPS, CUM1 and MAM2.			
Birds	Chimney swift Chaetura pelagica	THR	THR	THR	<ul> <li>Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate.</li> <li>Foraging habitat for this species can be associated with the following ELC codes: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1 containing or adjacent structures with suitable nesitng habitat (i.e. chimnies).</li> </ul>	he Chimney Swift breeds in eastern North America, possibly as far north as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel. It winters in northwestern South America.	OBBA	Medium - S may be pre none were
Birds	Eastern Meadowlark Sturnella magna	THR	THR Schedule 1	THR	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs, or fence posts are used as elevated song perches. Eastern Meadowlarks prefer grassland habitats, including native prairies and savannahs, as well as non-native pastures, hayfields, weedy meadows, herbaceous fencerows, and airfields.	In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield but it also inhabits the Lake Nipissing, Timiskaming, and Lake of the Woods areas. Including all subspecies, the Eastern Meadowlark's global breeding range extends from central and eastern North America, south through parts of South America. However, there is only one subspecies in Canada and the neighbouring northeastern U.S. In Canada, the bulk of the population breeds in southern Ontario.	OBBA	Low - Cul support this dominate

y of Occurrence within the Study Area	Species Observed During Field Investigations
tural meadows most likely to species in the Study Area are d by forb species rather than grasses	No
uitable chimneys on buildings sent within the Study Area but found within the right-of-way.	No
tural meadows most likely to species in the Study Area are d by forb species rather than grasses	No

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{[1][2]}	Known Species Range ²	Source Identifying Species Record	Probabil
					TPO, TPS, CUM1, CUS, and MAM2 with elevated song perches.			
	Louisiana Waterthrush Parkesia motacilla	THR	THR	THR	The Louisiana Waterthrush is usually found in steep, forested ravines with fast-flowing streams. The Louisiana Waterthrush occupies specialized habitat, showing a strong preference for nesting along relatively pristine headwater streams and wetlands situated in large tracts of mature forest. Although it prefers running water (especially clear, coldwater streams), it also inhabits heavily wooded swamps with vernal or semi-permanent pools, where its territories can overlap with its sister species the Northern Waterthrush. It is often classified as both an area-sensitive forest species, and a riparian-obligate species. Louisiana Waterthrush nests are constructed within niches in steep stream banks, in the roots of uprooted trees, or in mossy logs and stumps, usually within a few metres of water.	The Louisiana Waterthrush summer range extends from the lower Great Lakes south to Georgia and west to Kansas. In Canada, the Louisiana Waterthrush breeds only in southern Ontario, along the Niagara Escarpment, in woodlands along Lake Erie, and scattered locations elsewhere. In Canada, the Louisiana Waterthrush breeds in southern Ontario, where it is considered a rare, but regular local summer resident. The bulk of the Canadian population is concentrated in two areas of Ontario: the Norfolk Sand Plain region bordering the north shore of Lake Erie, and the central Niagara Escarpment between Hamilton and Owen Sound.	OBBA	Low - no f FOD i
Birds	Northern Bobwhite Colinus virginianus	END	END Schedule 1	END	The Northern Bobwhite requires an early successional habitat that can be provided in a variety of vegetation types. Minimally it requires an interspersion of grassland, cropland, and brushy cover. In Ontario it is now usually associated with cultivated lands rather than native prairie fringes. In Ontario there were originally thousands of hectares of long-grass prairie in the extreme southwest. After settlement by Europeans, the creation of numerous small farms with diverse crops, inefficient harvest methods, and large weedy hedgerows greatly enhanced the potential for bobwhites, and resulted in the tremendous population increase. But, through the previous century, the trend has been away from pasture and summer fallow, and natural prairie has been all but eliminated. Habitat fragmentation is also ongoing, and may be a more significant problem than overall habitat loss.	The Northern Bobwhite is near its northern range limit in southern Ontario. This bird benefited greatly when the original forests were cleared and it expanded its range significantly in Ontario. At its peak over a century ago, its range in Ontario extended north to Georgian Bay and east to Kingston. This range has steadily retracted and now includes only the southwest corner of the province, mostly on Walpole Island, and possibly a few scattered locations nearby. Isolated sightings away from this area are usually a result of introductions or birds escaping from captivity. It has been introduced to many other areas with limited long-term success.	NHIC	Low - Cu support thi dominate

y of Occurrence within the Study Area	Species Observed During Field Investigations
ist flowing coldwater streams. Dry - Fresh classification	No
tural meadows most likely to species in the Study Area are d by forb species rather than grasses	No

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{[1][2]}	Known Species Range ²	Source Identifying Species Record	Probability
Birds	Yellow-breasted Chat Icteria virens	END	END	END	The Yellow-breasted Chat lives in thickets and scrub, especially locations where clearings have become overgrown. This bird eats insects gathered from the foliage of low, dense shrubs, or from the ground. The Yellow-breasted Chat is a shrub specialist, occurring in early successional shrub habitats in eastern North America. In Ontario, habitat has declined since the early 1960s, because of land conversion and successional change.	In Canada, it lives in southern British Columbia, the Prairies, and southwestern Ontario, where it is concentrated in Point Pelee National Park and Pelee Island in Lake Erie. Yellow-breasted Chats breed in North America, south of the boreal forest. The virens subspecies breeds from the east-central Great Plains and eastern Texas eastward, and north to southwestern Ontario.	OBBA	Low - Shrub woodland. N bird sur
Mammals	Easttern Small- footed Myotis <i>(Bat)</i> Myotis leibii	END	No Status	No Status	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.	The Eastern Small-footed Bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park. Most documented sightings are of bats in their winter hibernation sites.	BCI	Medium - M present wi surveys were
Mammals	Little Brown Myotis <i>(Bat)</i> Myotis lucifugus	END	No Status	END	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. This species can typically be associated with any community where suitable roosting (i.e. cavity trees, houses, abandoned buildings, barns, etc.) habitat is available.	The little brown bat is widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake. Outside Ontario, this bat is found across Canada (except in Nunavut) and most of the United States.	BCI	Medium - M present wi surveys were
Mammals	Tri-colored Bat	END	END Schedule 1	END	In Ontario, the Tri-colored Bat lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities, occasionally also in bars or other structures. This species forages over water and along streams in forests. At the close of the summer season, this species congregate at a location to swarm, usually near caves, mines or underground locations where they will winter; it has a strong fidelity to its winter hibernation sites. This bat overwinters in caves, typically individually instead of as a group.	This bat is found in Southern Ontario and ranging as far north as Espanola, near Sudbury, having a scattered distribution. Its broad range sweeps from eastern North America down to Central America.	BCI	Medium - M present wi surveys were

lity of Occurrence within the Study Area	Species Observed During Field Investigations
ub habitats are tending towards d. Not detected during breeding surveys in these habitats.	No
- Mature deciduous forests are	No
t within the Study Area but no	Targeted surveys recommended
vere completed to check for use.	during detailed design.
- Mature deciduous forests are	No
t within the Study Area but no	Targeted surveys recommended
vere completed to check for use.	during detailed design.
- Mature deciduous forests are	No
t within the Study Area but no	Targeted surveys recommended
vere completed to check for use	during detailed design.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{[1][2]}	Known Species Range ²	Source Identifying Species Record	Probability
	Perimyotis subflavus				This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available.			
Mammals	Northern (Long- eared) Myotis <i>(Bat)</i> Myotis septentrionalis	END	No Status	END	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. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available.	The northern long-eared bat is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon.	BCI	Medium - N present w surveys wer
Plants	Butternut Juglans cinerea	END	END Schedule 1	END	<ul> <li>In Ontario, 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.</li> <li>This species can typically be associated with the following ELC communities: FOD and mature hedgerows; Soil: dry rocky or moist (4, 5, 6) to fresh (2, 3).</li> </ul>	Butternut can be found throughout central and eastern North America. In Canada, Butternut occurs in Ontario, Quebec and New Brunswick. In Ontario, this species is found throughout the southwest, north to the Bruce Peninsula, and south of the Canadian Shield.	NHIC	High - Decid this species
Plants	Spotted Wintergreen Chimaphila maculata	THR	END Schedule 1	THR	In Ontario, Spotted Wintergreen occurs in dry oak-pine woodland habitats with sandy soils Typically, dominant tree species include White Pine, Red Oak, Black Oak, and American Beech. The species does best in semi-open habitats. Spotted Wintergreen is a woodland understorey species typically associated with dry-fresh oak and oak-pine mixed forests and woodlands. The plant tends to occur on well- drained sandy soils free of coarse fragments, with low organic content and poor nutrient status. FOC1, FOM1, FOM2-1, FOD1, and FOD2 that are semi-open and have sandy soils.	In Canada, it is only found in a few locations in southern Ontario in Norfolk County and the Niagara Region. It is believed to have been been extirpated from Simcoe Kent, Middlesex, and York Counties, Hamilton-Wentworth Region, and the District of Muskoka. Spotted Wintergreen occurs in eastern North America, Mexico, and Central America. Its range in eastern North America extends from southern Michigan and Ontario, east to southern New Hampshire and Maine, and south to Mississippi and northern Florida. Historically, Spotted Wintergreen was more widely distributed in southern Ontario and into southwestern Quebec. It is now restricted to a few subpopulations in southern Ontario and is considered extirpated in Quebec. In Canada, there are currently five extant subpopulations.	NHIC	Low - beli Hamilton. M seasc

ility of Occurrence within the Study Area	Species Observed During Field Investigations
- Mature deciduous forests are t within the Study Area but no were completed to check for use	No Targeted surveys recommended during detailed design.
eciduous forests are present and les was recorded during surveys.	Yes
believed to be extirpated from n. Was not detected in the three eason botanical inventory.	No



# Appendix

# Significant Wildlife Habitat and Species of Conservation Concern Screening

- F.1 Significant Wildlife Habitat Assessment
- F.2 Species of Conservation Concern Assessment



# H.1 Significant Wildlife Habitat Assessment

## SWH Ecoregion 7E Criterion Schedule

#### Table 1.1 Seasonal Concentration Areas of Animals.

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite	Habitat Criteria and Information	Defining Criteria	Present Within the	Found Within the
		Codes	Sources		Study Area	Study Area
Waterfowl Stopover and Staging Areas (Terrestrial) Rationale: Habitat important to migrating waterfowl.	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	Codes CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with waste grain in the Long Point, Rondeau, Lk. St. Clair, Grand Bend and Pt. Pelee areas may be important to Tundra Swans.	<ul> <li>Sources</li> <li>Fields with sheet water during Spring (mid- March to May).</li> <li>Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl.</li> <li>Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available.</li> <li><u>Information Sources</u></li> <li>Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence.</li> <li>Reports and other information available from Conservation Authorities (CAs)</li> <li>Sites documented through waterfowl planning processes (eg. EHJV implementation plan)</li> <li>Field Naturalist Clubs</li> <li>Ducks Unlimited Canada</li> <li>Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area</li> </ul>	<ul> <li>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"ccxi</li> <li>Any mixed species aggregations of 100[®]</li> <li>or more individuals required.</li> <li>The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependant on local site conditions and adjacent land use is the significant wildlife habitat ^{cxtviii}.</li> <li>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).</li> <li>SWHMIST^{cxlix} Index #7 provides development effects and mitigation measures.</li> </ul>	No evidence of annual spring flooding from melt water or run-off observed within cultural meadow or thicket communities. No anecdotal evidence of concentrations of waterfowl within the Study Area from Ebird.	No; Candidate habitat is not present within the Study Area.
Waterfowl Stopover and Staging Areas (Aquatic) <u>Rationale:</u> Important for local and migrant waterfowl populations during the spring or fall migration or both	Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6	<ul> <li>Information Sources         <ul> <li>Environment Canada</li> <li>Naturalist clubs often are aware of staging/stopover areas.</li> <li>OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging.</li> <li>Sites documented through waterfowl planning processes (eg. EHJV implementation plan)</li> <li>Ducks Unlimited projects</li> <li>Element occurrence specification by</li> </ul> </li> </ul>	<ul> <li>Studies carried out and verified presence of:</li> <li>Aggregations of 100 ^(E) or more of listed species for 7 days^(E), results in &gt; 700 waterfowl use days.</li> <li>Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH ^{cxlix}</li> <li>The combined area of the ELC ecosites and a 100m radius area is the SWH ^{cxlviii}</li> </ul>	No; Limited shallow marsh (MAS), shallow aquatic (SA) or deciduous swamp (SWD) communities were identified within the Study Area. No anecdotal evidence of	<b>No;</b> Candidate habitat is not present within the Study Area.
periods combined. Sites identified are usually only	Black Scoter Ring-necked duck	SWD7	Nature Serve: http://www.natureserve.org	Wetland area and shorelines     associated with sites identified	concentrations of waterfowl within the Study Area from	

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite	Habitat Criteria and Information	Defining Criteria	Present Within the	Found Within the
		Codes	Sources		Study Area	Study Area
one of a few in the eco-district.	Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck		• Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	<ul> <li>within the SWHTG ^{cxlvili} Appendix K ^{cxlix} are significant wildlife habitat.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi}</li> <li>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).</li> <li>SWH MIST^{cxlix} Index #7 provides development effects and mitigation measures.</li> </ul>	Ebird.	
Shorebird	Greater Yellowlegs	BBO1	Shorelines of lakes, rivers and wetlands,	Studies confirming:	No;	No;
Migratory Stopover Area <u>Rationale:</u> High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Lesser Yellowlegs Marbled Godwit 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	BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	<ul> <li>including beach areas, bars and seasonally flooded, muddy and un- vegetated shoreline habitats.</li> <li>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,</li> <li><u>Information Sources</u></li> <li>Western hemisphere shorebird reserve network.</li> <li>Canadian Wildlife Service (CWS) Ontario Shorebird Survey.</li> <li>Bird Studies Canada</li> <li>Ontario Nature</li> <li>Local birders and naturalist clubs</li> <li>NHIC Shorebird Migratory Concentration Area</li> </ul>	<ul> <li>Presence of 3 or more of listed species and &gt; 1000¹ 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)</li> <li>Whimbrel stop briefly (&lt;24hrs) during spring migration, any site with &gt;100¹ Whimbrel used for 3 years or more is significant.</li> <li>The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area ^{cxlviii}</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{coxi}</li> <li>SWH MIST^{cxlix} Index #8 provides development effects and mitigation measures.</li> </ul>	Meadow marsh (MAM) communities and shoreline habitats present within the Study Area are not large enough to support aggregations of migratory shorebirds.	Candidate habitat is not present within the Study Area.
Raptor Wintering	Rough-legged Hawk	Hawks/Owls	The habitat provides a combination of	Studies confirm the use of these habitats	No;	No;
Area <u>Rationale;</u> Sites used by multiple species, a high number of individuals and used annually are most significant	Red-talled Hawk Northern Harrier American Kestrel Snowy Owl Special Concern: Short-eared Owl Bald Eagle	Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland:	rieids and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering(hawk/owl) sites need to be > 20 ha ^{cxlviii, cxlix} with a combination of forest and upland. ^{xvi, xvii, xviii, xix, xx, xxi} . Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands ^{cxlix} Field area of the habitat is to be wind swept with limited snow depth or	<ul> <li>Dy:</li> <li>One or more Short-eared Owls or; One of more Bald Eagles or; At least 10 individuals and two of listed hawk/owl species E.</li> <li>To be significant a site must be used regularly (3 in 5 years) ^{cxlix} for a minimum of 20 days by the above number of birds^E.</li> <li>The habitat area for an Eagle</li> </ul>	Hawks/Owls: Deciduous forest (FOD) adjacent to upland communities are present within and adjacent to the Study Area but encompass less than 20 ha. Bald Eagle: Deciduous forest	Candidate habitat was not identified within the Study Area.

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite	Habitat Criteria and Information	Defining Criteria	Present Within the	Found Within the
		Codes	Sources	-	Study Area	Study Area
		CUM; CUT; CUS; CUW. Bald Eagle: Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or lakes with open water (hunting areas).	<ul> <li>accumulation.</li> <li>Eagle sites have open water and large trees and snags available for roosting.</li> <li>Information Sources:</li> <li>OMNR Ecologist or Biologist</li> <li>Naturalist club</li> <li>Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area</li> <li>Data from Bird Studies Canada, most notably for Short-eared Owls.</li> <li>Results of Christmas Bird Counts.</li> <li>Reports and other information available from Conservation Authorities.</li> </ul>	<ul> <li>winter site is the shoreline forest ecosites directly adjacent to the prime hunting area E.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi}</li> <li>SWH MIST^{cxlix} Index #10 and #11 provides development effects and mitigation measures.</li> </ul>	(FOD) in Study Area is not adjacent to large rivers or lakes.	
Bat Hibernacula Rationale: Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat Tri-colored Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	<ul> <li>Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.</li> <li>Active mine sites should not be considered as SWH.</li> <li>The locations of bat hibernacula are relatively poorly known.</li> <li>Information Sources</li> <li>OMNR for possible locations and contact for local experts</li> <li>Natural Heritage Information Center (NHIC) Bat Hibernaculum</li> <li>Ministry of Northern Development and Mines for location of mine shafts.</li> <li>Clubs that explore caves (eg. Sierra Club)</li> <li>University Biology Departments with bat experts.</li> </ul>	<ul> <li>All sites with confirmed hibernating bats are SWH ^(E).</li> <li>The area includes 200m radius around the entrance of the hibernaculum ^{cxIviii, ccvii, (E)} for most development types and 1000m for wind farms.</li> <li>Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Guideline for Wind Power Projects Potential Impacts to Bats and Bat Habitats"^{ccv}.</li> <li>SWH MIST^{cxlix} Index #1 provides development effects and mitigation measures.</li> </ul>	No suitable caves, mines, underground foundations or Karsts were identified during field investigations.	No; Candidate habitat was not identified within the Study Area.

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite	Habitat Criteria and Information	Defining Criteria	Present Within the	Found Within the
		Codes	Sources		Study Area	Study Area
Bat Maternity Colonies Rationale: Known locations of forested bat maternity colonies is 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	<ul> <li>Maternity colonies can be found in tree cavities, vegetation and often in buildings xxii, xxv, xxvi, xxvii, xxxi (buildings are not considered to be SWH). Maternity roosts are not found in caves and mines in Ontario ^{xxii}.</li> <li>Maternity colonies located in Mature deciduous or mixed forest stands ^{ccix}, ^{ccx} with &gt;10/ha large diameter (&gt;25cm dbh) wildlife trees ^{ccvii}</li> <li>Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 ^{ccxiv} or class 1 or 2 ^{ccxii}.</li> <li>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 ^{ccx}</li> <li>OMNR for possible locations and contact for local experts.</li> <li>University Biology Departments with bat experts.</li> </ul>	<ul> <li>Maternity Colonies with confirmed use by; <ul> <li>&gt;10 Big Brown Bats¹</li> <li>&gt;5 Adult Female Silver-haired Bats¹</li> </ul> </li> <li>The area of the habitat includes the entire woodland, or the forest stand ELC Ecosite containing the maternity colonies¹.</li> <li>Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects" ^{ccv}.</li> <li>SWH MIST^{cxlix} Index #12 provides development effects and mitigation measures.</li> </ul>	Yes; Deciduous forest (FOD) with at least 10 snags/ ha may be present within the Study Area.	Candidate; Presence of indicator species unknown as acoustic monitoring was not performed.
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; ELC Community Classes; SW, MA, OA and SA. ELC Community Series; FEO and BOO Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over- wintering habitat.	<ul> <li>For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates.</li> <li>Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. cix, cx, cxi, cxviii</li> <li>Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.</li> <li><u>Information Sources</u></li> <li>EIS studies carried out by Conservation Authorities.</li> <li>Field Naturalist Clubs</li> <li>OMNRF Ecologist or Biologist</li> <li>Natural Heritage Information Center (NHIC)</li> </ul>	<ul> <li>Presence of 5 over-wintering Midland Painted Turtles is significant¹.</li> <li>One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant¹.</li> <li>The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep- water pool where the turtles are over wintering is the SWH.</li> <li>Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) ^{cvii}. Congregation of turtles is more common where wintering areas are limited and therefore significant ^{cix, cx, cxi, cxii}.</li> <li>SWH MIST^{cxlix} Index #28 provides development effects and mitigation measures for turtle wintering habitat.</li> </ul>	No; Wetlands and water features within the Study Area are not deep enough to be suitable for turtle overwintering.	No; Candidate habitat was not identified within the Study Area.

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite	Habitat Criteria and Information	Defining Criteria	Present Within the	Found Within the
		Codes	Sources		Study Area	Study Area
Reptile	Snakes:	For all snakes,	For snakes, hibernation takes place in	Studies confirming:	No;	No;
Hibernaculum	Eastern Gartersnake	habitat may be	sites located below frost lines in	Presence of snake hibernacula used		
	Northern Watersnake	found in any	burrows, rock crevices and other natural	by a minimum of five individuals of a	Debris piles observed	Numbers of Eastern
Rationale:	Northern Red-bellied Snake	ecosite other than	or naturalized locations. The existence	snake sp. <u>or;</u> individuals of two or	during field	Gartersnake observed
Generally, sites	Northern Brownsnake	very wet ones.	of features that go below frost line; such	more snake spp.	investigations	investigations de pet
are the only	Smooth Green Snake	Talus, Rock	as rock piles or slopes, old stone	Congregations of a minimum of five	unlikely provide	meet criteria for
known sites in the	Northern Ring-necked Snake	Barren, Crevice	fences, and abandoned crumbling	individuals of a snake sp. <u>or;</u>	access below the	significance
area. Sites with		and Cave, and	toundations assist in identifying	individuals of two or more snake spp.	Trost line. No	Significance.
ine nignesi	Special Concern: Milkonoko	Aivar siles may be	Candidate SVVH.	near potential hibernacula (eg.	abandoned buildings.	
individuale are	Fastorn Dibbonsnako	those babitate	Areas of broken and lissured fock are	foundation or rocky slope) on sunny		
most significant		แก่ยระ กลุ่มแลเร.	access to subterranean sites below the	warm days in Spring (Apr/May) and		
most significant.		Observations of	frost line ^{xliv, I, II, III, CXII} Wetlands can also	Fall (Sept/Oct) ¹ .		
		congregations of	be important over-wintering habitat in	<u>Note</u> : If there are Special Concern		
		snakes on sunny	conifer or shrub swamps and swales.	Species present, then site is SWH		
		warm days in the	poor fens, or depressions in bedrock	<u>Note</u> : Sites for hibernation possess		
		spring or fall is a	terrain with sparse trees or shrubs with	specific nabital parameters (e.g.		
		good indicator.	sphagnum moss or sedge hummock	consequently are used annually		
			ground cover.	often by many of the same		
				individuals of a local population [i.e.		
			Information Sources	strong hibernation site fidelity.		
			In spring, local residents or	Other critical life processes (e.g.		
			landowners may have observed the	mating) often take place in close		
			emergence of snakes on their	proximity to hibernacula. The feature		
			Property (e.g.old dug weils).	in which the hibernacula is located		
			Reports and other information     available from Conservation	plus a 30 m buffer is the SWH $^{ ilde{\mathbb{D}}}$		
				• SWH MIST ^{cxlix} Index #13 provides		
			Field Naturalist Clubs	development effects and mitigation		
			University herpetologists	measures for snake hibernacula.		
			Natural Heritage Information Center			
			(NHIC)			
			(			
Colonially -	Cliff Swallow	Eroding banks,	Any site or areas with exposed soil	Studies confirming:	No;	No;
Nesting Bird	Northern Rough-winged Swallow (this species is not	sandy hills, borrow	banks, undisturbed or naturally	Presence of 1 or more nesting sites	Suitable creding	No quitable posting
Breeding Habitat	colonial but can be found in Cliff Swallow colonies).	pits, steep slopes,	eroding that is not a	with 8 ^{cxlvix} or more cliff swallow pairs	banks along	habitat was identified
(Bank and Cliff)		and sand piles, cliff	licensed/permitted aggregate area.	and/or rough-winged swallow pairs	watercourse or cliff	during field
		faces, bridge	Does not include man-made	during the breeding season.	faces were not	investigations.
Rationale;		abutments, silos,	structures (bridges or buildings) or	A colony identified as SWH will	observed during field	
HISTORICAL USE and		parns (CIIII	recently (2 years) disturbed soil	include a 50m radius habitat area	investigations.	
		Swallows).	areas, such as berms,	trom the peripheral nests		
this babitat		Habitat found in the	empankments, soil or aggregate	Field surveys to observe and count		
significant An		following ecosites.	Does not include a	during the brooding season (May		
identified colony		CUM1 CUT1	licensed/permitted Mineral Aggregate	lune) Evaluation methods to follow		
can be verv		CUS1 BLO1		"Bird and Bird Habitate: Guidelines		
important to local		BLS1 BLT1		for Wind Power Projects" ccxi		
populations. All		CLO1 CLS1	Information Sources	SWH MIST ^{cxlix} Index #4 provides		
swallow		CLT1	Reports and other information	development effects and mitigation		
		1			J	

			CANDIDATE SWH	CONFIRMED SWH Candidate Habita		Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite Habitat Criteria and Information		Defining Criteria	Present Within the	Found Within the
		Codes	Sources	-	Study Area	Study Area
population are declining in Ontario.			<ul> <li>available from Conservation Authorities</li> <li>Ontario Breeding Bird Atlas ^{ccv}.</li> <li>Bird Studies Canada; <i>NatureCounts</i> http://www.birdscanada.org/birdmon/</li> <li>Field Naturalist Clubs.</li> </ul>	measures		
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) <u>Rationale:</u> Large colonies are important to local bird population, 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	<ul> <li>Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.</li> <li>Most nests in trees are 11 to 15 m from ground, near the top of the tree.</li> <li>Information Sources</li> <li>Ontario Breeding Bird Atlas ^{ccv}, colonial nest records.</li> <li>Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF).</li> <li>Natural Heritage Information Center (NHIC) Mixed Wader Nesting Colony</li> <li>Aerial photographs can help identify large heronries.</li> <li>Reports and other information available from Conservation Authorities</li> <li>MNRF District Offices.</li> <li>Local naturalist clubs.</li> </ul>	<ul> <li>Studies confirming:</li> <li>Presence of 2^(E) or more active nests of Great Blue Heron or other listed species.</li> <li>The habitat extends from the edge of the colony and a minimum 300 m radius or extend of the Forest Ecosite containing the colony or any island &lt;15.0ha with a colony is the SWH ^{cc, ccvii}</li> <li>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</li> <li>SWH MIST^{cxlix} Index #5 provides development effects and mitigation measures.</li> </ul>	No; No swamps or fens were identified within the Study Area.	No; Candidate habitat was not identified within the Study Area.
Colonially - Nesting Bird Breeding Habitat (Ground) <u>Rationale:</u> Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little 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	<ul> <li>Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas.</li> <li>Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.</li> <li><u>Information Sources</u></li> <li>Ontario Breeding Bird Atlas ^{cov}, rare/colonial species records.</li> <li>Canadian Wildlife Service</li> <li>Reports and other information available from Conservation Authorities</li> <li>Natural Heritage Information Center</li> </ul>	<ul> <li>Studies confirming:</li> <li>Presence of &gt; 25 active nests for Herring Gulls or Ring-billed Gulls, &gt;5 active nests for Common Tern or &gt;2 active nests for Caspian Tern[©].</li> <li>Presence of 5 or more pairs for Brewer's Blackbird[©]</li> <li>Any active nesting colony of one or more Little Gull, and Great Black- backed Gull is significant[©].</li> <li>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 &lt;3.0ha with a colony is the SWH ^{cc, ccvii}</li> </ul>	No; No rocky islands or peninsulas within a lake or large river were observed. No records of Brewer's Blackbird in the vicinity of the Study Area.	No; Ring-billed Gull observed during field investigations, including breeding bird surveys, did not exhibit evidence of breeding.

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Present Within the Study Area	Found Within the Study Area
Migratory Butterfly Stopover Areas <u>Rationale:</u> Butterfly stopover	Painted Lady Red Admiral <u>Special Concern</u> Monarch	Codes Combination of ELC Community Series; need to have present one Community Series from each	Sources(NHIC) Colonial Waterbird Nesting AreaAreaMNRF District Offices.Field Naturalist Clubs.A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie and Ontario cxlix.The habitat is typically a	<ul> <li>Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi}</li> <li>SWH MIST^{cxlix} Index #6 provides development effects and mitigation measures.</li> <li>Studies confirm:</li> <li>The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)^{xliii}. MUD is based on the number of days a site is used by Monarchs, multiplied by the number</li> </ul>	Study Area No; The Study Area is more than 5 km away from Lake Ontario.	Study Area         No;         Candidate habitat is not present within the Study Area.
areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.		Iandclass: <u>Field</u> : CUM CUT CUS <u>Forest</u> : FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	<ul> <li>combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south XXXII, XXXIII, XXXIV, XXXV, XXXV</li> <li>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 ^{cxtivii,} cxtix.</li> <li>Stopover areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes XXXVII, XXXVIII, XXXIII, XXXII, XII</li> <li>Information Sources <ul> <li>MNRF district Offices</li> <li>Natural Heritage Information Center (NHIC)</li> <li>Agriculture Canada in Ottawa may have list of butterfly experts.</li> <li>Field Naturalist Clubs</li> <li>Toronto Entomologists Association Conservation Authorities</li> </ul> </li> </ul>	<ul> <li>of individuals using the site. Numbers of butterflies can range from 100-500/day^{XXXVii}, significant variation can occur between years and multiple years of sampling should occur XI, XIii.</li> <li>Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD</li> <li>MUD of &gt;5000 or &gt;3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. SWH MIST CXIIX Index #16 provides development effects and mitigation measures.</li> </ul>		No:
Landbird Migratory Stopover Areas	All migratory songbirds.	All Ecosites associated with these ELC	Woodlots need to be >5 ha (E) in size and within 5 km iv, v, vi, vii, viii, ix, x, xi,	<ul> <li>Studies confirm:</li> <li>Use of the woodlot by &gt;200 birds/day and with &gt;35 spn with at</li> </ul>	<b>No;</b> The Study Area is	<b>No;</b> Candidate habitat is not
Rationale: Sites with a high diversity of species as well as high numbers are most significant.	http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D- 1 All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7:	Community Series; FOC FOM FOD SWC SWM SWD	<ul> <li>All, All, All, Alv, Av of Lake Ontario and Erie.</li> <li>If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitat. E</li> <li>If multiple woodlands are located along the shoreline those</li> </ul>	<ul> <li>least 10 bird spp. recorded on at least 5 different survey dates (E). This abundance and diversity of migrant bird species is considered above average and significant.</li> <li>Studies should be completed during spring (March to May) and fall (Aug</li> </ul>	more than 5 km away from Lake Ontario.	present within the Study Area.

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat
Wildlife Habitat	Wildlife Species	ELC Ecosite	Habitat Criteria and Information	Defining Criteria	Present Within the	Found Within the
		Codes	Sources		Study Area	Study Area
	Specially Protected Birds (Raptors)		<ul> <li>Woodlands &lt;2km from Lake Erie and Lake Ontario are more significant ^{cxlix}</li> <li>Sites have a variety of habitats; forest, grassland and wetland complexes ^{cxlix}.</li> <li>The largest sites are more significant ^{cxlix}</li> <li>Woodlots and forest fragments are important habitats to migrating birds^{ccxviii}, these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH ^{cxlviii}.</li> <li>Information Sources</li> <li>Bird Studies Canada</li> <li>Ontario Nature</li> <li>Local birders and naturalist club</li> <li>Ontario Important Bird Areas (IBA) Program</li> </ul>	to Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{ccxi} • SWH MIST ^{cxlix} Index #9 provides development effects and mitigation measures.		
Deer Winter Congregation Areas <u>Rationale:</u> 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 cxtviii	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.	<ul> <li>Woodlots &gt;100 ha in size or if large woodlots are rare in a planning area woodlots&gt;50ha (E).</li> <li>Deer movement during winter in the southern areas Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands ^{cxt/viii}.</li> <li>Large woodlots &gt; 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha ^{ccxxiv}.</li> <li>Woodlots with high densities of deer due to artificial feeding are not significant(E).</li> <li>Information Sources</li> <li>MNRF District Offices.</li> <li>LIO/NRVIS</li> </ul>	<ul> <li>Studies confirm:</li> <li>Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF cxlviii</li> <li>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®</li> <li>Studies should be completed during winter (Jan/Feb) when &gt;20cm of snow is on the ground using aerial survey techniques^{ccxxiv}, ground or road surveys, or a pellet count deer density survey^{ccxxv}.</li> <li>SWH MIST ^{cxlix} Index #2 provides development effects and mitigation measures.</li> </ul>	Yes; Deer Winter Congregation Areas were identified by the NDMNRF.	Confirmed; Deer Winter Congregation Areas were identified by the NDMNRF.

Table 1.2.1 Rare Vegetation C	communities.					
Rare Vegetation Community	ELC Especito Codo	CANDIDATE SW	VH	CONFIRMED SWH	Candidate Habitat within	Confirmed Habitat within
Cliffs and Talus Slopes <u>Rationale:</u> Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite vithin Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	<ul> <li>Most cliff and talus slopes occur along the Niagara Escarpment.</li> <li><u>Information Sources</u></li> <li>The Niagara Escarpment Commission has detailed information on location of these habitats.</li> <li>OMNRF Districts</li> <li>Natural Heritage Information Center (NHIC) has location information available their website</li> <li>Field Naturalist Clubs</li> <li>Conservation Authorities</li> </ul>	<ul> <li>Confirm any ELC Vegetation Type for Cliffs or Talus Slopes ^Ixxviii</li> <li>SWH MIST^{cxlix} Index #21 provides development effects and mitigation measures.</li> </ul>	No cliff or talus ecosites were identified during ELC surveys.	No; Candidate habitat is not present within the Study Area.
Sand Barren <u>Rationale:</u> 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%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by 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%.	<ul> <li>A sand barren area &gt;0.5ha in size[®].</li> <li><u>Information Sources</u></li> <li>OMNRF Destricts.</li> <li>Natural Heritage Information Center (NHIC) has location information available on their website</li> <li>Field Naturalist Clubs</li> <li>Conservation Authorities</li> </ul>	<ul> <li>Confirm any ELC Vegetation Type for Sand Barrens Ixxviii</li> <li>Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover exotics) ^(E).</li> <li>SWHMIST^{cxlix} Index #20 provides development effects and mitigation measures.</li> </ul>	<b>No;</b> No sand barren ecosites were identified during ELC surveys.	<b>No;</b> Candidate habitat is not present within the study area.
Alvar <u>Rationale:</u> Alvars are extremely rare habitats in Ecoregion 7E.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 Five Alvar Indicator Species: 1)Carex crawei 2)Panicum	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	<ul> <li>An Alvar site &gt; 0.5 ha in size ^{bxxv}. Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie.cxcix <u>Information Sources</u></li> <li>Alvars of Ontario (2000), Federation of Ontario Naturalists ^{bxxvi}.</li> <li>Ontario Nature – Conserving Great Lakes Alvars^{ccviii}.</li> <li>Natural Heritage Information Center (NHIC) has location information available on their website</li> </ul>	<ul> <li>Field studies identify four of the five Alvar</li> <li>Indicator Species ^{Ixxv} at a Candidate Alvar site is Significant.</li> <li>Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover exotics).</li> <li>The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses ^{Ixxv}.</li> <li>SWH MIST^{cxlix} Index #17 provides development effects and mitigation measures.</li> </ul>	No; This vegetation community was not identified within the Study Area.	<b>No;</b> Candidate habitat is not present within the study area.

		CANDIDATE SW	VH	CONFIRMED SWH	Candidate Habitat within Confirm	
Rare Vegetation Community	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria	the Study Area	the Study Area
	<ul> <li>philadelphicum</li> <li>3)Elocharis compressa</li> <li>4)Scutellaria parvula</li> <li>5)Trichostema brachiatum</li> <li>These indicator species are very specific to Alvars within Ecoregion 7E[®].</li> </ul>	of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover	<ul> <li>OMNRF Staff.</li> <li>Field Naturalist Clubs.</li> <li>Conservation Authorities.</li> </ul>			
Old Growth Forest <u>Rationale:</u> Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	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 mosaic of gaps that encourage development of multi-layered canopy and an abundance of snags and downed woody debris.	<ul> <li>Woodland area is &gt;0.5 ha®.</li> <li><u>Information Sources</u></li> <li>OMNRF Forest Resource Inventory mapping</li> <li>OMNRF Districts.</li> <li>Field Naturalist Clubs</li> <li>Conservation Authorities</li> <li>Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations.</li> <li>Municipal forestry departments</li> </ul>	<ul> <li>Field Studies will determine:</li> <li>If dominant trees species of the ecosite are &gt;140 years old, then area containing these trees is Significant Wildlife Habitat ^{cxlviii}.</li> <li>The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut steps will not be present)</li> <li>The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH.</li> <li>Determine ELC vegetation types for the forest area containing the old growth characteristics larea containing the old growth characteristics is the SWH.</li> <li>SWH MIST^{cxlix} Index #23 provides development effects and mitigation measures.</li> </ul>	No; Trees within deciduous forest (FOD) community are too small to be considered old-growth.	No; Candidate habitat is not present within the study area.
Savannah <u>Rationale:</u> Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).	<ul> <li>No minimum size to site E Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</li> <li><u>Information Sources</u></li> <li>Natural Heritage Information Center (NHIC) has location data available on their website.</li> <li>OMNRF Districts.</li> <li>Field Naturalists Clubs.</li> <li>Conservation Authorities.</li> </ul>	<ul> <li>Field studies confirm one or more of the Savannah indicator species listed in ^{Ixxv} Appendix N should be present [®]. Note: Savannah plant spp. list from Ecoregion 7E should be used</li> <li>Area of the ELC Ecosite is the SWH.</li> <li>Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover exotics).</li> <li>SWH MIST^{cxlix} Index #18 provides development effects and mitigation measures.</li> </ul>	<b>No;</b> This vegetation community was not identified within the Study Area.	<b>No;</b> Candidate habitat is not present within the study area.
Tallgrass Prairie	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated	No minimum size to site . Site must be restored or a natural site. Remnant	Field studies confirm one or more of the Prairie indicator species listed in ^{lxxv} Appendix N should	<b>No;</b> This vegetation community	<b>No;</b> Candidate habitat is not

		CANDIDATE SW	/Η	CONFIRMED SWH	Candidate Habitat within	Confirmed Habitat within
Rare Vegetation Community	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria	the Study Area	the Study Area
<b>Rationale:</b> Tallgrass Prairies are extremely rare habitats in Ontario.		by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.	sites such as railway right of ways are not considered to be SWH. <u>Information Sources</u>	be present  . Note: Prairie plant spp. list from Ecoregion 7E should be used	was not identified within the Study Area.	present within the study area.
		In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). ^{cc}	<ul> <li>OMNRF Districts.</li> <li>Natural Heritage Information Center (NHIC) has location data available on their website.</li> <li>Field Naturalists Clubs.</li> <li>Conservation Authorities</li> </ul>	<ul> <li>Area of the ELC Ecosite is the SWH</li> <li>Site must not be dominated by exotic or introduced species (&lt;50% vegetative cover exotics).</li> <li>SWH MIST^{cxlix} Index #19 provides development effects and mitigation measures.</li> </ul>		
Other Rare Vegetation Communities <u>Rationale:</u> Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG ^{cxIvii} . Any ELC Ecosite Code that 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.	<ul> <li>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M ^{cxtviii}</li> <li>The OMNRF/NHIC will have up to date listing for rare vegetation communities.</li> <li>Information Sources</li> <li>OMNRF Districts.</li> <li>Natural Heritage Information Center (NHIC) has location data available on their website.</li> <li>Field Naturalists Clubs.</li> <li>Conservation Authorities</li> </ul>	<ul> <li>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG^{cxIVIII}.</li> <li>Area of the ELC Vegetation Type polygon is the SWH.</li> <li>SWH MIST ^{cxIIX} Index #37 provides development effects and mitigation measures.</li> </ul>	Yes; Rare vegetation communities may be present within the Study Area	No; No provincially rare (S2S3) vegetation communities present within the Study Area.

#### Table 1.2.2 Specialized Habitats of Wildlife considered SWH.

Specialized			CANDIDATE SWH	CONFIRMED SWH	CONFIRMED SWH Candidate Habitat Confirmed F	
Wildlife Habitat	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	within the Study Area	the Study Area
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	<ul> <li>A waterfowl nesting area extends 120 m ^{cxlix} from a wetland (&gt; 0.5 ha) or a wetland (&gt;0.5 ha) with small wetlands (&lt;0.5 ha) within 120m or a cluster of 3 or more small (&lt;0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur ^{cxlix}.</li> <li>Upland areas should be at least 120m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests.</li> <li>Wood Ducks and Hooded Mergansers utilize large diameter trees (&gt;40cm dbh) in woodlands for cavity nest sites.</li> <li>Information Sources</li> <li>Ducks Unlimited staff may know the locations of particularly productive nesting sites.</li> <li>OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat.</li> <li>Reports and other information available from Conservation Authorities</li> </ul>	<ul> <li>Studies confirmed:</li> <li>Presence of 3 or more nesting pairs for listed species excluding Mallards[®], or;</li> <li>Presence of 10 or more nesting pairs for listed species including Mallards[®]</li> <li>Any active nesting site of an American Black Duck is considered significant.</li> <li>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"^{ccxi}</li> <li>A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m ^{cxt/viii} from the wetland and will provide enough habitat for waterfowl to successfully nest.</li> <li>SWH MIST^{cxlix} Index #25 provides development effects and mitigation measures.</li> </ul>	No; Wetland areas are limited with no documented waterfowl nesting.	No; Numbers of indicator species observed during breeding bird surveys do not meet criteria for significance. No indication of abundant waterfowl nesting observed during field investigations and features not anticipated to support significant concentrations.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat <u>Rationale:</u> Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and	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	<ul> <li>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</li> <li>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.</li> <li>Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).</li> <li><u>Information Sources</u></li> <li>Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario.</li> <li>MNRF values information (LIO/NRVIS) will list known nesting locations, Note: data from NRVIS is provided as a point and does not</li> </ul>	<ul> <li>Studies confirm the use of these nests by:</li> <li>One or more active Osprey or Bald Eagle nests in an area^{cxlviii}.</li> <li>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.</li> <li>For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH ^{ccvii}, maintaining undisturbed shorelines with large trees within this area is important^{cxlviii}.</li> <li>For a Bald Eagle the active nest</li> </ul>	No; Riparian areas adjacent to deciduous forest (FOD) are too small to support Osprey or Bald Eagle foraging. No potential Osprey or Bald Eagle nests were identified during field investigations.	<b>No;</b> Candidate habitat is not present within the study area.

Specialized			CANDIDATE SWH	CONFIRMED SWH
Wildlife Habitat	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria
scarcity of habitat.			<ul> <li>represent all the habitat.</li> <li>Nature Counts, Ontario Nest Records Scheme data.</li> <li>OMNRF Districts.</li> <li>Check the Ontario Breeding Bird Atlas ^{ccv} or Rare Breeding Birds in Ontario for species documented</li> <li>Reports and other information available from Conservation Authorities</li> <li>Field naturalist Clubs</li> </ul>	<ul> <li>and a 400-800 m radius around the nest is the SWH. ^{cvi}, ^{ccvii} Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat ^{cvi}</li> <li>To be significant a site must be used annually. When found inactive, the site must be known to be inactive for &gt;3 years or suspected of not being used for &gt;5 years before being considered not significant. ^{ccvii}</li> <li>Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{ccxii}</li> <li>SWH MIST^{cxlix} Index #26 provides development effects and mitigation measures</li> </ul>
Woodland Raptor Nesting Habitat Rationale: Nests 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	<ul> <li>All natural or conifer plantation woodland/forest stands combined &gt;30ha or with &gt;4 ha of interior habitat ^{bxxxiii}, ^{ixxix, xc, xci, ^{xcii}, ^{xciv, xcv, xcvi, ^{cxxxiii}. Interior habitat determined with a 200m buffer ^{cxlviii}}}</li> <li>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 Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands.</li> <li>In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.</li> <li>Information Sources</li> <li>OMNRF Districts.</li> <li>Check the Ontario Breeding Bird Atlas ^{ccv} or Rare Breeding Birds in Ontario for species documented.</li> <li>Check data from Bird Studies Canada.</li> <li>Reports and other information available from Conservation Authorities</li> </ul>	<ul> <li>Studies confirm:</li> <li>Presence of 1 or more active nests from species list is considered significant ^{cxtviii}.</li> <li>Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) ^{ccvii}.</li> <li>Barred Owl – A 200m radius around the nest is the SWH ^{ccvii}.</li> <li>Broad-winged Hawk and Coopers Hawk – A 100m radius around the nest is the SWH ^{ccvii}.</li> <li>Sharp-Shinned Hawk – A 50m radius around the nest is the SWH^{ccvii}.</li> <li>Conduct field investigations from mid-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.</li> <li>SWH MIST^{cxlix} Index #27 provides</li> </ul>

Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
	Net
No; Deciduous forest (FOD) in the Study Area does not meet size criteria for significance. No stick nests were observed during field investigations.	NO; Candidate habitat is not present within the study area.

Specialized C/		CANDIDATE SWH	CANDIDATE SWH CONFIRMED SWH		Confirmed Habitat within	
Wildlife Habitat	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	within the Study Area	the Study Area
				development effects and mitigation measures.		
Turtle Nesting Areas Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle <u>Special Concern Species</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) ^{cxt/viii} or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	<ul> <li>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.</li> <li>For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.</li> <li>Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.</li> <li><u>Information Sources</u></li> <li>Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels).</li> <li>Check the Ontario Herpetofaunal Atlas records (or other similar atlases) for uncommon turtles; location information may help to find potential nesting habitat for them.</li> <li>Natural Heritage Information Center (NHIC)</li> <li>Field Naturalist Clubs</li> </ul>	<ul> <li>Studies confirm:</li> <li>Presence of 5 or more nesting Midland Painted Turtles®</li> <li>One or more Northern Map Turtle or Snapping Turtle nesting is a SWH®.</li> <li>The area or collection of sites within an area of exposed mineral soils where the turtles' nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH. ^{cxlviii}</li> <li>Travel routes from wetland to nesting area are to be considered within the SWH as a part of the 30- 100m area of habitat. ^{cxlix}</li> <li>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.</li> <li>SWH MIST ^{cxlix} Index #28 provides development effects and mitigation measures for turtle nesting habitat.</li> </ul>	No; No naturally occurring areas of exposed mineral soil adjacent (<100 m) to qualifying ecosites were observed within the Study Area.	No; Candidate habitat is not present within the study area.
Seeps and Springs <u>Rationale:</u> 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 Salamander spp.	Seeps/Springs are areas where ground water 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.	<ul> <li>Any forested area (with &lt;25% meadow/field/pasture) within the headwaters of a stream or river system ^{cxvii,} cxlix.</li> <li>Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species ^{cxix, cxx, cxxi, cxxii, cxiii, cxiv}.</li> <li><u>Information Sources</u></li> <li>Topographical Map.</li> <li>Thermography.</li> <li>Hydrological surveys conducted by Conservation Authorities and MOE.</li> <li>Field Naturalists Clubs and landowners.</li> <li>Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.</li> </ul>	<ul> <li>Field Studies confirm:</li> <li>Presence of a site with 2 or more seeps/springs should be considered SWH.</li> <li>The area of an ELC forest ecosite or ecoelement 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 ^{cxlviii}.</li> <li>SWH MIST ^{cxlix} Index #30 provides development effects and mitigation measures</li> </ul>	Yes; Deciduous forest (FOD) within the headwaters of a stream or river system are present in the Study Area.	<b>No;</b> No seeps/springs were identified during field investigations.

Specialized			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat within
Wildlife Habitat	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	within the Study Area	the Study Area
Amphibian Breeding Habitat (Woodland). <u>Rationale:</u> 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	<ul> <li>Presence of a wetland, pond or woodland pool (including vernal pools) &gt;500m² within or adjacent (within 120m) to a woodland (no minimum size).clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx. Some small wetlands may not be mapped and may be important breeding pools for amphibians.</li> <li>Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat cxlviii</li> <li><u>Information Sources</u></li> <li>Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records</li> <li>Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property.</li> <li>OMNRF Districts and wetland evaluations</li> <li>Field Naturalist Clubs</li> <li>Canadian Wildlife Service Amphibian Road Call Survey</li> <li>Ontario Vernal Pool Association: http://www.ontariovernalpools.org</li> </ul>	<ul> <li>Studies confirm;</li> <li>Presence of breeding population of 1 or more of the listed salamander species or 2 or more of the listed frog species with at least 20 individuals (adults, juveniles, eggs/larval masses) lxxi or 2 or more of the listed frog species wioth Call Level Codes of 3 (E).</li> <li>A combination of observation study and call count survey will be required during the sping (March- June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands.</li> <li>The habitat is the wetland area plus a 230m radius of 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.</li> <li>SWH MIST cxlix Index #14 provides development effects and mitigation measures.</li> </ul>	Yes; Woodland pool within 120 m of deciduous forest (FOD) are present within the Study Area	No; Numbers of indicator species observed during anuran call surveys conducted in 2021 did not meet criteria of significance.
Amphibian Breeding Habitat (Wetlands) <u>Rationale:</u> 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 (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	<ul> <li>Wetlands&gt;500m2 (about 25m diameter)) ^{ccvii} ,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 ^{clxxxii}.</li> <li>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.</li> <li>Bullfrogs require permanent water bodies with abundant emergent vegetation.</li> <li><u>Information Sources</u></li> <li>Ontario Herpetofaunal Summary Atlas (or other similar atlases)</li> <li>Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count.</li> <li>OMNRF Districts and wetland evaluations.</li> <li>Reports and other information available from Conservation Authorities.</li> </ul>	<ul> <li>Studies confirm:</li> <li>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)^{Ixxi} or 2 or more of the listed frog/toad species with Call Level Codes of 3^(E).</li> <li>or; Wetland with confirmed breeding Bullfrogs are significant^(E).</li> <li>The ELC ecosite wetland area and the shoreline are the SWH.</li> <li>A combination of observational study and call count surveys cviii will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands.</li> </ul>	No; Wetlands >120 m do not occur within the Study Area.	No; Candidate habitat is not present within the study area. Anuran call surveys conducted in 2021 at wetlands did not meet criteria of significance.

Specialized			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat within
Wildlife Habitat	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	within the Study Area	the Study Area
				<ul> <li>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.</li> <li>SWH MIST cxlix Index #15 provides development effects and mitigation measures.</li> </ul>		

#### Table 1.3. Habitats of Species of Conservation Concern considered SWH.

······	Species		CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat within the	Confirmed Habitat within	
Wildlife	Species	ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	Study Area	the Study Area	
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 Pileated Woodpecker <u>Special Concern:</u> Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	<ul> <li>Habitats where interior forest breeding birds are breeding, typically large mature (&gt;60 yrs old) forest stands or woodlots &gt;30 ha. CV, CXXXI, CXXXII, CXXXIII, CXXXIV, CXXXV, CXXXVI, CXXXVII, CXXXVIII, CXXXIV, CXIV, CXIIII, CXIIII, CXIV, CXIV, CXIVI, CI, CII, CIII, CIIII, CIIV, cIV, cIVI, cIVII, CI, CII, CIII, CIIII, CIIV, cIV, cIVI, cIVII, cIVIII, CIX,</li> <li>Interior forest habitat is at least 200 m from forest edge habitat. ClXIV</li> <li>Information Sources</li> <li>Local birder clubs.</li> <li>Canadian Wildlife Service (CWS) for the location of forest bird monitoring.</li> <li>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</li> <li>Reports and other information available from Conservation Authorities</li> </ul>	<ul> <li>Studies confirm: <ul> <li>Presence of nesting or breeding pairs of 3 or more of the listed wildlife species.</li> <li><u>Note:</u> any site with breeding Cerulean Warblers or Canada Warbler is to be considered SWH.</li> </ul> </li> <li>Conduct field investigations in spring and early summer when birds are singing and defending their territories.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi}</li> <li>SWH MIST ^{CXIX} Index #34 provides development effects and mitigation measures.</li> </ul>	No; Deciduous forest (FOD) in the Study Area does not meet size criteria for significance.	No; Candidate habitat is not present within the study area.	
Marsh Breeding Bird Habitat <u>Rationale:</u> 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 <b>Special Concern:</b> Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	<ul> <li>Nesting occurs in wetlands.</li> <li>All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present cxxiv.</li> <li>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.</li> <li><u>Information Sources</u></li> <li>OMNRF District and wetland evaluations.</li> <li>Field Naturalist clubs</li> <li>Natural Heritage Information Centre (NHIC) Records.</li> <li>Reports and other information available from Conservation Authorities.</li> <li>Ontario Breeding Bird Atlas.</li> </ul>	<ul> <li>Studies confirm:</li> <li>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 E.</li> <li>Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH E.</li> <li>Area of the ELC ecosite is the SWH.</li> <li>Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"</li> <li>SWH MIST Index #35 provides development effects and mitigation measures</li> </ul>	Yes; Meadow marsh (MAM) communities are present in the Study Area.	<b>No;</b> Indicator species were not observed during field investigations, which included breeding bird surveys. Features not anticipated to support significant concentrations.	

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat within the	Confirmed Habitat within	
Wildlife	Species	ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	Study Area	the Study Area	
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 <b>Special Concern</b> Short-eared Owl	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30 ha dx, dxi, dxii, dxii, dxiv, dxvi, dxvii, dxvii, dxii,         • 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.	<ul> <li>Field Studies confirm:</li> <li>Presence of nesting or breeding of 2 or more of the listed species. ©</li> <li>A field with 1 or more breeding Short-eared Owls is to be considered SWH.</li> <li>The area of SWH is the contiguous ELC ecosite field areas.</li> <li>Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories.</li> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi</li> <li>SWH MIST cxlix Index #32 provides development effects and mitigation measures</li> </ul>	No; Cultural meadow (CUM) communities present in the Study Area are less than 30 ha in size.	No; Candidate habitat is not present within the study area.	
Shrub/Early Successional Bird Breeding 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 ^{cxcix} .	Indicator Spp: Brown Thrasher Clay-coloured Sparrow <u>Common Spp.</u> Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher <b>Special Concern:</b> 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 >10ha ^{clxiv} 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) (E). • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species clxxiii. • Shrub and thicket habitat sites considered significant should have a	<ul> <li>Field Studies confirm:</li> <li>Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. (E)</li> <li>A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. (E)</li> <li>The area of the SWH is the contiguous ELC ecosite field/thicket area.</li> <li>Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories</li> </ul>	<b>No;</b> Cultural thicket (CUT) communities encompassing greater than 10 ha are not present within the Study Area.	<b>No;</b> Numbers of indicator species observed during breeding bird surveys do not meet criteria for significance.	

			CANDIDATE SWH	CONFIRMED SWH	Candidate Habitat within the	Confirmed Habitat within the Study Area	
Wildlife	Species	ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	Study Area		
			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	<ul> <li>Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi</li> <li>SWH MIST</li> <li>cxlix Index #33 provides development effects and mitigation measures.</li> </ul>			
<b>Terrestrial Crayfish</b> ; <b>Rationale:</b> Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. ^{ccii}	Chimney or Digger Crayfish; ( <i>Fallicambarus fodiens</i> ) Devil Crawfish or Meadow Crayfish; ( <i>Cambarus Diogenes</i> )	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	<ul> <li>Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish.</li> <li>Constructs burrows in marshes, mudflats, meadows; the ground can't be too moist. Can often be found far from water.</li> <li>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. <u>Information Sources</u></li> <li>Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998</li> </ul>	<ul> <li>Studies Confirm:</li> <li>Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites cci</li> <li>Area of ELC ecosite or an Habitat ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH.</li> <li>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 cci</li> <li>SWH MIST cxlix Index #36 provides development effects and mitigation measures</li> </ul>	Yes; Meadow marsh (MAM) communities are present in the Study Area.	<b>No;</b> Neither indicator species nor their chimneys (burrows) were observed in suitable habitat within the Study Area during field investigations.	
Special Concern and Rare Wildlife Species <u>Rationale:</u> These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy	<ul> <li>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 lxxviii</li> <li>Information Sources</li> <li>Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data.</li> <li>NHIC Website "Get Information" : <u>http://nhic.mnr.gov.on.ca</u></li> <li>Ontario Breeding Bird Atlas•</li> <li>Expert advice should be sought as many of the rare spp. have little information available about their requirements</li> </ul>	<ul> <li>Studies Confirm:</li> <li>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.</li> <li>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. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat.</li> <li>SWH MIST Index #37 provides development effects and mitigation measures.</li> </ul>	Yes; Habitat for several Special Concern species as well as S- Rank 1-3 species are known to occur within the Study Area. See Appendix C2 -SOCC Habitat Screening for a complete list of SOCC and additional details pertaining to habitat assessment.	<b>Confirmed;</b> Eastern Wood Pewee and Wood Thrush habitat was confirmed within the deciduous forest (FOD4-1) during field investigations.	

#### Table 1.4 Animal Movement Corridors

		C	ANDIDATE SWH	CONFIRMED SWH	Candidate Habitat	Confirmed Habitat Present within the	
Habitat SPECIES		ELC Eco-sites	Habitat Criteria and Information Sources	Defining Criteria	Present Within the Study Area	Study Area	
Amphibian Movement Corridors <u>Rationale:</u> 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 Mink Frog Bullfrog	<ul> <li>Corridors may be found in all ecosites associated with water.</li> <li>Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1</li> </ul>	Movement corridors between breeding habitat and summer habitat ^{clxxiv, clxxv, clxxvi,} clxxvii, clxxvii, clxxi, clxxxi, clxxvi, clxxv	<ul> <li>Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites.</li> <li>* Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant cxlix</li> <li>Corridors should have at least 15m of vegetation on both sides of waterway cxlix or be up to 200m wide cxlix of woodland habitat and with gaps &lt;20m cxlix .</li> <li>Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat cxlix.</li> <li>SWH MIST cxlix Index #40 provides development effects and mitigation measures</li> </ul>	No; SWH Amphibian Breeding Habitat (Wetlands) was confirmed not present in the Study Area.	No; Candidate habitat is not present within the study area.	



# H.2 Species of Conservation Concern Assessment

## Appendix H2. Species of Special Concern Habitat Assessment

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Source Identifying Species Record	Suitable Habitat Identified In Study Area	Species Observed During Field Investigations
Birds	Eastern Wood- pewee Contopus virens	SC	SC Schedule 1	SC	The Eastern Wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate-age mature forest stands with little understory vegetation. During migration, a variety of habitats are used, including forest edges and early successional clearings.	The Eastern Wood-pewee is found across most of southern and central Ontario, and in northern Ontario as far north as Red Lake, Lake Nipigon, and Timmins. The breeding range of the Eastern Wood-pewee covers much of south-central and eastern North America.	OBBA	Yes Potentially suitable wooded habitat is present within Study Area.	Yes The species was recorded during breeding bird surveys.
Birds	Golden-winged Warbler Vermivora chrysoptera	SC	THR Schedule 1	THR	Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas. In their breeding areas, Golden-winged Warblers seem to be fond of regeneration zones where young shrubs grow, surrounded by mature forest, and characterized by plant succession of 10 to 30 years. The warblers frequent clusters of herbaceous plants and low bushes (where they place their nests, which are built on the ground). They favour environments where the trees are spread out, as well as the forest edge, and use this setting for perching, singing, and looking for food. Golden-winged Warblers are found in dry uplands, swamp forests, and marshes. This warbler shows a preference for beaver ponds and burned-out or intermittently cultivated areas.	The Golden-winged Warbler is found in southern Saskatchewan, Manitoba, Ontario, and Quebec, as well as the north-eastern United States. In Ontario, these birds breed in central-eastern Ontario, as far south as Lake Ontario and the St. Lawrence River, and as far north as the northern edge of Georgian Bay. Golden-winged Warblers have also been found in the Lake of the Woods area near the Manitoba border, and around Long Point on Lake Erie. Golden-winged Warblers nest primarily in the northeastern United States, southeastern Saskatchewan, southwestern Manitoba, southwestern Ontario and far southwestern Quebec. In Ontario, they breed from the far southwest of the province north as far as the centre of the Nipissing region, the southern part of the Sudbury and Algoma districts, and the southwest part of the Rainy River district, near Lake of the Woods.	OBBA	Yes Potentially suitable habitat is present within Study Area.	No The species was not recorded during breeding bird surveys or incidentially.
Birds	Grasshopper Sparrow Ammodramus savannarum Grasshopper Sparrow (pratensis subspecies; Eastern Grasshopper Sparrow) Ammodramus savannarum	SC	SC Schedule 1	SC	It lives in open grassland areas with well-drained, sandy soil. It will also nest in hayfields and pasture, as well as alvars, prairies, and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape. The Grasshopper Sparrow is a short- distance migrant and leaves Ontario in the fall to migrate to the southestern United States and Central America for the winter. In Canada, the Eastern Grasshopper Sparrow typically breeds in large human-created grasslands (5 ha or greater), such as pastures and hayfields, and natural prairies, such as alvars, characterized by well-drained, often poor soil dominated by relatively low, sparse perennial herbaceous vegetation.	The Grasshopper Sparrow can be found throughout southern Ontario, but only occasionally on the Canadian Shield. It is most common where grasslands, hay, or pasture dominate the landscape. In Canada, the breeding range of the Eastern Grasshopper Sparrow includes extreme southern Québec and southern Ontario, with the vast majority of birds occurring in Ontario.	OBBA	No Meadow communities were typically dominated by dense growth of herbaceous plants.	No The species was not recorded during breeding bird surveys or incidentially.
Birds	Wood Thrush Hylocichla mustelina	SC	THR Schedule 1	THR	The Wood Thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests, but will also use smaller stands of trees. They build their nests in living saplings, trees, or shrubs, usually in Sugar Maple or American Beech. In Canada, the Wood Thrush nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. This species prefers large forest mosaics, but may also nest in small forest fragments.	<ul> <li>The Wood Thrush is found all across southern Ontario. It is also found, but less common, along the north shore of Lake Huron, as far west as the southeastern tip of Lake Superior. There is a very small population near Lake of the Woods in northwestern Ontario, and there have been scattered sightings in the mixed forest of northern Ontario.</li> <li>The Wood Thrush breeds in southeastern Canada from southern Ontario east to Nova Scotia.</li> </ul>	OBBA	Yes Potentially suitable wooded habitat is present within Study Area.	Yes The species was recorded during breeding bird surveys.

## Appendix H2. Species of Special Concern Habitat Assessment

Taxonom	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Source Identifying Species Record	Suitable Habitat Identified In Study Area	Species Observed During Field Investigations
Fish	Grass Pickerel Esox americanus vermiculatus	SC	SC Schedule 1	SC	The habitat of the Grass Pickerel is characterized by warm, slow-moving streams, ponds and shallow bays of larger lakes, with clear to tea-coloured water, and abundant aquatic vegetation. Bottom substrate is usually mud, but it has also been found over rock and gravel. Associated with overland flooding, spawning occurs in the spring in water temperatures of 4° to 12° Celcius; however, there is evidence of late summer to winter spawning as well. Eggs are dispersed and adhere to aquatic vegetation. No nest is built and neither eggs nor young are provided parental care.	<ul> <li>The Grass Pickerel range extends from Minnesota and Nebraska east to southwestern Quebec and south from Ontario and Quebec to Louisiana, Mississippi and Texas. In Canada, it is limited to extreme southwestern Quebec and southern Ontario. In Ontario, Grass Pickerel is found in coastal wetlands in the Great Lakes and tributaries of Lake St. Clair, Lake Erie, Lake Huron, the Niagara River, Lake Ontario, and the St. Lawrence River, and inland in the Severn River system.</li> <li>The Grass Pickerel is largely restricted to the west of the Appalachian Mountains, in the Great Lakes and the Mississippi River basins. In Canada, its range is disjunct and is represented by several populations in southwestern Quebec and southern Ontario. It is known in the lower Ottawa and St. Lawrence rivers, as well as in shallow bays and tributaries of eastern and southwestern Lake Ontario, and along the north shore of Lake Erie. Populations occur in Lake St. Clair and some of its tributaries. It is also found in several tributaries in the Lake Huron watershed. It has been found in the St.</li> <li>Lawrence River, as well as in shallow bays and tributaries of eastern and southwestern Lake Ontario, inland watercourses of the Niagara region, and along the north shore of Lake Erie. Populations occur in Lake St. Clair and some of its tributaries. It is also found in several tributaries and waterbodies in the lower Lake Huron watershed.</li> </ul>	DFO	No Suitable stream habitat is not present within Study Area.	No The species was not recorded during surveys or incidentially.

## Appendix H2. Species of Special Concern Habitat Assessment

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Source Identifying Species Record	Suitable Habitat Identified In Study Area	Species Observed During Field Investigations
Insects	Monarch Danaus plexippus	SC	SC Schedule 1	END	Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Milkweeds (numerous species) are the sole food plant for Monarch caterpillars. These plants grow predominantly in open and periodically disturbed habitats such as roadsides, fields, wetlands, prairies, and open forests. Milkweeds are often planted outside their native range, and sometimes wayward Monarchs are observed at these patches. Monarchs require staging areas which are used to rest, feed, and avoid inclement weather during migration. In Canada, they are found along the north shores of the Great Lakes where Monarchs roost in trees before crossing large areas of open water.	The Monarch's range extends from Central America to southern Canada. In Canada, Monarchs are most abundant in southern Ontario and Quebec where milkweed plants and breeding habitat are widespread. During late summer and fall, Monarchs from Ontario migrate to central Mexico where they spend the winter months. During migration, groups of Monarchs numbering in the thousands can be seen along the north shores of Lake Ontario and Lake Erie. The overall native range of the Monarch occurs from Central America northward through the continental United States to southern Canada, and from the Atlantic Coast westward to the Pacific Coast. The Canadian range of occurrence includes portions of all ten provinces and the Northwest Territories. Monarchs are loosely divided into eastern and western subgroups based on their migratory routes and overwintering sites. Eastern Monarchs breed from Alberta east to Nova Scotia and migrate south to overwinter in the mountains of Central Mexico. The breeding range in Canada is south of the 50° latitude in Ontario, Quebec, and the Maritimes. Each fall hundreds of thousands of Monarchs migrate through Long Point in southern Ontario but it's unknown what proportion of the Canadian population these individuals represent.	Ontario Butterfly Atlas	Yes Suitable meadow habitat is present within the Study Area.	Yes The species was observed foraging within the Study Area
Plants	Perfoliate Bellwort <i>Uvularia perfoliata</i>	N/A	N/A	N/A	It grows in habitats such as floodplain forests, but also mesic upland forests, and dry rocky woodlands.The presence of this species is dependent on appropriate habitat, and it may be eliminated from an area by development, changes in land use, or competition with invasive species.	Uvularia perfoliata is widely distributed in the eastern and southern United States from Texas to New Hampshire, plus the Canadian province of Ontario. It is listed as an endangered species by the states of Indiana and New Hampshire.	NHIC	No No potentially suitable woodland habitat present within the Study Area.	No The species was not recorded during vegetation surveys.
Reptiles	Northern Map Turtle <i>Graptemys</i> geographica	SC	SC Schedule 1	SC	The Northern Map Turtle inhabits rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. They require high-quality water that supports the female's mollusc prey. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled. The Northern Map Turtle 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 rocks and logs) and exposure to the sun for at least part of the day.	The Northern Map Turtle's range extends from the Great Lakes region west to Oklahoma and Kansas, south to Louisiana, and east to the Adirondack and Appalachian mountain barrier. In Canada, it is found in southwestern Quebec and southern Ontario. In southern Ontario, it lives primarily on the shores of Georgian Bay, Lake St. Clair, Lake Erie, and Lake Ontario, and along larger rivers including the Thames, Grand, and Ottawa. It reaches its northern limit in southern Ontario and southwestern Quebec, where it is associated with the Great Lakes Basin and the St. Lawrence River.	ORAA 2018	No Suitable wetland habitat has not identified within the Study Area.	No However targeted surveys were not undertaken.

### **Appendix F2. Species of Special Concern Habitat Assessment**

Glancaster Road Municipal Class Environmental Assessment Phases 3 and 4

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Source Identifying Species Record	Suitable Habitat Identified In Study Area	Species Observed During Field Investigations
Reptiles	Snapping Turtle Chelydra serpentina	SC	SC Schedule 1	Not At Risk	<ul> <li>Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams, and aggregate pits.</li> <li>Although Snapping Turtles have been observed in shallow water in almost every kind of freshwater habitat, the preferred habitat of the species is characterized by slow-moving water 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, or areas combining several of these wetland habitats. Individual turtles will persist in urbanized water bodies, such as golf course ponds and irrigation canals, but it is unlikely that a population could become established in such habitats. The Snapping Turtle can occur in highly polluted waterways, but environmental contamination is known to reduce the already low reproductive output of this species. Basking on offshore logs and protruding rocks can be common in Snapping Turtles, depending on environmental temperature. Females generally nest on sand or gravel banks along waterways. Upon emergence from the nest in early fall, hatchling Snapping Turtles usually move to water, after which they bury themselves under leaf litter or debris. Snapping Turtles overwinter underwater, buried beneath logs, sticks or overhanging banks in small streams that flow continuously throughout the winter. They can also hibernate buried in deep mud in marshy areas or beneath floating mats of vegetation. Snapping Turtle habitat is diminishing in both quantity and quality in Canada, with losses primarily due to conversion of wetlands to agriculture and urban development.</li> </ul>	The Snapping Turtle's range extends from Ecuador to Canada. The Snapping Turtle's range is contracting. In Canada, the species is widespread from Nova Scotia to southeastern Saskatchewan, though it is absent from northwestern Ontario, where summers are likely too cool for Snapping Turtle embryos to complete development successfully. The Snapping Turtle is therefore present in mainland Nova Scotia, southern New Brunswick, southern and central Quebec, southern and central Ontario, southern Manitoba, and southeastern Saskatchewan, primarily in the Qu'Appelle watershed.	ORAA 2019	Yes This species can persist in urbanized environments. Watercourses which may provide habitat for the species are identified within the Study Area.	No However targeted surveys were not undertaken.

Glossary

ESA - Endangered - a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act.

END SARA - Endangered - a wildlife species that is facing imminent extirpation or extinction.

THR ESA - Threatened - a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SARA - Threatened - a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

ESA - Special Concern (formerly Vulnerable) - a species with characteristics that make it sensitive to human activities or natural events. SC

SARA - Special Concern - a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

OMNR Ontario Ministry of Natural Resources

ESA Endangered Species Act

SARA Species at Risk Act (Federal)

Schedule 1 The official list of species that are classified as extirpated, endangered, threatened, and of special concern.

COSEWIC Committee on the Stauts of Endangerd Wildlife in Canada - a committee of experts that assesses and designates which wild species are in some danger of disappearing from Canada.

#### References

1 - Species at Risk . Ontario Ministry of Natural Resources. http://www.mnr.gov.on.ca/en/Business/Species/index.html. © Queens Printer For Ontario, 2013.

2 - Species at Risk Status Reports. Committed on the Status of Endangered Wildlife in Canada. Ottawa. http://www.sararegistry.gc.ca/search/advSearchResults_e.cfm?stype=doc&docID=18.

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