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Toronto Island Park Master Plan

Natural Heritage Background Report

Prepared for

The City of Toronto

On behalf of

DTAH



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Toronto Island Park Master Plan

Natural Heritage Background Report

1. Introduction

In September of 2020, the City of Toronto retained a consulting team led by DTAH to develop a comprehensive Master Plan for Toronto Island Park. A key element of the Master Plan is ensuring long-term environmental resilience and sustainability of the island's natural features, which are unique in both the City of Toronto and in the western half of Lake Ontario. In order to develop a thorough understanding of the island's ecology and ensure that environmental resilience and sustainability are core components of the Master Plan, North-South Environmental Inc. (NSE) was retained to prepare this Natural Heritage Report and provide ecological expertise into the planning process.

The Toronto Islands are a group of 12 to 15 islands in Toronto's Inner Harbour whose origins reflect the natural forces which shaped Toronto Harbour and the shoreline of western Lake Ontario. Despite a legacy of human use dating back to the earliest First Nations inhabitants of the region, a number of rare and significant natural habitats persist on the islands. These natural habitats are largely protected as Environmentally Significant Areas (ESAs) and Provincially Significant Wetlands (PSWs) and form the core of the islands' ecosystem. A candidate Provincial Area of Natural and Scientific Interest (ANSI) has also been delineated on the islands. This report collected information from a wide variety of background sources, complemented through field work in the fall of 2020, to provide a thorough description of the islands' ecology and existing natural features.

1.1. Study Area

The study area for this report encompasses all of the Toronto Islands, including Centre Island (the largest and most prominent island), Algonquin Island, Doughnut Island, Duck Island, Forestry Island, Hanlan's Island, Middle Island, Mugg's Island, North Chippewa Island, Olympic Island, Royal Canadian Yacht Club (RCYC) Island, Senator Frank Patrick O'Connor Island, Snake Island, South Chippewa Island and South Island.

2. Background Sources

A wide variety of background sources were consulted in preparing this report. Some of the primary resources were studies of the islands' ESAs which were completed by NSE between 2006 and 2010. Other resources included:

- The City of Toronto Tree Canopy Study (KBM Resources Group et al., 2018)
- The Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre

(NHIC) Natural Heritage Areas mapping application

- Data from the Toronto and Region Conservation Authority (TRCA)
- Recent aerial imagery of the islands
- Public consultation undertaken by DTAH
- Other reports containing natural heritage information about the Toronto Islands
- Citizen science platforms such as iNaturalist and eBird

A full list of references can be found in **Section 7**.

3. Field Methodology

To complement the information obtained through the review of background materials as described above, NSE conducted a two-day reconnaissance visit to the Toronto Islands in October of 2020. The purposes of this visit were to:

- verify the boundaries of features within ESAs which were mapped by NSE in 2008
- characterize the urban forest canopy outside of the ESAs

Formal surveys for plants and wildlife were not completed in ESAs since it was determined that sufficient information could be obtained from background resources. The urban forest canopy on the islands was characterized by estimating percent canopy cover of various tree species within 50 m of a series of points across the islands. In this way, the urban forest canopy across the entire study area was interpolated using geographic information system (GIS) software.

4. Existing Conditions

4.1. Physiography

The Toronto Islands originated as a peninsula very similar to other Great Lakes sandspits such as Rondeau and Long Point in Lake Erie and Presque-île in Lake Ontario. Like other sandspits, the Toronto Island peninsula was a highly dynamic environment characterized by constant shifting of its shorelines and topography influenced by storms, ice scour and sediment accumulation. It is widely believed that most of the sediment which makes up the Toronto Islands originated from erosion of the Scarborough Bluffs to the east (Nairn et al., 1994). A major storm in 1858 caused lake waters to break through the narrow isthmus which connected the peninsula to the mainland, which transformed the peninsula into what are now the Toronto Islands. The resulting passage, now called the Eastern Channel, divides the Toronto Islands from Cherry Beach on the mainland. It is important to note that the Eastern Channel has been maintained over the past 160 years by dredging and the construction of seawalls and jetties; in the absence of human maintenance of these features, it is quite possible that the Toronto Islands would eventually reconnect to the mainland.

The islands are largely composed of fine sand which made up the dune system of the original peninsula. Remnants of the original dune system remain at Hanlan's Beach and Ward's Island. However, the existing Toronto Islands have been substantially built up and altered with fill and topsoil which differ significantly in texture and porosity from the original sand. Some of the islands (e.g., Algonquin Island and Snake Island) were constructed from excavated material in the early 20th century. Many of the islands' shorelines have been hardened with seawalls and revetments (see **Figure 1**). Breakwaters, jetties and groynes have been constructed to reduce erosion but these structures also prevent the accumulation of sediment which historically replenished the islands' shorelines. The Leslie Street Spit (now Tommy Thompson Park), which began construction in the 1960s and reached its current length in 1978, has dramatically reduced the amount of sediment available to replenish the Toronto Islands shorelines. The overall effect of the human modifications to the islands over the past 150 years is that the ecosystem has been transformed from a highly dynamic and frequently shifting sandspit to a relatively static series of islands.

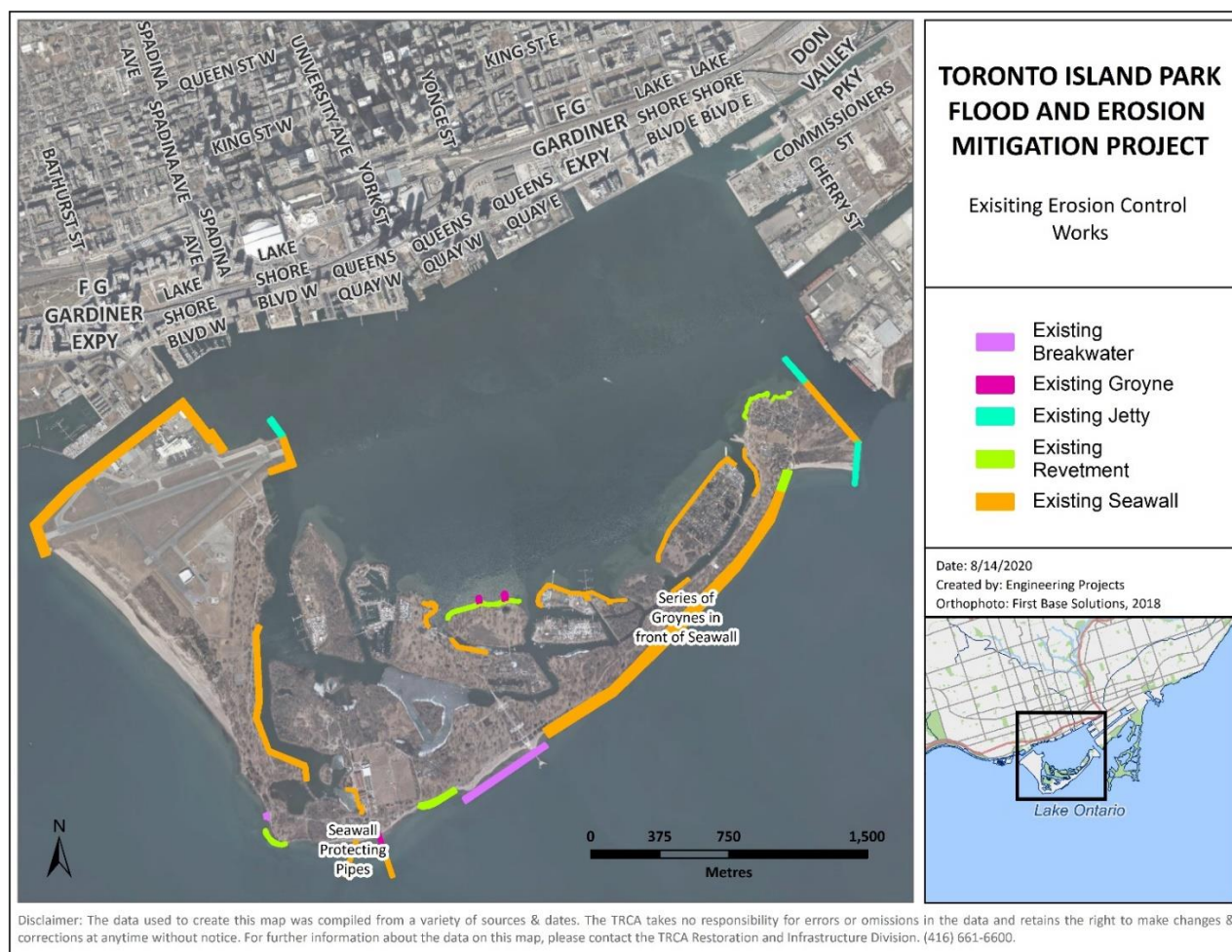


Figure 1. Shoreline modifications in the Toronto Islands (TRCA, 2020)

4.2. Surface Water and Groundwater

Lake Ontario, one of the five North American Great Lakes, is the primary hydrologic feature of the Toronto Islands. The islands are separated from the mainland by Toronto Harbour to the north and the Western and Eastern Channels, which are maintained to enable ship access to the harbour. The various channels and bays within the island system itself (e.g., Blockhouse Channel, Hanlan's Bay, Long Pond, Deep Pike Cut, Sunfish Cut) are all technically part of Toronto Harbour and thus Lake Ontario. Trout Pond, at the southern tip of Centre Island, is slightly elevated above Lake Ontario at certain times of year and is the largest permanent surface water feature on any of the islands which is not technically a part of Lake Ontario. There are no other permanent surface water features on the islands. Ephemeral surface water features include dune swales (which are most evident at Hanlan's Beach) and indistinct drainage features which convey stormwater intermittently to Lake Ontario.

Areas immediately off the southern shore of the Toronto Islands, in addition to some terrestrial areas around Gibraltar Point, are designated Intake Protection Zones with Moderate (Level 1) and Low (Level 2) vulnerability. The purpose of this designation is to protect source water intakes which provide drinking water for much of the Greater Toronto Area (CTC Source Protection Region, 2018).

Owing to its low topography, there are no notable areas of groundwater discharge (e.g., seeps and springs) on the Toronto Islands. There are no significant groundwater recharge areas on the islands (TRCA, 2012).

4.3. Fish and Aquatic Habitat

Toronto Harbour and the open coastal areas off the southern shore of the Toronto Islands are home to a diverse fish community consisting of at least 40 native species and 10 non-native species (TRCA, 2008). Fish which spawn and engage in other life processes in the area include coldwater species (5 native and 1 non-native), coolwater species (21 native and 3 non-native) and warmwater species (14 native and 3 non-native) (TRCA, 2008). No fish Species at Risk (SAR) are known to occur in nearshore areas of the Toronto Island system, but the Deepwater Sculpin (*Myoxocephalus thompsonii*) occurs in deepwater areas of Lake Ontario off the southern shore of the islands (Fisheries and Oceans Canada [DFO], 2020). Declines in the diversity and biomass of native fish species in Lake Ontario and the other Great Lakes in the second half of the 20th century have been well-documented (see, for example, Egan, 2017). However, fish sampling along the Toronto waterfront by TRCA between 1989 and 2005 found that declines in native fish species richness began to stabilize towards the end of that time period (TRCA, 2008).

Based on data from LIO, there are no significant fish spawning areas in and around the Toronto Islands. Nonetheless, various native and non-native species can be expected to spawn at low densities in the island system's nearshore areas. However, shoreline hardening (e.g., seawalls and revetments) limits the amount of potential spawning habitat available for many fish species. For example, some

species such as Walleye (*Sander vitreus*) require shallow nearshore areas with sandy and gravelly substrates for spawning, but aquatic habitat adjacent to hardened shorelines tends to be deeper and have more muck and fine sediment in the substrate. Hardened shorelines also typically lack riparian vegetation, which is preferred by many minnow and baitfish species since it provides shelter from predators and localized reductions in water temperature. Although there is no data available to identify the most important spawning areas around the Toronto Islands, the most suitable spawning habitats are expected to occur in nearshore areas with sandy substrates and no shoreline structures.

Eleven species of freshwater mussels (Unionidae) are known to occur in Lake Ontario, including in Toronto Harbour, and many of these can be expected to occur in aquatic habitats around the Toronto Islands (Metcalf-Smith et al., 1998; Reid et al., 2018). No freshwater mussel SAR are known to occur around the islands (DFO, 2020).

4.4. Environmentally Significant Areas

The Toronto Islands are home to six Environmentally Significant Areas (ESAs) (see **Figure 2**). ESAs in the City of Toronto are identified based on the criteria in Policy 3.4.14 of the City's Official Plan. NSE conducted extensive field work in the Toronto Islands ESAs in 2006 in order to refine ESA boundaries and identify significant species and features. NSE's ecologists conducted brief visits to publicly accessible ESAs in 2020 to verify boundaries and identify any significant changes that have occurred since 2006. Descriptions of the Island system's ESAs are provided below.

4.4.1. Centre Island Meadow/Wildlife Sanctuary

Centre Island Meadows ESA is located on Centre Island to the north of the water treatment plant. It also includes all of Forestry Island and Doughnut Island. The Centre Island portion of the ESA consists primarily of woodland communities dominated by Eastern Cottonwood (*Populus deltoides*) and a variety of non-native species. The understory is dominated by non-native species. The only abundant native species is Red-osier Dogwood (*Cornus sericea*). Seventeen other plant communities have been assessed in the ESA, including three provincially rare vegetation communities. Two provincially rare plant species occur in the ESA: Low Nutrush (*Scleria verticillata*) and Cup Plant (*Silphium perfoliatum*). However, the latter species is native only in extreme southwestern Ontario and is considered non-native in this part of Ontario.

Centre Island Meadows ESA was found to have a relatively high diversity of breeding birds owing to its relatively large size and diversity of vegetation communities. No provincially rare or at risk bird species are known to nest in this ESA but three locally rare birds have been recorded as possible or probable breeders. One provincially rare wildlife species and three locally rare wildlife species have been recorded in this ESA.

A City-owned maintenance yard associated with the water treatment plant occupies a sizeable area

within Centre Island Meadows ESA. Because of this and the abundance of non-native species, this ESA was determined to be in “fair” or “good” condition in 2012. This ESA could not be accessed by NSE’s ecologists in 2020, so it was not possible to assess whether significant changes have occurred.



Figure 2. ESAs on the Toronto Islands

4.4.2. Hanlan’s Beach ESA

Hanlan’s Beach ESA includes most of the western shoreline of Centre Island and encompasses the natural dune system in the western part of the island system. The northern portion of this ESA is immediately adjacent to Billy Bishop Toronto City Airport. Because the ESA occupies the exposed windward side of the island system, this ESA experiences frequent disturbance from wind, waves and ice, which has resulted in unique native plant communities reminiscent of communities found in other Great Lakes dune systems. The ESA is characterized by upland ridges on dunes and pannes or swales

in between. Unique vegetation occurs in both upland and lowland sites, including two provincially rare plant species and 19 locally rare plant species. Unlike other ESAs on the Toronto Islands, Hanlan's Beach has a relatively low abundance of non-native species. The most abundant non-native species is Silver Birch (*Betula pendula*), which is the dominant tree species in the ESA. However, field work by NSE in 2020 found that most of the Silver Birch has succumbed to an unknown pathogen. It is unknown how this might affect the ESA's vegetation communities as new species begin to occupy areas where Silver Birch has died off.

Because most of the vegetation communities in Hanlan's Beach ESA are open or sparsely treed, there is a relatively low diversity of breeding bird species. However, two locally rare bird species have been recorded as possible or probable breeders in the ESA.

In 2012, it was noted that there were extensive informal trails throughout Hanlan's Beach which were causing localized fragmentation and losses in the ESA's plant communities. Installation of boardwalks and barriers to direct pedestrian traffic within the ESA since then appears to have substantially reduced the number of informal trails. However, some informal trails were still observed in 2020. In 2012, Hanlan's Beach was determined to be in "good" condition. Field work by NSE in 2020 determined that the ESA likely remains in "good" or even "excellent" condition due to a reduction in the number of informal trails and the persistence of rare species and vegetation communities.

4.4.3. Mugg's Island ESA

Mugg's Island ESA encompasses the entire eastern half and parts of the western half of Mugg's Island. The portions of Mugg's Island not included in the ESA are occupied by the Island Yacht Club. Vegetation on the island consists mainly of relatively open forest dominated by Eastern Cottonwood. Non-native species such as Crack Willow (*Salix euxina*) and Silver Birch are abundant in the canopy. The understory and groundcover are dominated by non-native species, namely Tartarian Honeysuckle (*Lonicera tatarica*) and Flattened Bluegrass (*Poa compressa*). However, the ESA does contain one provincially rare vegetation community – Prairie Slough Grass mineral meadow marsh – which is dominated by Prairie Slough Grass (*Sporobolus michauxianus*), a locally rare species. Three other locally rare plant species occur in Mugg's Island ESA but no provincially rare species occur in the ESA.

Bird species which nest on Mugg's Island are mainly common species associated with forest and thicket type habitats. No reptiles or amphibians have been observed on the island.

Mugg's Island was not visited by NSE's ecologists in 2020 since the island is accessible only by boat. However, aerial imagery does not indicate any major changes to features in the ESA since 2012. In 2012, it was noted that there are extensive recreational trails around the island. This is likely still the case since the ESA is used recreationally by members of the Island Yacht Club. Mugg's Island ESA was determined to be in "fair" or "good" condition in 2012 due to the abundance of non-native species and extensive recreational trails.

4.4.4. Snake Island Area ESA

Snake Island Area ESA encompasses all of Snake Island, Senator Frank Patrick O'Connor Island, South Chippewa Island and a small portion of North Chippewa Island. The western edge of the ESA is adjacent to the Royal Canadian Yacht Club. The islands which comprise this ESA were constructed in the early 20th century using sand fill excavated from Centre Island. Therefore, vegetation in this ESA consists of species which colonized the islands beginning approximately 100 years ago. Vegetation communities are therefore dominated by non-native species. Vegetation in this ESA consists primarily of open woodlands dominated by White Poplar (*Populus alba*) and a variety of conifers such as Norway Spruce (*Picea abies*). The understories of all the islands are dominated by non-native honeysuckles (*Lonicera* spp.). Despite the prevalence of non-native species, some locally significant species and rare plant communities have developed on the islands. Notably a provincially rare sand barren dominated by locally significant sand dropseed (*Sporobolus cryptandrus*) and containing abundant beach wormwood (*Artemisia campestris*) persists in the northern portion of Snake Island.

During field work by NSE between 2006 and 2010, the Snake Island area was found to have a high diversity of breeding birds considering the islands' small sizes. Two locally significant bird species were found to be possible or probable breeders. No other wildlife was observed on the islands.

In 2012, the Snake Island Area ESA was determined to be in "fair" or "good" condition due to the abundance of non-native species, frequent disturbance (e.g., camping, which is permitted on Snake Island) and significant amount of deadfall throughout the islands. In 2020, non-native species were found to be even more abundant on the islands and a significant number of canopy trees have fallen, especially on South Chippewa Island. For this reason, although the provincially rare sand barren on Snake Island continues to persist, the ESA may qualify as "poor" or "fair" condition. The ESA could benefit from management of invasive species and deadfall.

4.4.5. Ward's Island ESA

Ward's Island ESA encompasses the eastern end of Centre Island, including the easternmost point in the Toronto Islands system. Ward's Island is not a true island but is a peninsula of Centre Island. The residential community of Ward's Island is located immediately to the west of the ESA. The eastern edge of the ESA is delineated by a seawall which was constructed to maintain ship access to Toronto Harbour via the Eastern Channel.

Ward's Island ESA and Hanlan's Beach represent the last remaining natural dune systems on the Toronto Islands. Like Hanlan's Beach, Ward's Island ESA is characterized by a series of ridges and pannes occupying the tops of dunes and interdunal swales. Vegetation on ridges consists of Silver Birch and Eastern Cottonwood (*Populus deltoides*) with understories of Red-osier Dogwood (*Cornus sericea*). Dune swales are dominated by Nelson's Horsetail (*Equisetum x nelsonii*), Canada Bluejoint (*Calamagrostis canadensis*) and Red-osier Dogwood. A large amount of invasive Common Reed

(*Phragmites australis* ssp. *australis*) was observed in the ESA during field work by NSE in 2020. Ward's Island ESA provides habitat for at least 23 locally significant plant species such as Sphinx Ladies'-tresses (*Spiranthes incurva*) and Greater Fringed Gentian (*Gentianopsis crinita*).

Birds which breed on Ward's Island are primarily species which are adapted to nesting in marshes and thickets. Three locally significant bird species have been documented as possible or probable breeders in the ESA. Ward's Island is notable because it is one of the only areas of the Toronto Islands system which supports amphibian breeding habitat. Northern Leopard Frogs (*Lithobates pipiens*) and American Toads (*Anaxyrus americanus*) have been recorded breeding in interdunal swales in Ward's Island ESA.

In 2012, Ward's Island ESA was determined to be in "fair" to "good" condition due to the presence of some non-native species and abundant informal trails. In 2020, informal trails appeared to have been reduced in the ESA. However, invasive non-native species, such as *Phragmites*, appear to have increased substantially. This ESA could benefit from management of *Phragmites* and other invasive species. Also worth noting is that Silver Birch, which was previously the dominant woody species in this ESA, has declined significantly due to an unknown pathogen. It is unknown how the decline of Silver Birch might affect ecological succession in the ESA.

4.4.6. West Algonquin Island ESA

West Algonquin Island ESA occupies the western portion of Algonquin Island. The Algonquin Island residential community is located immediately adjacent to the ESA. Like the Snake Island Area ESA, a substantial portion of West Algonquin Island was constructed from sandy fill excavated from Centre Island. As a result, much of the vegetation consists of species which colonized the island beginning in the mid-20th century and non-native species are abundant. The largest vegetation community is a cultural meadow which occupies the central portion of the ESA. In 2020, this community was found to be dominated by Red Fescue (*Festuca rubra*), which is generally considered to be a non-native species in southern Ontario. Two rare species were found in this meadow in 2020 - Stiff Sunflower (*Helianthus pauciflorus*) and Narrow-leaved Mountain-mint (*Pycnanthemum tenuifolium*) - but it is possible that these were introduced deliberately as part of naturalization activities in the ESA. Surrounding the central meadow community is a complex of woodland and thicket communities with abundant Eastern Cottonwood, Crack Willow and non-native honeysuckles. West Algonquin Island provides habitat for three provincially rare plant species (although two may be introduced) and at least 14 locally significant plant species. Four plant communities in the ESA are considered to be locally significant.

West Algonquin Island ESA provides relatively little wildlife habitat relative to other ESAs in the Toronto Islands. Relatively few breeding birds or other wildlife have been documented in the ESA. Overall condition of the ESA was not evaluated in 2012, but the abundance of non-native species and large areas of frequent human disturbance suggest that it should be in "poor" or "fair" condition. The

ESA, particularly the central meadow, is used recreationally by the adjacent Algonquin Island residential community. However, the community has undertaken efforts to restore and enhance the natural environment by planting native species and installing bird houses.

4.5. Wetlands

The Toronto Islands system contains the **Toronto Islands Coastal Wetland Complex**, which has been evaluated as a provincially significant wetland (PSW) (see **Figure 3**). This wetland complex includes 34 wetland features which are geographically separate but hydrologically connected via Lake Ontario and the various channels and bays in the island system. It should be noted that many of these features are included within the island system's ESAs.

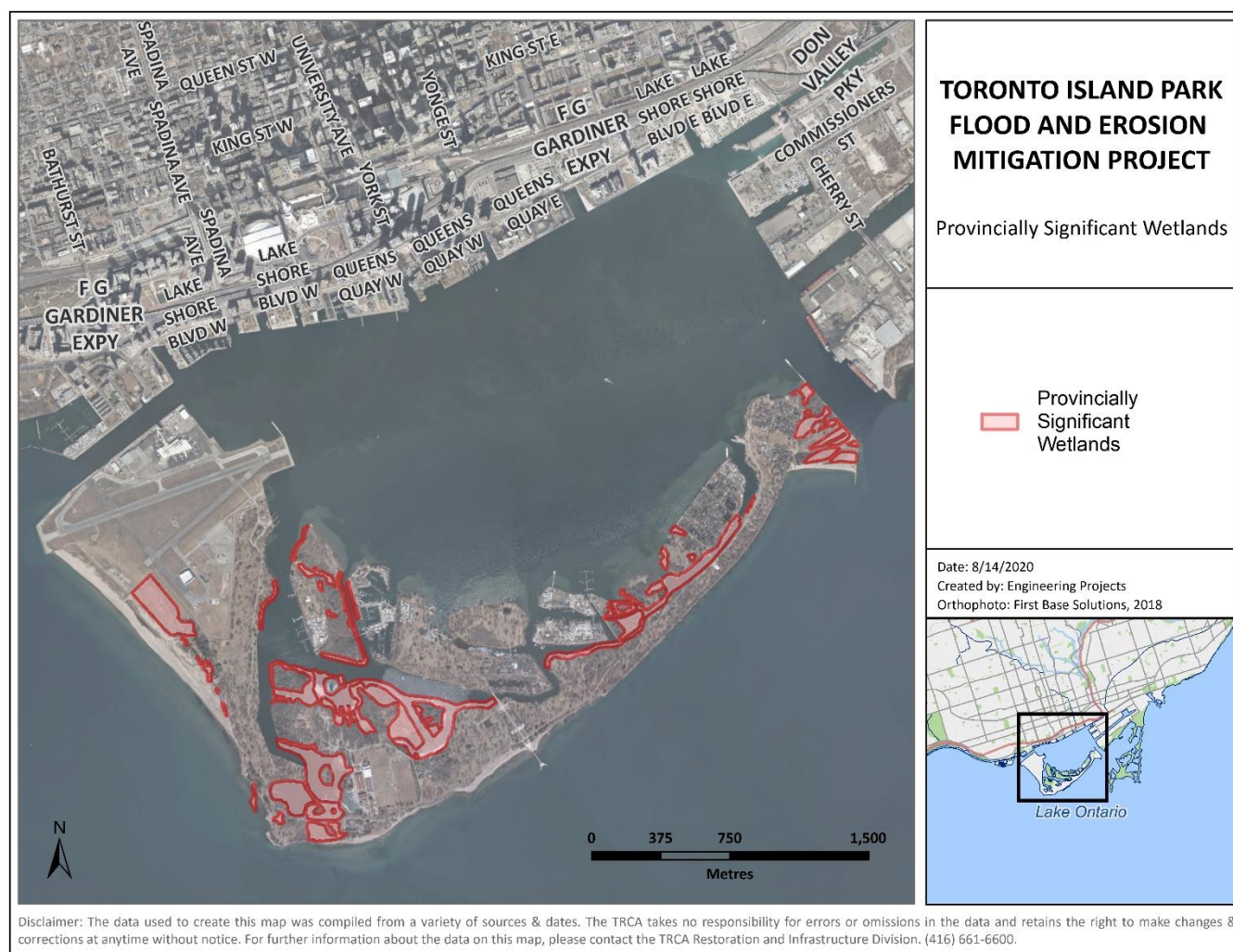


Figure 3. Toronto Islands Wetland Complex.

Field work by NSE in 2006 refined the boundaries of the PSW, verified its status as provincially significant and identified a number of significant ecological features. Most of the PSW consists of submerged aquatic communities dominated by aquatic plants such as Canada Waterweed (*Elodea canadensis*). Marshes make up the second largest community type overall and include cattail (*Typha* spp.) marshes, Canada Bluejoint (*Calamagrostis canadensis*) marshes and various other types. In 2020, it was noted that *Phragmites* was abundant in many marsh communities in the PSW. The PSW also contains thicket swamp and deciduous swamp communities, which are dominated by willows (*Salix* spp.) and Eastern Cottonwood, respectively. The different vegetation communities in the PSW support a diversity of breeding birds, including several locally significant species. Some features support breeding populations of amphibians such as Northern Leopard Frog and American Toad.

4.6. Vegetation

4.6.1. Vegetation Communities

Note that this section discusses only the natural and naturalized vegetation communities which occur in ESAs and wetlands. For a discussion of vegetation outside of ESAs and wetlands, refer to **Section 4.6.3**.

Within the island system's ESAs and wetlands, a total of 20 vegetation community types have been assessed, including a diversity of forests, woodlands, thickets, dunes, beaches, swamps and marshes. Four of these communities are rare in Ontario, all of which are associated with the dunes and well-drained sandy soils of the islands:

- Tallgrass Meadow Marsh (MAM6)
- Treed Sand Dune (SDT1)
- Dry Tallgrass Woodland (TPW1)
- Fresh-Moist Tallgrass Woodland (TPW2)

Natural vegetation communities reflect the island system's origins as a dynamic sandspit. However, many vegetation communities are dominated by non-native species, which reflects the long history of human modification of the islands. Brief descriptions of the vegetation communities on the Toronto Islands are provided in **Table 1**.

Table 1. Vegetation communities of the Toronto Islands

Community Name	Area (ha)	Description
Mineral Cultural Thicket (CUT1)	0.53	Cultural thicket communities on the islands are dominated by non-native species such as Silver Birch (<i>Betula pendula</i>), Common Buckthorn (<i>Rhamnus cathartica</i>) and non-native honeysuckles (<i>Lonicera</i> spp.).

Community Name	Area (ha)	Description
Fresh-Moist Poplar Deciduous Forest (FOD8-1)	3.91	Poplar-dominated deciduous forests on the islands consist mainly of Eastern Cottonwood, but some are dominated by non-native White Poplar (<i>Populus alba</i>).
Fresh-Moist Poplar Mixed Forest (FOM8)	3.78	Poplar-dominated mixed forests mainly consist of Eastern Cottonwood mixed with non-native conifers such as Scots Pine and Norway Spruce. The mixed forest on Snake Island is dominated by White Poplar mixed with non-native conifers.
Mineral Meadow Marsh (MAM2)	0.77	Mineral meadow marshes are mainly found in dune swales at Hanlan's Beach and Ward's Island. Dominant species include horsetails (<i>Equisetum</i> spp.) and Canada Bluejoint (<i>Calamagrostis canadensis</i>).
Tallgrass Meadow Marsh (MAM6)	2.78	Tallgrass meadow marshes are mainly found in the dune swales at Hanlan's Beach and Ward's Island and are dominated by a mix of Prairie Cordgrass (<i>Sporobolus michauxianus</i>) and Canada Bluejoint (<i>Calamagrostis canadensis</i>).
Mineral Shallow Marsh (MAS2)	0.49	Mineral shallow marshes are found in dune swales and shallow estuaries and are mainly dominated by cattails (<i>Typha</i> spp.) and <i>Phragmites</i> .
Submerged Shallow Aquatic (SAS1)	0.34	Submerged shallow aquatic communities are found in shallow channels and embayments where the dominant vegetation consists of submergent species.
Treed Sand Dune (SDT1)	3.84	Treed sand dunes are the dominant communities at Hanlan's Beach and Ward's Island. The dominant trees in these communities are Silver Birch and Eastern Red Cedar (<i>Juniperus virginiana</i>). Most of the Silver Birch in these communities has died off from an unknown pathogen. Since this is a non-native species, it is possible that the loss of Silver Birch will help these communities succeed to a more natural state over time.
Mineral Deciduous Swamp (SWD4)	5.03	Mineral deciduous swamps make up the largest community type on the islands overall. They are mainly dominated by Eastern Cottonwood but

Community Name	Area (ha)	Description
		occasionally by White Poplar, willows and/or Black Alder (<i>Alnus glutinosa</i>).
Mineral Thicket Swamp (SWT2)	0.08	Thicket swamp communities are mainly found in dune swales at Hanlan's Beach and Ward's Island and are dominated by Red Osier Dogwood (<i>Cornus sericea</i>).
Dry Tallgrass Woodland (TPW1)	0.48	Dry tallgrass woodlands are characterized by a relatively open canopy, sparse trees and herbaceous vegetation dominated by warm-season grasses such as Sand Dropseed (<i>Sporobolus cryptandrus</i>).
Fresh-Moist Tallgrass Woodland (TPW2)	1.59	Fresh-moist tallgrass woodlands are similar to the above but tend to have moist soil year round and are dominated by lowland warm-season grasses such as Prairie Cordgrass (<i>Sporobolus michauxianus</i>).

4.6.2. Vegetation Inventory

Based on field work by NSE and others dating back to 1993, a total of 377 plant species have been identified in natural and naturalized vegetation communities on the Toronto Islands. Of these, 238 (63%) are native to Ontario and 139 (37%) are non-native. Owing to its legacy of human disturbance, most of the vegetation on the Toronto Islands consists of non-native and often invasive species. However, some significant species still occur on the islands and significant natural vegetation communities persist in areas such as Hanlan's Beach and Ward's Island. This includes an impressive 85 locally rare species of which 12 are provincially rare.¹ Provincially rare species which presently or historically occurred on the Toronto Islands are:

- Short-fruited Rush (*Juncus brachycarpus*)
- Purple Agalinis (*Agalinis purpurea* var. *purpurea*)
- False Pimpernel (*Lindernia dubia*)
- Cup Plant (*Silphium perfoliatum*)
- Hairy Evening-primrose (*Oenothera villosa*)
- Schweinitz's Flatsedge (*Cyperus schweinitzii*)
- Low Nutrush (*Scleria verticillata*)
- Nuttall's Waterweed (*Elodea nuttallii*)
- Sharp-fruited Rush (*Juncus acuminatus*)

¹ Note that some of the provincially and locally rare species found on the islands may have been introduced (e.g., Cup Plant).

- American Beachgrass (*Ammophila breviligulata*)
- Beach Cinquefoil (*Potentilla paradoxa*)
- Common Hoptree (*Ptelea trifoliata*)

These species, in addition to the locally rare species found on the islands, are mainly plants of dunes and beaches, which reflects the uniqueness of those vegetation communities in the City of Toronto and in Ontario. Some of the more abundant non-native plant species on the islands are widely considered to be invasive, such as *Phragmites*, Black Alder, Norway Maple and non-native honeysuckles. A complete list of flora species is provided in **Appendix A**.

4.6.3. Urban Forest Canopy

Outside of the ESAs, the Toronto Islands have a well-established urban forest canopy. Field work in the fall of 2020 attempted to characterize the species and age composition of the urban forest canopy across the island system at a high level and the results are illustrated in **Figures 4 and 5**.

The dominant species throughout most of the Toronto Islands is Eastern Cottonwood, a native species which is widespread in Ontario and is especially common in floodplains and low-lying areas along Great Lakes shorelines. Other abundant species are Freeman Maple (*Acer x freemanii*), White Willow (*Salix alba*), Honey Locust (*Gleditsia triacanthos*) and Black Locust (*Robinia pseudoacacia*) (see **Figure 4**). It is worth noting that most of the Eastern Cottonwood trees in the urban forest canopy are probably natural in origin, while most other trees were either planted or are the offspring of trees which were originally planted.

The urban forest canopy on the Toronto Islands consists primarily of very mature trees (probably older than 75 years) and the dominant trees are all relatively short-lived species which are now reaching the end of their lifespan (see **Figure 5**). During field work by NSE in 2020, it was noted that a large number of White Willows and Freeman Maples had broken primary limbs or were experiencing canopy dieback. Mature Eastern Cottonwoods were found to be in better condition overall, but these, too, are approaching the end of their typical lifespan, which is about 100 years (Johnson and Burkhardt, 1976). The implications of this could be significant within the next 15 to 20 years as it is likely that a large number of mature trees will need to be removed and there are insufficient numbers of trees of younger age classes to replace them. If maintaining an urban forest canopy is a priority, then tree planting should be encouraged and should preferably consist of native species with suited to local conditions, such as Eastern White Pine (*Pinus strobus*), Oaks (*Quercus alba*, *Q. macrocarpa*, *Q. muehlenbergii*, *Q. rubra*, *Q. velutina*), Maples (*Ace nigrum*, *A. rubrum*, *A. saccharum*) and Sassafras (*Sassafras albidum*). The Toronto Islands are located in Ontario's Carolinian Zone (Ecoregion 7E), which has the largest diversity of tree species of any ecozone in Canada. The islands provide an opportunity to showcase this diversity of tree species.

Many parts of the islands are dominated by non-native tree species, namely White Willow, Black

Locust (*Robinia pseudoacacia*), Black Pine (*Pinus nigra*), Norway Maple (*Acer platanoides*) and Norway Spruce (*Picea abies*). In order to optimize the urban forest canopy's value for migrating/nesting birds and other wildlife, newly planted trees should be native to the Toronto area and suited to the growing conditions on the Toronto Islands.

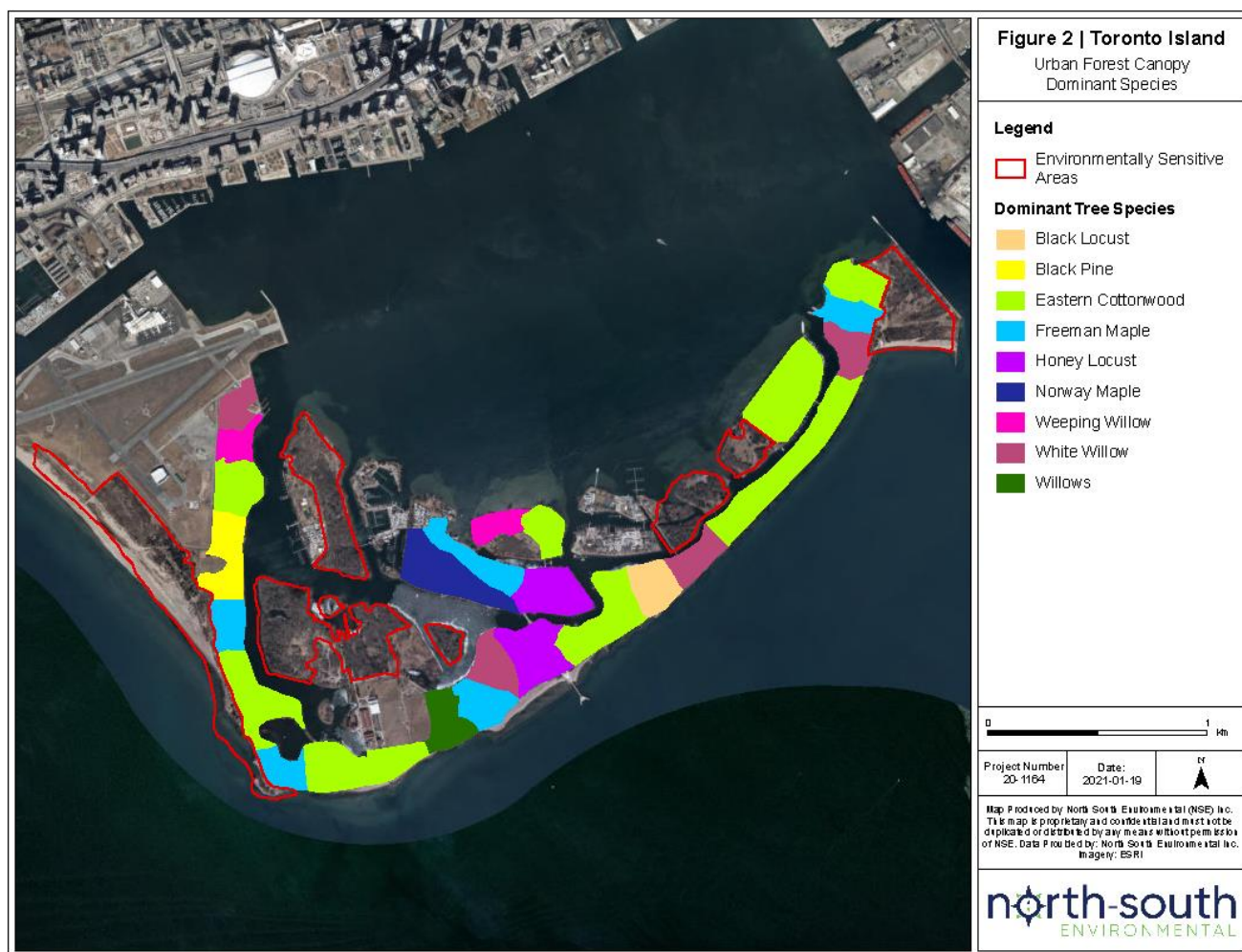


Figure 4. Dominant tree species in the urban forest canopy.

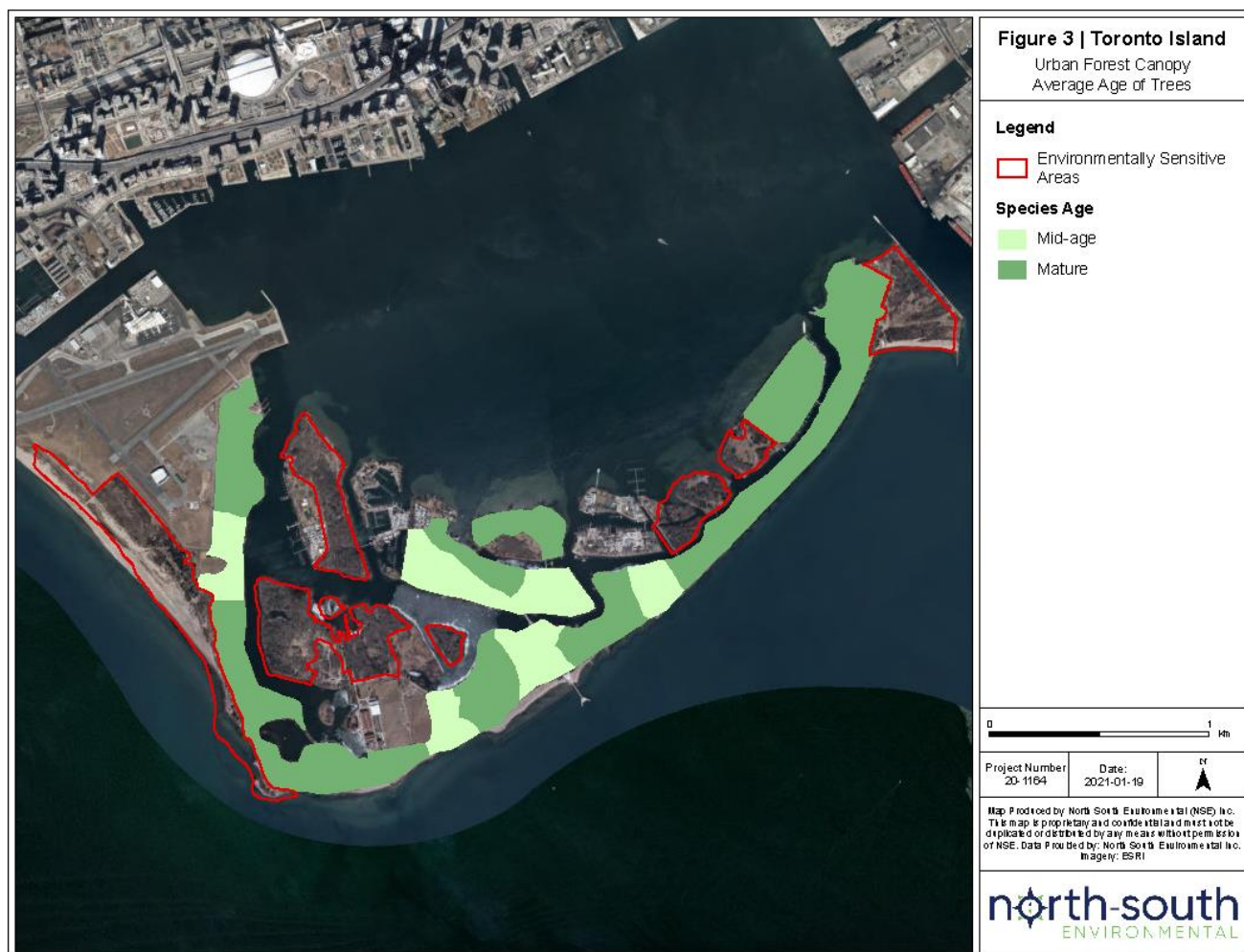


Figure 5. Average age of the urban forest canopy.

4.7. Wildlife

4.7.1. Breeding Birds and Migratory Birds

Field work by NSE between 2006 and 2010 documented 76 bird species which breed or potentially breed on the Toronto Islands. A complete list of fauna species is provided in **Appendix A**. Most birds which breed on the islands are common species which are highly adaptable and have a low sensitivity to human disturbance. However, the island's ESAs and wetlands provide nesting habitat for a number of more specialized bird species, including three SAR, 19 species of provincial conservation concern and several additional locally significant species.

The Toronto Islands are an important migratory bird stopover location. For birds which migrate across Lake Ontario in the spring, the Toronto Islands are often the first land where they can rest and forage

before continuing their migration. Likewise, during fall migration, migratory birds often stop on the Toronto Islands to rest and forage before continuing their journey south. The citizen science website eBird has observations of 288 bird species at the Toronto Islands birdwatching hotspot, which is exceeded only by Colonel Sam Smith Park (292 species) and Tommy Thompson Park (310 species). The majority of these species are migrants which stop over on the Toronto Islands but do not breed there. The Toronto Islands could therefore be argued as the third most important migratory bird stopover location in the City of Toronto.

There is a significant population of outdoor cats in the communities of Algonquin Island and Ward's Island, which pose a direct threat to birds on the islands. A persistent population of outdoor cats is a significant stressor on breeding and migratory birds and could affect the recognition of the islands as a Migratory Bird Sanctuary.

4.7.2. Other Wildlife

The ESAs and other parts of the Toronto Islands provide habitat for eight mammals, six reptiles and two amphibians. A diversity of insects and other wildlife also occur on the islands. During field work by NSE in 2020, an American mink (*Neovison vison*) was seen hunting and sheltering on a concrete jetty near Gibraltar Point, indicating that even human-made structures can provide habitat for wildlife. Turtles, including one SAR and two species of conservation concern, nest on the islands and overwinter in shallow vegetated bays and channels.

4.7.3. Significant Wildlife Habitat

The presence of provincially significant wildlife habitats on the Toronto Islands was assessed using the SWH Criteria Schedules for Ecoregion 7E (MNRF, 2015). Most SWH are located in the islands' ESAs but some occur throughout the island system. Below is a brief overview of the types of SWH which are confirmed to occur on the Toronto Islands. Other types of wildlife habitat occur on the islands but cannot be confirmed to be provincially significant based on existing data. Examples of "candidate" SWH include shorebird migratory stopover areas, bat maternity colonies, waterfowl nesting areas, turtle nesting areas and marsh breeding bird habitat. A table outlining all of the SWH which may occur on the Toronto Islands, including candidate SWH, can be found in **Appendix B**.

Seasonal Concentration Areas of Animals

- *Waterfowl Stopover and Staging Areas*: The ponds, marshes, bays and coastal inlets of the Toronto Islands system support large numbers of migrating waterfowl in the spring and fall, as well as many overwintering waterfowl.
- *Raptor Wintering Area*: The entire island system is a significant raptor wintering area where hawks and other raptors spend the winter hunting and resting.
- *Turtle Wintering Areas*: The ponds, marshes, bays and coastal inlets of the islands are

overwintering habitat for at least three native turtle species.

- *Migratory Butterfly Stopover Area*: The entire island system is a significant stopover area for Monarch butterflies during spring and fall migration.
- *Landbird Migratory Stopover Area*: The entire island system, especially the larger woodlands, is a significant stopover area for songbirds and other terrestrial birds during spring and fall migration.

Specialized Habitat for Wildlife

- *Bald Eagle and Osprey Nesting, Foraging and Perching Habitat*: Bald Eagles have nested on the Toronto Islands in the past (most recently in 2015). Osprey nests have not been documented recently but Ospreys are periodically seen around the islands and could nest there in the future.

Habitat for Species of Conservation Concern

- *Habitat for Special Concern and Rare Wildlife Species*: The islands are home to a large number of Special Concern and provincially rare species, including 12 plants, 19 birds and two reptiles.

4.8. Species at Risk

The Toronto Islands are home to four birds and one reptile species listed as Endangered or Threatened under the provincial *Endangered Species Act* (2007). Habitats of these species receive regulatory protection from development and harmful activities and are the most sensitive habitats to disturbance in the Toronto Islands. SAR known from the islands include:

Golden Eagle (*Aquila chrysaetos*) (Endangered): Golden Eagles are rare visitors to the Toronto Islands in the winter or during migration, but they do not nest or breed on the islands since this is well south of their breeding range in the far north.

Piping Plover (*Charadrius melodus*) (Endangered): Piping plovers nested on Hanlan's Beach in 2015, 2016 and 2019. Chicks were successfully hatched in 2016 which represented the first successful reproduction of Piping Plovers on the Toronto Waterfront in over 80 years. Regulated habitat for Piping Plovers, as defined in the General Habitat Description (MNRF, 2019a), is significant constraint to development or shoreline alteration at Hanlan's Beach.

Peregrine Falcon (*Falco peregrinus*) (Threatened): Peregrine Falcons nest in downtown Toronto and visit the islands to hunt, but they do not nest on the islands.

Barn Swallow (*Hirundo rustica*) (Threatened): Barn Swallows nest almost exclusively on human structures, such as bridges, concrete culverts, barns and other buildings. They can be expected to nest on suitable structures throughout the island system.

Blanding's Turtle (*Emydoidea blandingii*) (Threatened): Blanding's Turtles can still be found in suitable habitats around the islands. Regulated habitat for Blanding's Turtles, as defined in the General Habitat Description (MNRF, 2019b), is a constraint to development and certain other activities on the islands.

Endangered Bats: Ontario's four Endangered bat species – Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*M. lucifugus*), Northern Myotis (*M. septentrionalis*) and Tricoloured Bat (*Perimyotis subflavus*) – may occur on the Toronto Islands. Endangered bats could breed and nurse their young in cavity trees and other suitable habitat or they may simply stop over to feed or rest. It is unlikely that hibernacula for Endangered bat species occur on the islands since these bats typically overwinter in caves and mine shafts, which aren't present on the islands.

5. Regulated Features and Special Designations

Fish Habitat

All aquatic habitats in and around the islands which support fish are regulated by DFO under the federal *Fisheries Act* (1980). Activities that could affect fish and fish habitats, such as shoreline alterations, can be expected to require review and authorization by DFO.

Migratory Bird Sanctuary (proposed)

Because of its significance as a migratory bird stopover area, a proposal was introduced in 2017 by Toronto councillors Joe Cressy and Paula Fletcher to designate the islands as a Migratory Bird Sanctuary under the federal *Migratory Birds Convention Act* and the provincial *Migratory Birds Act*. The proposal must be approved by Environment and Climate Change Canada (ECCC) and MNRF before the title can be officially granted to the islands.

Area of Natural and Scientific Interest

The Toronto Islands contain a candidate Life Science Area of Natural and Scientific Interest (ANSI), which encompasses most of the islands' ESAs and wetlands. Life Science ANSI is an official designation for areas of high biodiversity and unique natural landscapes. NSE conducted an assessment of significance for the Toronto Island ANSI in 2009 and found that it satisfies all the criteria for provincial significance. However, the ANSI has not yet been officially designated by MNRF.

Provincially Significant Wetlands

As previously discussed, many of the island system's wetland features have been evaluated using OWES and are recognized by MNRF as being provincially significant. Under the natural heritage policies of the Provincial Policy Statement (PPS) (2020), development and site alteration within these features is not permitted.

Environmentally Significant Areas

The island system's ESAs have been delineated and assessed through field work and have been found to satisfy the criteria in Policy 3.4.14 of the City's Official Plan. Under the policies in the Official Plan, development and site alteration is prohibited in ESAs with the exception of conservation projects, trail development and flood and erosion control projects.

Significant Wildlife Habitat

SWH on the Toronto Islands is generally protected from harmful development and site alteration under the natural heritage policies of the PPS (2020). Most SWH on the islands is confined within ESAs, but some SWH (e.g., raptor wintering areas) encompasses large portions of the island system. Most development or site alteration projects on the islands will have to demonstrate how potential impacts to SWH will be mitigated.

6. Conclusions

The Toronto Islands support a diversity of aquatic and terrestrial species and habitats which reflect their origin as a dynamic Great Lakes sandspit and their legacy of human land use change. Key natural heritage considerations which should be incorporated into the Master Plan include:

1. Protection and creation of nearshore fish spawning habitat to protect the "fish nursery of the waterfront".
2. Protection of SAR habitat and PSWs from harmful development or interference
3. Careful management of ESAs to maintain ecological integrity and protect rare and unique species and habitats from the effects of invasive species, climate change and other stressors.
4. Implementation of a tree planting program and careful management of existing trees outside of ESAs in order to maintain a resilient urban forest canopy.
5. Provision of low-impact trails and interpretive features to connect residents and visitors with the island's unique ecological features.
6. Implement restrictions on outdoor cats to remove a significant imminent threat to migratory birds and improve the chances of recognition as a Migratory Bird Sanctuary.

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APPENDIX A | Flora and Fauna Tables

Appendix A-1. Flora Table

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
Aceraceae										
<i>Acer negundo</i> L.	Manitoba Maple	NO	G5	S5	NO					NO
<i>Acer platanoides</i> L.	Norway Maple	YES	G?	SE5	NO					NO
<i>Acer rubrum</i> L.	Red Maple	NO	G5	S5	NO					NO
<i>Acer saccharinum</i> L.	Silver Maple	NO	G5	S5	NO					NO
<i>Acer saccharum</i> Marshall ssp. <i>saccharum</i>	Sugar Maple	NO	G5T5	S5	NO					NO
<i>Acer x freemanii</i> E. Murr.	Hybrid Soft Maple	NO	HYB	S?	NO					NO
Alismataceae										
<i>Alisma plantago-aquatica</i> L.	Broad-leaved Water-plantain	NO	G5	SRF	NO					NO
<i>Sagittaria latifolia</i> Willd.	Broadleaf Arrowhead	NO	G5	S5	NO					NO
Amaranthaceae										
<i>Amaranthus retroflexus</i> L.	Red-root Pigweed	YES	G?	SE5	NO					NO
Anacardiaceae										
<i>Rhus aromatica</i> Aiton	Fragrant Sumac	NO	G5	S5			YES	R		NO
<i>Rhus radicans</i> L. ssp. <i>negundo</i> (Greene) McNeill	Climbing Poison-ivy	NO	G5T5	S5	NO					NO
<i>Rhus rydbergii</i> Small ex Rydb.	Western Poison-ivy	NO	G5	S5	NO					NO
<i>Rhus typhina</i> L.	Staghorn Sumac	NO	G5	S5	NO					NO
Apiaceae										
<i>Cicuta bulbifera</i> L.	Bulb-bearing Water-hemlock	NO	G5	S5	YES				L3	NO
<i>Daucus carota</i> L.	Wild Carrot	YES	G?	SE5	NO					NO
Apocynaceae										
<i>Apocynum cannabinum</i> L.	Indian Hemp	NO	G5	S5	NO					NO
Araceae										
<i>Symplocarpus foetidus</i> (L.) Salisb. ex Nutt.	Skunk Cabbage	NO	G5	S5	YES					YES
Asclepiadaceae										
<i>Asclepias incarnata</i> L.	Swamp Milkweed	NO	G5	S5	NO					NO
<i>Asclepias syriaca</i> L.	Common Milkweed	NO	G5	S5	NO					NO
<i>Cynanchum rossicum</i> (Kleopov) Borhidi	European Swallow-wort	YES	G?	SE5	NO					NO
Asteraceae										
<i>Achillea millefolium</i> L.	Common Yarrow	YES	G5T?	SE	NO					NO
<i>Achillea ptarmica</i> L.	False Sneezewort	YES	G?	SE2?	NO					NO
<i>Ambrosia artemisiifolia</i> L.	Annual Ragweed	NO	G5	S5	NO					NO
<i>Ambrosia trifida</i> L.	Great Ragweed	NO	G5	S5	NO					NO
<i>Arctium lappa</i> L.	Greater Burdock	YES	G?	SE5	NO					NO
<i>Arctium minus</i> (Hill) Bernh.	Common Burdock	YES	G?	SE5	NO					NO
<i>Artemisia biennis</i> Willd.	Biennial Wormwood	YES	G5	SE5	NO					NO
<i>Artemisia campestris</i> L. ssp. <i>caudata</i> (Michx.) H.M. Hall & Clements	Beach Wormwood	NO	G5T5	S4S5	YES				L2	YES

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
<i>Artemisia vulgaris</i> L.	Common Wormwood	YES	G?	SE5	NO					NO
<i>Bidens cernua</i> L.	Nodding Beggar-ticks	NO	G5	S5	NO					NO
<i>Bidens frondosa</i> L.	Devil's Beggar-ticks	NO	G5	S5	NO					NO
<i>Bidens tripartita</i> L.	Beggar-ticks	NO	G5	S5	YES			R		YES
<i>Cichorium intybus</i> L.	Chicory	YES	G?	SE5	NO					NO
<i>Cirsium arvense</i> (L.) Scop.	Canada Thistle	YES	G?	SE5	NO					NO
<i>Cirsium vulgare</i> (Savi) Ten.	Bull Thistle	YES	G5	SE5	NO					NO
<i>Conyza canadensis</i> (L.) Cronquist	Canada Fleabane	NO	G5	S5	NO					NO
<i>Erigeron annuus</i> (L.) Pers.	White-top Fleabane	NO	G5	S5	NO					NO
<i>Erigeron philadelphicus</i> L.	Philadelphia Fleabane	NO	G5T5	S5	NO					NO
<i>Eupatorium maculatum</i> L. ssp. <i>maculatum</i>	Spotted Joe-pye-weed	NO	G5T?	S5	NO					NO
<i>Eupatorium perfoliatum</i> L.	Common Boneset	NO	G5	S5	NO					NO
<i>Euthamia graminifolia</i> (L.) Nutt.	Flat-top Fragrant-golden-rod	NO	G5	S5	NO					NO
<i>Gaillardia pulchella</i> Foug.	Fire-wheel Blanket-flower	YES	G4G5	SE1	NO					NO
<i>Galinsoga parviflora</i> Cav.	Small-flower Quickweed	YES	G?	SE	NO					NO
<i>Helianthus tuberosus</i> L.	Jerusalem Artichoke	NO	G5	S5	NO					NO
<i>Hieracium pilosella</i> L.	Mouse-ear Hawkweed	YES	G?	SE5						NO
<i>Lactuca canadensis</i> L.	Canada Lettuce	NO	G5	S5	Unknown					NO
<i>Rudbeckia hirta</i> L.	Black-eyed Susan	NO	G5	S5						NO
<i>Silphium perfoliatum</i> L. var. <i>perfoliatum</i>	Cup-plant	NO	G5	S2	YES	YES		NPRr		NO
<i>Solidago altissima</i> L. var. <i>altissima</i>	Tall Goldenrod	NO	G5T5	S5	NO					NO
<i>Solidago canadensis</i>	Canada Goldenrod	NO	G5	S5	NO					
<i>Solidago flexicaulis</i> L.	Broad-leaved Goldenrod	NO	G5	S5	NO					NO
<i>Solidago gigantea</i> Aiton	Smooth Goldenrod	NO	G5	S5	NO					NO
<i>Solidago juncea</i> Aiton	Early Goldenrod	NO	G5	S5	Unknown					NO
<i>Solidago nemoralis</i>	Field Goldenrod	NO	G5	S5	NO					
<i>Solidago nemoralis</i> Aiton ssp. <i>nemoralis</i>	Gray Goldenrod	NO	G5T5	S5						NO
<i>Sonchus arvensis</i> L. ssp. <i>arvensis</i>	Field Sow-thistle	YES	G?T?	SE5	NO					NO
<i>Sonchus asper</i> (L.) Hill ssp. <i>asper</i>	Spiny Annual Sow-thistle	YES	G?T?	SE5	NO					NO
<i>Sonchus oleraceus</i> L.	Common Sow-thistle	YES	G?	SE5	NO					NO
<i>Symphyotrichum ciliolatum</i> (Lindl. in Hook) Löve & Löve	Lindley's Aster	NO	G5	S5	NO					YES
<i>Symphyotrichum cordifolium</i> (L.) Nesom	Heart-leaved Aster	NO	G5	S5	NO					NO
<i>Symphyotrichum ericoides</i>	White Heath Aster	NO	G5	S5	NO					
<i>Symphyotrichum laeve</i> (L.) Löve & Löve	Smooth Blue Aster	NO	G5	S5	YES		YES		L3	NO
<i>Symphyotrichum laeve</i> var. <i>laeve</i>	Smooth Aster	NO	G5T?	S5						
<i>Symphyotrichum lanceolatum</i> (Willd.) Nesom ssp. <i>lanceolatum</i>	Panicled Aster	NO	G5T?	S5	NO					NO
<i>Symphyotrichum novae-angliae</i> (L.) Nesom	New England Aster	NO	G5	S5	NO					NO
<i>Symphyotrichum pilosum</i>	White Heath Aster	NO	G5	S5						

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
<i>Symphyotrichum pilosum</i> (Willd.) Nesom var. <i>pilosum</i>	Hairy Aster	NO	G5T?	S5	YES				L3	YES
<i>Symphyotrichum pilosum</i> (Willd.) Nesom var. <i>pringlei</i> (A. Gray) Nesom	Pringle's Aster	NO	G5T5	S4	YES				L2	NO
<i>Symphyotrichum urophyllum</i> (Lindl. in DC.) Nesom	Arrow-leaved Aster	NO	G4	S4	YES		YES		L3	YES
<i>Taraxacum erythrospermum</i> Andr. ex Besser	Red-seeded Dandelion	YES	G?	SE5	NO					NO
<i>Taraxacum officinale</i> G. Weber	Common Dandelion	YES	G5	SE5	NO					NO
<i>Tragopogon pratensis</i> L. ssp. <i>pratensis</i>	Meadow Goat's-beard	YES	G?T?	SE5	NO					NO
<i>Tussilago farfara</i> L.	Colt's Foot	YES	G?	SE5	NO					NO
<i>Xanthium strumarium</i> L.	Rough Cockle-bur	NO	G5	S5	NO					NO
Balsaminaceae										
<i>Impatiens capensis</i> Meerb.	Spotted Jewel-weed	NO	G5	S5	NO					NO
<i>Impatiens glandulifera</i> Royle	Policeman's Helmet	YES	G?	SE4	NO					NO
<i>Impatiens pallida</i> Nutt.	Pale Jewel-weed	NO	G5	S5	Unknown					YES
Berberidaceae										
<i>Berberis thunbergii</i> DC.	Japanese Barberry	YES	G?	SE5	NO					NO
<i>Berberis vulgaris</i> L.	European Barberry	YES	G?	SE5	NO					NO
Betulaceae										
<i>Alnus glutinosa</i> (L.) Gaertn.	European Alder	YES	G?	SE4	NO					NO
<i>Betula papyrifera</i> Marshall	White Birch	NO	G5	S5	NO					NO
<i>Betula pendula</i> Roth	European Weeping Birch	YES	G?	SE4	NO					NO
Boraginaceae										
<i>Echium vulgare</i> L.	Common Viper's-bugloss	YES	G?	SE5	NO					NO
<i>Lithospermum officinale</i> L.	European Gromwell	YES	G?	SE5	NO					NO
<i>Myosotis laxa</i> Lehm.	Small Forget-me-not	NO	G5	S5	NO				L3	NO
<i>Myosotis scorpioides</i> L.	True Forget-me-not	YES	G5	SE5	NO					NO
Brassicaceae										
<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	Garlic Mustard	YES	G?	SE5	NO					NO
<i>Cakile edentula</i> (Bigelow) Hook.	American Sea-rocket	NO	G5	S4	YES			Rr	L2	YES
<i>Hesperis matronalis</i> L.	Dame's Rocket	YES	G4G5	SE5	NO					NO
<i>Lepidium densiflorum</i> Schrad.	Dense-flower Pepper-grass	YES	G5	SE5	NO					NO
<i>Rorippa palustris</i> (L.) Besser ssp. <i>fernaldiana</i> (Butters & Abbe) Jonsell	Marsh Yellow-cress	NO	G5T5	S5	NO					NO
Campanulaceae										
<i>Campanula aparinoides</i> Pursh	Marsh Bellflower	NO	G5	S5	YES				L2	YES
<i>Campanula rapunculoides</i> L.	Creeping Bellflower	YES	G?	SE5	NO					NO
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	NO	G5	S5	YES				L1	YES
Caprifoliaceae										
<i>Lonicera morrowii</i> A. Gray	Morrow Honeysuckle	YES	G?	SE3	NO					NO
<i>Lonicera tatarica</i> L.	Tartarian Honeysuckle	YES	G?	SE5	NO					NO
<i>Lonicera x bella</i> Zabel	Hybrid Honeysuckle	YES	HYB	SE2	NO					NO

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
<i>Lonicera xylosteum</i> L.	European Fly Honeysuckle	YES	G?	SE2	NO					NO
<i>Viburnum lantana</i> L.	Wayfaring Tree	YES	G?	SE2	NO					NO
<i>Viburnum opulus</i> L.	Guelder Rose	YES	G5	SE4	NO					NO
Caryophyllaceae										
<i>Arenaria serpyllifolia</i> L.	Thyme-leaf Sandwort	YES	G?	SE5	NO					NO
<i>Cerastium fontanum</i> Baumg.	Mouse-eared Chickweed	YES	G?	SE5	NO					NO
<i>Saponaria officinalis</i> L.	Bouncing-bet	YES	G?	SE5	NO					NO
<i>Silene antirrhina</i> L.	Sleepy Catchfly	NO	G5	S5	YES				L3	YES
<i>Silene latifolia</i> Poir.	Bladder Champion	YES	G?	SE5	NO					NO
Celastraceae										
<i>Euonymus europaea</i> L.	European Spindle Tree	YES	G?	SE2	NO					NO
Ceratophyllaceae										
<i>Ceratophyllum demersum</i> L.	Common Hornwort	NO	G5	S5	YES				L3	YES
Chenopodiaceae										
<i>Chenopodium album</i> L. var. <i>album</i>	Lamb's Quarters	YES	G5T?	SE5	NO					NO
<i>Chenopodium glaucum</i> L. ssp. <i>glaucum</i>	Oak-leaved Goosefoot	YES	G5T?	SE5	NO					NO
<i>Cycloloma atriplicifolium</i> (Spreng.) J. Coult.	Winged Pigweed	NO	G5	S4	NO					NO
<i>Salsola kali</i> L.	Russian-thistle	YES	G?T?	SE1	NO					NO
Convolvulaceae										
<i>Calystegia sepium</i> (L.) R. Br. ssp. <i>angulatum</i> Brummitt	Hedge Bindweed	NO	G5T5	SU						NO
<i>Convolvulus arvensis</i> L.	Field Bindweed	YES	G?	SE5	NO					NO
Cornaceae										
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	NO	G5	S5	NO				L3	NO
<i>Cornus stolonifera</i> Michx.	Red-osier Dogwood	NO	G5	S5	NO					NO
Crassulaceae										
<i>Sedum acre</i> L.	Mossy Stonecrop	YES	G?	SE5	NO					NO
Cucurbitaceae										
<i>Echinocystis lobata</i> (Michx.) Torr. & A. Gray	Wild Cucumber	NO	G5	S5	NO					NO
Cupressaceae										
<i>Juniperus virginiana</i> L.	Eastern Red Cedar	NO	G5	S5	YES					YES
<i>Thuja occidentalis</i> L.	Eastern White Cedar	NO	G5	S5	NO					NO
Cyperaceae										
<i>Carex aquatilis</i> Wahlenb.	Aquatic Sedge	NO	G5	S5	YES				L2	YES
<i>Carex aurea</i> Nutt.	Golden-fruited Sedge	NO	G5	S5	NO					NO
<i>Carex bebbii</i> (L.H. Bailey) Olney ex Fern.	Bebb's Sedge	NO	G5	S5	NO					NO
<i>Carex cristatella</i> Britton	Crested Sedge	NO	G5	S5	NO					NO
<i>Carex garberi</i> Fern.	Elk Sedge	NO	G4	S4	YES			r	L2	NO
<i>Carex gracillima</i> Schwein.	Graceful Sedge	NO	G5	S5	NO					NO

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<i>Carex lasiocarpa</i> Ehrh.	Slender Sedge	NO	G5	S5	Extirpated				L2	YES
<i>Carex pellita</i> Willd.	Woolly Sedge	NO	G5	S5	YES					YES
<i>Carex projecta</i> Mack.	Necklace Sedge	NO	G5	S5	YES					YES
<i>Carex pseudo-cyperus</i> L.	Cyperus-like Sedge	NO	G5	S5	NO					NO
<i>Carex viridula</i> Michx. ssp. <i>viridula</i>	Green Sedge	NO	G5	S5	YES				L2	YES
<i>Cyperus bipartitus</i> Torr.	Umbrella Sedge	NO	G5	S5	YES				L3	YES
<i>Cyperus fuscus</i> L.	Brown Cyperus	YES	G?	SE2	NO					NO
<i>Cyperus odoratus</i> L.	Fragrant Umbrella Sedge	NO	G5	S5	YES			R	L3	YES
<i>Cyperus schweinitzii</i> Torr.	Schweinitz's Cyperus	NO	G5	S3	YES			r	L2	NO
<i>Cyperus squarrosus</i> L.	Awed Cyperus	NO	G5	S4				R		NO
<i>Eleocharis acicularis</i> (L.) Roem. & Schult.	Least Spike-rush	NO	G5	S5	YES				L3	YES
<i>Eleocharis elliptica</i> Kunth	Slender Spike-rush	NO	G5	S5	YES				L3	NO
<i>Eleocharis erythropoda</i> Steud.	Red-stemmed Spike-rush	NO	G5	S5	NO					NO
<i>Eleocharis pauciflora</i> (Light.) Link	Few-flowered Spike-rush	NO	G5	S5	YES				L2	NO
<i>Scirpus acutus</i> Muhlenb. ex Bigelow	Hard-stemmed Bulrush	NO	G5	S5	YES				L3	YES
<i>Scirpus fluviatilis</i> (Torr.) A. Gray	River Bulrush	NO	G5	S4S5	YES				L3	YES
<i>Scirpus pungens</i> M. Vahl	Common Three-square	NO	G5	S5	YES					YES
<i>Scirpus validus</i> L.	Softstem Bulrush	NO	G?	S5	NO					NO
<i>Scleria verticillata</i> Muhlenb. ex Willd.	Low Nutrush	NO	G5	S3	YES			NPR	L1	NO
Dipsacaceae										
<i>Dipsacus fullonum</i> L. ssp. <i>sylvestris</i> (Hudson) Clapham	Wild Teasel	YES	G?T?	SE5	NO					NO
Dryopteridaceae										
<i>Dryopteris carthusiana</i> (Vill.) H.P. Fuchs	Spinulose Wood Fern	NO	G5	S5	NO					NO
<i>Matteuccia struthiopteris</i> (L.) Tod. var. <i>pensylvanica</i> (Willd.) C.V. Morton	Ostrich Fern	NO	G5	S5	NO					NO
<i>Onoclea sensibilis</i> L.	Sensitive Fern	NO	G5	S5	NO					NO
Elaeagnaceae										
<i>Elaeagnus umbellata</i> Thunb.	Autum Olive	YES	G?	SE3	NO					NO
Equisetaceae										
<i>Equisetum arvense</i> L.	Field Horsetail	NO	G5	S5	NO					NO
<i>Equisetum fluviatile</i> L.	Water Horsetail	NO	G5	S5	YES				L3	YES
<i>Equisetum hyemale</i> L. ssp. <i>affine</i> (Engelm.) Calder & Roy	Scouring-rush	NO	G5	S5	NO					NO
<i>Equisetum x nelsonii</i> (A.A. Eaton) J.H. Schaffn.	Hybrid Horsetail	NO	HYB	S2?	NO				L3	NO
Euphorbiaceae										
<i>Chamaesyce polygonifolia</i> (L.) Small	Seaside Spurge	NO	G5?	S4	YES			Rr	L2	YES
Fabaceae										
<i>Amphicarpaea bracteata</i> (L.) Fern.	American Hog-peanut	NO	G5	S5	NO					NO
<i>Coronilla varia</i> L.	Crown-vetch	YES	G?	SE5	NO					NO
<i>Desmodium canadense</i> (L.) DC.	Showy Tick-trefoil	NO	G5	S4	NO		YES			YES

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<i>Lathyrus palustris</i> L.	Vetchling Peavine	NO	G5	S5	YES				L2	YES
<i>Medicago lupulina</i> L.	Black Medic	YES	G?	SE5	NO					NO
<i>Medicago sativa</i> L. ssp. <i>sativa</i>	Alfalfa	YES	G?T?	SE5	NO					NO
<i>Melilotus alba</i> Medik.	White Sweet Clover	YES	G5	SE5	NO					NO
<i>Robinia pseudo-acacia</i> L.	Black Locust	YES	G5	SE5	NO					NO
<i>Trifolium pratense</i> L.	Red Clover	YES	G?	SE5	NO					NO
<i>Trifolium repens</i> L.	White Clover	YES	G?	SE5	NO					NO
<i>Vicia cracca</i> L.	Tufted Vetch	YES	G?	SE5	NO					NO
Fagaceae										
<i>Quercus macrocarpa</i> Michx.	Bur Oak	NO	G5	S5	NO					NO
<i>Quercus rubra</i> L.	Red Oak	NO	G5	S5	NO					NO
Gentianaceae										
<i>Gentianopsis crinita</i> (Froel.) Ma	Fringed Gentian	NO	G5	S5	YES			R	L2	Ext
Grossulariaceae										
<i>Ribes hirtellum</i> Michx.	Smooth Gooseberry	NO	G5	S5	YES				L3	YES
Guttiferae										
<i>Hypericum majus</i> (A. Gray) Britton	Larger Canadian St. John's-wort	NO	G5	S5	Extirpated				LX	YES
Haloragaceae										
<i>Myriophyllum sibiricum</i> Kom.	Common Water-milfoil	NO	G5	S5	YES				L1	YES
<i>Myriophyllum spicatum</i> L.	Eurasian Water-milfoil	YES	G?	SE5	NO					NO
Hippocastanaceae										
<i>Aesculus hippocastanum</i> L.	Horse Chestnut	YES	G?	SE2	NO					NO
Hydrocharitaceae										
<i>Elodea canadensis</i> Rich. ex Michx.	Broad Waterweed	NO	G5	S5	YES				L3	YES
<i>Elodea nuttallii</i> (Planchon) H. St. John	Nuttall's Waterweed	NO	G5	S3	YES			R	L3	NO
<i>Vallisneria americana</i> Michx.	Water-celery	NO	G5	S5	YES				L1	YES
Iridaceae										
<i>Iris pseudacorus</i> L.	Yellow Iris	YES	G?	SE3	NO					NO
<i>Iris versicolor</i> L.	Blueflag	NO	G5	S5	Unknown				L3	NO
Juncaceae										
<i>Juncus acuminatus</i> Michx.	Sharp-fruited Rush	NO	G5	S3	Extirpated			PR	LX	NO
<i>Juncus alpinoarticulatus</i> Chaix	Richardson Rush	NO	G5	S5	YES				L3	YES
<i>Juncus articulatus</i> L.	Jointed Rush	NO	G5	S5						NO
<i>Juncus balticus</i> Willd.	Baltic Rush	NO	G5	S5	YES					YES
<i>Juncus brachycarpus</i> Engelm.	Shore Rush	NO	G4G5	S1						NO
<i>Juncus brachycephalus</i> (Engelm.) Buch.	Small-head Rush	NO	G5	S4S5	YES				L2	NO
<i>Juncus bufonius</i> L.	Toad Rush	NO	G5	S5	NO					NO

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<i>Juncus dudleyi</i> Wiegelb	Dudley's Rush	NO	G5	S5	NO					NO
<i>Juncus effusus</i> L. ssp. <i>solutus</i> (Fern. & Wiegand) Hämet-Ahti	Soft Rush	NO	G5	S5?	NO					NO
<i>Juncus nodosus</i> L.	Knotted Rush	NO	G5	S5	NO					NO
<i>Juncus tenuis</i> Willd.	Path Rush	NO	G5	S5	NO					NO
<i>Juncus torreyi</i> Coville	Torrey's Rush	NO	G5	S5	NO					NO
Juncaginaceae										
<i>Triglochin maritimum</i> L.	Common Bog Arrow-grass	NO	G5	S5	YES				L1	YES
Lamiaceae										
<i>Glechoma hederacea</i> L.	Ground Ivy	YES	G?	SE5	NO					NO
<i>Leonurus cardiaca</i> L.	Motherwort	YES	G?	SE5	NO					NO
<i>Lycopus americanus</i> Muhlenb. ex Bartram	American Bugleweed	NO	G5	S5	NO					NO
<i>Lycopus europaeus</i> L.	European Bugleweed	YES	G?	SE5	NO					NO
<i>Lycopus uniflorus</i> Michx.	northern Bugleweed	NO	G5	S5	NO					NO
<i>Mentha arvensis</i> L.	Field Mint	NO	G5	S5	NO					NO
<i>Mentha x piperita</i> L.	Pepper Mint	YES	HYB	SE4	NO					NO
<i>Nepeta cataria</i> L.	Catnip	YES	G?	SE5	NO					NO
<i>Physostegia virginiana</i> (L.) Benth. ssp. <i>virginiana</i>	Virginia False Dragonhead	NO	G5	S4	YES				L3	NO
<i>Prunella vulgaris</i> L. ssp. <i>vulgaris</i>	Heal-all	YES	G5T?	SE3	NO					NO
<i>Pycnanthemum virginianum</i> (L.) Durand & Jackson ex Fern. & Robinson	Virginia Mountain-mint	NO	G5	S4	YES		YES	R	L3	NO
<i>Scutellaria galericulata</i> L.	Hooded Skullcap	NO	G5	S5	Unknown					NO
<i>Scutellaria lateriflora</i> L.	Mad Dog Skullcap	NO	G5	S5	Unknown					NO
<i>Stachys palustris</i> L.	Marsh Hedge-nettle	YES	G5?	SE5	YES				L3	YES
<i>Teucrium canadense</i> L. ssp. <i>canadense</i>	Wood Germander	NO	G5T5	S5?	YES				L3	YES
Lemnaceae										
<i>Lemna minor</i> L.	Lesser Duckweed	NO	G5	S5	NO					NO
<i>Lemna trisulca</i> L.	Star Duckweed	NO	G5	S5	YES				L3	YES
<i>Spirodela polyrhiza</i> (L.) Schleid.	Greater Duckweed	NO	G5	S5	YES				L3	NO
Lentibulariaceae										
<i>Utricularia cornuta</i> Michx.	Horned Bladderwort	NO	G5	S5						YES
<i>Utricularia miNO</i> r L.	Lesser Bladderwort	NO	G5	S5	YES				L1	YES
<i>Utricularia vulgaris</i> L.	Greater Bladderwort	NO	G5	S5	YES				L1	YES
Liliaceae										
<i>Asparagus officinalis</i> L.	Asparagus	YES	G5?	SE5	NO					NO
<i>Convallaria majalis</i> L.	Lily-of-the-valley	YES	G5	SE5	NO					NO
<i>Hemerocallis fulva</i> (L.) L.	Orange Daylily	YES	G?	SE5	NO					NO
<i>Maianthemum stellatum</i> (L.) Link	Starflower False Solomon's-seal	NO	G5	S5	NO					NO
Lythraceae										

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<i>Lythrum salicaria</i> L.	Purple Loosestrife	YES	G5	SE5	NO					NO
Magnoliaceae										
<i>Liriodendron tulipifera</i> L.	Tulip Tree	NO	G5	S4		YES		NPRr		NO
Moraceae										
<i>Morus alba</i> L.	White Mulberry	YES	G?	SE5	NO					NO
Najadaceae										
<i>Najas flexilis</i> (Willd.) Rost. & W. Schmidt	Slender Naiad	NO	G5	S5	YES				L2	YES
Nymphaeaceae										
<i>Nuphar variegata</i> Durand in Clinton	Yellow Cowlily	NO	G5T5	S5	YES				L3	YES
<i>Nymphaea odorata</i> Ait. spp. odorata	Fragrant White Water-lily	NO	G5T5	S5?						NO
Oleaceae										
<i>Fraxinus americana</i> L.	White Ash	NO	G5	S5	NO					NO
<i>Syringa vulgaris</i> L.	Lilac	YES	G?	SE5	NO					NO
Onagraceae										
<i>Circaea lutetiana</i> L. ssp. canadensis (L.) Aschers. & Magnusson	Enchanter's Nightshade	NO	G5	S5	NO					NO
<i>Epilobium ciliatum</i> Raf. ssp. ciliatum	Hairy Willow-herb	NO	G5	S5	NO					NO
<i>Epilobium hirsutum</i> L.	Great-hairy Willow-herb	YES	G?	SE5	NO					NO
<i>Epilobium parviflorum</i> Schreb.	Small-flower Willow-herb	YES	G?	SE4	NO					NO
<i>Oenothera biennis</i> L.	Common Evening-primrose	NO	G5	S5	Unknown					NO
<i>Oenothera oakesiana</i> (A. Gray) Robbins ex S. Watson & Coult.	Evening-primrose	NO	G4G5Q	S4?	YES			R	L3	NO
<i>Oenothera villosa</i> Thunb. ssp. villosa	Villose Evening-primrose	NO	G5	S2?	YES	YES			L3	NO
Orchidaceae										
<i>Epipactis helleborine</i> (L.) Crantz	Eastern Helleborine	YES	G?	SE5	NO					NO
<i>Liparis loeselii</i> (L.) Rich. ex Lindl.	Loesel's Twayblade	NO	G5	S4S5	YES				L3	YES
<i>Platanthera hyperborea</i> (L.) Lindl.	Leafy northern Green Orchid	NO	G5	S5	YES				L2	NO
<i>Spiranthes cernua</i> (L.) Rich.	nodding Ladies'-tresses	NO	G5	S5	YES				L3	YES
<i>Spiranthes romanzoffiana</i> Cham.	Hooded Ladies'-tresses	NO	G5	S5	YES				L1	NO
Oxalidaceae										
<i>Oxalis stricta</i> L.	Upright Yellow Wood-sorrel	NO	G5	S5	NO					NO
Papaveraceae										
<i>Chelidonium majus</i> L.	Celandine	YES	G?	SE5	NO					NO
Pinaceae										
<i>Larix decidua</i> Miller	European Larch	YES	G5	SE2	NO					NO
<i>Picea abies</i> (L.) Karsten	Norway Spruce	YES	G5	SE3	NO					NO
<i>Picea glauca</i> (Moench) Voss	White Spruce	NO	G5	S5	NO				L3	YES
<i>Pinus resinosa</i> Sol. ex Aiton	Red Pine	NO	G5	S5	YES				L1	YES
<i>Pinus strobus</i> L.	White Pine	NO	G5	S5	NO					NO
<i>Pinus sylvestris</i> L.	Scotch Pine	YES	G?	SE5	NO					NO

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Plantaginaceae										
<i>Plantago lanceolata</i> L.	English Plantain	YES	G5	SE5	NO					NO
<i>Plantago major</i> L.	Nipple-seed Plantain	YES	G5	SE5	NO					NO
Poaceae										
<i>Agrostis gigantea</i> Roth	Red-top	YES	G4G5	SE5	NO					NO
<i>Agrostis scabra</i> Willd.	Rough Bentgrass	NO	G5	S5	YES				L3	NO
<i>Agrostis stolonifera</i> L.	Spreading Bentgrass	NO	G5	S5	NO					NO
<i>Ammophila breviligulata</i> Fern.	American Beachgrass	NO	G5	S3	YES			r	L3	NO
<i>Andropogon gerardii</i> Vitman	Big Bluestem	NO	G5	S4	YES		YES		L3	YES
<i>Bromus inermis</i> Leyss. ssp. inermis	Smooth Brome	YES	G5T?	SE5	NO					NO
<i>Bromus tectorum</i> L.	Cheat Grass	YES	G?	SE5	NO					NO
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	Canada Blue-joint	NO	G5	S5	NO					NO
<i>Dactylis glomerata</i> L.	Orchard Grass	YES	G?	SE5	NO					NO
<i>Echinochloa crusgalli</i> (L.) P. Beauv.	Barnyard Grass	YES	G?	SE5	NO					NO
<i>Elymus canadensis</i> L.	Canada Wild-rye	NO	G5	S4S5	YES		YES		L3	Ext
<i>Elymus hystrix</i> L.	Bottlebrush Grass	NO	G5	S5	Unknown					NO
<i>Elymus repens</i> (L.) Gould	Quack Grass	YES	G5	SE5	NO					NO
<i>Eragrostis pectinacea</i> (Michx.) Nees ex Steud. var. pectinacea	Tufted Love Grass	NO	G5T5	S5	NO					NO
<i>Festuca arundinacea</i> Schreb.	Kentucky Fescue	YES	G?	SE5	NO					NO
<i>Festuca pratensis</i> Hudson	Meadow Fescue	YES	G5	SE5	NO					NO
<i>Festuca rubra</i> L. ssp. rubra	Red Fescue	NO	G5	S5	NO					NO
<i>Festuca trachyphylla</i> (Hack.) Krajina	Hard Fescue	YES	G?	SE4	NO					NO
<i>Hordeum jubatum</i> L.	Foxtail Barley	YES	G5	SE5	NO					NO
<i>Leersia oryzoides</i> (L.) Sw.	Rice Cutgrass	NO	G5	S5	NO					NO
<i>Miscanthus sacchariflorus</i> (Maxim.) Hack.	Japanese Silver Grass	YES	G?	SE3	NO					NO
<i>Panicum acuminatum</i> Sw. var. acuminatum	Acuminate Panic Grass	NO	G5T5	S5	NO		YES			NO
<i>Panicum capillare</i> L.	Witchgrass	NO	G5	S5	NO					NO
<i>Panicum flexile</i> (Gattinger) Scribn.	Wiry Witchgrass	NO	G5	S4	YES				L3	NO
<i>Panicum virgatum</i> L.	Old Switch Panic Grass	NO	G5	S4	YES		YES		L3	NO
<i>Phalaris arundinacea</i> L.	Reed Canary Grass	NO	G5	S5	NO					NO
<i>Phleum pratense</i> L.	Meadow Timothy	YES	G?	SE5	NO					NO
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Common Reed	NO	G5	S5	NO					NO
<i>Poa annua</i> L.	Annual Bluegrass	YES	G?	SE5	NO					NO
<i>Poa compressa</i> L.	Canada Bluegrass	YES	G?	SE5	NO					NO
<i>Poa palustris</i> L.	Fowl Bluegrass	NO	G5	S5	NO					NO
<i>Poa pratensis</i> L. ssp. pratensis	Kentucky Bluegrass	NO	G5T5?	S5	NO					NO
<i>Setaria verticillata</i> (L.) P. Beauv.	Bristly Foxtail	YES	G?	SE4	NO					NO
<i>Setaria viridis</i> (L.) P. Beauv.	Green Bristle Grass	YES	G?	SE5	NO					NO

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
<i>Spartina pectinata</i> Link	Fresh Water Cordgrass	NO	G5	S4	YES		YES		L3	Ext
<i>Sphenopholis intermedia</i> (Rydb.) Rydb.	Slender Wedge Grass	NO	G5	S4S5	Unknown				L3	NO
<i>Sporobolus cryptandrus</i> (Torr.) A. Gray	Sand Dropseed	NO	G5	S4	YES		YES		L3	YES
<i>Zea mays</i> L.	Indian Corn	YES	G?	SE2	NO					NO
Polygonaceae										
<i>Polygonum amphibium</i> L.	Water Smartweed	NO	G5	S5	YES				L3	NO
<i>Polygonum aviculare</i> L.	Prostrate Knotweed	YES	G?	SE5	NO					NO
<i>Polygonum convolvulus</i> L.	Black Bindweed	YES	G?	SE5	NO					NO
<i>Polygonum cuspidatum</i> Siebold & Zucc.	Japanese Knotweed	YES	G?	SE4	NO					NO
<i>Polygonum lapathifolium</i> L.	Dock-leaf Smartweed	NO	G5	S5	NO					NO
<i>Polygonum pensylvanicum</i> L.	Pennsylvania Smartweed	NO	G5	S5	YES					YES
<i>Polygonum persicaria</i> L.	Lady's Thumb	YES	G3G5	SE5	YES					NO
<i>Rumex crispus</i> L.	Curly Dock	YES	G?	SE5	NO					NO
<i>Rumex maritimus</i> L.	Sea-side Dock	NO	G5	S4	NO					NO
<i>Rumex orbiculatus</i> A. Gray	Water Dock	NO	G5	S4S5	YES				L3	YES
Potamogetonaceae										
<i>Potamogeton berchtoldii</i> Fieber	Slender Pondweed	NO	G5	S4S5	YES				L1	YES
<i>Potamogeton crispus</i> L.	Curly Pondweed	YES	G5	SE5	NO					NO
<i>Potamogeton gramineus</i> L.	Grassy Pondweed	NO	G5	S5	YES				L2	YES
<i>Potamogeton pectinatus</i> L.	Sago Pondweed	NO	G5	S5	Unknown					NO
<i>Potamogeton perfoliatus</i> L.	Clasping-leaf Pondweed	NO	G5	S4	Extirpated			R	LX	NO
<i>Potamogeton richardsonii</i> (A. Bennett) Rydb.	Richardson's Pondweed	NO	G5	S5	YES				L1	YES
<i>Potamogeton zosteriformis</i> Fern.	Flatstem Pondweed	NO	G5	S5	YES				L2	YES
Primulaceae										
<i>Lysimachia ciliata</i> L.	Fringed Loosestrife	NO	G5	S5	NO					NO
<i>Lysimachia nummularia</i> L.	Creeping Jennie	YES	G?	SE5	NO					NO
<i>Lysimachia terrestris</i> (L.) B.S.P.	Swamp Loosestrife	NO	G5	S5	YES				L2	YES
<i>Lysimachia thyrsoflora</i> L.	Water Loosestrife	NO	G5	S5	YES				L3	YES
<i>Lysimachia vulgaris</i> L.	Garden Loosestrife	YES	G?	SE3	NO					NO
Ranunculaceae										
<i>Anemone canadensis</i> L.	Canada Anemone	NO	G5	S5	NO					NO
<i>Anemone cylindrica</i> A. Gray	Thimbleweed	NO	G5	S4	YES		YES		L3	YES
<i>Ranunculus acris</i> L.	Tall Butter-cup	YES	G5	SE5	NO					NO
<i>Ranunculus repens</i> L.	Creeping Buttercup	YES	G?	SE5	NO					NO
<i>Ranunculus sceleratus</i> L. var. <i>sceleratus</i>	Cursed Crowfoot	NO	G5	SU	NO					NO
<i>Thalictrum pubescens</i> Pursh	Tall Meadow-rue	NO	G5	S5	NO					NO
Rhamnaceae										
<i>Rhamnus cathartica</i> L.	European Buckthorn	YES	G?	SE5	NO					NO

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
<i>Rhamnus frangula</i> L.	Glossy Buckthorn	YES	G?	SE5	NO					NO
Rosaceae										
<i>Aruncus dioicus</i> (Walter) Fern.	Common Goatsbeard	YES	G5	SE1						NO
<i>Fragaria virginiana</i> Miller ssp. <i>virginiana</i>	Virginia Strawberry	NO	G5	SU	NO					NO
<i>Geum canadense</i> Jacq.	White Avens	NO	G5	S5	NO					NO
<i>Geum urbanum</i> L.	Clover-root	YES	G5	SE2	NO					NO
<i>Malus pumila</i> Miller	Common Crabapple	YES	G5	SE5	NO					NO
<i>Potentilla anserina</i> L. ssp. <i>anserina</i>	Silverweed	NO	G5	S5	NO					YES
<i>Potentilla argentea</i> L.	Silvery Cinquefoil	YES	G?	SE5	NO					NO
<i>Potentilla palustris</i> (L.) Scop.	Marsh Cinquefoil	NO	G5	S5	YES				L2	YES
<i>Potentilla paradoxa</i> Nutt.	Bushy Cinquefoil	NO	G5	S3	YES			PRr	L3	YES
<i>Potentilla recta</i> L.	Sulphur Cinquefoil	YES	G?	SE5	NO					NO
<i>Prunus pensylvanica</i> L. f.	Pin Cherry	NO	G5	S5	NO					NO
<i>Prunus virginiana</i> L.	Choke Cherry	NO	G5	S5	NO					NO
<i>Rosa blanda</i> Aiton	Smooth Rose	NO	G5	S5	NO					NO
<i>Rosa multiflora</i> Thunb. ex Murray	Multiflora Rose	YES	G?	SE4	NO					NO
<i>Rosa rugosa</i> Thunb.	Rugosa Rose	YES	G?	SE1	NO					NO
<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i> (Dieck) Focke	Red Raspberry	NO	G5T5	S5	NO					NO
<i>Rubus occidentalis</i> L.	Black Raspberry	NO	G5	S5	NO					NO
<i>Rubus odoratus</i> L.	Purple Flowering Raspberry	NO	G5	S5	NO					NO
<i>Sorbus aucuparia</i> L.	European Mountain-ash	YES	G5	SE4	NO					NO
Rubiaceae										
<i>Galium palustre</i> L.	Marsh Bedstraw	NO	G5	S5	NO					NO
Rutaceae										
<i>Ptelea trifoliata</i> L.	Hop Tree	NO	G5	S3		YES		NPRr		NO
Salicaceae										
<i>Populus alba</i> L.	White Poplar	YES	G5	SE5	NO					NO
<i>Populus balsamifera</i> L. ssp. <i>balsamifera</i>	Balsam Poplar	NO	G5	S5	NO					NO
<i>Populus deltoides</i> Bartram ex Marshall ssp. <i>deltoides</i>	Eastern Cottonwood	NO	G5T5	SU	NO					NO
<i>Populus nigra</i> L.	Lombardy Poplar	YES	G5	SE4	NO					NO
<i>Populus tremuloides</i> Michx.	Trembling Aspen	NO	G5	S5	NO					NO
<i>Salix amygdaloides</i> Anderss.	Peach-leaved Willow	NO	G5	S5	Unknown					YES
<i>Salix bebbiana</i> Sarg.	Beaked Willow	NO	G5	S5	NO					NO
<i>Salix cordata</i> Michx.	Diamond Willow	NO	G5	S4S5	Extirpated			r	LX	NO
<i>Salix discolor</i> Muhlenb.	Pussy Willow	NO	G5	S5	NO					NO
<i>Salix eriocephala</i> Michx.	Heart-leaved Willow	NO	G5	S5	NO					NO
<i>Salix exigua</i> Nutt.	Sandbar Willow	NO	G5	S5	NO					YES
<i>Salix fragilis</i> L.	Crack Willow	YES	G?	SE5	NO					NO

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
<i>Salix lucida Muhlenb.</i>	Shining Willow	NO	G5	S5	YES				L3	YES
<i>Salix nigra Marshall</i>	Black Willow	NO	G5	S4?	YES				L3	YES
<i>Salix purpurea L.</i>	Basket Willow	YES	G5	SE4	NO					NO
<i>Salix sp.</i>	Willow	?	G?	S?						?
<i>Salix x rubens Schrank</i>	Hybrid Willow	YES	HYB	SE4	NO					NO
Scrophulariaceae										
<i>Agalinis paupercula (Gray) Britton</i>	Small-flowered Agalinis	NO	G5	SU	YES				L1	NO
<i>Agalinis purpurea (L.) Pennell</i>	Large Purple Agalinis	NO	G5	S1	Extirpated				LX	NO
<i>Agalinis tenuifolia (M. Vahl) Raf. var. macrophylla (Benth.) Blake</i>	Slender-leaved Agalinis	NO	G5T4T5	S1?						NO
<i>Linaria vulgaris Miller</i>	Butter-and-eggs	YES	G?	SE5	NO					NO
<i>Lindernia dubia (L.) Pennell var. anagallidea (Michx.) Cooperrider</i>	Long-stalked False Pimpernel	NO	G5T4	S1						NO
<i>Lindernia dubia (L.) Pennell var. dubia</i>	Low-stalked False Pimpernel	NO	G5T5	S4	YES				L3	YES
<i>Mimulus ringens L.</i>	Square-stem Monkeyflower	NO	G5	S5	NO				L3	NO
<i>Verbascum thapsus L.</i>	Great Mullein	YES	G?	SE5	NO					NO
Simaroubaceae										
<i>Ailanthus altissima (Miller) Swingle</i>	Tree-of-heaven	YES	G?	SE5	NO					NO
Solanaceae										
<i>Physalis virginiana Miller</i>	Virginia Ground-cherry	NO	G5	SU	YES	YES		Rr	L3	YES
<i>Solanum dulcamara L.</i>	Climbing Nightshade	YES	G?	SE5	NO					NO
<i>Solanum nigrum L.</i>	Black Nightshade	YES	G?	SE1	NO					NO
Sparganiaceae										
<i>Sparganium eurycarpum Engelm. ex A. Gray</i>	Large Bur-reed	NO	G5	S5	YES				L3	YES
Tiliaceae										
<i>Tilia cordata Miller</i>	Little-leaf Linden	YES	G?	SE1						NO
Typhaceae										
<i>Typha angustifolia L.</i>	Narrow-leaved Cattail	YES	G5	SE5	NO					NO
<i>Typha latifolia L.</i>	Broad-leaf Cattail	NO	G5	S5	NO					NO
<i>Typha x glauca Godron</i>	Blue Cattail	YES	HYB	SE5	NO					NO
Ulmaceae										
<i>Ulmus americana L.</i>	American Elm	NO	G5?	S5	NO					NO
Urticaceae										
<i>Urtica dioica L. ssp. dioica</i>	European Stinging Nettle	YES	G5T?	SE2	NO					NO
Verbenaceae										
<i>Verbena hastata L.</i>	Blue Vervain	NO	G5	S5	NO					NO
Violaceae										
<i>Viola arvensis Murray</i>	European Field Pansy	YES	G?	SE4	NO					NO
<i>Viola sororia Willd.</i>	Woolly Blue Violet	NO	G5	S5	NO					NO
Vitaceae										

Scientific Name	Common Name	Introduced	GRank	SRank	7E4	Carolinian Zone	Prairie Savannah	MNR Central Region	TRCA	CVC
<i>Parthenocissus vitacea (Knerr) Hitchc.</i>	Inserted Virginia Creeper	NO	G5	S5	NO					
<i>Vitis riparia Michx.</i>	Riverbank Grape	NO	G5	S5	NO					NO

Appendix A-2. Fauna Table

Scientific Name	Common Name	Introduced	GRank	SRank	COSEWIC	ESA	TRCA	Area Sensitive
Amphibian								
<i>Anaxyrus americanus</i>	American Toad	NO	G5	S5			L4	NO
<i>Lithobates pipiens</i>	Northern Leopard Frog	NO	G5	S5	NAR		L3	YES
Bird								
<i>Branta canadensis</i>	Canada Goose	NO	G5	S5			L5	NO
<i>Aix sponsa</i>	Wood Duck	NO	G5	S5			L4	NO
<i>Mareca strepera</i>	Gadwall	NO	G5	S4			L4	NO
<i>Anas platyrhynchos</i>	Mallard	NO	G5	S5			L5	NO
<i>Anas crecca</i>	Green-winged Teal	NO	G5	S4			L2	NO
<i>Aythya valisineria</i>	Canvasback	NO	G5	S1B,S4N			L2	YES
<i>Aythya americana</i>	Redhead	NO	G5	S2B,S4N				YES
<i>Melanitta fusca</i>	White-winged Scoter	NO	G5	S4B,S4N				NO
<i>Clangula hyemalis</i>	Long-tailed Duck	NO	G5	S3B				NO
<i>Bucephala albeola</i>	Bufflehead	NO	G5	S4				NO
<i>Bucephala clangula</i>	Common Goldeneye	NO	G5	S5				YES
<i>Mergus merganser</i>	Common Merganser	NO	G5	S5B,S5N			L3	YES
<i>Oxyura jamaicensis</i>	Ruddy Duck	NO	G5	S4B,S4N				NO
<i>Podiceps auritus</i>	Horned Grebe	NO	G5	S1B,S4N	SC	SC		NO
<i>Ardea herodias</i>	Great Blue Heron	NO	G5	S4			L3	NO
<i>Ardea alba</i>	Great Egret	NO	G5	S2B			L3	NO
<i>Butorides virescens</i>	Green Heron	NO	G5	S4B			L4	NO
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	NO	G5	S3B,S3N			L3	NO
<i>Pandion haliaetus</i>	Osprey	NO	G5	S5B			L3	NO
<i>Haliaeetus leucocephalus</i>	Bald Eagle	NO	G5	S2N,S4B	NAR	SC		YES
<i>Accipiter cooperii</i>	Cooper's Hawk	NO	G5	S4	NAR	NAR	L4	YES
<i>Aquila chrysaetos</i>	Golden Eagle	NO	G5	S2B	NAR	END		NO
<i>Falco peregrinus</i>	Peregrine Falcon	NO	G4	S3B	SC	THR	L4	NO
<i>Coturnicops noveboracensis</i>	Yellow Rail	NO	G4	S4B	SC	SC		YES
<i>Pluvialis dominica</i>	American Golden-Plover	NO	G5	S2B,S4N				NO
<i>Charadrius vociferus</i>	Killdeer	NO	G5	S5B,S5N			L4	NO
<i>Actitis macularius</i>	Spotted Sandpiper	NO	G5	S5			L4	NO
<i>Numenius phaeopus</i>	Whimbrel	NO	G5	S3B,S4N				NO
<i>Calidris alpina</i>	Dunlin	NO	G5	S4B,S5N				NO
<i>Limnodromus griseus</i>	Short-billed Dowitcher	NO	G5	S3B,S4N				NO
<i>Larus marinus</i>	Great Black-backed Gull	NO	G5	S2B			LX	NO
<i>Larus delawarensis</i>	Ring-billed Gull	NO	G5	S5B,S4N			L4	NO
<i>Hydroprogne caspia</i>	Caspian Tern	NO	G5	S3B	NAR	NAR	L3	NO
<i>Sterna hirundo</i>	Common Tern	NO	G5	S4B	NAR	NAR	L3	NO

Scientific Name	Common Name	Introduced	GRank	SRank	COSEWIC	ESA	TRCA	Area Sensitive
<i>Sterna forsteri</i>	Forster's Tern	NO	G5	S2B	DD	DD		YES
<i>Chlidonias niger</i>	Black Tern	NO	G4	S3B	NAR	SC	LX	YES
<i>Zenaida macroura</i>	Mourning Dove	NO	G5	S5			L5	NO
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	NO	G5	S4			LX	NO
<i>Megaceryle alcyon</i>	Belted Kingfisher	NO	G5	S4B			L4	NO
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	NO	G5	S4B	END	SC	L3	NO
<i>Picoides pubescens</i>	Downy Woodpecker	NO	G5	S5			L5	NO
<i>Colaptes auratus</i>	Northern Flicker	NO	G5	S4B			L4	NO
<i>Contopus virens</i>	Eastern Wood-pewee	NO	G5	S4B	SC	SC	L4	NO
<i>Empidonax traillii</i>	Willow Flycatcher	NO	G5	S5B			L4	NO
<i>Empidonax minimus</i>	Least Flycatcher	NO	G5	S4B			L3	YES
<i>Tyrannus tyrannus</i>	Eastern Kingbird	NO	G5	S4B			L4	NO
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	NO	G5	S4B			L4	NO
<i>Vireo gilvus</i>	Warbling Vireo	NO	G5	S5B			L5	NO
<i>Vireo olivaceus</i>	Red-eyed Vireo	NO	G5	S5B			L4	NO
<i>Cyanocitta cristata</i>	Blue Jay	NO	G5	S5			L5	NO
<i>Corvus brachyrhynchos</i>	American Crow	NO	G5	S5B			L5	NO
<i>Tachycineta bicolor</i>	Tree Swallow	NO	G5	S4B			L4	NO
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	NO	G5	S4B			L4	NO
<i>Hirundo rustica</i>	Barn Swallow	NO	G5	S4B	THR	THR	L4	NO
<i>Poecile atricapillus</i>	Black-capped Chickadee	NO	G5	S5			L5	NO
<i>Thryothorus ludovicianus</i>	Carolina Wren	NO	G5	S4			L4	NO
<i>Troglodytes aedon</i>	House Wren	NO	G5	S5B			L5	NO
<i>Troglodytes hiemalis</i>	Winter Wren	NO	G5	S5B			L3	YES
<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher	NO	G5	S4B			L4	YES
<i>Turdus migratorius</i>	American Robin	NO	G5	S5B			L5	NO
<i>Dumetella carolinensis</i>	Gray Catbird	NO	G5	S4B			L4	NO
<i>Toxostoma rufum</i>	Brown Thrasher	NO	G5	S4B			L3	NO
<i>Sturnus vulgaris</i>	European Starling	YES	G5	SNA			L+	NO
<i>Bombycilla cedrorum</i>	Cedar Waxwing	NO	G5	S5B			L5	NO
<i>Setophaga petechia</i>	Yellow Warbler	NO	G5	S5B			L5	NO
<i>Setophaga ruticilla</i>	American Redstart	NO	G5	S5B			L3	YES
<i>Spizella pusilla</i>	Field Sparrow	NO	G5	S4B			L3	NO
<i>Melospiza melodia</i>	Song Sparrow	NO	G5	S5B			L5	NO
<i>Cardinalis cardinalis</i>	Northern Cardinal	NO	G5	S5			L5	NO
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	NO	G5	S4			L5	NO
<i>Quiscalus quiscula</i>	Common Grackle	NO	G5	S5B			L5	NO
<i>Molothrus ater</i>	Brown-headed Cowbird	NO	G5	S4B			L5	NO

Scientific Name	Common Name	Introduced	GRank	SRank	COSEWIC	ESA	TRCA	Area Sensitive
<i>Icterus spurius</i>	Orchard Oriole	NO	G5	S4B			L5	NO
<i>Icterus galbula</i>	Baltimore Oriole	NO	G5	S4B			L5	NO
<i>Spinus tristis</i>	American Goldfinch	NO	G5	S5B			L5	NO
<i>Passer domesticus</i>	House Sparrow	YES	G5	SNA			L+	NO
Fish								
<i>Lepisosteus osseus</i>	Longnose Gar	NO	G5	S4				NO
<i>Osmerus mordax</i>	Rainbow Smelt	YES	G5	S5				NO
<i>Amia calva</i>	Bowfin	NO	G5	S4				NO
<i>Anguilla rostrata</i>	American Eel	NO	G4	S1?	THR	END		NO
<i>Alosa pseudoharengus</i>	Alewife	YES	G5	SNA				NO
<i>Dorosoma cepedianum</i>	Gizzard Shad	NO	G5	S4				NO
<i>Pimephales notatus</i>	Bluntnose Minnow	NO	G5	S5	NAR			NO
<i>Pimephales promelas</i>	Fathead Minnow	NO	G5	S5				NO
<i>Notropis hudsonius</i>	Spottail Shiner	NO	G5	S5				NO
<i>Notropis cornutus</i>	Common Shiner	NO	G5	S4				NO
<i>Notropis atherinoides</i>	Emerald Shiner	NO	G5	S5				NO
<i>Notemigonus crysoleucas</i>	Golden Shiner	NO	G5	S5				NO
<i>Cyprinus carpio</i>	Common Carp	YES	G5	S4				NO
<i>Carassius auratus</i>	Goldfish	YES	G5	SNA				NO
<i>Catostomus commersoni</i>	White Sucker	NO	G5	S5				NO
<i>Ameiurus nebulosus</i>	Brown Bullhead	NO	G5	S5				NO
<i>Esox lucius</i>	Northern Pike	NO	G5	S5				NO
<i>Oncorhynchus mykiss</i>	Rainbow Trout	YES	G5	SNA				NO
<i>Oncorhynchus tshawytscha</i>	Chinook Salmon	YES	G5	SNA	END			NO
<i>Salmo trutta</i>	Brown Trout	YES	G5	SNA				NO
<i>Labidesthes sicculus</i>	Brook Silverside	NO	G5	S4	NAR			NO
<i>Gasterosteus aculeatus</i>	Threespine Stickleback	NO	G5	S4				NO
<i>Culaea inconstans</i>	Brook Stickleback	NO	G5	S5				NO
<i>Ambloplites rupestris</i>	Rock Bass	NO	G5	S5				NO
<i>Morone chrysops</i>	White Bass	NO	G5	S4				NO
<i>Morone americana</i>	White Perch	YES	G5	SNA				NO
<i>Micropterus salmoides</i>	Largemouth Bass	NO	G5	S5				NO
<i>Micropterus dolomieu</i>	Smallmouth Bass	NO	G5	S5				NO
<i>Lepomis macrochirus</i>	Bluegill	NO	G5	S5				NO
<i>Lepomis gibbosus</i>	Pumpkinseed	NO	G5	S5				NO
<i>Pomoxis nigromaculatus</i>	Black Crappie	NO	G5	S4				NO
<i>Stizostedion vitreum vitreum</i>	Walleye	NO	G5	S5				NO
<i>Etheostoma nigrum</i>	Johnny Darter	NO	G5	S5				NO
<i>Perca flavescens</i>	Yellow Perch	NO	G5	S5				NO

Scientific Name	Common Name	Introduced	GRank	SRank	COSEWIC	ESA	TRCA	Area Sensitive
<i>Aplodinotus grunniens</i>	Freshwater Drum	NO	G5	S5				NO
<i>Neogobius melanostomus</i>	Round Goby	YES	G5	SNA				NO
Mammal								
<i>Sylvilagus floridanus</i>	Eastern Cottontail	NO	G5	S5			L4	NO
<i>Sciurus carolinensis</i>	Eastern Gray Squirrel	NO	G5	S5			L5	NO
<i>Castor canadensis</i>	Beaver	NO	G5	S5			L4	NO
<i>Ondatra zibethicus</i>	Muskrat	NO	G5	S5			L4	NO
<i>Canis latrans</i>	Coyote	NO	G5	S5			L4	NO
<i>Vulpes vulpes</i>	Red Fox	NO	G5	S5			L4	NO
<i>Procyon lotor</i>	Raccoon	NO	G5	S5			L5	NO
<i>Mephitis mephitis</i>	Striped Skunk	NO	G5	S5			L5	NO
Reptile								
<i>Chelydra serpentina</i>	Snapping Turtle	NO	G5	S3	SC	SC	L3	NO
<i>Graptemys geographica</i>	Northern Map Turtle	NO	G5	S3	SC	SC	L2	YES
<i>Chrysemys picta marginata</i>	Midland Painted Turtle	NO	G5T5	S4	SC		L3	NO
<i>Emydoidea blandingii</i>	Blanding's Turtle	NO	G4	S3	END	THR	L1	NO
<i>Storeria dekayi</i>	DeKay's Brownsnake	NO	G5	S5	NAR	NAR	L4	NO
<i>Thamnophis sirtalis sirtalis</i>	Eastern Gartersnake	NO	G5T5	S5			L4	NO

G Rank - Global Rank

NatureServe. 2008. Appropriate Use of NatureServe Conservation Status Assessments in Species Listing Processes.

- GX - Presumed extinct
- GH - Possibly extinct
- G1 - Critically imperiled
- G2 - Imperiled
- G3 - Vulnerable
- G4 - Apparently secure
- G5 - Secure
- GRN - Rank Not yet Assessed
- GNA - Rank Not Applicable (hybrids, etc)
- GxGx - Range Rank due to uncertainty ex G2G3
- GxTx - T=infraspecific taxon ranking - eg. Tracked subspecies

S Rank = Sub-national Rank

- NHIC - 2018 - Ontario Vascular Plant Species List
- SH - Possibly extirpated (Historical)
- S1 - Extremely rare in Ontario / Critically Imperiled

- S2 - Very rare in Ontario / Imperiled
- S3 - Rare to uncommon in Ontario / Vulnerable
- S4 - Considered to be common in Ontario / Apparently Secure
- S5 - Indicates that a species is widespread in Ontario / Secure
- S? - Not ranked yet
- SNR - Unranked
- SNA - Not applicable (hybrids, etc)
- SE - Exotic - 1-5, 5 is most common. SEH-historic
- SU - Unranked
- SX - Presumed extirpated from Ontario
- C - Cultivated
- ? - Uncertain classification due to insufficient information
- SxSx - Range Rank due to uncertainty ex S2S3

COSEWIC = Committee on the Status of Endangered Wildlife in Canada

- Government of Canada. 2015. Committee of the Status of Endangered Wildlife in Canada. Gatineau, Québec.
- EXT - Extinct
- EXP - Extirpated
- END - Endangered

THR – Threatened
SC – Special Concern
NAR – Not at Risk

ESA = Endangered Species Act

Ontario Government. 2018 Species at risk in Ontario List. Peterborough, Ontario.
EXT – Extirpated
END – Endangered
THR – Threatened
SC – Special Concern

TRCA = Toronto and Region Conservation Authority (2018)

Annual Local Occurrence Score and Local Rank Update Terrestrial Fauna and Flora Species, and Vegetation
Communities July 2018
L1 – Rare
L2 – Probably rare
L3 – Considered of concern regionally
L4 – Considered of concern in urban matrix
L5 –Secure throughout the jurisdiction, including the urban matrix
L+? – Probable Exotic
L+ – definite Exotic
LX – Extirpated from TRCA
LU – Not verified within TRCA

APPENDIX B | Significant Wildlife Habitat Screening

Appendix B. Significant Wildlife Habitat Screening

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
SEASONAL CONCENTRATION AREAS OF ANIMALS					
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	CUM1 CUT1 Plus, evidence of annual spring flooding from meltwater or run-off within these Ecosites. Fields with seasonal flooding and waste grains in the Long Point, Rondeau, Lake St. Clair, Grand Bend and Point Pelee areas may be important to Tundra Swans.	CRITERIA <ul style="list-style-type: none">Fields with sheet water during Spring (mid-March to May)Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowlAgricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available INFORMATION SOURCES <ul style="list-style-type: none">Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence.Reports and other information available from Conservation AuthoritiesSites documented through waterfowl planning processes (e.g., EHJV implementation plan)Field Naturalist ClubsDucks Unlimited CanadaNatural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” <ul style="list-style-type: none">Any mixed species aggregations of 100 or more individuals requiredThe flooded field ecosite habitat plus a 100-300 m radius, dependent on local site conditions and adjacent land use is the significant wildlife habitatAnnual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates) SWH MIST Index #7 provides development effects and mitigation measures.	ABSENT – Open fields with sheet water during spring snowmelt do not occur on the Toronto Islands.
Waterfowl Stopover and Staging Areas (Aquatic) Rationale - Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	CRITERIA <ul style="list-style-type: none">Ponds, marshes, lakes, bays, coastal inlets and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualifyThese habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). INFORMATION SOURCES <ul style="list-style-type: none">Environment CanadaNaturalist clubs often are aware of staging/stopover areas.	Studies carried out and verified presence of: <ul style="list-style-type: none">Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use daysAreas with annual staging of ruddy ducks, canvasbacks, and redheads are SWHThe combined area of the ELC ecosites and a 100 m radius area is the SWHWetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat.Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”	CONFIRMED – Data from eBird suggests that the ponds, marshes, bays and coastal inlets of the Toronto Islands system support over 700 waterfowl use days during spring and fall migration.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
	White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck		<ul style="list-style-type: none"> OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. Sites documented through waterfowl planning processes (e.g., EHJV implementation plan) Ducks Unlimited projects Element occurrence specification by Nature Serve: http://www.natureserve.org NHIC Waterfowl Concentration Area 	<ul style="list-style-type: none"> Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). SWH MIST Index #7 provides development effects and mitigation measures.	
Shorebird Migratory Stopover Areas Rationale - High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs 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	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	CRITERIA <ul style="list-style-type: none"> Shorelines of lakes, rivers and wetlands, including beach area, bars and seasonally flooded, muddy and unvegetated shoreline habitats Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October Sewage treatment ponds and storm water ponds do not qualify as SWH. INFORMATION SOURCES <ul style="list-style-type: none"> Western hemisphere shorebird reserve network Canadian Wildlife Service (CWS) Ontario Shorebird Survey Bird Studies Canada Ontario Nature Local birders and naturalist clubs NHIC Shorebird Migratory Concentration Area 	Studies confirming: <ul style="list-style-type: none"> Presence of 3 or more of listed species and >1000 shorebird use days during spring or fall migration period (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) Whimbrel stop briefly (<24 hours) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" SWH MIST Index #8 provides development effects and mitigation measures.	CANDIDATE - Several indicator species have been observed around the Toronto Islands. However, it is unclear, based on eBird data, whether the islands support the requisite number of shorebird use days.
Raptor Wintering Area Rationale - Sites used by multiple species, a high number of individuals and	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl SPECIAL CONCERN Short-eared Owl	HAWKS/OWLS: Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM, CUT, CUS, CUW.	CRITERIA <ul style="list-style-type: none"> The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors Raptor wintering (hawk/owl) sites need to be >20 ha with a combination of forest and upland 	Studies confirm the sue of these habitats by: <ul style="list-style-type: none"> One or more Short-eared Owls OR one of more Bald Eagles OR at least 10 individuals and two of the listed hawk/owl species 	CONFIRMED - The Toronto Islands contain an ideal mosaic of forest and open country habitats and have supported overwintering Bald Eagles and other raptors for over 5 years.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
used annually are most significant.	Bald Eagle	BALD EAGLE Forest Community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	<ul style="list-style-type: none"> Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15 ha) with adjacent woodlands Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water and large trees and snags available for roosting <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> OMNRF Ecologist or Biologist Naturalist clubs NHIC Raptor Winter Concentration Area Data from Bird Studies Canada Results of Christmas Bird Counts Reports and other information available from Conservation Authorities 	<ul style="list-style-type: none"> To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” <p>SWH MIST Index #10 and #11 provides development effects and mitigation measures.</p>	
Bat Hibernacula Rationale - Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR3 CCA1 CCA2 (Note: buildings are not considered SWH)	<p>CRITERIA</p> <ul style="list-style-type: none"> Hibernacula may be found in caves, mine shafts, underground foundations and Karsts Active mine sites should not be considered as SWH The locations of Bat Hibernacula are relatively poorly known. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> OMNRF for possible locations and contact for local experts NHIC Bat Hibernaculum Ministry of Northern Development and Mines for location of mine shafts. Clubs that explore caves (e.g., Sierra Club) <p>University Biology Departments with bat experts.</p>	<ul style="list-style-type: none"> All sites with confirmed hibernating bats are SWH The area includes 200 m radius around the entrance of the hibernaculum for most development types and 1000 m for wind farms Studies are to be conducted during the peak swarming period (August to September). Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects” <p>SWH MIST Index #1 provides development effects and mitigation measures.</p>	ABSENT - No caves, mine shafts, underground foundations or other suitable structures are present anywhere in the island system.
Bat Maternity Colonies Rationale - Known locations of forested bat maternity	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites.	<p>CRITERIA</p> <ul style="list-style-type: none"> Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). 	<ul style="list-style-type: none"> Maternity colonies with confirmed use by: <ul style="list-style-type: none"> >10 Big Brown Bats >5 adult female Silver-haired Bats The area of habitat includes the entire woodland or a forest stand ELC Ecosite 	CANDIDATE - Cavity trees are present throughout the island system and may exceed 10/ha in some areas, such as Snake Island ESA. To our knowledge, acoustic surveys for bats have never been conducted

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
colonies are extremely rare in all Ontario landscapes.		All ELC Ecosites in ELC Community Series: FOD, FOM, SWD, SWM	<ul style="list-style-type: none"> Maternity roosts are not found in caves and mines in Ontario Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25 cm diameter at breast height) wildlife trees Female bats prefer wildlife trees (snags) in early stages of decay, class 1-3 or class 1 or 2 Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> OMNRF for possible locations and contact for local experts University Biology Departments with bat experts. 	<p>or an Ecoelement containing the maternity colonies</p> <ul style="list-style-type: none"> Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects" <p>SWH MIST Index #12 provides the development effects and mitigation measures.</p>	on the islands but it is reasonable to assume that bats are present and could use cavity trees as maternity roosts.
<p>Turtle Wintering Areas</p> <p>Rationale – Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	SPECIAL CONCERN Midland Painted Turtle Northern Map Turtle Snapping Turtle	<p>Snapping and Midland Painted Turtles: SW, MA, OA and SA; FEO and BOO.</p> <p>Northern Map Turtle: Open water areas such as deeper rivers or streams and lakes with current can also be used as overwintering habitat.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> For most turtles, wintering areas are in the same general areas as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. Overwintering sites are permanent water bodies, large wetlands and bogs or fens with adequate dissolved oxygen. Manmade ponds such as sewage lagoons or storm water ponds should not be considered SWH. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> EIS studies carried out by conservation authorities. Field naturalist clubs. OMNRF ecologist or biologist NHIC 	<ul style="list-style-type: none"> Presence of five overwintering Midland Painted Turtles is significant. One or more Northern Map Turtle or Snapping Turtle overwintering within a wetland is significant. The mapped ELC ecosite area with the overwintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are overwintering is the SWH. Overwintering areas may be identified by searching for congregations (basking areas) of turtles on warm, sunny days during the fall (September to October) or spring (March to May). Congregation of turtles is more common where wintering areas are limited and therefore significant. <p>SWH MIST Index #28 provides development effects and mitigation measures for turtle wintering habitat.</p>	CONFIRMED – Numerous turtles, including at least two native species and two non-native species, live on the Toronto Islands and can be assumed to overwinter in ponds, bays and inlets throughout the island system.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
<p>Reptile Hibernaculum</p> <p>Rationale - Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>SNAKES</p> <p>Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Milksnake</p> <p>SPECIAL CONCERN Eastern Ribbonsnake</p>	<p>For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats.</p> <p>Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line, such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g., old dug wells). Reports and other information available from Conservation Authorities. Field Naturalist Clubs University herpetologists NHIC 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of snake hibernacula used by a minimum of five individuals of a snake species OR individuals of two or more snake species. Congregations of a minimum of five individuals of a snake species OR individuals of two or more snake spp. near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in Spring (April/May) and Fall (September/October) NOTE: If there are Special Concern Species present, then site is SWH NOTE: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e., strong hibernation site fidelity). Other critical life processes (e.g., mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH <p>SWH MIS Index #13 provides development effects and mitigation measures for snake hibernacula.</p>	<p>ABSENT - No concentrations of snakes have been observed anywhere on the Toronto Islands, including Snake Island.</p>
<p>Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)</p> <p>Rationale - Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow</p>	<p>Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)</p>	<p>Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation. <p>INFORMATION SOURCES</p>	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of 1 or more nesting sites with 8 or more Cliff Swallow pairs and/or rough-winged swallow pairs during the breeding season. A colony identified as SWH will include a 50 m radius habitat area from the peripheral nests Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird 	<p>ABSENT - Both indicator species have been observed in the Toronto Islands, but there are no exposed banks, bluffs or cliffs in the on the islands which would be suitable nesting habitat.</p>

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
populations are declining in Ontario.		CLS1 CLT1	<ul style="list-style-type: none"> • Reports and other information available from Conservation Authorities • Ontario Breeding Bird Atlas • Bird Studies Canada <i>NatureCounts</i> http://www.birdscanada.org/birdmon • Field naturalist clubs 	Habitats: Guidelines for Wind Power Projects” SWH MIST Index #4 provides development effects and mitigation measures.	
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs) Rationale – Large colonies are important to local bird populations, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	CRITERIA <ul style="list-style-type: none"> • Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. INFORMATION SOURCES <ul style="list-style-type: none"> • Ontario Breeding Bird Atlas colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • NHIC Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from Conservation Authorities. • MNRF District Offices • Field Naturalist Clubs. 	Studies confirming: <ul style="list-style-type: none"> • Presence of 2 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest Ecosite containing the colony or any island <15 ha with a colony is the SWH • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells SWH MIST Index #5 provides development effects and mitigation measures.	CANDIDATE – All of the indicator species have been observed on the islands and there is suitable nesting habitat. It is unknown if nests belonging to these species have ever been found on the islands.
Colonially-Nesting Bird Breeding Habitat (Ground) Rationale – Colonies are important to local bird populations, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer’s Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer’s Blackbird) MAM1-6 MAS1-3 CUM CUT CUS	CRITERIA <ul style="list-style-type: none"> • Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. INFORMATION SOURCES <ul style="list-style-type: none"> • Ontario Breeding Bird Atlas, rare/colonial species records. • Canadian Wildlife Service 	Studies confirming: <ul style="list-style-type: none"> • Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern • Presence of 5 or more pairs for Brewer’s Blackbird • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant • The edge of the colony and a minimum 150 m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3 ha with a colony is the SWH 	CANDIDATE – Several of the indicator species are known to breed on the islands, but it is unknown if they breed in sufficient numbers for their habitats to qualify as significant.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
			<ul style="list-style-type: none"> • Reports and other information available from Conservation Authorities. • NHIC Colonial Waterbird Nesting Area • MNRF District Offices. Field Naturalist Clubs	<ul style="list-style-type: none"> • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" SWH MIST Index #6 provides development effects and mitigation measures.	
Migratory Butterfly Stopover Areas Rationale - Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral SPECIAL CONCERN Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: Field: CUM, CUT, CUS Forest: FOC, FOD, FOM, CUP Anecdotal, a candidate site for butterfly stopover will have a history of butterflies being observed.	CRITERIA <ul style="list-style-type: none"> • 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 or Lake Ontario • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes INFORMATION SOURCES <ul style="list-style-type: none"> • MNRF District Offices • NHIC • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs • Toronto Entomologists Association 	Studies confirm: <ul style="list-style-type: none"> • The presence of Monarch Use Days (MUD) during fall migration (August/October). MUD is based on the number of days the site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. SWH MIST Index #16 provides development effects and mitigation measures.	CONFIRMED - The islands are located on Lake Ontario and contain over 10 ha of suitable stopover and resting habitat.
Landbird Migratory Stopover Areas Rationale - Sites with a high diversity of species as well as	All migratory songbirds Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM	CRITERIA <ul style="list-style-type: none"> • Woodlots >5 ha in size and within 5 km of Lake Erie and Lake Ontario. If woodlands are rare in an area of shoreline, woodland fragments 2-5 ha can be considered for this habitat 	Studies confirm: <ul style="list-style-type: none"> • Use of the habitat by >200 birds/day and with >35 species and with at least 10 bird species recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant 	CONFIRMED - The islands are located on Lake Ontario and are used by over 200 migratory songbirds per day during spring and fall migration.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
high numbers are most significant.	All migrant raptor species: Ontario Ministry of Natural Resources: <i>Fish and Wildlife Conservation Act, 1997</i> . Schedule 7: Specially Protected Birds (Raptors)	SWD	<ul style="list-style-type: none"> If multiple woodlands are located along the shoreline those woodlands <2 km from Lake Erie and Lake Ontario are more significant Sites have a variety of habitats: forest, grassland and wetland complexes The largest sites are more significant Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and within 5 km of Lake Erie and Lake Ontario are Candidate SWH. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> Bird Studies Canada Ontario Nature Local birders and field naturalist clubs Ontario Important Bird Areas (IBA) Program 	<ul style="list-style-type: none"> Studies should be completed during spring (March-May) and fall (August-October) migration using standardized assessment techniques. Evaluation to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" SWH MIST Index #9 provides development effects and mitigation measures. 	
<p>Deer Winter Congregation Areas</p> <p>Rationale - Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions.</p>	White-tailed Deer	<p>All forested Ecosites with these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD</p> <p>Conifer plantations much smaller than 50 ha may also be used.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Woodlots >100 ha in size or if large woodlots are rare in a planning area, woodlots >50 ha 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 Large woodlots >100 ha and up to 1,500 ha are known to be used annually by densities of deer that range from 0.1-0.5 deer/ha Woodlots with high densities of deer due to artificial feeding are not significant. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> MNRF District Offices LIO/NRVIS 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF Use of the woodlot by White-tailed Deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF Studies should be complete4d during winter (January/February) when >20 cm of snow is on the ground using aerial survey techniques, ground road surveys, or a pellet count deer survey <p>SWH MIST Index #2 provides development effects and mitigation measures</p>	ABSENT - MNRF has not mapped any deer winter congregation areas in the study area.
RARE VEGETATION COMMUNITIES					
Cliffs and Talus Slopes		Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT	<p>CRITERIA</p> <ul style="list-style-type: none"> Most cliff and talus slopes occur along the Niagara Escarpment 	<ul style="list-style-type: none"> Confirm any ELC Vegetation Type for Cliffs or Talus Slopes 	ABSENT - None of the listed Ecosites are present in the study area.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
Rationale – Cliffs and Talus Slopes are extremely rare habitats in Ontario.		<p>A Cliff is vertical to near vertical bedrock >3 m in height.</p> <p>A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.</p>	<p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> The Niagara Escarpment Commission has detailed information on location of these habitats OMNRF Districts NHIC has location information available on their website Field Naturalist Clubs Conservation Authorities 	SWH MIST Index #21 provides development effects and mitigation measures	
<p>Sand Barren</p> <p>Rationale – Sand barrens are rare in Ontario and support rare species. Most sand barrens have been lost due to cottage development and forestry.</p>		<p>ELC Ecosites: SBO1, SBS1, SBT1</p> <p>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%</p> <p>Sand barrens typically are exposed sand, generally sparsely vegetated and caused by a lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> A sand barren area >0.5 ha in size <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> The Niagara Escarpment Commission has detailed information on location of these habitats OMNRF Districts NHIC has location information available on their website Field Naturalist Clubs Conservation Authorities 	<ul style="list-style-type: none"> Confirm any ELC Vegetation Type for Sand Barrens Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic species) <p>SWH MIST Index #20 provides development effects and mitigation measures</p>	CONFIRMED – There is a sand barren community located in the Snake Island ESA.
<p>Alvar</p> <p>Rationale – Alvars are extremely rare habitats in Ecoregion 7E.</p>	<p>Five alvar indicator species: <i>Carex crawei</i> <i>Panicum philadelphicum</i> <i>Eleocharis compressa</i> <i>Scutellaria parvula</i> <i>Trichostema brachiatum</i></p> <p>These indicator species are very specific to Alvars within Ecoregion 7E</p>	<p>ALO1, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2</p> <p>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</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> An Alvar site >0.5 ha in size Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> Alvars of Ontario (Federation of Ontario Naturalists, 2000) Conserving Great Lakes Alvars (Ontario Nature) OMNRF Districts 	<ul style="list-style-type: none"> Field studies identify that four of the five alvar indicator species at a Candidate Alvar Site is significant Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic species) The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses <p>SWH MIST Index #17 provides development effects and mitigation measures</p>	ABSENT – None of the listed Ecosites or indicator species are present in the study area.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
		periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover	<ul style="list-style-type: none"> NHIC has location information available on their website Field Naturalist Clubs Conservation Authorities 		
<p>Old Growth Forest</p> <p>Rationale – Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.</p>		<p>Forest Community Series: FOD, FOC, FOM, SWD, SWC, SWM</p> <p>Old Growth Forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Woodland area is >0.5 ha <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> OMNRF Forest Resource Inventory mapping OMNRF Districts Field Naturalist Clubs Conservation Authorities Sustainable Forestry License (SFL) companies will possibly know locations through field operations Municipal forestry departments 	<p>Field studies will determine:</p> <ul style="list-style-type: none"> If dominant tree species of the forest are >140 years old, then the area containing these trees is SWH The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present) The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH Determine ELC vegetation types for the forest area containing the old growth characteristics <p>SWH MIST Index #23 provides development effects and mitigation measures</p>	<p>ABSENT – Although there are individual trees on the Toronto Islands which may be older than 140 years, they are not located in forest communities and there are no forest communities with a median age of over 140 years.</p>
<p>Savannah</p> <p>Rationale – Savannahs are extremely rare habitats in Ontario.</p>		<p>TPS1, TPS2, TPW1, TPW2, CUS2</p> <p>A Savannah is a tallgrass prairie habitat that has tree cover between 25-60%</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right-of-ways are not considered SWH <p>INFORMATION SOURCES</p>	<p>Field studies confirm:</p> <ul style="list-style-type: none"> One or more of the Savannah indicator species listed in Appendix N of the SWHTG should be present. Note: savannah plant species list from Ecoregion 7E should be used. Area of the ELC Ecosite is the SWH 	<p>CONFIRMED – Both dry and fresh-moist tallgrass woodlands are found on the islands.</p>

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
		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 style="list-style-type: none"> NHIC has location information available on their website Field Naturalist Clubs Conservation Authorities 	<ul style="list-style-type: none"> Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic species) SWH MIST Index #18 provides development effects and mitigation measures.	
Tallgrass Prairie Rationale – Tallgrass prairies are extremely rare habitats in Ontario		TPO1, TPO2 A tallgrass prairie has ground cover dominated by prairie grasses. An open tallgrass prairie habitat has <25% tree cover. 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).	CRITERIA <ul style="list-style-type: none"> No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right-of-ways are not considered SWH INFORMATION SOURCES <ul style="list-style-type: none"> NHIC has location information available on their website Field naturalist clubs Conservation Authorities 	Field studies confirm: <ul style="list-style-type: none"> One or more of the Prairie indicator species listed in Appendix N of the SWHTG should be present. Note: savannah plant species list from Ecoregion 7E should be used. Area of the ELC Ecosite is the SWH Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic species) SWH MIST Index #19 provides development effects and mitigation measures.	ABSENT – None of the listed Ecosites are present on the islands.
Other Rare Vegetation Communities Rationale – Plant communities that often contain rare species which depend on the habitat for survival.		Provincially rare (S1, S2, S3) vegetation communities are listed in Appendix M of the SWHTG (MNRF, 2000). 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.	CRITERIA <ul style="list-style-type: none"> ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M of the Significant Wildlife Habitat Technical Guide (MNRF, 2000). MNRF/NHIC will have up to date listing for rare vegetation communities. INFORMATION SOURCES <ul style="list-style-type: none"> NHIC has location information available on their website Field Naturalist Clubs Conservation Authorities 	<ul style="list-style-type: none"> Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of the SWHTG (MNRF, 2000). Area of the ELC Vegetation Type polygon is the SWH. SWH MIST Index #37 provides development effects and mitigation measures.	CONFIRMED – Other rare vegetation communities found on the islands are Treed Dunes (SDT1) and Tallgrass Meadow Marsh (MAM6).

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
SPECIALIZED HABITAT FOR WILDLIFE					
<p>Waterfowl Nesting Area</p> <p>Rationale - Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant</p>	<p>American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard</p>	<p>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</p> <p>Note: Includes adjacency to Provincially Significant Wetlands</p>	<p>CRITERIA</p> <ul style="list-style-type: none">A waterfowl nesting area extends 120 m from a wetland (>0.5 ha) or a wetland (>0.5 ha) and any small wetlands (0.5 ha) within 120 m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occurUpland areas should be at least 120 m wide so that predators such as raccoons, skunks and foxes have difficulty finding nestsWood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm diameter at breast height) in woodlands for cavity nest sites. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none">Ducks Unlimited staff may know the locations of particularly productive nesting sitesMNR Wetland Evaluations for indication of significant waterfowl nesting habitatReports and other information available from Conservation Authorities	<p>Studies confirmed:</p> <ul style="list-style-type: none">Presence of 3 or more nesting pairs for listed species excluding Mallards, OR presence of 10 or more nesting pairs for listed species including Mallards.Any active nesting site of an American Black Duck is considered significant.Nesting studies should be completed during the spring breeding season (April-June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”A field study confirming waterfowl nesting habitat will determine boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest <p>SWH MIST Index #25 provides development effects and mitigation measures.</p>	<p>CANDIDATE - At least three of the indicator species are probable breeders on the Toronto Islands.</p>
<p>Bald Eagle and Osprey Nesting, Foraging and Perching Habitat</p> <p>Rationale - 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 scarcity of habitat.</p>	<p>Osprey</p> <p>SPECIAL CONCERN Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas - rivers, lakes, ponds and wetlands.</p>	<p>CRITERIA</p> <ul style="list-style-type: none">Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy.Nests located on man-made objects are not to be included as SWH (e.g., telephone poles and constructed nesting platforms) <p>INFORMATION SOURCES</p> <ul style="list-style-type: none">NHIC compiles all known nesting sites for Bald Eagles in Ontario	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none">One or more active Osprey or Bald Eagle nests in an areaSome species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH.For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is importantFor a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800 m is dependent on sight lines from the nest	<p>CONFIRMED - Bald Eagles have historically nested on the Toronto Islands (most recently in 2015).</p>

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
			<ul style="list-style-type: none"> • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat • Nature Counts, Ontario Nest Records Scheme data. • OMNRF District. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented • Reports and other information available from Conservation Authorities. • Field naturalists clubs 	<p>to the development and inclusion of perching and foraging habitat</p> <ul style="list-style-type: none"> • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid-August. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” <p>SWH MIST Index #26 provides development effects and mitigation measures</p>	
<p>Woodland Raptor Nesting Habitat</p> <p>Rationale - Nest sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.</p>	<p>Northern Goshawk Cooper’s Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites.</p> <p>May also be found in SWC, SWM, SWD and CUP3.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> • All natural or conifer plantation woodland/forest stands >30 ha with >4 ha of interior habitat. Interior habitat determined with a 200 m buffer. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests, within tops or crotches of trees. Species such as Cooper’s Hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from Conservation Authorities. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of one or more active nests from species list is considered significant • Red-shouldered Hawk and Northern Goshawk - A 400 m radius around the nest or 28 ha area of habitat is the SWH. The 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest. • Barred Owl - A 200m radius around the nest is the SWH • Broad-winged Hawk and Coopers Hawk - A 100m radius around the nest is the SWH • Sharp-Shinned Hawk - A 50 m radius around the nest is the SWH • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. <p>SWH MIST Index #27 provides development effects and mitigation measures</p>	<p>ABSENT - No forest or swamp ecosites larger than 30 ha are present on the Toronto Islands.</p>

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
<p>Turtle Nesting Areas</p> <p>Rationale - These habitats are rare and when identified will often be the only breeding site for local populations of turtles.</p>	<p>SPECIAL CONCERN</p> <p>Midland Painted Turtle</p> <p>Northern Map Turtle</p> <p>Snapping Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, BOO1, FEO1</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and is located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes and rivers are most frequently used. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • NHIC • Field naturalist clubs. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 5 or more nesting Midland Painted Turtles. • One or more Northern Map Turtles or Snapping Turtles nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30 to 100 m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30 to 100 m area of habitat. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. <p>SWH MIST Index #28 provides development effects and mitigation measures for turtle nesting habitat.</p>	<p>CANDIDATE - Snapping Turtles and Midland Painted Turtles occur on the Toronto Islands and can be expected to nest on exposed banks in the area. However, no specific turtle nesting sites are known.</p>
<p>Seeps and Springs</p> <p>Rationale - Seeps/springs are typical of headwater areas and are often at the source of coldwater streams.</p>	<p>Wild Turkey</p> <p>Ruffed Grouse</p> <p>Spruce Grouse</p> <p>White-tailed Deer</p> <p>Salamanders</p>	<p>Seeps and springs are areas where groundwater comes to the surface. Often, they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps and/or springs.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> • Any forested area (with <25% meadow/field/ pasture) within the headwaters of a stream or river system • Seeps and springs are important feeding and drinking areas. Especially in the winter will support a variety of plant and animal species. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> • Topographical Map. • Thermography. • Hydrological surveys conducted by Conservation Authorities and MECP. 	<p>Field studies confirm:</p> <ul style="list-style-type: none"> • Presence of a site with 2 or more seeps and/or springs should be considered SWH. • The area of an ELC forest ecosite or an 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 <p>SWH MIST Index #30 provides development effects and mitigation measures</p>	<p>ABSENT - No seeps or springs are known to occur on the Toronto Islands.</p>

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
			<ul style="list-style-type: none"> Field Naturalists Clubs and landowners. Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped 		
<p>Amphibian Breeding Habitat (Woodland)</p> <p>Rationale - These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.</p>	<p>Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog</p>	<p>All Ecosites associated with these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD</p> <p>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.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Presence of a wetland, pond or woodland pool (including vernal pools) >500 m² (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat. <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. OMNRF Districts and wetland evaluations Field Naturalist clubs CSW Amphibian Road Call Survey Ontario Vernal Pool Association: http://www.ontariovernalpools.org 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or egg masses) or 2 or more of the listed frog species with Call Level Codes of 3. A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands The habitat is the wetland area plus a 230 m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. <p>SWH MIST Index #14 provides development effects and mitigation measures</p>	<p>ABSENT - None of the indicator species have been observed on the islands.</p>
<p>Amphibian Breeding Habitat (Wetland)</p> <p>Rationale - Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within central Ontario landscapes.</p>	<p>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</p>	<p>ELC Community Classes SW, MA, FE, BO, OA and SA.</p> <p>Typically, these wetland ecosites will be isolated (>120 m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g., Bullfrog) may be adjacent to woodlands.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Wetlands >500 m² (about 25 m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators Bullfrogs require permanent water bodies with abundant emergent vegetation. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species OR 2 or more of the listed frog or toad species with at least 20 individuals (adults or eggs masses) OR 2 or more of the listed frog/toad species with Call Level Codes of 3 OR Wetland with confirmed breeding Bullfrogs are significant The ELC ecosite wetland area and the shoreline are the SWH A combination of observational study and call count surveys will be required during the spring (March-June) when 	<p>CANDIDATE - Two of the indicator species (American Toad and Northern Leopard Frog) have been observed on the islands. However, it is unknown if enough breeding individuals occur at any locations to meet the criteria for significance.</p>

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
			<p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> Ontario Herpetofaunal Summary Atlas (or other similar atlases) CWS Amphibian Road Surveys and Backyard Amphibian Call Count. OMNRF Districts and wetland evaluations. Reports and other information available from Conservation Authorities 	<p>amphibians are concentrated around suitable breeding habitat within or near the wetlands.</p> <ul style="list-style-type: none"> 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. <p>SWH MIST Index #15 provides development effects and mitigation measures.</p>	
<p>Woodland Area-Sensitive Bird Breeding Habitat</p> <p>Rationale - Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest songbirds.</p>	<p>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</p> <p>SPECIAL CONCERN Canada Warbler</p>	<p>All Ecosites associated with these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Habitats where interior forest breeding birds are breeding, typically large mature (>60 years old) forest stands or woodlots >30 ha Interior forest habitat is at least 200 m from forest edge habitat <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> Local birder clubs. CWS for the location of forest bird monitoring. Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species Reports and other information available from Conservation Authorities. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. Note: any site with breeding Canada Warblers is to be considered SWH Conduct field investigations in spring and early summer when birds are singing and defending their territories Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" <p>SWH MIST Index #34 provides development effects and mitigation measures</p>	<p>ABSENT - Interior forest is not present in the study area.</p>
HABITAT FOR SPECIES OF CONSERVATION CONCERN					
<p>Marsh Breeding Bird Habitat</p> <p>Rationale - Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	<p>American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan</p>	<p>MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, FEO1, BOO1</p> <p>Green Heron: all SW, MA and CUM1 sites</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Nesting occurs in wetlands. All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH Area of the ELC ecosite is the SWH. 	<p>CANDIDATE - Four of the indicator species (Virginia Rail, Sora, Marsh Wren, Green Heron) have been observed on the islands but breeding by these species has not been confirmed.</p>

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
	SPECIAL CONCERN Black Tern Yellow Rail		INFORMATION SOURCES <ul style="list-style-type: none"> • OMNRF District and wetland evaluations. • Field Naturalist clubs • NHIC Records. • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas 	<ul style="list-style-type: none"> • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" SWH MIST Index #35 provides development effects and mitigation measures	
<p>Open Country Bird Breeding Habitat</p> <p>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.</p>	<p>Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow</p> <p>SPECIAL CONCERN Short-eared Owl</p>	CUM1, CUM2	<p>CRITERIA</p> <ul style="list-style-type: none"> • Large grassland areas (includes natural and cultural fields and meadows) >30 ha • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • EIS Reports and other information available from Conservation Authorities 	<p>Field studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 2 or more of the listed species • A field with 1 or more breeding Short-eared Owls is to be considered SWH • The area of SWH is the contiguous ELC ecosite field areas • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" SWH MIST Index #32 provides development effects and mitigation measures	ABSENT - There are no open country communities larger than 30 ha on the islands.
<p>Shrub/Early Successional Bird Breeding Habitat</p> <p>Rationale - This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40</p>	<p>INDICATOR SPECIES Brown Thrasher Clay-coloured Sparrow</p> <p>COMMON SPECIES Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p>	<p>CUT1, CUT2, CUS1, CUS2, CUW1, CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat for some bird species</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> • Large field areas succeeding to shrub and thicket habitats >10 ha in size • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years) 	<p>Field studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat • The area of the SWH is the contiguous ELC ecosite field/thicket area. 	ABSENT - The study area does not contain thicket, savannah or woodland communities larger than 10 ha.

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
years based on CWS (2004) trend records.	SPECIAL CONCERN Golden-winged Warbler		<ul style="list-style-type: none"> Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> Agricultural land classification maps, Ministry of Agriculture. Local bird clubs. Ontario Breeding Bird Atlas Reports and other information available from Conservation Authorities 	<ul style="list-style-type: none"> Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" <p>SWH MIST Index #33 provides development effects and mitigation measures</p>	
Terrestrial Crayfish Rationale - Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.	Chimney or Digger Crayfish Devil Crayfish or Meadow Crayfish	<p>MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, SWD, SWT, SWM</p> <p>CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well-formed. <p>INFORMATION SOURCES</p> <p>Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF, March, 1998</p>	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult <p>SWH MIST Index #36 provides development effects and mitigation measures</p>	ABSENT - Terrestrial crayfish have never been observed on the Toronto Islands.
Special Concern and Rare Wildlife Species Rationale - These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1, S2, S3, SH) plant and animal species. Lists of these species are tracked by the NHIC	<p>All plant and animal element occurrences (EOs) within a 1 km or 10 km grid.</p> <p>Older EOs were recorded prior to GPS being available, therefore location information may lack accuracy.</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> 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 <p>INFORMATION SOURCES</p>	<p>Studies confirm:</p> <ul style="list-style-type: none"> Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. 	CONFIRMED - The following Special Concern and provincially rare species are known to occur on the islands:

Habitat Type	Wildlife Species	Candidate SWH		Confirmed SWH Criteria	Probability of Occurrence in EIS Study Area
		Ecosites	Criteria and Information Sources		
			<ul style="list-style-type: none"> NHIC will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. NHIC Website “Get Information”: http://nhic.mnr.gov.on.ca Ontario Breeding Bird Atlas Expert advice should be sought as many of the rare species. Have little information available about their requirements. 	<p>The habitat needs be easily mapped and cover an important life stage component for a species (e.g., specific nesting habitat or foraging habitat).</p> <p>SWH MIST Index #37 provides development effects and mitigation measures</p>	
ANIMAL MOVEMENT CORRIDORS					
<p>Amphibian Movement Corridors</p> <p>Rationale – Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.</p>	<p>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</p>	<p>Corridors may be found in all ecosites associated with water.</p> <p>Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1</p>	<p>CRITERIA</p> <ul style="list-style-type: none"> Movement corridors between breeding habitat and summer habitat Movement corridors must be determined when amphibian breeding habitat is confirmed as SWH (Amphibian Breeding Habitat, Wetland) <p>INFORMATION SOURCES</p> <ul style="list-style-type: none"> MNRF District Office. NHIC Reports and other information available from Conservation Authorities. Field Naturalist Clubs 	<ul style="list-style-type: none"> Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20 m Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat <p>SWH MIST Index #40 provides development effects and mitigation measures</p>	<p>ABSENT - There are very few features suitable for amphibian breeding on the islands and these are separated by a variety of barriers so there are unlikely to be movement corridors between these features.</p>