

Appendix C8

Butterfly Report



BUTTERFLY REPORT
WOLFE ISLAND WIND PROJECT
TECHNICAL APPENDIX C8

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Prepared for:

**Canadian Renewable Energy
Corporation**
a wholly owned subsidiary of
Canadian Hydro Developers, Inc.
c/o 500 -1324 17th Avenue SW
Calgary AB, T2T 5S8

Prepared by:

Stantec Consulting Ltd.
361 Southgate Drive
Guelph ON N1G 3M5

TECHNICAL APPENDIX C8 BUTTERFLY REPORT

Table of Contents

1.0 INTRODUCTION	1.1
1.1 THE PROJECT	1.1
1.2 PURPOSE	1.1

2.0 METHODOLOGY	2.1
------------------------------	------------

3.0 RESULTS	3.1
3.1 SPECIES OCCURRENCE ON WOLFE ISLAND	3.1
3.2 BEHAVIOURAL TRAITS AND LIFE HISTORY CHARACTERISTICS	3.2
3.3 POTENTIAL FOR COLLISIONS	3.3
3.3.1 Migrating Monarchs	3.3
3.3.2 Resident Monarchs	3.4
3.4 KNOWN SOURCES OF MORTALITY	3.5
3.4.1 Anthropogenic Sources	3.5
3.4.2 Natural Sources	3.6

4.0 DISCUSSION.....	4.1
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5.0 REFERENCES	5.1
-----------------------------	------------

List of Appendices

Appendix A Figures

Appendix B Tables

List of Figures

Appendix A

Figure 1.1 Project Location and Study Area

Figure 2.1 Approximate Monarch Butterfly Migration And Major Fall Roosting Areas

**BUTTERFLY REPORT
WOLFE ISLAND WIND PROJECT, TECHNICAL APPENDIX C8**

Table of Contents

List of Tables

Appendix B

Table 2.1 Species Anticipated to Occur Within the Wolfe Island Wind Project Study Area

1.0 Introduction

1.1 THE PROJECT

Canadian Hydro Developers, Inc., through its wholly owned subsidiary Canadian Renewable Energy Corporation (“CREC”), is proposing to develop a 197.8 megawatt (“MW”) wind plant on Wolfe Island, Township of Frontenac Islands, Frontenac County, Province of Ontario. Eighty-six 2.3 MW wind turbine generators will be placed strategically over the western portion of Wolfe Island (the “Project”).

Electricity from the Project will be gathered via a 34.5 kilo volt (“kV”) collection system, converted to 230 kV at a transformer station on Wolfe Island, and then transmitted via a new electrical transmission line that will run underwater through a portion of the St. Lawrence River, known locally as the “Lower Gap”. Upon reaching the mainland, the transmission line will be underground, connecting with the provincial grid at Hydro One Network Inc.’s Gardiners Transformer Station in the City of Kingston. The study area for the Project is shown in **Figure 1.1 (Appendix A)**.

1.2 PURPOSE

Eastern Ontario is home to many species of butterflies, both resident and migratory. Given that the study area is in eastern Ontario, and coupled with comments received from stakeholders regarding the presence of monarch butterflies on Wolfe Island, a review of available information was conducted and this report was prepared to discuss the potential effects that the Project may have on butterflies.

As part of the Ontario Ministry of the Environment’s (“MOE”) Environmental Screening Process (“ESP”) for electricity projects (i.e., Ontario Regulation 116/01), Stantec Consulting Ltd. (“Stantec”) undertook the butterfly work to assist in addressing criterion 4.1 and 4.4 of the MOE’s environmental screening checklist: will the project:

- *cause negative effects on rare, threatened, or endangered species of flora or fauna or their habitat?*
- *have negative effects on wildlife habitat, populations, corridors, or movement?*

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2.0 Methodology

Background data sources on the movement and behaviour of regional butterfly populations were utilized for this report. Further, discussions with experts were also undertaken to obtain information on potential effects of wind turbines on butterflies and to obtain information on regional butterfly populations and movement. Sources of information used in the preparation of this report include:

- The Ontario Butterfly Atlas (Holmes et al, 1991)
- The Butterflies of Canada (Layberry et al, 1998)
- Monarch Watch (personal communications; including Chip Taylor, Director)
- Canadian Wildlife Service
- Friends of Presqu'île
- Peer reviewed publications
- Reports of local aggregations from residents
- Observation of potential habitat made during field investigations.

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3.0 Results

3.1 SPECIES OCCURRENCE ON WOLFE ISLAND

A list of sixty-seven butterfly species, anticipated to occur within the Wolfe Island study area, is provided in **Table 3-1 (Appendix B)**. This list is based upon species ranges provided in the Ontario Butterfly Atlas (Holmes et al., 1991). All species are ranked S5 (i.e., secure – common, widespread, and abundant in the province) or S4 (i.e., apparently secure – uncommon but not rare; some cause for long-term concern due to declines or other factors), with the follow six exceptions:

- European skipper and cabbage white are ranked SE (i.e., exotic – not believed to be a native component of Ontario's flora)
- painted lady and red admiral are ranked SZB (i.e., breeding migrants/vagrants in Ontario)
- Dion skipper is ranked S3S4 (i.e., vulnerable – vulnerable in the province due to a restricted range, relatively few populations [often 80 or fewer], recent and widespread declines, or other factors making it vulnerable to extirpation)
- juniper hairstreak is ranked S2 (i.e., imperilled – imperilled in the province because of rarity due to very restricted range, very few populations [often 20 or fewer], steep declines, or other factors making it very vulnerable to extirpation from the province)

Scientific names are provided in **Table 3-1 (Appendix B)**.

The larvae of painted ladies will feed on a variety of plant species including thistles, composites, knapweed, burdock, and sunflowers (Layberry et al., 1998). They experience population fluctuations in Ontario, but are likely common on the agricultural lands of Wolfe Island during peak years. Red admiral larvae feed on stinging nettle and wood nettle. They are also likely common along woodland edges of Wolfe Island.

The Dion skipper breeds in marshy areas and damp meadows that contain its larva host species, the sedges *Carex lacustris*, *C. hyalinolepis* and possibly *C. stricta* (Layberry et al., 1998). All three host plant species are expected to occur in the marshy wetlands of Wolfe Island. If the Dion skipper occurs on Wolfe Island, it would be restricted to marshy areas.

The juniper hairstreak breeds in open red cedar (*Juniperus virginiana*) woodlands or thickets, showing a preference for smaller trees (Layberry, et al., 1998). They tend to be territorial and are found in very close proximity to their host plant, red cedar. One area of suitable habitat was identified within the study area. A juniper thicket community, approximately 20 hectares in size

and comprised of smaller (<5 m tall), well-spaced trees, was located at the southeast corner of Baseline Road and Concession 7.

No threatened or endangered butterfly species are known to occur on Wolfe Island. The Committee on the Status of Endangered Wildlife in Canada (“COSEWIC”) and the Committee On the Status of Species At Risk in Ontario (“COSSARO”) identify one species, the monarch butterfly, as Special Concern (i.e., a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats). Despite its status, the monarch is relatively common in Ontario with a ranking of S4.

The main threats facing the eastern North American population of monarchs, resulting in the Special Concern status, include loss of forest habitat on their Mexico wintering grounds and loss of nectaring and larva food plants due to herbicide use on their breeding grounds, which includes Ontario (Canadian Wildlife Service, 2006). Monarchs typically occur in areas with abundant milkweed (i.e., their larva host plant) and a diversity of flowering plants as an adult food source. They are expected to be common in the agricultural lands of Wolfe Island during the summer months.

3.2 BEHAVIOURAL TRAITS AND LIFE HISTORY CHARACTERISTICS

Most resident Canadian butterfly species fly very close to the tops of vegetation in open communities (i.e., within 0.5 – 3 m above ground) (A. Taylor, pers. obs.) where nectaring and larva host plants occur. They tend to remain in their breeding habitat with little movement over large distances. Therefore, most species are not expected to frequently range into the blade sweep area of wind turbines.

Some larger species, such as swallowtails, will move over larger distances. Swallowtails generally fly close to the ground with maximum heights occurring as an individual flies over woodlots between areas of open foraging habitat (A. Taylor, pers. obs.). Even under these circumstances, a swallowtail's maximum height would be expected to be at the treetops, well below the sweep of wind turbine blades.

Fall migrating monarch butterflies are known to travel in large numbers at much higher altitudes. This species has, during fall migration, been recorded at heights in excess of 3,300 metres (Calvert, 2001). The monarchs overwinter in about 30 small, forested mountainous sites between 70 and 170 km west of Mexico City (Brower, 1995). Monarchs begin to leave the wintering ground in March, starting the northward spring migration.

During the northern migration, once the monarchs reach northern Mexico, they begin to breed. At this point, the spring migration and breeding season occur simultaneously, resulting in a diffuse migration, taking several generations and several months to reach Ontario. Monarchs, during this spring migration and breeding period, generally behave like other resident species flying close to tops of vegetation (A. Taylor, pers. obs.).

Three other relatively common migrants can be expected within the study area, namely the American lady (ranked S5), painted lady, and red admiral. These species move into Ontario

each spring, completing two or three generations in a summer. The northward migration is typically diffuse and is conducted at low flight altitudes.

These species can survive a particularly mild winter, but are generally not known to overwinter in Canada (Layberry et al., 1998). Their strategy to survive the winter is poorly understood. It is believed that the northward movement in the spring and summer may be a 'dead end' and that permanent populations in the southern United States maintain the species in Ontario (Layberry et al., 1998). Regardless, there is a general consensus that these species do not have a strong tendency to migrate south in the fall. As they do not aggregate in large numbers and would rarely obtain the height of wind turbine blade sweep area, they are not considered to be at high risk of collision.

3.3 POTENTIAL FOR COLLISIONS

A thorough search of published literature revealed no studies or information that dealt specifically with the potential effects of a wind power project on resident or migratory butterfly species. However, detailed published information about the natural history and behaviour of butterfly species, as presented in Section 3.2, was analyzed to permit assessments of risk.

Of primary importance when predicting effects of a wind power project on butterflies is the flight heights and geographic travel corridors of the members of this group. As discussed above, most species of butterflies are not expected to fly at the height of wind turbine blade sweep area. Monarch butterflies were the only species expected to be at some risk of collision due to their life history traits (i.e., large aggregations of fall migrating individuals) and behavioural characteristics (i.e., migration at flight elevations up to 3,300 m).

3.3.1 Migrating Monarchs

The migratory monarch butterfly achieves flight heights significantly greater than most resident butterflies. During migration, this species attains heights above turbine blade sweep range (35 – 125 m) for approximately three-quarters of daylight hours under ideal wind conditions (i.e., off-shore winds of less than 10 km/h), descending at night to form communal roosts in trees (Calvert, 2001).

The inland routes of fall migrating monarch butterflies can change from year to year based upon availability of resources (Monarch Watch, 2006). However, general patterns in movement do occur, in particular the routes used to cross the Great Lakes (**Figure 2.1, Appendix A**). An interview with Dr. Chip Taylor, Director of Monarch Watch at the University of Kansas, indicated that if winds are blowing in a favourable off-shore direction, then migrating monarchs will maintain their height, passing above the Great Lakes. However, if there are on-shore winds, monarchs will tend to move along the north shore of the Great Lakes until they come to a peninsula where they congregate in staging areas until winds become favourable.

The majority of fall migrating monarchs in Ontario use three such staging areas: Point Pelee, Long Point, and in Prince Edward County at Presqu'île Point and to a lesser extent at Prince Edward Point (C. Taylor, pers. comm., 2006). Presqu'île Point, which is within Presqu'île

Provincial Park, and Prince Edward Point are located approximately 100 km and 40 km to the west of the study area, respectively. As many as 8,000 monarchs have been recorded at Presqu'ile Point during a single day (Friends of Presquile, undated). On Price Edward Point, the Commission for Environmental Cooperation ("CEC"), an international organization, established an International Monarch Butterfly Reserve in 1996 (North American Commission for Environmental Cooperation, 2000).

Point Pelee and Long Point are located on Lake Erie over 500 km and 460 km, respectively, southwest of the study area. As many as 10,000 monarchs can pass through Point Pelee or Long Point in a day.

Wolfe Island is not known to act as a significant staging area. This is largely due to the island's geographical situation, at the entrance to the St. Lawrence River. Monarchs migrating from the north, to the east of Wolfe Island are likely to cross the St. Lawrence River without staging, as the river does not pose a significant barrier. Alternately, monarchs moving to the west of Wolfe Island would, upon confronting Lake Ontario, move further west along the lakeshore to Presqu'ile or Prince Edward Point.

Dr. Taylor indicated that most of the eastern Ontario population of monarchs are believed to cross Lake Ontario from the Presqu'ile Point staging site (C. Taylor, pers. comm., 2006). As such, Wolfe Island is not situated in an area which concentrates large numbers of migrating monarchs.

Despite not being on a major migration path, some monarch migration activity is anticipated on Wolfe Island. If winds are blowing in a favourable off-shore direction, then migrating monarchs from the north generally pass over the Great Lakes without stopping. Under these conditions, migrating monarchs would be passing over Wolfe Island. However, as the monarchs would be passing through at heights well above the turbines, the risk of collision is expected to be low.

Potential interaction with the Project would only occur when monarchs return to ground level in the evening, during bad weather, or to feed. However, given the relatively small size of the study area (when compared to the broad front of monarch movement through southern Ontario) the probability of large numbers of monarchs returning to the ground directly into the area of wind turbines is quite low. It is also hypothesized that monarchs descending to roost at the end of the day would be more likely to come down on the mainland to avoid a water crossing late in the day.

3.3.2 Resident Monarchs

The dominance of agricultural land, specifically pasture and fallow fields, on Wolfe Island provides suitable habitat for breeding monarch butterflies. As such, Wolfe Island is expected to support a stable population of resident monarchs. As discussed in Section 3.2, breeding monarchs generally fly at low attitudes (i.e., 0.5 – 3 m above the ground) and would thus be at low risk to collisions with wind turbines.

At the onset of fall migration, Wolfe Island's resident monarchs are expected to leave the island for the south, making the short over-water crossing to the New York mainland. Under some weather conditions (i.e., on-shore winds), aggregations of these monarchs would be expected near the south Wolfe Island shoreline. Reports have been made by local residents of monarchs roosting in trees at several locations in the Wolfe Island study area.

The most significant concentrations are reported to occur on Bear Point, at the extreme southwestern tip of the Island (Friends of Big Sandy Bay, pers. comm., April 12, 2007). Although precise numbers are not available, given the amount of suitable habitat on Wolfe Island, Stantec estimates that dozens to hundreds of monarchs could be observed at Bear Point at any one time. Aggregations of this size are quite common along the north shorelines of Lake Erie and Lake Ontario during the fall migration period.

Some resident breeding monarchs on Wolfe Island would be passing through the study area, during the initial step of their fall migration. However, they would not be expected to achieve significant altitudes during the short migration to the south side of the Island. In addition, monarchs would be expected to stay particularly low, when considering the strong winds in the study area, as butterflies fly low during strong winds (C. Taylor, pers. comm., 2006). Therefore, the number of monarchs that could come into contact with wind turbine blades, and thus be at risk of collision, is expected to be negligible.

3.4 KNOWN SOURCES OF MORTALITY

3.4.1 Anthropogenic Sources

As described above, mortality among butterflies as a result of the proposed Project is not predicted to be significant. In contrast, other anthropogenic sources are anticipated to have a potentially noticeable impact on butterfly species. For example, a major cause of mortality among butterflies is collisions with automobiles.

One study by Mckenna et al. (2001) quantified mortality of butterflies on roadways in Illinois resulting from collisions with automobiles. Thirteen roadside transects were searched for dead butterflies during the six-week study, which yielded 1,824 road-killed butterflies. Based upon these results, the study estimated that more than 200 million butterflies are killed weekly in the state of Illinois by collisions with automobiles. The study also estimated that the number of monarch butterflies killed in this way could exceed 500,000 per week in Illinois. Of note is that the study predicted that increased speed of traffic would increase mortality.

A second study indicated that automobile collisions with butterflies in Iowa were similarly significant (Ries et al., 2001). During a six-week period in July through August, 212 collisions were noted. The sampling area for this survey consisted of 12 roadside areas of prairie vegetation, each at least 500 m long. Only species that overwintered in Iowa, approximately 25 species, were recorded. Further, only fatal collisions that occurred during the active sampling time were recorded (i.e., while a surveyor was present).

Other anthropogenic sources of butterfly mortality include the direct and indirect mortality effects from pesticide use, loss of host and feeding plants due to herbicide use, and loss of habitat due to land-use conversion. Almost the entire population of eastern North American Monarchs overwinter in about 30 small sites of Oyamel Fir forest in a mountainous region between 70 and 170 km west of Mexico City (Brower, 1995). As this small area concentrates the entire eastern population of monarchs, habitat destruction within the winter grounds puts this population of monarchs at great risk (Layberry, et al., 1998). The Mexican government has taken step to protect these winter ground from logging and development pressure, however, enforcement continues to be a problem (Layberry, et al., 1998).

The above studies highlight the fact that collisions in the 0.5 – 3 m above ground level are a far more significant source of mortality than would be expected from wind turbines, which are generally above normal flight heights for most species.

3.4.2 Natural Sources

Few studies were encountered during the literature search that directly quantified mortality of butterflies as a result of predation, disease, and other environmental factors. However, one study investigated predation by birds on the monarch butterfly at a wintering site in Mexico (Brower and Calvert, 1985).

During the 135-day monarch wintering period, the researchers investigated a single 2.5 ha colony of monarchs (Brower and Calvert, 1985). Nets were placed above the forest floor to intercept whole or partially eaten monarchs as they fell from the canopy. Data was collected and used to estimate the total mortality across all wintering monarch colonies (i.e., concentrated in a small area along the Mexican Pacific coast). It was estimated that over two million monarchs were killed in the wintering areas by birds during this 135-day period.

4.0 Discussion


A review and analysis of existing literature on the life history and behavioural traits of butterflies that potentially exist on Wolfe Island has led to the conclusion that the risk of mortality of butterflies from collisions with wind turbines will be negligible. Most species of butterfly fly well below the blade sweep area.

Under conditions where migrating monarchs would fly with the wind through the site, most flocks will move well above the height of the wind turbines. Nevertheless, there remains limited potential that, under certain conditions such as specific wind speeds, direction, time of day, and weather conditions, some monarchs may be at risk of collision.


However, the monarch population of eastern Ontario is known to concentrate at Presqu'île Point, 100 km southwest of the Wolfe Island area during fall migration. Consequently, numbers of migrating monarchs passing through the study area are not expected to be high, relative to the number of monarchs migrating from eastern Ontario. The resident island population of monarchs during their breeding season, and as they leave in the fall, are expected to fly at low altitudes and thus be at minimal risk to collision with wind turbines.

The literature suggests that there are other sources of mortality for butterflies that are far more significant than any potential mortality caused by collisions with wind turbines. Of particular note is mortality in butterflies from collision with automobiles, which has been estimated to kill millions of butterflies weekly. When compared to natural and other anthropogenic sources, it is unlikely that the Project will have a significant effect on resident or migratory butterfly species.

STANTEC CONSULTING LTD



Andrew Taylor, B.Sc.



Valerie Wyatt, M.Sc.

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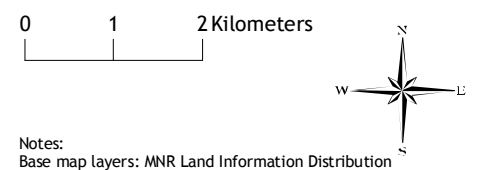
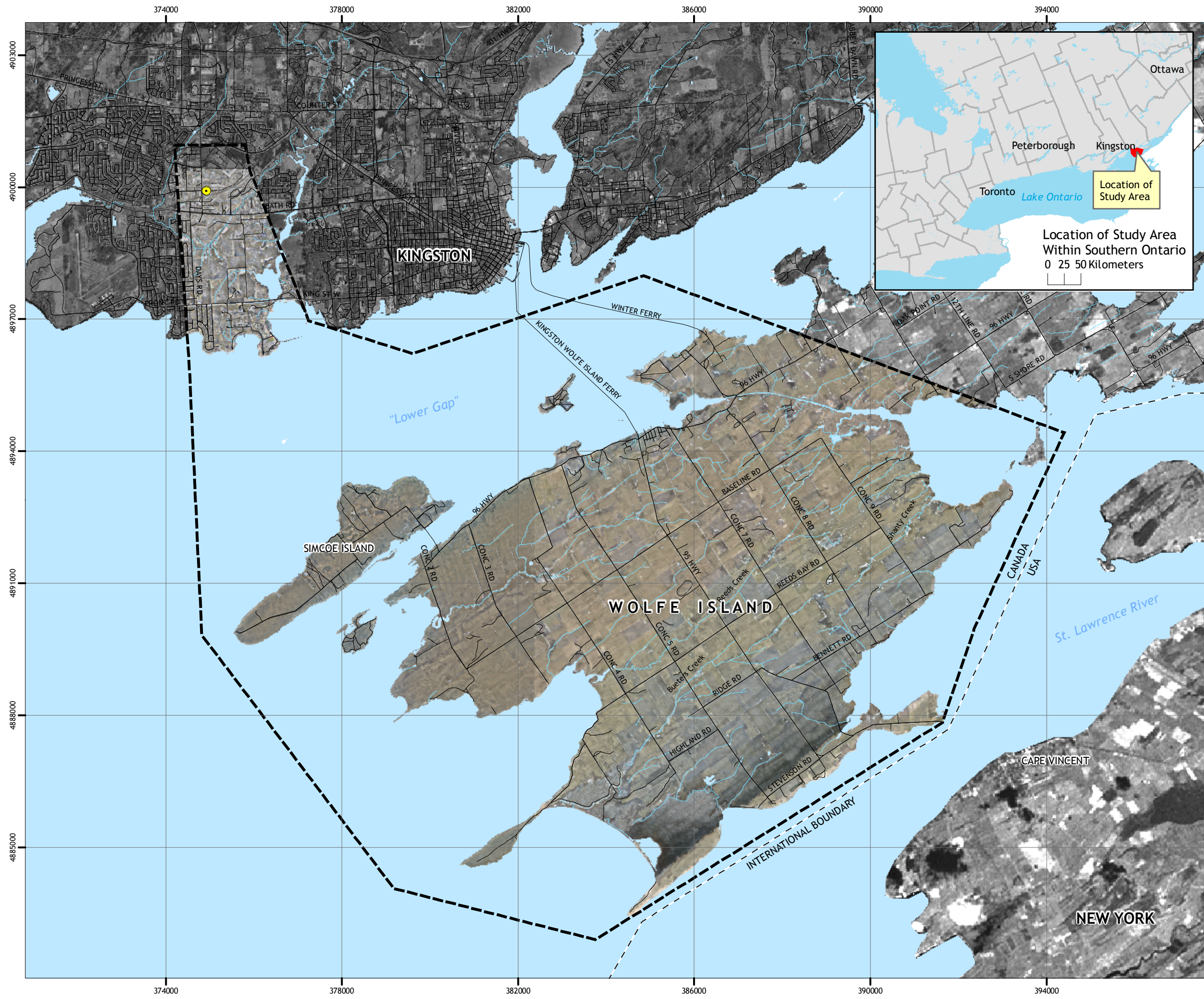
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Appendix A

Figures



Air Photos: LIDAR (study area coverage), January 2006.
LANDSAT7 (U.S. coverage), 1999.
City of Kingston (city coverage), 2005.



- Legend
- Study Area
 - Gardiners Transformer Station

WOLFE ISLAND WIND PROJECT
BUTTERFLY REPORT

FIGURE NO.

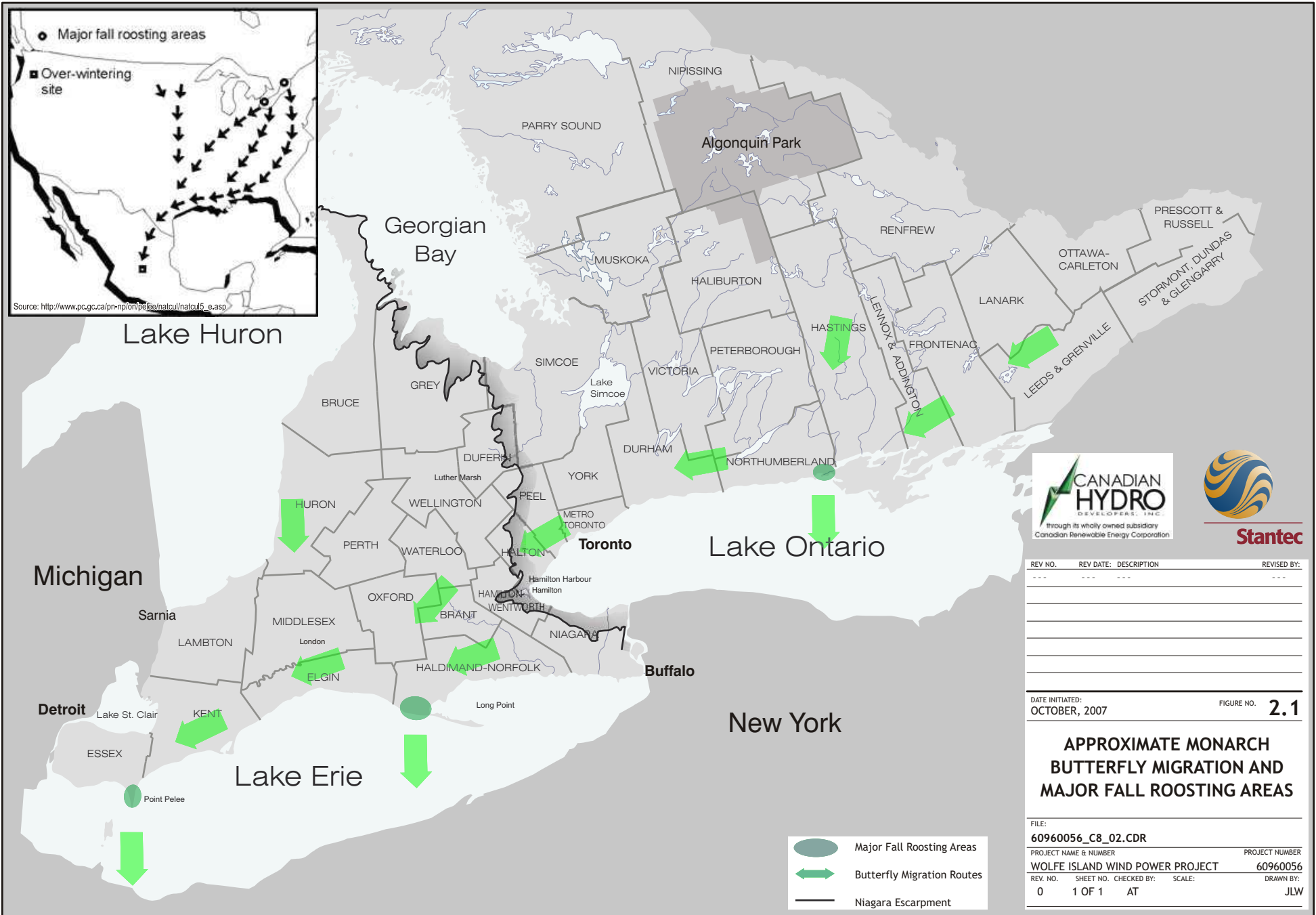
1.1

Project Location
and Study Area

FILE: 60960056_C8_01_project_location.mxd PROJECT NUMBER: 60960180

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October, 2007



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DATE INITIATED: OCTOBER, 2007 FIGURE NO. **2.1**

APPROXIMATE MONARCH BUTTERFLY MIGRATION AND MAJOR FALL ROOSTING AREAS

FILE: 60960056_C8_02.CDR		PROJECT NUMBER
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Source: Monarch Watch, 2006. (Major fall roosting areas)

Appendix B

Tables

Table 2.1 Species anticipated to occur within the Wolfe Island Study Area

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	REGION
BUTTERFLIES						
Silver Spotted Skipper	<i>Epargyreus clarus</i>	S4	G5			
Northern Cloudy Wing	<i>Thorybes pylades</i>	S5	G5			
Dreamy Dusky Wing	<i>Erynnis icelus</i>	S5	G5			
Juvenal's Dusky Wing	<i>Erynnis juvenalis</i>	S5	G5			
Columbine Dusky Wing	<i>Erynnis lucilius</i>	S4	G4			
Arctic Skipper	<i>Carterocephalus palaemon</i>	S5	G5			7
Least Skipper	<i>Ancyloxypha numitor</i>	S5	G5			
European Skipper	<i>Thymelicus lineola</i>	SE	G5			
Leonard's Skipper	<i>Hesperia leonardus</i>	S4	G4			
Indian Skipper	<i>Hesperia sassacus</i>	S4	G5			
Peck's Skipper	<i>Polites peckius</i>	S5	G5			
Tawny-edged Skipper	<i>Polites themistocles</i>	S5	G5			
Crossline Skipper	<i>Polites origenes</i>	S4	G5			
Long Dash Skipper	<i>Polites mystic</i>	S5	G5			
Northern Broken-Dash	<i>Wallengrenia egermet</i>	S5	G5			
Hobomok Skipper	<i>Poanes hobomok</i>	S5	G5			
Broad-winged Skipper	<i>Poanes viator</i>	S4	G5			
Dion Skipper	<i>Euphyes dion</i>	S3S4	G4			
Dun Skipper	<i>Euphyes vestris</i>	S5	G5			
Black Swallowtail	<i>Papilio polyxenes</i>	S5	G5			
Canadian Tiger Swallowtail	<i>Papilio canadensis</i>	S5	G5			
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	S4S5	G5			
Mustard White	<i>Pieris oleracea</i>	S4	G4G5			
Cabbage White	<i>Pieris rapae</i>	SE	G5			
Olympia Marblewing	<i>Euchloe olympia</i>	S4	G4G5			
Clouded Sulphur	<i>Colias philodice</i>	S5	G5			
Orange Sulphur	<i>Colias eurytheme</i>	S5	G5			
Harvester	<i>Feniseca tarquinius</i>	S4	G4			
American Copper	<i>Lycaena phlaeas</i>	S4	G5			
Bronze Copper	<i>Lycaena hyllus</i>	S5	G5			
Coral Hairstreak	<i>Harknclenus titus</i>	S4	G5			
Acadian Hairstreak	<i>Satyrrium acadicum</i>	S4	G5			
Edward's Hairstreak	<i>Satyrrium edwardsii</i>	S4	G4			
Banded Hairstreak	<i>Satyrrium calanus</i>	S4	G5			

Table 2.1 Species anticipated to occur within the Wolfe Island Study Area

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	REGION
Striped Hairstreak	<i>Satyrium liparops</i>	S5	G5			
Hoary Elfin	<i>Callophrys polios</i>	S4	G5			7
Juniper Hairstreak	<i>Callophrys gryneus</i>	S2	G5			
Eastern Pine Elfin	<i>Callophrys niphon</i>	S5	G5			7
Eastern Tailed Blue	<i>Everes comyntas</i>	S5	G5			
Spring Azure	<i>Celastrina ladon</i>	S5	G5			
Silvery Blue	<i>Glaucoopsyche lygdamus</i>	S5	G5			
Great Spangled Fritillary	<i>Speyeria cybele</i>	S5	G5			
Aphrodite Fritillary	<i>Speyeria aphrodite</i>	S5	G5			
Silver-bordered Fritillary	<i>Boloria selene</i>	S5	G5			
Meadow Fritillary	<i>Boloria bellona</i>	S5	G5			
Harris' Checkerspot	<i>Chlosyne harrisii</i>	S4	G4			7
Pearl Crescent	<i>Phyciodes tharos</i>	S4	G5			
Tawny Crescent	<i>Phyciodes batesii</i>	S4	G4			7
Northern Crescent	<i>Phycoides pascoensis</i>	S5	G5			
Baltimore Checkerspot	<i>Euphydryas phaeton</i>	S4	G4			
Question Mark	<i>Polygonia interrogationis</i>	S5	G5			
Eastern Comma	<i>Polygonia comma</i>	S5	G5			
Grey Comma	<i>Polygonia progne</i>	S5	G5			
Compton Tortoiseshell	<i>Nymphalis vaualbum</i>	S5	G5			
Mourning Cloak	<i>Nymphalis antiopa</i>	S5	G5			
Milbert's Tortoiseshell	<i>Nymphalis milberti</i>	S5	G5			
American Painted Lady	<i>Vanessa virginiensis</i>	S5	G5			
Painted Lady	<i>Vanessa cardui</i>	SZB	G5			
Red Admiral	<i>Vanessa atalanta</i>	SZB	G5			
White Admiral	<i>Limenitis arthemis</i>	S5	G5			
Viceroy	<i>Limenitis archippus</i>	S5	G5			
Northern Pearly Eye	<i>Enodia anthedon</i>	S4	G5			
Eyed Brown	<i>Satyroides eurydice</i>	S5	G5			
Little Wood-Satyr	<i>Megisto cymela</i>	S5	G5			
Common Ringlet	<i>Coenonympha tullia</i>	S5	G5			
Common Wood-Nymph	<i>Cercyonis pegala</i>	S5	G5			
Monarch	<i>Danaus plexippus</i>	S4	G4	SC	SC	
SIGNIFICANT SPECIES						

Table 2.1 Species anticipated to occur within the Wolfe Island Study Area

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	COSSARO	COSEWIC	REGION
Global:		0				
National:		1				
Provincial:		1				
Regional:		0				
Local:		0				
Explanation of Status and Acronyms						
COSSARO: Committee on the Status of Species at Risk in Ontario						
COSEWIC: Committee on the Status of Endangered Species in Canada						
REGION: Rare in a Site Region						
S2: Imperilled – Imperilled in the province because of rarity due to very restricted range, very few populations (often						
S3: Vulnerable – Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer),						
S3S4: Rare to common in Ontario						
S4: Apparently secure – uncommon but not rare; some cause for long-term concern due to declines or other factors						
S4S5: Common to very common in Ontario						
S5: Secure – common, widespread, and abundant in the province						
SE: Exotic – not believed to be a native component of Ontario's flora						
SZB: Breeding migrants in the province						
G4: Common; usually more than 100 occurrences; usually not susceptible to immediate threats.						
G4G5: Common to very common globally						
G5: Very common; demonstrably secure under present conditions.						
SC: Special Concern						
6: Rare in Site Region 6						
7: Rare in Site Region 7						