**NOTES**

1) COORDINATE SYSTEM UTM NAD83 ZONE 18.
2) WOODLAND MAPPING REFLECTS AERIAL PHOTOGRAPHY FLOWN IN 2004.

**LEGEND**

- SIGNIFICANT WOODLAND
- CONTRIBUTORY WOODLAND
- VALLEYLAND
- ENVIRONMENTALLY SENSITIVE AREA
- UNEVALUATED WETLAND
- LINKAGES AND CORRIDORS

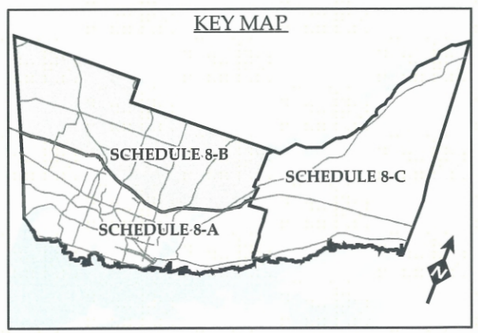
**OTHER FEATURES**

- MAJOR ROAD
- LOCAL ROAD OR PRIVATE LANE
- RAILWAY
- URBAN BOUNDARY
- MUNICIPAL BOUNDARY
- WATERBODY

N

WILTON RD
Loughborough Lake
Collins Lake
Odessa Lake
HIGHWAY 38
CON 6 W
CON 5 W
UNITY RD
BERTH RD
River Styx
SEE SCHEDULE 8-C
SYDENHAM RD
BUR BROOK RD
BATTERSEA RD
Colonel By Lake
KINGSTON MILLS RD
KINGSTON MILLS GORGE
HIGHWAY 401
SEE SCHEDULE 8-A

KEY MAP




SCALE

0 0.5 1 2 3 4 5
kilometres
1:60,000

# CITY OF KINGSTON
# OFFICIAL PLAN
## SCHEDULE 8-B
## NATURAL HERITAGE AREA 'B'

APPROVED - JANUARY 27, 2010
CONSOLIDATED - AUGUST 1, 2011

Map Document:K:\D08_Official Plan Documents\OFFICIAL PLAN 2010\OFFICIAL PLAN Maps- Consolidated\Schedule Templates\8B Natural Heritage Area B.mxd
Printing Date: 7/20/2011

# APPENDIX E

# 2011 STANTEC SURVEY AND RECOMMENDED WORKPLAN REPORT

# FIELD SURVEY SUMMARY AND RECOMMENDED WORKPLAN SAMSUNG RENEWABLE ENERGY INC. SOLAR PV ENERGY PROJECT – PHASE 2 (KINGSTON)

Prepared for:
**Samsung Renewable Energy Inc.**
55 Standish Court
Mississauga, ON L5R 4B2

Prepared by:
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Project 161010624
June 29, 2011

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# 1.0 Introduction

Stantec Consulting Ltd. (Stantec) was retained by Samsung Renewable Energy Inc. to conduct and report on field investigations to support a Natural Heritage Evaluation Report for a Renewable Energy Application (REA) for the Sol-luce KST 100 MW Solar PV Energy Project – Phase 2(1).

The solar PV project includes 100 MW of solar energy generation (approximately 410,000-500,000 modules) and an associated 5 km transmission line to connect the output power to the IESO-controlled grid in eastern Ontario, Canada. The project will connect to a collector substation capable of transforming the power from a medium voltage power collector system to a 230 kV voltage level. A transmission line of approximately 5 km in length will be used to connect the power generated by the Sol-luce KST 100 MW Solar Project to the Ontario Electricity Grid. An interconnect station will also be required at the Point of Power Connection (PCC).

The proposed project site is located in the Loyalist Township and Greater Kingston Area (formerly Township of Ernestown in the County of Lennon and Addington and Township of Kingston in the County of Frontenac). The project area is immediately southeast of Lake Odessa and the 'Study Area' for this initial suite of field surveys is depicted on Figure 1[1].

This report is intended to satisfy the requirements for a summary of natural heritage field surveys conducted to-date, as well as to define a work plan moving forward (see Appendix B).

[1] Figures referenced throughout this report are provided in Appendix A.

# 2.0 Site Investigation

The initial site investigations were conducted in accordance with O. Reg 359/09, s. 26 (1), Natural Heritage Site Investigation. This report has been prepared in consideration of the guidance provided in s. 26 (3) from the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2010). The surveys conducted were undertaken for the purpose of obtaining time sensitive wildlife studies for the Natural Heritage Assessment.

## 2.1 BACKGROUND

Publicly available MNR databases were reviewed as part of the preliminary investigations. The Study Area identified is located within the Napanee Limestone Plain Important Bird Area (IBA). The IBA report states:

> *"The Napanee Limestone Plain is situated in eastern Ontario, with the town of Napanee at its centre. The site includes natural upland habitats between Belleville and Kingston, north to Erinsville and south to the Bay of Quinte. The area is a mosaic of shallow soil habitats such as savannah grasslands with scattered Red Cedar or hawthorrn and small wood-lots. Grassland habitats are in the early stages of succession, having been originally cleared for settlement… The Napanee Limstone Plain is important for its grassland and alvar bird populations. Thirty or more pairs of Loggerhead Shrikes breed on this plain. This is about 20% of the Canadian population of the nationally endangered eastern population, and about 75% of Ontario's breeding shrikes. The Upland Sandpiper is also found here in nationally significant numbers. It is estimated that 150 to 200 pairs breed here annually, which is perhaps 2% of the Canadian Upland Sandpiper population. Also of national significance is the nationally endangered Henslows Sparrow, which is has been present regularly in low numbers (1 to 5 pairs). However, there have been no recent records for this rapidly declining, but also hard-to-find species."*

A preliminary review of the MNR's Natural Heritage Information Centre database indicates the presence of one additional species at risk, Common Musk Turtle, that could occur within the Study Area and that would be covered by Ontario's *Endangered Species Act*. As well, the Atlas of the Breeding Birds of Ontario identifies the presence of several additional bird species at risk breeding in the vicinity, including Bobolink, Common Nighthawk, and Whip-poor-will in addition to Loggerhead Shrike.

No other significant features such as deer yards or colonies of nesting birds were identified through a preliminary review of publicly-available databases.

## 2.2 METHODS

Site investigations were completed in late winter and spring of 2011, including winter raptor surveys, Whip-poor-will surveys, amphibian and Musk Turtle surveys. Land access was

available for land parcels where components of the solar project are proposed. The site investigation included a combination of roadside surveys and transversing the optioned land parcels on foot. Dates, times, duration, field personnel and weather for each field survey are presented in Table 1.

**Table 1: Study Area Site Investigation Record**

| Survey Date | Survey Type | Personnel | Time | Weather Conditions* |
|---|---|---|---|---|
| 2011-02-28 | Winter Raptor | J. Crumb, M. Straus | 14:30-16:45 | 3ºC; wind = 4<br>50% cloud cover, no precipitation<br>avg. snow depth = patchy, 0-10cm |
| 2011-02-28 | Winter Short-eared Owl | J. Crumb, M. Straus | 17:15-18:20 | 3º-0ºC; wind = 4<br>100% cloud cover, no precipitation<br>avg. snow depth = patchy, 0-10cm |
| 2011-03-01 | Winter Raptor | J. Crumb, M. Straus | n/a | 6º-2ºC; wind = 2<br>0% cloud cover, no precipitation<br>avg. snow depth = patchy, 0-10cm |
| 2011-03-16 | Winter Raptor | M. Straus, D. Graham | 13:50-15:39 | 4ºC; wind = 1-2<br>100% cloud cover, precipitation (rain)<br>avg. snow depth = patchy, 0-5cm |
| 2011-03-16 | Winter Short-eared Owl | M. Straus, D. Graham | 18:25-19:38 | 4ºC; wind = 1<br>100% cloud cover, no precipitation<br>avg. snow depth = patchy |
| 2011-03-17 | Winter Raptor | M. Straus, D. Graham | 09:00-13:45 | 3ºC; wind = 1<br>partly cloud cover, no precipitation<br>avg. snow depth = patchy |
| 2011-04-21 | Amphibian Call | B. Holden, J. Heslop | 20:15-21:45 | 4º-0ºC; wind = 1-0<br>40-10% cloud cover, no precipitation |
| 2011-05-18 | Amphibian Call | R. Stamp, J. Heslop | 20:45-22:00 | 17ºC; wind = 3<br>95% cloud cover, no precipitation |
| 2011-05-18 | Whip-poor-will | R. Stamp, J. Heslop | 20:30-22:41 | 17ºC; wind = 3<br>95% cloud cover, no precipitation |
| 2011-05-18 | Musk Turtle | R. Stamp, J. Heslop | 15:15-18:00 | 18ºC; wind = 3<br>75% cloud cover, no precipitation |
| 2011-05-19 | Musk Turtle | R. Stamp, J. Heslop | | 21ºC; wind = 6<br>40% cloud cover, no precipitation |

* Wind conditions expressed using Beaufort Scale:
0 = calm, <2 km/hr
1 = light, 2-6 km/hr
2 = light, 7-12 km/hr
3 = moderate, 13-19 km/hr
4 = moderate, 20-30 km/hr
5 = fresh, 31-40 km/hr
6 = strong, 41-51 km/hr

### 2.2.1 Winter Raptor Surveys

Two rounds of winter raptor surveys were complete, one in late February and one in early March. The surveys consisted of late afternoon surveys for raptors and early evening surveys (from just before sunset to dusk) for Short-eared Owls.

The majority of roads in the Study Area were driven at slow speeds (i.e. 30-40 km/h). The fields and woodlots were scanned using binoculars to detect any raptors, and a spotting scope was used for closer inspection of stationary birds. In addition to roadside surveys, wondering transect in suitable grassland habitat were transversed on foot. All raptors and owls were recorded and their locations mapped.

### 2.2.2 Whip-poor-will Surveys

One survey was conducted to detect the presence and relative abundances of Whip-poor-will in the Study Area. Surveys were comprised of six-minute point counts at 4 monitoring stations in suitable habitat, spaced at intervals of a minimum of 400 m (Figure 1). Birds that were visually observed or heard were recorded as either within 100 m or farther than 100 m from the observer. Surveys began shortly after sunset to ensure the peak activity period for calling Whip-poor-will was captured.

For each survey station, a record was made of the start time and a hand held GPS unit was used to georeference location. A brief description of the habitat was made for each station.

### 2.2.3 Amphibians

Call count surveys to assess the presence and relative abundances of amphibians in the Study Area were conducted in April and May. Calling amphibian surveys followed the protocols identified in the Marsh Monitoring Program Manual (Bird Studies Canada, 1994) and the Amphibian Road Call-Counts Participants Manual (Environment Canada, 1997). Surveys were conducted between one-half hour after sunset and midnight. Eight survey stations were selected and placed around the availability of suitable habitat. Survey stations are shown on Figure 1.

The protocol involved the surveyor standing at each selected station and listening for three minutes. Amphibians were recorded to be within each surveyed station if they were within 100 metres of the surveyor. Consistent with the Marsh Monitoring Program protocol, all calling activity was ranked using one of the following three abundance code categories: (1) calls not simultaneous – number of individuals can be accurately counted; (2) some calls simultaneous – number of individuals can be reliably estimated; and (3) full chorus – calls continuous and overlapping, so number of individuals cannot be reliably estimated.

### 2.2.4 Musk Turtle

A Musk Turtle survey and habitat assessment was conducted in May, focusing on areas of aquatic habitat within the Study Area. Areas of aquatic habitat that were assessed for Musk Turtle suitability are shown in Figure 1.

A conservative approach was taken to identifying areas of suitable Musk Turtle habitat; suitable habitat was defined as shallow, permanent water with a soft substrate (i.e. not bedrock) and little to no current. Presence of supporting features (i.e. submerged logs, muskrat or beaver lodges) were assumed to enhance the habitat, but were not considered critical habitat components in identifying suitable habitat.

## 2.3 RESULTS

### 2.3.1 Winter Raptor Surveys

Important habitat components for wintering raptor concentrations include hay fields, pastures and open meadows that support large and productive small mammal populations can provide critical winter feeding areas (MNR, 2000). The best roosting sites are typically found in relatively mature mixed or coniferous woodlands that abut windswept fields, with scattered trees and fence posts providing perches for hunting (MNR, 2000).

A total of 3 species of raptors were observed over all winter raptor surveys. Daily results of the winter raptor surveys are provided in Table 2. Red-tailed Hawk was by far the most abundant species, with 11 observations over the 4 days of surveys. Other species were found in much lower numbers, including a single American Kestrel and a single Short-eared Owl. In addition to the raptor species, one predator songbird, Northern Shrike, was observed.

**Table 2: Samsung Odessa – 2011 Winter Raptor Surveys Summary**

| Species | 28-Feb-11 | 1-Mar-11 | 16-Mar-11 | 17-Mar-11 | Total |
|---|---|---|---|---|---|
| Red-tailed Hawk | 2 | | 7 | 2 | 11 |
| American Kestrel | | | 1 | | 1 |
| Northern Shrike | | | 1 | 1 | 2 |
| Short-eared Owl | | | 1 | | 1 |
| Total | 2 | 0 | 10 | 3 | |
| Total/km | 47.80 | 45.50 | 82.00 | 51.50 | |

Raptors observations were generally spread out across the project area, with two areas of higher raptor concentration; one to the north of the Unity Road and Cordukes Road intersection and one west of the Van Order Road and Highway 38 intersection.

All species of raptors observed are relatively common in Ontario, with the exception of the Short-eared Owl, which is identified as provincially and federal species of special concern. The single Short-eared Owl observation was made in proximity to the intersection of County Road 19 and Howes Road.

### 2.3.2 Whip-poor-will Surveys

Preferred breeding habitat of the Whip-poor-will includes open woodlands and forest edges; they are often associated habitat with patchy forest cover. Whip-poor-wills typically nest in areas with sparse ground cover. They will breed in woodland with a variety of different compositions, but are often associated with oak or pine. Within the Study Area, suitable habitat was comprised of juniper scrubland mixed with patches of deciduous forest. Monitoring stations were established in areas of such potential habitat and are shown in Figure 1.

No Whip-poor-wills were observed within the Study Area during the surveys. As such, this species was considered absent from the Study Area during the breeding season of 2011.

### 2.3.3 Amphibians

Over the course of the two (2) rounds of amphibian surveys, four (4) species were observed, including American Toad, Spring Peeper, Western Chorus Frog and Grey Treefrog. A summary of the species and abundance of amphibians at each of the monitoring stations is provided in Table 3.

**Table 3: Samsung Odessa – 2011 Amphibian Call Surveys Summary**

| Station | Date | Species Abundance* | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | NLFR | WOFR | SPPE | CHFR | AMTO | GRFR | GRTR | |
| A | 21-Apr | | | 2 | | | | | |
| | 18-May | | | 2 | | | | | |
| B | 21-Apr | | | 1 | 3 | | | | |
| | 18-May | | | 1 | 1 | 1 | | 2 | |
| C | 21-Apr | | | 2 | 1 | | | | |
| | 18-May | | | 1 | | 1 | | 1 | |
| D | 21-Apr | | | 1 | 2 | | | | |
| | 18-May | | | 1 | 1 | | | | |
| E | 21-Apr | | | 3 | 1 | | | | |
| | 18-May | | | 3 | | | | 1 | |
| F | 21-Apr | | | 1 | | | | | |
| | 18-May | | | 3 | | | | 2 | |
| G | 21-Apr | | | 3 | 1 | | | | |
| | 18-May | | | 3 | | | | | |

**Table 3: Samsung Odessa – 2011 Amphibian Call Surveys Summary**

| Station | Date | Species Abundance* | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | | NLFR | WOFR | SPPE | CHFR | AMTO | GRFR | GRTR | |
| H | 21-Apr | | | 1 | 1 | | | | |
| | 18-May | | | 3 | 1 | 3 | | | |
| I | 21-Apr | | | | 1 | | | | |
| | 18-May | | | | | | | 2 | |

* Abundance Codes
1. Calls not simultaneous, number of individuals can be accurately counted;
2. Some calls simultaneous, number of individuals can be reliable estimated;
3. Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated

AMTO = American Toad (*Bufo americanus*)
BCFR = Boreal Chorus Frog (*Pseudacris maculata*)
BULL = American Bullfrog (*Rana catesbeiana*)
CHFR = Chorus Frog (*Psuedacris triseriata*)
FOTO = Fowler's Toad (*Bufo fowleri*)
GRFR = Green Frog (*Rana clamitans*)
GRTR = Gray Treefrog (*Hyla versicolor*)
MIFR = Mink Frog (*Rana septentrionalis*)
NLFR = Northern Leopard Frog (*Rana pipiens*)
PIFR = Pickerel Frog (*Rana palustris*)
SPPE = Spring Peeper (*Psuedacris crucifer*)
WOFR = Wood Frog (*Rana sylvatica*)

All species observed are common in Ontario. One species, the Western Chorus Frog, has been identified as federally threatened. It was found to be common within the Odessa project area. However, the threatened status has been related to the declines in Quebec. It has been recently assessed as not at risk within Ontario.

Areas of higher amphibian abundance were observed along the watercourse that runs south or Rock Road, under Raymond Road and Highway 38 (Stations E, F and G, Figure 1). Amphibians were also found to be abundant along the watercourse that crosses Unity Road, east of Quabbin Road (Station H, Figure 1).

### 2.3.4 Musk Turtle

No Musk Turtles were observed during the site investigations; however, given the secretive nature of the species a lack of observations does not suggest the species was not present. As such a habitat assessment is generally a better indication of potential presence.

Musk Turtles may occur in lakes, ponds, rivers and marshes. They prefer permanent, shallow water with a soft substrate and little to no current. Musk Turtles prefer areas of dense aquatic vegetation and submerged logs, often found in proximity to muskrat or beaver lodges. Generally, suitable habitat for this species was absent from the Study Area. One area of potential habitat was observed immediately to the west of the Study Area. A summary of the assessment of each area of aquatic habitat is provided in Table 4.

**Table 4: Summary of Musk Turtle Habitat Assessment**

| Habitat Area (Figure 1) | Habitat Description | Suitable for Musk Turtle (yes/no) |
|---|---|---|
| MT1 | Habitat consisted of dug ponds along a watercourse. These ponds were of suitable depth, with a slow current. The substrate was limestone with grass vegetation along the margins. Not considered suitable habitat for Musk Turtles due to rocky substrate. Although not suitable for Musk Turtle, Snapping Turtle and Painted Turtle were observed in this area. | No |
| MT2 | Habitat consisted of a creek that was generally too shallow for Musk Turtles with a moderate flow; overall not suitable habitat. Eastern Gartersnake and Northern Watersnake were observed in this area. | No |
| MT3 | Habitat consisted of a creek that was generally too shallow, with a limestone substrate; overall not suitable Musk Turtle habitat. | No |
| MT4 | Habitat consisted of a creek that was generally too shallow, with a limestone substrate; overall not suitable Musk Turtle habitat. | No |
| MT5 | Habitat consisted of two dug ponds. These two ponds were relatively large with shallow margins; potentially old quarries. Substrate consisted of limestone bedrock. Overall, not suitable for Musk Turtles. Although not suitable for Musk Turtles, up to 10 Painted Turtles were observed basking at the edge of these ponds. | No |
| MT6 | Habitat consisted of the narrowing southern tip of Odessa Lake. This long linear portion of the lake was relatively shallow with abundant emergent vegetation. This area likely provides the only potential Musk Turtle habitat within the Study Area. A Snapping Turtle was observed in this area during the surveys. | Yes |
| MT7 | Habitat consisted of a creek that was relatively shallow with a limestone bedrock substrate. The creek was abundant tree and shrub cover. Overall, not suitable habitat for Musk Turtles due to rocky substrate. | No |

In consideration of the above noted suite of field surveys, a work program has been developed to complete the remaining field surveys that would be need to support a Natural Heritage Assessment report as per REA guidelines. The work plan is included in Appendix B and has been provide as stand-alone document that can be used for submission as a Terms of Reference for the Ministry of Natural Resources (MNR).

## 2.4 QUALIFICATIONS

Personnel responsible for conducting the site investigations are listed above in Table 1. *Curricula vitae* are provided in Appendix C.

**STANTEC CONSULTING LTD.**

Andrew Taylor, B.Sc.
Senior Ecologist

Daniel Eusebi, BES, MCIP, RPP
Senior Environmental Planner

# APPENDIX A
# Figures

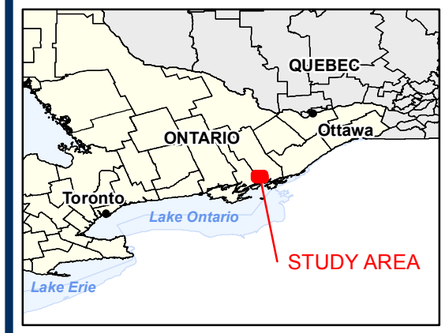
Figure 1. Wildlife Monitoring Stations

## Legend

- Project Area
- Road
- Watercourse
- Waterbody
- Signed Property

**Wildlife Monitoring Station**

- Amphibian Monitoring Station
- Musk Turtle Monitoring Station
- Whip-Poor-Will Monitoring Station




## Notes

1. Coordinate System: UTM NAD 83 - Zone 18 (N).
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2011.
3. Orthographic Imagery: © First Base Solutions, 2011 - Imagery Date: 2008.

Stantec

June, 2011
161010624

Client/Project
SAMSUNG
PHASE 2 SOLAR BIRD PROJECT

Figure No.
1

Title
**Wildlife Monitoring Stations**

0 500 1,000 m
1:40,000

W:\active\60960577\drawing\Other_SamsungProjects\Odessa_161010624\MXD\161010624_WildlifeMonitoring_20110629_SL.mxd
Revised: 2011-06-29 By: slemay

# APPENDIX B
# Proposed Natural Heritage Assessment Site Investigation Workplan

# APPENDIX B: Proposed Natural Heritage Assessment Site Investigation Workplan
# Samsung Renewable Energy Inc.
# Solar PV Energy Project – Phase 2 (Kingston)

Prepared for:
**Samsung Renewable Energy Inc.**
55 Standish Court
Mississauga, Ontario L5R 4B2

Prepared by:
**Stantec Consulting Ltd.**
1 – 70 Southgate Drive
Guelph, Ontario N1G 4P5

Project 161010624
June 29, 2011

**APPENDIX B: PROPOSED NATURAL HERITAGE ASSESSMENT SITE INVESTIGATION WORKPLAN**
**SAMSUNG RENEWABLE ENERGY INC.**
**SOLAR PV ENERGY PROJECT – PHASE 2 (KINGSTON)**

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**APPENDIX B: PROPOSED NATURAL HERITAGE ASSESSMENT SITE INVESTIGATION WORKPLAN**
**SAMSUNG RENEWABLE ENERGY INC.**
**SOLAR PV ENERGY PROJECT – PHASE 2 (KINGSTON)**

## B-1. Introduction

The Samsung Renewable Energy Inc. Solar PV Energy Project – Phase 2 (the Project) is located north of Odessa, Ontario in Loyalist Township and the greater City of Kingston (formerly Ernest and Kingston Townships respectively). *O. Reg. 359/09* requires that a natural heritage assessment (NHA) be completed for solar power projects. This is comprised of a records review, site investigation, and evaluation of significance of each natural feature identified in the course of the records review and site investigation. This work plan is intended to provide a comprehensive overview of all natural heritage survey requirements under the approval process.

Site investigations based on this work plan will be conducted in and within 120 m of the project location for the purpose of determining:

- Whether the results of the records review are correct or require correction;
- Whether any additional natural features or water bodies exist, which were not documented in the records review;
- The boundaries, located within 120m of the project location, of any natural feature or water body identified in the records review or site investigation; and,
- The distance from the project location to the boundaries of each natural feature or water body.

## B-2. Background Information / Site Context

The Study Area generally consists of agricultural fields, with scattered woodland and scrubland habitat. Much of the open agricultural fields are in hay or pasture; many have been left fallow. Watercourses with associated wetland cross through the Study Area.

The Study Area is located within the Napanee Limestone Plain Important Bird Area (IBA). The IBA report indicates:

> *The Napanee Limstone Plain is situated in eastern Ontario, with the town of Napanee at its centre. The site includes natural upland habitats between Belleville and Kingston, north to Erinsville and south to the Bay of Quinte. The area is a mosaic of shallow soil habitats such as savannah grasslands with scattered Red Cedar or hawthorrn and small wood-lots. Grassland habitats are in the early stages of succession, having been originally cleared for settlement. The Napanee Limstone Plain is important for its grassland and alvar bird populations. Thirty or more pairs of Loggerhead Shrikes breed*

> *on this plain. This is about 20% of the Canadian population of the nationally endangered eastern population, and about 75% of Ontario's breeding shrikes. The Upland Sandpiper is also found here in nationally significant numbers. It is estimated that 150 to 200 pairs breed here annually, which is perhaps 2% of the Canadian Upland Sandpiper population. Also of national significance is the nationally endangered Henslows Sparrow, which is has been present regularly in low numbers (1 to 5 pairs). However, there have been no recent records for this rapidly declining, but also hard-to-find species. (http://www.ibacanada.com/site.jsp?siteID=ON152&lang=EN )*

A preliminary review of the MNR's Natural Heritage Information Centre database indicates the presence of one additional species at risk, Common Musk Turtle, that could occur within the Study Area and that would be covered by Ontario's Endangered Species Act. As well, the Atlas of the Breeding Birds of Ontario identifies the presence of several additional bird species at risk breeding in the vicinity, including Bobolink, Common Nighthawk, and Whip-poor-will in addition to Loggerhead Shrike.

No other significant features such as deer yards or colonies of nesting birds were identified through a preliminary review of publicly-available databases.

A preliminary assessment was undertaken to identify the potential for features that may be designated as significant wildlife habitat (i.e. seasonal concentration areas, rare vegetation communities or specialized habitats, movement corridors and habitats of species of conservation concern) within the Study Area. Each feature, which background information indicates could reasonably be found in the Study Area, will be assessed through the site investigations and the evaluation of significance, based on criteria as outlined in the Significant Wildlife Habitat Technical Guide (SWHTG) (MNR, 2000).

## SEASONAL CONCENTRATION AREAS

The Study Area is located approximately 8 km from the Lake Ontario shoreline. It is therefore not likely to support significant concentration of migratory landbirds or butterflies; the SWHTG suggests only suitable habitats within 5km of the shoreline would be considered candidate significant habitat for migratory land bird or butterfly stopover habitat.

Habitat within the Study Area may be suitable for raptor winter feeding and roosting areas. Studies conducted in 2010 indicate a moderate level of winter raptor use within the Study Area, including a single Short-eared Owl observation.

Eastern Milksnakes (species of special concern), as well as other common snakes, are likely to occur in the Study Area. Potential reptile hibernacula features will be identified during site investigations.

There is a known bat hibernacula in the Murvale area, greater than 1 km to the north of the Study Area. Site investigations will determine whether additional candidate bat significant wildlife habitat features are present in the Study Area (e.g. caves). Currently, no bat monitoring is proposed as the project is sited more than 320 m from known bat hibernacula and therefore does not require field studies to support an evaluation of significance (MNR, 2010a).

## RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITATS

Based on an assessment of the habitat in the Study Area and historic species records, three specialized habitats have the potential to occur to some degree in the project location: rare vegetation community (alvar), habitat for area-sensitive species, and amphibian woodland breeding ponds.

Site investigations to assess amphibian woodland breeding ponds were conducted in spring of 2011. As such, no further site investigations for amphibians are proposed. The presence and extent of rare vegetation communities and area-sensitive species are present within the Study Area will be confirmed through the site investigation program.

## MOVEMENT CORRIDORS

Animal movement corridors are parts of the landscape used by animals to move from one habitat to another (SWHTG, MNR, 2000).

The Loyalist County Official Plan (2010) identifies linkages and movement corridors within the Study Area associated with natural vegetation cover. The site investigation will include habitat assessment to assess the significance of movement corridors identified within the Official Plan in addition to other candidate features within the Study Area.

Criteria for confirming bat and bird migration corridors are not currently defined in the Significant Wildlife Habitat Technical Guide meaning that the evaluation and confirmation of significant wildlife habitat is not possible for these categories (MNR, 2010b).

## SPECIES OF CONSERVATION CONCERN

The Study Area is likely to support moderate to high relative densities of Ontario Partners in Flight priority species associated with grassland and shrubland/successional habitats (Ontario PIF, 2008). The decline of grassland birds has been identified as a conservation concern (Cadman et al., 2007), and areas containing healthy populations of species belonging to these guilds would be considered for designation of significant wildlife habitat. The presence and densities of these species will be assessed through the site investigation program.

Records of species on conservation concern (including Short-eared Owl, Common Nighthawk, Eastern Milksnake, Snapping Turtle, and Monarch) occur from the vicinity of the Study Area, the habitat of which will be identified during the site investigation.

**SUMMARY**

The following features that could be significant wildlife habitat were identified, requiring site investigations to confirm their presence and extent:

- Seasonal concentrations (raptor winter feeding and roosting areas, reptile hibernacula);
- Rare Vegetation Communities or Specialized habitats (rare vegetation community, area-sensitive species, amphibian breeding);
- Movement Corridors; and
- Habitat for Species of Conservation Concern (grassland and/or shrubland/successional breeding birds, species of special concern).

**THREATENED AND ENDANGERED SPECIES**

Historic records of endangered and threatened species occur from the Study Area, including Loggerhead Shrike and Henslow's Sparrow. Other species at risk that may occur in the Study Area include Bobolink and Whip-poor-will, Eastern Meadowlark and Barn Swallow. However, surveys in May of 2011 did not detect the presence of Whip-poor-will within the Study Area.

NHIC reports records of Musk Turtle in the vicinity of the Study Area. A survey and habitat assessment in May 2011 concluded the only potentially suitable habitat for this species occur immediately west of the Study Area, in the shallow portions of Odessa Lake. As such, no further studies for this species are proposed.

Site investigations in will assess the presence and identify habitat of the species listed above, with the exception of the Whip-poor-will and Musk Turtle for which targeted surveys have already been completed. The site investigations aim to collect the required information to facilitate permitting under the Endangered Species Act (2007), if required.

## B-3. Proposed Site Investigation Work Program

**1) Winter Raptor Roosting Survey (three surveys, January to March):**

Surveys in the winter of 2011 identified candidate winter raptor feeding areas, including one area used by Short-eared Owls. Given recent direction from MNR, walking surveys in these areas to identify / confirm potential winter raptor roosting sites are recommended.

Surveys will focus on the areas where winter raptors were observed in higher concentrations during the 2010 surveys; north of the Unity Rd and Cordukes Rd intersection, west of the Van

Order Rd and Highway 38 intersection and west of the intersection of County Rd 19 and Howes Rd.

Three surveys, one in each of January, February and March are proposed. Surveys will consist of walking wooded areas in proximity to the candidate winter raptor feeding area, recording all observations and behavior of raptors. Observations will be recorded on a feature by feature (i.e. woodlot by woodlot) base, to allow for separate evaluations of significance. Surveys will extend into dusk, to increase the potential of Short-eared Owl observations.

**2) Breeding Bird Surveys (two rounds, late May to early July):**

Two rounds of breeding bird surveys will be conducted from late May to early July. Ten minute point counts will be conducted to record the density of species using the various habitats within the Study Area (i.e. grassland, scrubland, woodland and marsh). Effort will be made to place at least a single point count in each of the larger (e.g. greater than 5 ha) natural heritage features (i.e. grassland, scrubland, woodland or marsh). Area searches will be used to complement the point count surveys by collecting a comprehensive species list for each natural heritage feature.

**3) Bobolink, Eastern Meadowlark and Barn Swallow Surveys (three visits, June to Early July):**

Bobolink surveys will be conducted as outlined in MNR guidelines released in March 2011, which utilize a combination of point counts and transects. In addition to Bobolink, Eastern Meadowlarks and Barn Swallows will be recorded. Nesting structures for Barn Swallows in proximity to the project location will also be assessed and mapped.

**4) Henslow's Sparrow Surveys (two visits, June):**

The presence of Henslow's Sparrow will be assessed during the early morning breeding bird surveys (described above). In addition to the early morning surveys, two rounds of evening surveys will also be conducted in June. Monitoring stations will be established within suitable grassland habitat throughout the Study Area. The surveys will take place at or after dusk and will utilize a playback recording to elicit a response.

**5) Loggerhead Shrike Surveys (two visits, June):**

A Loggerhead Shrike habitat assessment will be undertaken to identify areas of suitable habitat. These areas will be surveyed during the early morning breeding bird surveys (described above) to confirm the presence of absence of this species.

**6) Ecological Land Classification (ELC) and Rare Flora and Rare Vegetation Communities Surveys (July and August):**

Vegetation communities within and adjacent to optioned lands or potential locations of project components (e.g. collector lines) will be delineated on aerial photographs and subsequently

checked in the field; community characterizations (ecosites) will be based on the ELC system (Lee et al., 1998). Site visits will occur between July through September. The information collected during these visits will be used to identify rare vegetation communities and plant species at risk, detect unevaluated wetlands, and confirm designation of significant woodlands. A surveyor trained in both ELC and OWES will conduct the surveys.

**7) Candidate Significant Wildlife Habitat Features Assessment:**

Surveyors will identify the presence of potentially significant habitat features, such as potential bat hibernacula and maternity roosts, vernal pools, and reptile hibernacula features during all visits.

Upon completion of the site investigation field program, an evaluation of significance for the natural heritage assessment will be conducted in accordance with the Natural Heritage Reference Manual (MNR, 2010d), and Significant Wildlife Habitat Technical Guide (MNR, 2000). The Natural Heritage Assessment Report will be produced and submitted to the MNR, and will include mapping of the project in relation to identified natural features.

## B-4. References

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier (eds). 2007. Atlas of the Breeding Birds of Ontario 2001- 2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto. 706 pp.

Corporation of Loyalist Township. 2010. Loyalist Township Official Plan. Prepared by Cumming Cockburn Limited. November 2010.

IBA Canada. Undated. Important Bird Areas of Canada database. http://www.bsc-eoc.org/iba/site.jsp?siteID=ON003 (accessed April, 2011).

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological land classification for Southwestern Ontario: first approximation and its application. Ontario Ministry of Natural Resources, South Central Region, Science Development and Transfer Branch. Technical Manual ELC-005.

Ontario Partners In Flight. 2008. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain (North American Bird Conservation Region 13), Priorities, Objectives and Recommended Actions. Environment Canada (Ontario Region) and Ontario Ministry of Natural Resources.

Ontario Ministry of Natural Resources. 2010a. Bats and Bat Habitats. Guidelines for Wind Power Projects. March, 2010.

Ontario Ministry of Natural Resources. 2010b. Birds and Bird Habitats. Guidelines for Wind Power Projects. October, 2010.

Ontario Ministry of Natural Resources. 2010c. Natural Heritage Assessment Guide for Renewable Energy Projects. December, 2010.

Ontario Ministry of Natural Resources. 2010d. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. June, 2010.

Ontario Ministry of Natural Resources. 2010e. Renewable Energy Atlas. http://www.lio.ontario.ca/imf-ows/imf.jsp?site=renew_en

Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. 151 pp.

# APPENDIX C
## *Curricula Vitae*

# Andrew Taylor B.Sc.

Ecologist

Andrew Taylor is a knowledgeable terrestrial ecologist and project manager. He has successfully managed both small and large projects, including environmental impact statements, constraint analyses and environmental implementation reports. In addition, he has coordinated natural heritage components of Environmental Assessments. These projects involve the implementation of natural heritage policies of the Ontario Provincial Policy Statement, Greenbelt Plan and municipal policy documents. Andrew also has experience with policies pertaining to Threatened and Endangered Species including Butternut.

Andrew has strong field skills including identification of vascular plants, breeding amphibians (calling frogs and toads), breeding salamanders (adult and egg studies), reptiles and bats, with a particular emphasis on birds, butterflies and dragonflies. He is skilled at assessing wildlife habitat, applying Ecological Land Classification (ELC) and delineating wetland boundaries. Andrew is experienced at analyzing natural heritage features for the presence of Significant Woodlands or Significant Wildlife Habitat using guidance documents such as the 'Natural Heritage Reference Manual, How Much Habitat is Enough?' and the 'Significant Wildlife Habitat Technical Guide'.

Andrew has provided terrestrial ecology expertise in a wide range of sectors, including urban lands, energy (including renewable energy), recreational development, infrastructure and aggregate extraction.

## EDUCATION

B.Sc. (Hons), University of Guelph / Environmental Toxicology, Guelph, Ontario, 2001

Certificate, Ecological Land Classification for Southern Ontario, Turkey Point, Ontario, 2006

## AWARDS

2000 University of Guelph, Dean's List

1997 University of Guelph, Dean's List

## PROJECT EXPERIENCE

**Aggregate Services**

St. Marys Cement (SMC) Flamborough Quarry License Environmental Impact Study and Level 2 Natural Environment Technical Report (Ecologist)

*Identification and impact assessment of natural heritage features, compensation and management plan for Species at Risk (Butternut), water balance to maintain provincially significant wetland, salamander habitat and migration study, assessment of provincially significant woodland and significant wildlife habitat, environmental impacts of transportation.*

# Andrew Taylor B.Sc.

Ecologist

**Linear Infrastructure**

Natural Science Reports Related to MTO Highway Improvement Works, Various Sites, Ontario (Terrestrial Ecologist)

*Produced numerous Natural Sciences reports related to highway improvement works. Where required, Fisheries Act authorization was obtained and Fish Habitat Compensation Plans were developed. Potential impacts to terrestrial vegetation, wetlands and wildlife were described for the following studies:*
*- Highway 3 (Essex County): Preliminary Design Study;*
*- Highway 40 (Municipality of Chatham-Kent): Detail Design Study;*
*- Highway 401 (Kitchener): Post-construction Compliance Monitoring;*
*- Highway 401 (Essex County, near Comber): Post-construction Compliance Monitoring;*
*- Highway 26 (County of Grey): Post-construction Compliance Monitoring;*
*- Highway 17 (Sudbury): Preliminary Design Study;*
*- Highway 9 (Municipality of South Bruce): Post-construction Compliance Monitoring.*

**Multi-Unit / Family Residential**

Crates Marina, Keswick, Ontario (Project Manager / Ecologist)

*Environmental policies, approvals and desgin. Identification of natural heritage features and sensitive species.*

Kortright East Development, Guelph, Ontario (Project Manager / Ecologist)

*Envrionmental Implementation Report. Vegetation buffers, wildlife corridor, tree conservation plan, planning and design of invasive species removal, design of compliance and performance monitoring program.*

Southeast Sutton Development Area Plan, Sutton, Ontario (Project Manager / Ecologist)

*Environmental policies, approval and design. Identification of natural heritage features and constraints for Development Area Plan. Plan of Subdivision forest buffers, mitigation of impacts to forest resources, sensitive vegetation and Species at Risk. Participation in Ontario Muncipal Board discussions.*

**Natural Sciences & Heritage Resources**

Fourteen Mile Creek Development, Oakville, Ontario (Ecologist)

*Natural Heritage Monitoring Program Director - directed monitoring program of vegetation communities, change in species composition, avian wildlife, aquatic Species at Risk, benthic invertebrate communities, hydrogeology, geomorphology and erosion.*

Activa Waterloo East, Waterloo, Ontario (Ecologist)

*Terrestrial and Aquatic Monitoring Program - monitoring of vegetation communties, changes in species composition and disturbance levels were undertaken, interpreted and reported. Directed monitoring of benthic invertebrate communities.*

**Power**

Wolfe Island Wind Project Environmental Assessment - 86 Turbines, 197.6 MW, Wolfe Island, Ontario (Ecologist)

*Study design, coordination and conducting of monitoring for spring migratory birds, fall migrating raptors, staging waterfowl, winter raptors and grassland bird populations. Design and conducting specific studies to target avian Species at Risk. Assessment of amphibian populations, mammal populations, wildlife corridor and migratory bat populations. Preparation of technical report appendix to the Environmental Screening Report.*

Melancthon Wind Plant - 45 Turbines, 67.5 MW, Melancthon and Amaranth Townships, Ontario (Ecologist)

*Completion of post-construction monitoring program to assess direct mortality and potential avoidance impacts to breeding birds within the wind power facility. Technical reporting.*

Kingsbridge I Wind Plant - 22 Turbines, 39.6 MW, Goderich, Ontario (Ecologist)

*Phase I wind farm post-construction monitoring. Assessment of direct mortality of avian and bat species. Assessment of potential avoidance behaviour by migratory birds. Technical reporting.*

** denotes projects completed with other firms*

# Andrew Taylor B.Sc.

Ecologist

Proton Wind Program - 50 Turbines, 100 MW, Southgate Township, Ontario (Ecologist)
*Coordinating and conducting monitoring of migratory and breeding birds for wind turbine development, preparation of comprehensive technical appendix to the Environmental Screening Report.*

Port Alma Wind Power Project - 44 Turbines, 101.2 MW, Municipality of Chatham-Kent, Ontario (Ecologist)
*Coordinating and conducting monitoring of winter raptors, spring migratory shorebirds, breeding birds, fall migrating raptor and avian Species at Risk populations for wind turbine development. Prepared comprehensive technical report appendix to the Environmental Screening Report.*

Kingsbridge II Wind Project Environmental Assessment - 69 Turbines, 158.7 MW, Goderich, Ontario (Ecologist)
*Coordinating and conducting monitoring of migratory and breeding bird populations for wind turbine development. Prepared comprehensive technical report appendix to the Environmental Screening Report.*

Melancthon II Wind Project Environmental Assessment - 88 Turbines, 132 MW, Melancthon & Amaranth Townships, Ontario (Ecologist)
*Conducted monitoring of breeding bird populations or wind turbine development.*

**Research / Laboratories**

Rice Lake Plains Joint Initiative, Northumberland County, Ontario* (Ecologist)
*Tallgrass prairie research program. Identification and detailed cataloging of remnant tallgrass prairie sites, landowner liaison and education, development of tallgrass prairie management plans, reporting of findings.*

Alderville First Nations Black Oak Savannah, Alderville, Ontario* (Ecologist)
*Tallgrass prairie and black oak savannah research program. Technical reporting. Vegetation monitoring, tallgrass prairie reconstruction, wildlife monitoring, Species at Risk reintroduction.*

**Sports, Recreation & Leisure**

Sunnidale Park Master Plan, Barrie, Ontario (Ecologist)
*Identification and delineation of ecological management units. Design of management plans for ecological units, wetland and forest habitat rehabilitation. Technical reporting.*

** denotes projects completed with other firms*

# Robert Stamp
Ornithologist

Bob joined Stantec in 2004 as an avian ecologist. He been birding for more than 50 years and has compiled an extensive life list. At Stantec, Bob is responsible for carrying out seasonal bird and wildlife field surveys throughout Ontario, including pre and post construction monitoring at wind farms across the province. Bob also has extensive experience conducting bird surveys for development and aggregate projects.

## EDUCATION

Bachelor of Science, Honors, McMaster University, Biology, Hamilton, Ontario.

## PROFFESIONAL MEMBERSHIPS

Ontario Field Ornithologists, Member

Hamilton Naturalists Club, Member

## PROJECT EXPERIENCE

Port Alma Wind Project, Municipality of Chatham-Kent, Ontario (Ornithologist)
*Pre and post construction bird surveys.*

Melancthon Wind Project, Dufferin County, Ontario (Ornithologist)
*breeding bird surveys and post construction montotirng*

Wolfe Island Wind Project, Wolfe Island, Ontario (Ornithologist)
*Pre and post construction breeding, migratory and wintering birds.*

Port Dover and Nanticoke Wind Project, Ontario (Ornithologist)
*Pre and post construction bird surveys.*

# Brandon Holden

Environmental Scientist

Brandon joined Stantec in 2008. He has been birding extensively in Ontario and Eastern North America since 1997. Having recorded 344 species in Ontario, Brandon has a keen personal interest in finding vagrant bird species; highlighted last year by finding and photographing the first Black-tailed Gull (Larus crassirostris) for the province. A recent accomplishment was being voted onto the Ontario Bird Records Committee; the youngest member in its 30 year history. At Stantec, Brandon is responsible for carrying out seasonal bird and wildlife field surveys throughout Ontario, including some lengthy programs at remote sites.

## EDUCATION

Lambton College, Sarnia, Ontario, 2007

## PROFESSIONAL ASSOCIATIONS

Voting Member, Ontario Bird Record Committee (OBRC)

Member, Bird Studies Canada

Member, Ontario Field Ornithologists

Member, American Birding Association

## AWARDS

Finalist, Veolia Wildlife Photographer of the Year, London England, 2009

NatureScapes.net Image of the Week - Multiple Weeks, 2006-2009

Ross Thompson Trophy for Proficiency in Ornithology - 2004

Doug Tarry Young Ornithologist Award - 2002

Hamilton Civic Award - 2002

Ross Thompson Trophy for Proficiency in Ornithology - 2002

## PROJECT EXPERIENCE

**Research**

Port Alma Wind Project, Municipality of Chatham-Kent, Ontario (Environmental Scientist)
*Brandon conducted migratory bird surveys.*

Sault Ste. Marie Wind Power Project, Algoma District, Ontario (Environmental Scientist)
*Brandon conducted migratory bird surveys.*

Thunder Bay Wind Power Project, Thunder Bay District, Ontario (Environmental Scientist)
*Brandon conducted migratory bird surveys.*

Melancthon Wind Project, Dufferin County, Ontario (Environmental Scientist)
*Brandon conducted breeding bird surveys.*

Ostrander Point Wind Energy Park, Prince Edward County, Ontario (Environmental Scientist)
*Brandon conducted surveys on breeding, migratory and wintering birds.*

Wolfe Island Wind Project, Wolfe Island, Ontario (Environmental Scientist)
*Brandon conducted surveys on breeding, migratory and wintering birds.*

# Brandon Holden

Environmental Scientist

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**Sports, Recreation & Leisure**

Volunteer Work, Multiple Locations* (Volunteer)

*Annual leader of guided hikes for the Ontario Field Ornithologists, including a featured hike leader for two of the past three annual conventions. Brandon continues to volunteer by donating photographs to various provincial and local organizations. He also volunteers with the Hamilton Naturalists Club assisting with the Fall Bird Counts since 2001, and worked with the Haldimand Bird Observatory with bird banding.*

Peregrine Prints, Multiple Locations* (Photographer)

*Brandon established and maintains his own website, www.peregrineprints.com, showcasing his natural history photography and information. In 2010 the site has attracted over 23,000 visits and captured 800,000 hits as of June 1, 2010.*

**Emergency Planning / Response**

Emergency Medical Care Training, Multiple Locations*

*Brandon has taken extensive medical training; starting with general First Aid many years ago. He has upgraded this to Standard First Aid, First Responder and in 2008 obtained certification as an Emergency Medical Responder - the highest level available below Paramedic. Brandon also holds a (60 hour) Emergency Patient Care certificate from Lambton College.*

** denotes projects completed with other firms*

# Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Daniel is a Registered Professional Planner in Ontario, with a broad range of expertise in the environmental field, gained over a 22 year career. He has coordinated the environmental planning and implementation components for detailed natural science-based environmental assessments, environmental screenings, detailed design, rehabilitation, construction inspection and post-development monitoring projects. Through his extensive experience, Daniel provides a wealth of knowledge concerning permitting and approvals for a number of environmental disciplines. His range of experience equips him to facilitate the management of large projects with complex policy and planning requirements that involve evaluations of various natural heritage system components. Daniel excels at coordinating the natural heritage aspects of large projects that involve multidisciplinary professional input, as well as negotiation with regulatory agencies concerning permits, approvals and issues resolution.

Daniel provides oversight of plan development and implementation and terrestrial systems assessments, to ensure that all environmental requirements are properly investigated and addressed in order to achieve environmental regulatory compliance throughout the project. Daniel has acquired a skillset over the course of his career that is fundamental to the efficient management of the environmental aspects of large scale projects.

## EDUCATION

BES (Honours), Major in Environmental and Resource Studies, University of Waterloo, Waterloo, Ontario, 1988

Certificate, Ontario Ministry of Natural Resources / Ontario Wetland Evaluation Training Course, North Bay, Ontario, 2009

## MEMBERSHIPS

Registered Professional Planner, Ontario Professional Planners Institute

Member, Environment Committe, Ontario Stone, Sand & Gravel Association

Member, Society of Wetland Scientists

## PROJECT EXPERIENCE

**Environmental Assessments**

Link Pipeline Project, Environmental Assessment and Route Selection, Niagara Gas Transmission Limited (Environmental Planner)

Transportation Environmental Study Report, Highway 401 Bridge Rehabilitation at County Road 36 and Concession Road 7, Puslinch Township, Wellington County, Ministry of Transportation Ontario (MTO) (Environmental Planner)

Prism Pipeline Project (Environmental Permit and Approval Manager and Acquisition Coordinator)

Public Consultation Program for Remediation of Brownfield Site in Residential Neighbourhood, Pirelli Cable Inc (Project Manager)

*Developed two phase public consultation program for remediation of brownfield site. Presented information and completed individual liaison with affected landowners*

International Power Line Project - Environmental Site Assessment and Linear Facility Route Selection, Great Lakes Power Ltd. (Environmental Planner)

NEB Environmental Assessment, Great Lakes Power Ltd. (Project Manager)

*Coordinated public consultation program for high voltage power cable line – NEB Environmental Assessment. Involved preparation of notifications, presentation materials and establishment of public input database*

Groundwater Assessment Investigations and Remediation Initiatives for southwestern Ontario Tank Farm and Pumping Station, Enbridge Pipeline Inc. (Project Manager)

# Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Fox Hollow Subdivision Phase 1 External Sanitary Sewer - Water crossing, permits and approval package (Project Manager)

Transportation Design, Construction Report and Aquatic Assessment. Highway 3 Road Improvement St. Thomas to Aylmer, Ontario Ministry of Transportation (Environmental Planner)

Fisheries Assessment and Letter of Intent - Highway 3 Improvements/Aquatic Crossings, Ministry of Transportation

Environmental Screening Document, Terrestrial and Fisheries Technical Report, Hopewell Creek Bridge Rehabilitation at Highway 7, Ministry of Transportation Ontario (MTO) (Natural Environment Planner)

Sithe Goreway Station, Sithe Energies Canadian Development Ltd. (Project Manager)
*Represented client at public forums*

Fisheries Habitat Assessment, Oshawa/Newcastle proposed Highway 407, Route Location and Environmental Assessment Study (Project Manager)

Environmental Property Assessments, Preliminary Phase I Assessment for Contamination Identification, 50 Sites, Canadian National Real Estate Division (Project Manager)

Environmental Management System Audit of Enbridge Pipeline Division, Enbridge Pipeline Inc. (Project Manager)

Detailed Phase II Investigations for Former Massey Ferguson Brownfield Site, City of Brantford, Ontario (Project Manager)

City of London: Fisheries Habitat Assessment - Medway Creek Trunk Sewer, City of London (Project Manager)

Brownfield Phase I Investigations for 16 Sites in the City of Brantford, City of Brantford (Project Manager)

Westover Station - Initial Screening Level Risk Assessment, Enbridge Pipeline Inc.* (Project Manager)

Meyer Pier Park - Risk Assessment Peer Review, City of Belleville, Ontario* (Senior Environmental Planner)

Sudbury Area Community Risk Assessment - Soil and Groundwater Project Component Assessments, Inco* (Planner)

New Orleans/Gatineau Pipeline Environmental Assessment and Route Selection, Consumer Gas* (Project Manager)

Site Remediation Program at Six Remote Fly-in Sites in Northern Ontario, Bell Canada* (Site Remediation Program Manager)
*Conducted preliminary site assessments and coordinated site construction contractors*

Peer Review of Environmental Screening Reports and Phase 1 Assessments in South Western Ontario for Property Transactions, Union Gas* (Project Manager)

Vector Pipeline Project: Phase I and II Property Investigation, Vector Pipeline Ltd.* (Project Manager)

Nanticoke Junction: Phase I and II Environmental Site Assessment, Enbridge Pipeline Inc.* (Project Manager)

Peer Review of Phase I and II ESA's for Legal Counsel, Smith Valeriote, Barristers and Solicitors* (Project Manager)

PRISM Pipeline Project Environmental Site Assessment and Route Selection, Imperial Oil Ltd* (Environmental Planner)

Phase I and II Environmental Property Site Assessments* (Manager)
*More than 250 Phase I, and II Environmental Property Site Assessments in Ontario and Quebec for private industry, as well as federal and municipal governments*

Natural Science Route Selection Environmental Assessment for Line 9C portion of the Line 9 Reversal Project, Enbridge Pipeline Inc.* (Project Manager)

Ontario Manitoba Interconnection Project. Data Collection and Regulatory Agency Issue Assessment, Ontario Hydro* (Resource Planner)

** denotes projects completed with other firms*

# Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Orlean Pipeline Environmental Assessment Public Consultation Program, Consumers Gas (Project Manager)
*Preparation of announcements and public forum presentations for pipeline project approvals*

Agricultural Economic Assessment, Agricultural Assessments of Tom Howe Landfill Site and Canborough Landfill Site (Project Manager)

**Natural Sciences & Heritage Resources**

Vector Pipeline Project, Vector Pipeline Ltd. (Project Manager)
*Development of watercrossing technique design for environmental protection. Coordination of regulatory approval requirements*

PRISM Pipeline Project, Imperial Oil Ltd. (Project Manager)
*Environmental Construction permits and approvals for all natural environmental features*

OCWA Water Pipeline at the Ausable River Watercrossing, Ontario Clean Water Agency (Project Manager)
*Developed and implemented environmental protection methods on-site.*

Medway Creek Trunk Sewer Crossings (5), City of London (Project Manager)
*Preparation of watercrossing plans / bed-level crossing, permits and approval package.*

Line Lowering at 403 Burlington - Rambo Creek Crossing, Interprovincial Pipe Line Inc. (Project Manager)
*Preparation of Sediment Control Plan and Watercrossing Plans*

Line 9C, Shell Take off to Sarnia Terminal, Interprovincial Pipe Line Inc. (Project Manager)
*Preparation of Sediment Control Plan and Watercrossing Plans*

Line 9C Sarnia Delivery Line, Enbridge Pipeline Inc. (Project Manager)
*Development of watercrossing design for protection of water resource*

Highway 9 Project, 5 Watercrossings, Consumers Gas (Project Manager)
*Preparation of Sediment Control Plan and Watercrossing Plans*

Consumers Gas Link Project, Baby Creek (Project Manager)
*Preparation of Sediment Control Plan and Watercrossing Plans*

Conceptual Restoration Plans, Smithville and Wolverton Pumping Station, Interprovincial Pipe Line Inc. (Project Manager)

Link Pipeline Project, Niagara Gas Transmission Limited* (Project Manager)
*Conducted pre-construction woodlot appraisal for construction compensation*

**Aggregate Services**

Level 2 Natural Environment Technical Assessment Report for Aggregate Expansion, Hillsburgh Pit, CBM Aggregates, Erin, Ontario (Environmental Planner, Project Manager)

Adaptive Management Plan, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Landscape and Ecosystem Restoration Plan, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Level 2 Natural Environment Technical Report, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Duntroon Quarry Application Adaptive Management Plan (AMP), Walker Industries, Collingwood, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environmental Technical Assessment Report for Proposed Aggregate Application, Montrose Pit, Capital Paving, County of Wellington, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environment Technical Assessment Report for Proposed Aggregate Application, Godfrey Extension, CBM Aggregates, Peterborough County, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environment Technical Assessment Report for Proposed Aggregate Application, CBM Aggregates, Township of North Dumfries, Ontario (Environmental Planner)

** denotes projects completed with other firms*

Levels 1 & 2 Natural Environment Assessment, Holman Pit, Guelph Eramosa Township, Ontario (Environmental Planner)

Level 2 Natural Environmental Assessment Technical Report, Capital Paving, Aikensville, Ontario (Environmental Manager)

Level 2 Natural Environmental Assessment Technical Report Aggregate Application, Region of Halton, City of Burlington, Ontario (Environmental Coordinator)

Levels 1 & 2 Natural Environmental Technical Assessment Report for Proposed Aggregate Application, CBM Aggregates, Brant County, Ontario (Environmental Planner)

Level 2 Natural Environmental and Aquatic Assessment - Aggregate Quarry Application, Federal White Cement, Oxford County, Ontario (Project Manager)

Environmental Impact Study Report Aggregate Application, Flamborough, Ontario (Project Coordinator)

## PUBLICATIONS

Unique Features of Environmental Management System/ISO-14001 Application to Linear Facilities. *7th International Symposium on Environmental Concerns in Right-of-Way Management*, 2002.

# Don Graham M.Sc., B.Ed., B.A.

Intermediate Biologist

Don Graham is a Field Biologist with Stantec's Terrestrial Team providing environmental management consultation services to projects across Ontario. Don has a diverse background, having completed his Master of Science in Zoology at the University of Guelph and continued his education obtaining a Teaching Certificate from the University of Western Ontario, as well as the Ontario Wetland Evaluation System (OWES) course offered by the Ministry of Natural Resources.

Don has extensive experience conducting terrestrial fieldwork and writing terrestrial components of reports which meet provincial and municipal requirements for Class EA for Transportation Facilities, Municipal Class EA, Environmental Impact Studies and Natural Heritage Evaluations. Don's experience includes transportation, servicing, residential, industrial and commercial projects. His projects have involved a broad spectrum of field survey types including assessment of breeding birds, amphibians, vegetation communities, vegetation species, reptiles and Species at Risk in a variety of habitats within southern, central, eastern and northern Ontario, using protocols of the Ontario Breeding Bird Atlas, Marsh Monitoring Program and Ecological Land Classification. He is familiar with pertinent policies such as the Natural Heritage policies of the Provincial Policy Statement, Conservation Authority Regulatory Areas, the *Endangered Species Act* and the *Migratory Bird Convention Act*, and is experienced at effective regulatory agency liaison.

## EDUCATION

B.A., University of Guelph / Psychology, Guelph, Ontario, 1983

M.Sc., University of Guelph / Zoology, Guelph, Ontario, 1987

B.Ed., University of Western Ontario / Ontario Teaching Certificate, London, Ontario, 1990

Certificate, Ministry of Natural Resources / Ontario Wetland Evaluation System, North Bay, Ontario, 2005

Diploma, McMaster University / Spatial Analysis and GIS, Hamilton, Ontario, 2004

## MEMBERSHIPS

Member, Field Botanists of Ontario

Member, Ontario Field Ornithologists

Member, Bird Studies Canada

## PROJECT EXPERIENCE

**Natural Sciences & Heritage Resources**

Species at Risk in Ontario*, Various Sites (Biologist)
*Field experience with many Species at Risk including: Butternut, Blanding's turtle, Snapping Turtle, Eastern Hog-nosed Snake, Chimney Swift, Common Nighthawk, Bobolink, Least Bittern, Hooded Warbler, Acadian Flycatcher, Loggerhead Shrike, Canada Warbler and Golden-winged Warbler.*

Ontario Ministry of Natural Resources*, London and Aylmer District, Ontario (Field Biologist / Ornithological Technician)
*Scored wetlands within Aylmer District for the Ministry of Natural Resources using the Southern Ontario Wetland Evaluation System (3rd Edition) protocol. Work involved assessment of biological, social, hydrological and special features of wetlands in accordance with OWES, landowner liaison and planning of fieldwork. Created, edited, organized and managed data layers for Ontario wetlands, forests and urbanization using aerial photography, satellite imagery and ArcGIS software. Searched research plots for bird nests, collected field data on forest bird nesting success and plant characteristics using established techniques, managed data and created maps of research sites and nest locations using GIS software.*

Bird Studies Canada*, Port Rowan, Ontario (Ornithological Technician)
*Conducted bird and amphibian inventories for a wetland study using specified protocols. Reviewed background data and literature and wrote reports on population trends of colonial nesting tern species. Conducted forest bird inventories used in developing forestry management practices. Reported current bird sightings for the Bird Studies Canada web-site.*

** denotes projects completed with other firms*

# Don Graham M.Sc., B.Ed., B.A.

Intermediate Biologist

**Linear Infrastructure**

Various Servicing Projects*, Ontario (Biologist)

*Conducted terrestrial fieldwork and wrote terrestrial components of Municipal Class EA Reports and supporting Technical Reports to support proposed linear infrastructure construction in Ontario, including:*

*- York-Durham Sanitary Sewer development;*
*- Don River and Waterfront Sewer Improvements, Toronto;*
*- Horgan Watermain construction in Scarborough;*
*- Kennedy Road Sewer development in Markham;*
*- Improvements to sewage lagoon in Neustadt;*
*- Watermain in Sauble Beach;*
*- Jet fuel pipeline for Pearson International Fuel Facilities Corp. in Toronto;*
*- Repair of Trans-Northern Pipelines Inc. in eastern Ontario; and*
*- Construction of new pipeline for Trans-Northern Pipelines Inc. in eastern Ontario.*

**Highway and Transportation**

Various Highway and Transportation Projects*, Ontario (Biologist)

*Conducted terrestrial fieldwork and wrote terrestrial components of Class EA Reports for Transportation Facilities and supporting Technical Reports to support proposed road improvements in Ontario, including:*

*- New Highway 7 corridor between Kitchener-Waterloo and Guelph;*
*- Improvements to Highway 7 corridor in Durham Region;*
*- Improvements to Highway 11 north of Temagami;*
*- Twinning of Highway 11 in and north of Burk's Falls;*
*- Twinning of Highway 69 in vicinity of Pointe au Baril;*
*- Improvements to Highway 11 between Cochrane and Kirkland Lake;*
*- Bridge improvements and replacements in central Ontario;*
*- Proposed LRT line in Ottawa;*
*- Proposed LRT line linking Mississauga and Brampton;*
*- Extension of Peterborough Airport runway;*
*- Proposed Toronto-Bolton GO rail transit line; and*
*- Improvements to Toronto-Milton GO rail transit line.*

**Industrial Development**

Various Industrial Development Projects*, Ontario (Biologist)

*Conducted terrestrial fieldwork and wrote terrestrial components of Environmental Impact Studies to support Industrial Development projects in Ontario, including projects in Oakville and Toronto, Ontario.*

**Commercial / Retail Development**

Various Commercial Development Projects*, Ontario (Biologist)

*Conducted terrestrial fieldwork and wrote terrestrial components of Environmental Impact Studies to support Commercial Development projects in Ontario, including:*

*- Proposed golf course in Kawartha Lakes;*
*- Existing golf course in Gravenhurst;*
*- Mall expansion in Cookstown;*
*- Car dealership in Toronto; and*
*- Strip mall in Ajax.*

**Residential Development**

Various Residential Development Projects*, Ontario (Biologist)

*Conducted terrestrial fieldwork and wrote terrestrial components of Environmental Impact Studies to support Residential Development projects in Ontario, including projects located in: Kawartha Lakes, Pickering, Holland Landing East, Holland Landing West, Sharon, Newmarket, Belleville, Peterborough, Aurora and Toronto.*

** denotes projects completed with other firms*

# James Heslop

Bird Surveyor

James Heslop has thirty (30) years experience birding and record-keeping experience. He has volunteered with the Audubon Christmas Bird Censuses in Pickering, Hamilton, Fisherville, St. Catharines, and 25 years at Long Point. James was a volunteer for the Ontario Breeding Bird Atlas from 1981 to 1985, and from 2001 to 2005 (including point counts). He has also been involved with Ontario Forest Bird Monitoring of the Dundas Valley, was past recording secretary of the Norfolk Field Naturalists (NFN), past president of the Pickering Field Naturalists (PFN), was a Founding Member and is a Life Member of the Ontario Field Ornithologists (OFO), was the past lead editor of OFO News, past publicity director of the Hamilton Naturlaists' Club (HNC), is the current treasurer of the HNC, is the leader of field outings for the NFN, PFN, HNC and OFO, and is a current member of Hamilton Waterfront Trust Eastport Drive Trail Project Advisory Group.

## EDUCATION

Birding Courses, Sheridan College, Ontario, 1980

Commerce and Finance, University of Toronto, Ontario, 1972

## PROJECT EXPERIENCE

**Environmental Management**

Migratory and Breeding Bird Surveys*

*Migratory and breeding bird surveys for Positive Power Cooperative Inc, Dougan and Associates, Trow Associates*

Field Surveys*

*Study of hooded warblers, acadian flycatchers and invasive plants for Bird Studies Canada*

Bird Strike Surveys, Burlington Beach, Ontario* (Bird Surveying and Monitoring)

*Environment Canada*

# Melissa A. Straus B.Sc., M.Sc.

Ecologist

Melissa Straus is a Terrestrial Ecologist with experience in various sectors, including renewable energy and development. Her experience involves implementation of the Migratory Birds Convention Act and Species at Risk Act. Melissa is a skilled birder and has field experience conducting bird surveys (e.g., breeding bird surveys, nest searching) and post-construction monitoring at wind farms. She also has experience in wildlife habitat assessment and recently obtained her Ecological Land Classification certificate.

## EDUCATION

B.Sc. in Environmental Sciences, Co-op Program, University of Guelph, Guelph, Ontario, 2003

M.Sc. in Biology, Trent University, Peterborough, Ontario, 2009

Certified in the Ecological Land Classification System for Southern Ontario, Ontario Ministry of Natural Resources, Kemptville, Ontario, 2010

## PROFESSIONAL ASSOCIATIONS

Member, Peterborough Field Naturalists

Member, Guelph Field Naturalists

Member, Society of Canadian Ornithologists

Member, American Ornithologists' Union

## PROJECT EXPERIENCE

**Natural Sciences & Heritage Resources**

Conservation Planning, Mississauga, Ontario* (Conservation Planning Assistant)
*Created conservation plans for private landowners in the Credit Valley Watershed and inventoried vegetation using the Ecological Land Classification for Southern Ontario protocol.*

Forestry Impacts on Regeneration Rates and Bird Communities Research, East Lansing, Michigan* (Field Assistant)
*Performed avian point counts in the upper peninsula of Michigan, counted White-tailed Deer pellets along transects to estimate densities, and completed specialized vegetation surveys to assess forest regeneration rates.*

Forest Bird Research, London, Ontario* (Project Biologist)
*Prepared a manuscript on the nesting success of cavity-nesting birds in woodlots subjected to silviculture, conducted a meta-analysis of edge effects on nesting success of songbirds, and created fact sheets for a landowner stewardship guide. Conducted salamander mark and recapture surveys, nest searching and monitoring, completed numerous vegetation surveys, located and reported avian and vegetative species at risk, collected and identified invertebrates to Order.*

Alder Downs, East Gwillimbury, Ontario (Ecologist)
*Conducted pre-construction breeding bird surveys.*

White Pines, Picton, Ontario (Ecologist)
*Conducted evening amphibian and crepuscular bird auditory surveys.*

Melancthon Ecopower Centre, Melancthon Township, Ontario (Ecologist)
*Participated in environmental monitoring of post-construction wind turbine impacts on bird and bat mortalities.*

Hydro One Bruce X Milton Transmission Reinforcement, Bruce County, Ontario (Ecologist)
*Located and protected active bird nests during land clearing to ensure client compliance with the Migratory Birds Convention Act.*

** denotes projects completed with other firms*

Melissa A. Straus B.Sc., M.Sc.
Ecologist

## PUBLICATIONS

Reproductive success of cavity-nesting birds in partially harvested woodlots in southwestern Ontario. Melissa A. Straus, Kata Bavrlic, Erica Nol, Dawn M. Burke, and Ken A. Elliott. *Canadian Journal of Forest Research*, 2011.

The effects of partial harvesting on cavity-nesting bird communities in southwestern Ontario, Melissa Straus. *Society of Canadian Ornithologists (SCO-SOC) Conference Poster*, 2007.

Peterborough Field Naturalists Guest Speaker. *Impacts of partial harvesting on cavity-nesting birds in southwestern Ontario*, 2006.

Carolinian forests of southern Ontario: Species at risk and cavity-nesters, Melissa Straus. *Guelph Field Naturalists Guided Hike*, 2006.

# APPENDIX F

# COMPILED WILDLIFE SPECIES LIST

## Compiled Wildlife Species List

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| **MAMMALS** | | | | | | | |
| Masked Shrew | *Sorex cinereus* | | ■ | -- | -- | S5 | -- |
| Smoky Shrew | *Sorex fumeus* | | ■ | -- | -- | S5 | -- |
| Water Shrew | *Sorex palustris* | | ■ | -- | -- | S5 | -- |
| Northern Short-tailed Shrew | *Blarina brevicauda* | | ■ | -- | -- | S5 | -- |
| Hairy-tailed Mole | *Parascalops breweri* | | ■ | -- | -- | S4 | -- |
| Star-nosed Mole | *Condylura cristata* | | ■ | -- | -- | S5 | -- |
| Small-footed Myotis | *Myotis leibii* | | ■ | -- | -- | S2S3 | -- |
| Little Brown Myotis | *Myotis lucifugus* | | ■ | END | -- | S5 | -- |
| Northern Myotis | *Myotis septentrionalis* | | ■ | END | -- | S3? | -- |
| Silver-haired Bat | *Lasionycteris noctivagans* | | ■ | -- | -- | S4 | -- |
| Eastern Pipistrelle | *Pipistrellus subflavus* | | ■ | -- | -- | S3? | -- |
| Red Bat | *Lasiurus borealis* | | ■ | -- | -- | S4 | -- |
| Big Brown Bat | *Eptesicus fuscus* | | ■ | -- | -- | S5 | -- |
| Hoary Bat | *Lasiurus cinereus* | | ■ | -- | -- | S4 | -- |
| Eastern Cottontail | *Sylvilagus floridanus* | ■ | ■ | -- | -- | S5 | -- |
| Snowshoe Hare | *Lepus americanus* | | ■ | -- | -- | S5 | 20 |
| European Hare | *Lepus europaeus* | | ■ | -- | -- | SE | -- |
| Eastern Chipmunk | *Tamias striatus* | ■ | ■ | -- | -- | S5 | -- |
| Woodchuck | *Marmota monax* | | ■ | -- | -- | S5 | -- |
| Grey Squirrel | *Sciurus carolinensis* | ■ | ■ | -- | -- | S5 | -- |
| Red Squirrel | *Tamiasciurus hudsonicus* | ■ | ■ | -- | -- | S5 | -- |
| Northern Flying Squirrel | *Glaucomys sabrinus* | | ■ | -- | -- | S5 | -- |
| Southern Flying Squirrel | *Glaucomys volans* | | ■ | NAR | NAR | S4 | 20 |
| Beaver | *Castor canadensis* | ■ | ■ | -- | -- | S5 | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| White-footed Mouse | *Peromyscus leucopus* | | ■ | -- | -- | S5 | -- |
| Deer Mouse | *Peromyscus maniculatus* | | ■ | -- | -- | S5 | -- |
| Southern Red-backed Vole | *Clethrionomys gapperi* | | ■ | -- | -- | S5 | -- |
| Muskrat | *Ondatra zibethicus* | | ■ | -- | -- | S5 | -- |
| Southern Bog Lemming | *Synaptomys cooperi* | | ■ | -- | -- | S4 | -- |
| Meadow Vole | *Microtus pennsylvanicus* | ■ | ■ | -- | -- | S5 | -- |
| Norway Rat | *Rattus norvegicus* | | ■ | -- | -- | SE | -- |
| House Mouse | *Mus musculus* | | ■ | -- | -- | SE | -- |
| Meadow Jumping Mouse | *Zapus hudsonicus* | | ■ | -- | -- | S5 | -- |
| Woodland Jumping Mouse | *Napaeozapus insignis* | | ■ | -- | -- | S5 | -- |
| Porcupine | *Erethizon dorsatum* | ■ | ■ | -- | -- | S5 | -- |
| Coyote | *Canis latrans* | ■ | ■ | -- | -- | S5 | -- |
| Grey Wolf | *Canis lupus* | | ■ | NAR | NAR | S4 | -- |
| Red Fox | *Vulpes vulpes* | | ■ | -- | -- | S5 | -- |
| Grey Fox | *Urocyon cineroargenteus* | | ■ | THR | THR | S1 | -- |
| Black Bear | *Ursus americanus* | | ■ | NAR | NAR | S5 | -- |
| Raccoon | *Procyon lotor* | ■ | ■ | -- | -- | S5 | -- |
| Marten | *Martes americana* | | ■ | -- | -- | S5 | -- |
| Fisher | *Martes pennanti* | | ■ | -- | -- | S5 | -- |
| Ermine | *Mustela erminea* | | ■ | -- | -- | S5 | -- |
| Long-tailed Weasel | *Mustela frenata* | | ■ | -- | -- | S4 | -- |
| Mink | *Mustela vison* | | ■ | -- | -- | S5 | -- |
| Striped Skunk | *Mephitis mephitis* | ■ | ■ | -- | -- | S5 | -- |
| River Otter | *Lutra canadensis* | | ■ | -- | -- | S5 | -- |
| Lynx | *Lynx canadensis* | | ■ | NAR | -- | S5 | -- |
| Bobcat | *Lynx rufus* | | ■ | -- | -- | S4 | -- |
| White-tailed Deer | *Odocoileus virginianus* | ■ | ■ | -- | -- | S5 | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Moose | *Alces alces* | | ■ | -- | -- | S5 | -- |
| **BIRDS** | | | | | | | |
| Canada Goose[β] | *Branta canadensis* | ■ | ■ | -- | -- | S5B | -- |
| Mute Swan | *Cygnus olor* | | ■ | -- | -- | SNA | -- |
| Trumpeter Swan | *Cygnus buccinator* | | ■ | NAR | NAR | S4 | -- |
| Wood Duck[β] | *Aix sponsa* | ■ | ■ | -- | -- | S5B | -- |
| Gadwall | *Anas strepera* | | ■ | -- | -- | S4 | -- |
| American Black Duck | *Anas rubripes* | | ■ | -- | -- | S4 | -- |
| Mallard [β] | *Anas platyrhynchos* | ■ | ■ | -- | -- | S5 | -- |
| Blue-winged Teal | *Anas discors* | | ■ | -- | -- | S4 | -- |
| Northern Shoveler | *Anas clypeata* | | ■ | -- | -- | S4 | -- |
| Northern Pintail | *Anas acuta* | | ■ | -- | -- | S5 | -- |
| Green-winged Teal | *Anas crecca* | | ■ | -- | -- | S4 | -- |
| Ring-necked Duck | *Aythya collaris* | | ■ | -- | -- | S5 | -- |
| Hooded Merganser | *Lophodytes cucullatus* | | ■ | -- | -- | S5B, S5N | -- |
| Common Merganser | *Mergus merganser* | | ■ | -- | -- | S5B, S5N | -- |
| Ring-necked Pheasant[β] | *Phasianus colchicus* | | ■ | -- | -- | SNA | -- |
| Ruffed Grouse[β] | *Bonasa umbellus* | ■ | ■ | -- | -- | S5B | 25 |
| Wild Turkey[β] | *Meleagris gallopava* | ■ | ■ | -- | -- | S4 | -- |
| Common Loon | *Gavia immer* | ■ | ■ | NAR | NAR | S5B, S5N | 70 |
| Pied-billed Grebe | *Podilymbus podiceps* | | ■ | -- | -- | S4B, S4N | -- |
| Double-crested Cormorant | *Phalacrocorax auritus* | | ■ | NAR | NAR | S5B | 50 |
| American Bittern | *Botaurus lentiginosus* | | ■ | -- | -- | S4B | 10 |
| Great Blue Heron | *Ardea herodias* | ■ | ■ | -- | -- | S5 | -- |
| Green Heron | *Butorides virescens* | ■ | ■ | -- | -- | S4B | -- |
| Turkey Vulture | *Cathartes aura* | ■ | ■ | -- | -- | S5B | -- |
| Osprey | *Pandion haliaetus* | ■ | ■ | -- | -- | S5B | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Northern Harrier[β] | *Circus cyaneus* | ■ | ■ | NAR | NAR | S4B | 30 |
| Sharp-shinned Hawk[β] | *Accipiter striatus* | ■ | ■ | NAR | NAR | S5 | 30 |
| Cooper's Hawk[β] | *Accipiter cooperii* | ■ | ■ | NAR | NAR | S4 | 4-50+ |
| Northern Goshawk | *Accipiter gentilis* | | ■ | NAR | NAR | S4 | 100 |
| Red-shouldered Hawk | *Buteo lineatus* | | ■ | NAR | SC | SB | 100 |
| Broad-winged Hawk | *Buteo platypterus* | | ■ | -- | -- | S5 | 100 |
| Red-tailed Hawk[β] | *Buteo jamaicensis* | ■ | ■ | NAR | NAR | S5 | -- |
| Rough-legged Hawk | *Buteo lagopus* | ■ | | NAR | NAR | S1B, S4N | -- |
| Merlin | *Falco columbarius* | ■ | | NAR | NAR | S4 | -- |
| American Kestrel[β] | *Falco sparverius* | ■ | ■ | -- | -- | S5 | -- |
| Virginia Rail[β] | *Rallus limicola* | ■ | ■ | -- | -- | S5B | -- |
| Sora[β] | *Porzana carolina* | | ■ | -- | -- | S4B | -- |
| Sandhill Crane | *Grus canadensis* | | ■ | NAR | NAR | S5B | -- |
| Killdeer[β] | *Charadrius vociferus* | ■ | ■ | -- | -- | S5B | -- |
| Spotted Sandpiper[β] | *Actitis macularia* | | ■ | -- | -- | S5 | -- |
| Upland Sandpiper[β] | *Bartramia longicauda* | ■ | ■ | -- | -- | S4B | 25 |
| Wilson's Snipe[β] | *Gallinago delicata* | ■ | ■ | -- | -- | S5B | -- |
| American Woodcock[β] | *Scolopax minor* | ■ | ■ | -- | -- | S5N | -- |
| Wilson's Phalarope | *Phalaropus tricolor* | | ■ | -- | -- | S3B | -- |
| Herring Gull | *Larus argentatus* | ■ | ■ | -- | -- | S5B, S5N | -- |
| Ring-billed Gull | *Larus delawarensis* | ■ | | -- | -- | S5B, S5N | -- |
| Caspian Tern | *Hydroprogne caspia* | ■ | | NAR | NAR | S3B | -- |
| Black Tern[β] | *Chlidonias niger* | | ■ | NAR | SC | S3B | 20 |
| Rock Pigeon[β] | *Columba livia* | ■ | ■ | -- | -- | SNA | -- |
| Mourning Dove[β] | *Zenaida macroura* | ■ | ■ | -- | -- | S5 | -- |
| Yellow-billed Cuckoo[β] | *Coccyzus americanus* | | ■ | -- | -- | S4B | -- |
| Black-billed Cuckoo[β] | *Coccyzus erythropthalmus* | ■ | ■ | -- | -- | S5B | -- |
| Short-eared Owl | *Asio flammeus* | ■* | ■ | SC | SC | S3S4 | 75 |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Eastern Screech-Owl[β] | *Megascops asio* | | ■ | NAR | NAR | S4 | -- |
| Great Horned Owl[β] | *Bubo virginianus* | ■ | ■ | -- | -- | S5 | -- |
| Snowy Owl | *Bubo scandiaca* | ■ | ■ | NAR | NAR | SNA | -- |
| Barred Owl[β] | *Strix varia* | ■ | ■ | -- | -- | S4S5 | 100 |
| Long-eared Owl | *Asio otus* | | ■ | -- | -- | S4 | -- |
| Northern Saw-whet Owl | *Aegolius acadicus* | | ■ | -- | -- | S4 | -- |
| Common Nighthawk[β] | *Chordeiles minor* | | ■ | THR | SC | S4B | -- |
| Ruby-throated Hummingbird[β] | *Archilochus colubris* | | ■ | -- | -- | S5B | -- |
| Belted Kingfisher[β] | *Ceryle alcyon* | ■ | ■ | -- | -- | S4B | -- |
| Yellow-bellied Sapsucker[β] | *Sphyrapicus varius* | ■ | ■ | -- | -- | S5B | 30 |
| Downy Woodpecker[β] | *Picoides pubescens* | ■ | ■ | -- | -- | S5B | -- |
| Hairy Woodpecker[β] | *Picoides villosus* | ■ | ■ | -- | -- | S5B | 10 |
| Northern Flicker[β] | *Colaptes auratus* | ■ | ■ | -- | -- | S4B | -- |
| Pileated Woodpecker[β] | *Dryocopus pileatus* | ■ | ■ | -- | -- | S5 | 30-50 |
| Eastern Wood-Pewee[β] | *Contopus virens* | ■ | ■ | -- | -- | S4B | -- |
| Alder Flycatcher[β] | *Empidonax alnorum* | ■ | ■ | -- | -- | S5B | -- |
| Willow Flycatcher[β] | *Empidonax traillii* | ■ | ■ | -- | -- | S5B | -- |
| Least Flycatcher[β] | *Empidonax minimus* | ■ | ■ | -- | -- | S4B | -- |
| Eastern Phoebe[β] | *Sayornis phoebe* | ■ | ■ | -- | -- | S5B | -- |
| Great Crested Flycatcher[β] | *Myiarchus crinitus* | ■ | ■ | -- | -- | S4B | -- |
| Eastern Kingbird[β] | *Tyrannus tyrannus* | ■ | ■ | -- | -- | S4B | -- |
| Northern Shrike | *Lanius excubitor* | ■ | | -- | -- | SNA | -- |
| Yellow-throated Vireo | *Vireo flavifrons* | | ■ | -- | -- | S4B | 30 |
| Warbling Vireo[β] | *Vireo gilvus* | ■ | ■ | -- | -- | S5B | -- |
| Red-eyed Vireo[β] | *Vireo olivaceus* | ■ | ■ | -- | -- | S5B | -- |
| Blue Jay[β] | *Cyanocitta cristata* | ■ | ■ | -- | -- | S5B | -- |
| American Crow[β] | *Corvus brachyrhynchos* | ■ | ■ | -- | -- | S5B | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Common Raven[β] | *Corvus corax* | ■ | ■ | -- | -- | S5B | -- |
| Horned Lark | *Eremophila alpestris* | ■ | ■ | -- | -- | S5 | -- |
| Purple Martin | *Progne subis* | ■ | ■ | -- | -- | S4 | -- |
| Tree Swallow[β] | *Tachycineta bicolor* | ■ | ■ | -- | -- | S4B | -- |
| Northern Rough-winged Swallow | *Stelgidopteryx serripennis* | | ■ | -- | -- | S4B | -- |
| Bank Swallow | *Riparia riparia* | | ■ | -- | -- | S4B | -- |
| Cliff Swallow[β] | *Petrochelidon pyrrhonota* | ■ | ■ | -- | -- | S4B | -- |
| Barn Swallow[β] | *Hirundo rustica* | ■ | ■ | -- | -- | S4B | -- |
| Black-capped Chickadee[β] | *Poecile atricapillus* | ■ | ■ | -- | -- | S5 | -- |
| Red-breasted Nuthatch[β] | *Sitta canadensis* | ■ | ■ | -- | -- | S5 | 10 |
| White-breasted Nuthatch[β] | *Sitta carolinensis* | ■ | ■ | -- | -- | S5 | 10 |
| Brown Creeper[β] | *Certhia americana* | ■ | ■ | -- | -- | S5B | 30 |
| House Wren[β] | *Troglodytes aedon* | ■ | ■ | -- | -- | S5B | -- |
| Winter Wren[β] | *Troglodytes troglodytes* | | ■ | -- | -- | S5B | 30 |
| Sedge Wren | *Cistothorus platensis* | | ■ | NAR | NAR | S4B | -- |
| Marsh Wren[β] | *Cistothorus palustris* | ■ | ■ | -- | -- | S4B | -- |
| Golden-crowned Kinglet | *Regulus satrapa* | ■ | ■ | -- | -- | S5B | 30 |
| Ruby-crowned Kinglet | *Regulus calendula* | ■ | | -- | -- | S4B | -- |
| Eastern Bluebird[β] | *Sialia sialis* | ■ | ■ | NAR | NAR | S5B | -- |
| Veery[β] | *Catharus fuscescens* | ■ | ■ | -- | -- | S4B | 10 |
| Hermit Thrush | *Catharus guttatus* | | ■ | -- | -- | S5B | 100 |
| Wood Thrush[β] | *Hylocichla mustelina* | ■ | ■ | -- | -- | S4B | 4 |
| American Robin[β] | *Turdus migratorius* | ■ | ■ | -- | -- | S5B | -- |
| Gray Catbird[β] | *Dumetella carolinensis* | ■ | ■ | -- | -- | S4B | -- |
| Northern Mockingbird | *Mimus polyglottos* | | ■ | -- | -- | S4 | -- |
| Brown Thrasher[β] | *Toxostoma rufum* | ■ | ■ | -- | -- | S4B | -- |
| American Pipit | *Anthus rubescens* | ■ | | -- | -- | S4 | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| European Starling[β] | *Sturnus vulgaris* | ■ | ■ | -- | -- | SNA | -- |
| Cedar Waxwing[β] | *Bombycilla cedrorum* | ■ | ■ | -- | -- | S5B | -- |
| Bohemian Waxwing | *Bombycilla garrulus* | ■ | | -- | -- | S5B | -- |
| Golden-winged Warbler[β] | *Vermivora chrysoptera* | ■ | ■ | THR | SC | S4B | -- |
| Blue-winged/Golden-winged Warbler | *Vermivora sp.* | ■ | | -- | -- | -- | -- |
| Nashville Warbler[β] | *Oreothlypis ruficapilla* | ■ | ■ | -- | -- | S5B | -- |
| Yellow Warbler[β] | *Setophaga petechia* | ■ | ■ | -- | -- | S5B | -- |
| Chestnut-sided Warbler[β] | *Setophaga pensylvanica* | | ■ | -- | -- | S5B | -- |
| Magnolia Warbler | *Setophaga magnolia* | | ■ | -- | -- | S5B | 30 |
| Yellow-rumped Warbler[β] | *Setophaga coronata* | ■ | ■ | -- | -- | S5B | 30 |
| Black-throated Blue Warbler | *Setophaga caerulescens* | ■ | | -- | -- | S5B | 100 |
| Black-throated Green Warbler[β] | *Setophaga virens* | ■ | ■ | -- | -- | S5B | 30 |
| Blackburnian Warbler | *Setophaga fusca* | | ■ | -- | -- | S5B | 50 |
| Pine Warbler | *Setophaga pinus* | | ■ | -- | -- | S5B | 30 |
| Blackpoll Warbler | *Setophaga striata* | ■ | | -- | -- | S4B | -- |
| American Redstart[β] | *Setophaga ruticilla* | | ■ | -- | -- | S5B | 30 |
| Black-and-white Warbler[β] | *Mniotilta varia* | ■ | ■ | -- | -- | S5B | 100 |
| Ovenbird[β] | *Seiurus aurocapilla* | ■ | ■ | -- | -- | S4B | 20 |
| Northern Waterthrush[β] | *Parkesia noveboracensis* | ■ | ■ | -- | -- | S5B | 20 |
| Mourning Warbler[β] | *Geothlypis philadelphia* | | ■ | -- | -- | S4B | 30 |
| Common Yellowthroat[β] | *Geothlypis trichas* | ■ | ■ | -- | -- | S5B | -- |
| Scarlet Tanager[β] | *Piranga olivacea* | ■ | ■ | -- | -- | S4B | 30 |
| Eastern Towhee[β] | *Pipilo erythrophthalmus* | ■ | ■ | -- | -- | S4B | -- |
| American Tree Sparrow | *Spizella arborea* | ■ | | -- | -- | S4B | -- |
| Chipping Sparrow[β] | *Spizella passerina* | ■ | ■ | -- | -- | S5B | -- |
| Clay-colored Sparrow[β] | *Spizella pallida* | ■* | ■ | -- | -- | S4B | -- |
| Field Sparrow[β] | *Spizella pusilla* | ■ | ■ | -- | -- | S4B | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Vesper Sparrow[β] | *Pooecetes gramineus* | ■ | ■ | -- | -- | S4B | -- |
| Savannah Sparrow[β] | *Passerculus sandwichensis* | ■ | ■ | -- | -- | S4B | -- |
| Grasshopper Sparrow[β] | *Ammodramus savannarum* | ■ | ■ | -- | -- | S4B | -- |
| Song Sparrow[β] | *Melospiza melodia* | ■ | ■ | -- | -- | S5B | -- |
| Lincoln's Sparrow[β] | *Melospiza lincolnii* | | ■ | -- | -- | S5B | -- |
| Swamp Sparrow[β] | *Melospiza georgiana* | ■ | ■ | -- | -- | S5B | -- |
| White-throated Sparrow[β] | *Zonotrichia albicollis* | ■ | ■ | -- | -- | S5B | 20 |
| White-crowned Sparrow | *Zonotrichia leucophrys* | ■ | | -- | -- | S4B | -- |
| Dark-eyed Junco | *Junco hyemalis* | ■ | | -- | -- | S5B | -- |
| Snow Bunting | *Plectrophenax nivalis* | ■ | | -- | -- | SNA | -- |
| Northern Cardinal[β] | *Cardinalis cardinalis* | ■ | ■ | -- | -- | S5B | -- |
| Rose-breasted Grosbeak[β] | *Pheucticus ludovicianus* | ■ | ■ | -- | -- | S4B | -- |
| Indigo Bunting[β] | *Passerina cyanea* | ■ | ■ | -- | -- | S4B | -- |
| Red-winged Blackbird[β] | *Agelaius phoeniceus* | ■ | ■ | -- | -- | S4 | -- |
| Eastern Meadowlark[β] | *Sturnella magna* | ■ | ■ | -- | -- | S4B | -- |
| Common Grackle[β] | *Quiscalus quiscula* | ■ | ■ | -- | -- | S5B | -- |
| Brown-headed Cowbird[β] | *Molothrus ater* | ■ | ■ | -- | -- | S4B | -- |
| Orchard Oriole | *Icterus spurius* | | ■ | -- | -- | S4B | -- |
| Baltimore Oriole[β] | *Icterus galbula* | ■ | ■ | -- | -- | S4B | -- |
| Purple Finch | *Carpodacus purpureus* | | ■ | -- | -- | S5B | -- |
| House Finch[β] | *Carpodacus mexicanus* | | ■ | -- | -- | SNA | -- |
| Pine Siskin[β] | *Spinus pinus* | ■ | | -- | -- | S5B | -- |
| American Goldfinch[β] | *Spinus tristis* | ■ | ■ | -- | -- | S5B | -- |
| House Sparrow[β] | *Passer domesticus* | ■ | ■ | -- | -- | SNA | -- |
| **REPTILES** | | | | | | | |
| Snapping Turtle | *Chelydra serpentina* | ■ | ■ | SC | SC | S5 | -- |
| Midland Painted Turtle | *Chrysemys picta marginata* | ■ | ■ | -- | -- | S5 | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Northern Map Turtle | *Graptemys geographica* | | ■ | SC | SC | S3 | 30-50 |
| Five-lined Skink (Great Lakes Pop.) | *Eumeces fasciatus* | | ■ | SC | SC | S3 | -- |
| Eastern Gartersnake | *Thamnophis sirtalis* | ■ | ■ | -- | -- | S5 | -- |
| Eastern Ribbon Snake | *Thamnophis sauritus* | | ■ | SC | SC | S3 | -- |
| Northern Watersnake | *Nerodia sipedon sipedon* | ■ | ■ | NAR | NAR | S5 | 1 |
| Redbelly Snake | *Storeria occipitomaculata* | | ■ | -- | -- | S5 | -- |
| Brown Snake | *Storeria dekayi* | | ■ | NAR | -- | S5 | -- |
| Smooth Greensnake | *Opheodrys vernalis* | | ■ | -- | -- | S4 | -- |
| Ringneck Snake | *Diadophis punctatus* | | ■ | -- | -- | S4 | -- |
| Eastern Milksnake | *Lampropeltis triangulum* | | ■ | SC | SC | S3 | -- |
| **AMPHIBIANS** | | | | | | | |
| Mudpuppy | *Necturus maculosus* | | ■ | NAR | NAR | S4 | 10 |
| Red-spotted Newt | *Notophthalmus viridescens* | | ■ | -- | -- | S5 | -- |
| Spotted Salamander | *Ambystoma maculatum* | | ■ | -- | -- | S4 | -- |
| Four-toed Salamander | *Hemidactylium scutatum* | | ■ | NAR | NAR | S4 | -- |
| Northern Redback Salamander | *Plethodon cinereus* | | ■ | -- | -- | S5 | -- |
| American Toad | *Bufo americanus* | ■ | ■ | -- | -- | S5 | -- |
| Tetraploid Gray Treefrog | *Hyla versicolor* | ■ | ■ | -- | -- | S5 | -- |
| Western Chorus Frog | *Pseudacris triseriata* | ■ | ■ | THR** | NAR | S4 | -- |
| Spring Peeper | *Pseudacris crucifer* | ■ | ■ | -- | -- | S5 | -- |
| Bullfrog | *Rana catesbeiana* | ■ | ■ | -- | -- | S4 | 1 |
| Northern Green Frog | *Rana clamitans* | ■ | ■ | -- | -- | S5 | -- |
| Pickerel Frog | *Rana palustris* | ■ | ■ | NAR | NAR | S4 | -- |
| Wood Frog | *Rana sylvatica* | ■ | ■ | -- | -- | S5 | -- |
| Northern Leopard Frog | *Rana pipiens* | ■ | ■ | NAR | NAR | S5 | -- |
| Mink Frog | *Rana septentrionalis* | | ■ | -- | -- | S5 | -- |
| **ODONATA** | | | | | | | |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Ebony Jewelwing | *Calopteryx maculata* | | ■ | | | S5 | |
| Spotted Spreadwing | *Lestes congener* | | ■ | | | S5 | |
| Sweetflag Spreadwing | *Lestes forcipatus* | | ■ | | | S4 | |
| Slender Spreadwing | *Lestes rectangularis* | | ■ | | | S5 | |
| Lyre-tipped Spreadwing | *Lestes unguiculatus* | | ■ | | | S5 | |
| Violet Dancer | *Argia fumipennis violacea* | | ■ | | | S5 | |
| Powdered Dancer | *Argia moesta* | | ■ | | | S5 | |
| Taiga Bluet | *Coenagrion resolutum* | | ■ | | | S5 | |
| Boreal Bluet | *Enallagma boreale* | | ■ | | | S5 | |
| Tule Bluet | *Enallagma carunculatum* | | ■ | | | S5 | |
| Stream Bluet | *Enallagma exsulans* | | ■ | | | S5 | |
| Hagen's Bluet | *Enallagma hageni* | | ■ | | | S5 | |
| Fragile Forktail | *Ischnura posita* | | ■ | | | S4 | |
| Eastern Forktail | *Ischnura verticalis* | | ■ | | | S5 | |
| Sedge Sprite | *Nehalennia irene* | | ■ | | | S5 | |
| Lance-Tipped Darner | *Aeshna constricta* | | ■ | | | S5 | |
| Lake Darner | *Aeshna eremita* | | ■ | | | S5 | |
| Common Green Darner | *Anax junius* | | ■ | | | S5 | |
| Springtime Darner | *Basiaeschna janata* | | ■ | | | S5 | |
| Common Baskettail | *Epitheca cynosura* | ■ | | -- | -- | S5 | -- |
| Calico Pennant | *Celithemis elisa* | ■ | ■ | -- | -- | S5 | -- |
| Halloween Pennant | *Celithemis eponina* | ■ | ■ | -- | -- | S3 | -- |
| Eastern Pondhawk | *Erythemis simplicicollis* | ■ | ■ | -- | -- | S5 | -- |
| Dot-tailed Whiteface | *Leucorrhinia intacta* | ■ | ■ | -- | -- | S5 | -- |
| Slaty Skimmer | *Libellula incesta* | ■ | | -- | -- | S4 | -- |
| Widow Skimmer | *Libellula luctuosa* | ■ | ■ | -- | -- | S5 | -- |
| Twelve-Spotted Skimmer | *Libellula pulchella* | ■ | ■ | -- | -- | S5 | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Four-spotted Skimmer | *Libellula quadrimaculata* | ■ | | -- | -- | S5 | -- |
| Blue Dasher | *Pachydiplax longipennis* | ■ | ■ | -- | -- | S5 | -- |
| Common Whitetail | *Plathemis lydia* | ■ | | -- | -- | S5 | -- |
| White-faced Meadowhawk | *Sympetrum obtrusum* | ■ | | -- | -- | S5 | -- |
| Black Saddlebags | *Tramea lacerata* | ■ | | -- | -- | S4 | -- |
| **BUTTERFLIES** | | | | | | | |
| Silver Spotted Skipper | *Epargyreus clarus* | | ■ | -- | -- | S4 | -- |
| Northern Cloudy Wing | *Thorybes pylades* | | ■ | -- | -- | S5 | -- |
| Dreamy Dusky Wing | *Erynnis icelus* | | ■ | -- | -- | S5 | -- |
| Juvenal's Dusky Wing | *Erynnis juvenalis* | | ■ | -- | -- | S5 | -- |
| Columbine Dusky Wing | *Erynnis lucilius* | | ■ | -- | -- | S4 | -- |
| Arctic Skipper | *Carterocephalus palaemon* | | ■ | -- | -- | S5 | -- |
| Least Skipper | *Ancyloxypha numitor* | | ■ | -- | -- | S5 | -- |
| European Skipper | *Thymelicus lineola* | ■ | ■ | -- | -- | SE | -- |
| Leonard's Skipper | *Hesperia leonardus* | | ■ | -- | -- | S4 | -- |
| Peck's Skipper | *Polites peckius* | | ■ | -- | -- | S5 | -- |
| Tawny-edged Skipper | *Polites themistocles* | | ■ | -- | -- | S5 | -- |
| Crossline Skipper | *Polites origenes* | | ■ | -- | -- | S4 | -- |
| Long Dash Skipper | *Polites mystic* | | ■ | -- | -- | S5 | -- |
| Northern Broken-Dash | *Wallengrenia egermet* | | ■ | -- | -- | S5 | -- |
| Little Glassywing | *Pompeius verna* | | ■ | -- | -- | S4 | -- |
| Delaware Skipper | *Anatrytone logan* | | ■ | -- | -- | S4 | -- |
| Hobomok Skipper | *Poanes hobomok* | | ■ | -- | -- | S5 | -- |
| Broad-winged Skipper | *Poanes viator* | | ■ | -- | -- | S4 | -- |
| Dun Skipper | *Euphyes vestris* | | ■ | -- | -- | S5 | -- |
| Roadside Skipper | *Amblyscirtes vialis* | | ■ | -- | -- | S4 | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Black Swallowtail | *Papilio polyxenes* | ■ | ■ | -- | -- | S5 | -- |
| Giant Swallowtail | *Papilio cresphontes* | ■ | ■ | -- | -- | S3 | -- |
| Canadian Tiger Swallowtail | *Papilio canadensis* | | ■ | -- | -- | S5 | -- |
| Eastern Tiger Swallowtail | *Papilio glaucus* | ■ | ■ | -- | -- | S5 | -- |
| Mustard White | *Pieris oleracea* | | ■ | -- | -- | S4 | -- |
| Cabbage White | *Pieris rapae* | ■ | ■ | -- | -- | SNA | -- |
| Clouded Sulphur | *Colias philodice* | ■ | ■ | -- | -- | S5 | -- |
| Orange Sulphur | *Colias eurytheme* | ■ | ■ | -- | -- | S5 | -- |
| American Copper | *Lycaena phlaeas* | | ■ | -- | -- | S4 | -- |
| Bronze Copper | *Lycaena hyllus* | ■ | ■ | -- | -- | S5 | -- |
| Acadian Hairstreak | *Satyrium acadicum* | | ■ | -- | -- | S4 | -- |
| Coral Hairstreak | *Harkenclenus titus* | ■ | | -- | -- | S4 | -- |
| Juniper Hairstreak | *Callophrys gryneus* | | ■ | -- | -- | S3 | -- |
| Banded Hairstreak | *Satyrium calanus* | ■ | ■ | -- | -- | S4 | -- |
| Hickory Hairstreak | *Satyrium caryaevorum* | | ■ | -- | -- | S3S4 | -- |
| Eastern Pine Elfin | *Callophrys niphon* | | ■ | -- | -- | S5 | -- |
| Eastern Tailed Blue | *Everes comyntas* | ■ | ■ | -- | -- | S5 | -- |
| Spring Azure | *Celastrina ladon* | ■ | ■ | -- | -- | S5 | -- |
| Silvery Blue | *Glaucopsyche lygdamus* | | ■ | -- | -- | S5 | -- |
| Great Spangled Fritillary | *Speyeria cybele* | ■ | ■ | -- | -- | S5 | -- |
| Aphrodite Fritillary | *Speyeria aphrodite* | | ■ | -- | -- | S5 | -- |
| Meadow Fritillary | *Boloria bellona* | ■ | | | | S5 | -- |
| Silvery Checkerspot | *Chlosyne nycteis* | ■ | | -- | -- | S5 | -- |
| Pearl Crescent | *Phyciodes tharos* | | ■ | -- | -- | S4 | -- |
| Northern Crescent | *Phycoides pascoensis* | ■ | ■ | -- | -- | S5 | -- |
| Baltimore Checkerspot | *Euphydryas phaeton* | | ■ | -- | -- | S4 | -- |
| Question Mark | *Polygonia interrogationis* | | ■ | -- | -- | S5 | -- |

| Common Name | Scientific Name | Observed in Study Area | Records Review | SARA | SARO | NHIC S-Rank | Area Sensitivity (ha) |
|---|---|---|---|---|---|---|---|
| Eastern Comma | *Polygonia comma* | | ■ | -- | -- | S5 | -- |
| Grey Comma | *Polygonia progne* | | ■ | -- | -- | S5 | -- |
| Compton Tortoiseshell | *Nymphalis vaualbum* | | ■ | -- | -- | S5 | -- |
| Mourning Cloak | *Nymphalis antiopa* | ■ | ■ | -- | -- | S5 | -- |
| Milbert's Tortoiseshell | *Nymphalis milberti* | | ■ | -- | -- | S5 | -- |
| American Painted Lady | *Vanessa virginiensis* | | ■ | -- | -- | S5 | -- |
| Painted Lady | *Vanessa cardui* | | ■ | -- | -- | S5 | -- |
| Red Admiral | *Vanessa atalanta* | ■ | ■ | -- | -- | S5 | -- |
| White Admiral | *Limenitis arthemis* | ■ | ■ | -- | -- | S5 | -- |
| Viceroy | *Limenitis archippus* | | ■ | -- | -- | S5 | -- |
| Northern Pearly Eye | *Enodia anthedon* | ■ | ■ | -- | -- | S4 | -- |
| Eyed Brown | *Satyrodes eurydice* | | ■ | -- | -- | S5 | -- |
| Little Wood-Satyr | *Megisto cymela* | ■ | ■ | -- | -- | S5 | -- |
| Common Ringlet | *Coenonympha tullia* | ■ | ■ | -- | -- | S5 | -- |
| Common Wood-Nymph | *Cercyonis pegala* | ■ | ■ | -- | -- | S5 | -- |
| Monarch | *Danaus plexippus* | ■ | ■ | SC | -- | S2N, S4B | -- |

* Species recorded by observer other than an AMEC biologist. Observers were skilled in bird identification by sight and sounds. Loggerhead Shrike: observed by Kurt Hennige (Ebird.org, 2011); Short-eared Owl observed by Stantec (2011); Clay-coloured Sparrow observed by Stu Mackenzie (Ebird.org, 2011)

# APPENDIX G

# CURRICULA VITAE

# Matthew R. Evans, Ph.D.

**Senior Biologist**

## Professional summary

Dr. Evans has 21 years of experience as a wildlife biologist in Canada and the United States and has worked on several environmental assessment projects examining the impacts of development on various ecosystems (arctic, alpine, boreal, and wetland ecosystems) and on various species including Species at Risk such as Arctic Caribou, Woodland Caribou, Grizzly Bears, Bald Eagles, Peregrine Falcons, Bobolinks, Whip-poor-wills, Barrow's Goldeneye, Eastern Foxsnakes and Butler's Gartersnake. His experience includes environmental screening and scoping studies, baseline studies, and environmental assessments for forestry, mining, oil, gas, and renewable energy projects. One of his main interests is examining changes in wildlife resource selection, particularly habitat selection, made by species influenced by development and finding effective ways to mitigate negative impacts on animal behaviour.

Matt obtained his Ph.D. in Wildlife Ecology (Simon Fraser University) in 2003 working with the Canadian Wildlife Service (Environment Canada) in British Columbia where he examined the effects of various forestry practices on the ecology of wetland ecosystems and on habitat selection decisions made by breeding waterfowl. Since 2003, Matt's consulting activities have focused primarily on large-scale arctic projects in Alaska (oil and gas, gold and coal mining) and Nunavut (iron mining), and on wind and solar energy projects in Ontario.

Before becoming a full-time member of AMEC's Environment and Infrastructure Division in 2010, Matt was a professor at Mount Allison University (2003-2007) and the University of Illinois (2007-2010) where he taught various courses in ecology, conservation biology, population dynamics, animal behaviour, anatomy and physiology. He has taught both the Canadian *Species at Risk Act* (SARA) and the American *Endangered Species Act* (ESA) to his upper level conservation biology classes. He also taught an ecological methodology course annually that focused on experimental design and statistical analyses. He continues to serve as an Adjunct Professor at the University of Illinois teaching on-line courses for the Department of Biology and the Department of Environmental Studies.

## Education

Ph.D. (Wildlife Ecology), Simon Fraser University's Centre for Wildlife Ecology, Burnaby, British Columbia/Canada, 2003.
B.Sc. (Ecology; Minor: Zoology), University of Calgary, Calgary, Alberta/Canada, 1993.

## Languages

English

## Employment history

### Consulting:

AMEC Earth & Environmental, Senior Biologist, Mississauga, Ontario, 2009 to Present.
Knight-Piésold Consulting, Wildlife Biologist, North Bay, Ontario, 2006-2008.

Alaska Biological Research, Wildlife Biologist, Fairbanks, Alaska, 2003-2006.

### Academic:

Adjunct Professor, University of Illinois, 2010-Present.
Assistant Professor, University of Illinois, 2007-2010.
Assistant Professor, Mount Allison University, 2003-2007.

### Other:

Canadian Wildlife Service, Research Technician and Ph.D. Student, Vancouver/Burnaby, British Columbia, 1998-2003.
University of British Columbia, Arctic Institute of North America, Research Technician, Lynx-Snowshoe Hare Population Dynamics Project, Kluane National Park, Yukon, 1995-1997.
University of Alberta and the Alberta Fish and Wildlife Service, Woodland Caribou Project, Northern Alberta, 1993-1995.
University of Calgary, Kananaskis Field Station, Research Technician and Undergraduate Student, various bird and small mammal studies, Canmore/Calgary, Alberta, 1990-1993.

## Representative projects

### Environmental Consulting Projects:

***2010-Present:*** *Various Natural Heritage Assessment Studies for Renewable Energy Approvals (REA) made under Ontario's Environmental Protection Act.*

***2010-2011:*** *Marine Bird Environmental Impact Statement, Mitigation and Monitoring Plan for a Proposed Iron Mine on Northern Baffin Island, Nunavut, Baffinland Mines Corporation, Toronto, Ontario/Canada.*
***2008:*** *Terrestrial Bird Environmental Impact Statement, Mitigation and Monitoring Plan for a Proposed Iron Mine on Northern Baffin Island, Nunavut, Baffinland Mines Corporation, Toronto, Ontario/Canada.*
***2006-2009:*** *Environmental Baseline Studies of Terrestrial and Marine Birds for a Proposed Iron Mine on Northern Baffin Island, Nunavut, Baffinland Mines Corporation, Toronto, Ontario/Canada.*
***2005-2006:*** *Environmental Baseline Studies on Caribou, Moose, Grizzly Bears, Eagles, and Waterfowl for a Proposed Open-Pit Coal Mine in Chuitna, Alaska, Pacific Rim Coal Ltd., Anchorage, Alaska/U.S.A.*
***2005-2006:*** *Environmental Baseline Studies on Caribou, Moose, Grizzly Bears, Seals, Eagles, Waterfowl, and Seabirds for a Proposed Open-Pit Gold Mine in Iliamna, Alaska, Northern Dynasty Minerals Ltd., Vancouver, British Columbia/Canada.*
***2003-2006:*** *Monitoring the Effects of Oil and Gas Exploration and Drilling on Arctic Caribou and Waterfowl in Northern Alaska, Conoco Phillips Ltd., Anchorage, Alaska/U.S.A.*

### Academic Projects:

***2007-2010:*** *Monitoring the Changes in Avian Species Diversity and Density at the Emiquon Wetland Restoration Preserve, Havana, Illinois.*
***2006-2007:*** *Assessing Bird Mortality Levels on the Tantramar Marshes Caused by Collisions with Radio Canada International Shortwave Antennae and Powerlines, Sackville, New Brunswick.*
***2005-2007:*** *Examining the Effects of Different Silvicultural Practices on Four Species of Songbirds: Two Habitat Generalists and Two Specialists, Southeastern New Brunswick.*

***2004-2007:*** *Examining the Behavioural Adaptations of Semipalmated Sandpipers in Response to the Reintroduction and Recovery of a Local Peregrine Falcon Population, Coupled with a Dramatic Decline in Food Supply in the Bay of Fundy, New Brunswick.*
***2004-2007:*** *Has Climate Changed Caused Sea Ducks to Migrate Earlier? Assessing the Current Distribution, Abundance, and Migratory Chronology of Three Species of Scoters Along the Atlantic Coast of Canada and Comparing These to Historic Records.*
***2004-2006:*** *Using Dendrochronology Techniques to Establish Life History Tables for Wood Turtles in Eastern Canada, and Examining the Relationship Between Turtle Shell Growth-rings and Global Warming Over the Past 150 Years.*
***1999-2004:*** *Evaluating the Importance of Endogenous Nutrient Contributions to Reproduction by Barrow's Goldeneye Using Stable Isotope Analysis.*
***1999-2004:*** *Modelling Gradual and Catastrophic Mortality from Egg Laying to Fledging in Barrow's Goldeneye Clutches and Broods.*
***1997-2004:*** *Annual Survival and Natal Return Rates of Barrow's Goldeneye and Bufflehead in central British Columbia.*
***1997-2004:*** *Feather Growth Rate and Body Mass Changes During Wing Moult by Bufflehead Females.*

## Publications and presentations

### Publications

"Apparent Survival, Natal Philopatry, and Recruitment of Barrow's Goldeneye in the Cariboo-Chilcotin Region of British Columbia". W. Boyd, B. Smith, S. Iverson, M. Evans, J. Thompson, S. Schneider. Canadian Journal of Zoology. 87, 337-345. 2009.
"Daytime Spring Migrations of Scoters in the Bay of Fundy". A. Bond, P. Hicklin and M. Evans. Waterbirds. 30, 566-572. 2007.
"Tracing Nutrient Allocation to Reproduction in Barrow's Goldeneye: An Isotope Approach". K. Hobson, J. Thompson, M. Evans and W. Boyd. The Journal of Wildlife Management. 69, 1221-1228. 2005.
"A Clutch and Brood Survival Model that Discriminates Random and Correlated Mortality". B. Smith, W. Boyd and M. Evans. 2005. Ecological Applications. 15, 281-293. 2005.
"A Comparison of the Characteristics and Fates of Barrow's Goldeneye and Bufflehead Nests in Nest Boxes and Natural Cavities". M. Evans, D. Lank, W. Boyd and F. Cooke. Condor. 104, 610-619. 2002.
"Breeding Habitat Selection by Barrow's Goldeneye and Bufflehead in the Cariboo-Chilcotin Region of British Columbia: Nest Sites, Brood-rearing Habitat, and the Effects of Competition." M. Evans. Ph.D. Thesis, Simon Fraser University. 218 pages. 2003.

### Technical Reports

Various Natural Heritage Assessment Studies for Renewable Energy Approvals (REA) made under Ontario's Environmental Protection Act.
"Environmental Impact Statement for Marine Birds for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada". M. Evans. 2010.
"Environmental Impact Statement for Terrestrial Birds for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada". M. Evans. 2010.
"Wildlife Habitat Assessment Report for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada". V. Banci and M. Evans. 2008.

“Bulk Sampling Program Comprehensive Environmental Management Plan for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada”. R. Cook and M. Evans. 2007.
“Wildlife Mitigation and Monitoring Plan for 2008 Bulk Sampling Program for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada”. R. Cook and M. Evans. 2007.
“Wildlife Mitigation and Monitoring Plan for 2008 Geotechnical Drilling Program for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada”. R. Cook and M. Evans. 2007.
“2007 Baseline Study Report: Analysis of Avian Species Diversity, Abundance, and Distribution in the Northern Baffin Island Region”. M. Evans. Report for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada. 2007.
“2006 Baseline Study Report: Analysis of Avian Species Diversity, Abundance, and Distribution in the Northern Baffin Island Region”. M. Evans. Report for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada. 2006.
“Bulk Sampling Program Environmental Screening Report for Baffinland Iron Mines Corporation's Mary River Project, Baffin Island, Nunavut, Canada”. R. Cook and M. Evans. 2006.
“Abundance and Demographics of Barrow's Goldeneye and Bufflehead at Riske Creek, B.C.” W. Boyd and M. Evans. Technical Report for the Canadian Wildlife Service, Delta, British Columbia. 2006.
“Sea Duck Joint Venture Species Account for Barrows Goldeneye Populations Across North America”. North American Sea Duck Joint Venture. M. Evans. 2000.
“Sea Duck Joint Venture Species Account for Bufflehead Populations Across North America”. M. Evans. North American Sea Duck Joint Venture. 2000.

## Presentations Given at Scientific Meetings

“Wetland Selection by Barrow's Goldeneye and Bufflehead Breeding Pairs and Brood-rearing Females”. M. Evans, W. Boyd and D. Lank. North American Sea Duck Conference, Victoria, British Columbia. 2002.
“Natural Cavity Nest Site Selection by Barrow's Goldeneye and Bufflehead in British Columbia”. M. Evans. Third North American Ornithological Conference: A Joint Meeting between the Society of Canadian Ornithologists, the Cooper Ornithological Society, and The American Ornithological Union. New Orleans, Louisiana. 2002.
“Brood-rearing Habitat Selection by Barrow's Goldeneye and Its Effect on Duckling Growth, Survival, and Return Rates”. M. Evans, D. Lank, F. Cooke and W. Boyd. Second North American Ornithological Conference: A Joint Meeting between the Society of Canadian Ornithologists, and The American Ornithological Union. Seattle, Washington. 2001
“The Breeding Ecology of Barrow’s Goldeneye and Bufflehead in Natural Cavities and Nest Boxes”. M. Evans, D. Lank, F. Cooke and W. Boyd. First North American Ornithological Conference: A Joint Meeting between the Society of Canadian Ornithologists, The American Ornithological Union, and The British Ornithological Union. St. John’s, Newfoundland. 2000.
“Brood-rearing Habitat Selection by Barrow's Goldeneye and Its Effect on Duckling Growth, Survival, and Return Rates”. M. Evans, D. Lank, F. Cooke and W. Boyd. North American Duck Symposium, Saskatoon, Saskatchewan. 2000.

## Poster Presentations Given at Scientific Meetings

“Examining the Effects of Interspecific Competition Between Barrow’s Goldeneye and Bufflehead”. M. Evans. North American Sea Duck Conference, Victoria, British Columbia. 2002.

“Examining the Effects of Interspecific Competition Between Barrow’s Goldeneye and Bufflehead”. M. Evans. Third North American Ornithological Conference: A Joint Meeting between the Society of Canadian Ornithologists, The Cooper Ornithological Society, and The American Ornithological Union. New Orleans, Louisiana. 2002.
“Natural Cavity Selection by Barrows Goldeneye and Bufflehead, and a Comparison to Nest Box Usage”. M. Evans, D. Lank, F. Cooke and W. Boyd. Environment Canada Conference: The Application of Ecological Research to Conservation. Vancouver, British Columbia. 2001.
“Brood-rearing Habitat Selection by Barrow's Goldeneye and Its Effect on Duckling Growth, Survival, and Return Rates”. M. Evans, D. Lank, F. Cooke and W. Boyd. Environment Canada Conference: The Application of Ecological Research to Conservation. Vancouver, British Columbia. 2001.
“Natural Cavity Selection by Barrows Goldeneye and Bufflehead, and a Comparison to Nest Box Usage”. M. Evans, D. Lank, F. Cooke and W. Boyd. North American Duck Symposium, Saskatoon, Saskatchewan. 2000.
“Brood-rearing Habitat Selection by Barrow's Goldeneye and Its Effect on Duckling Growth, Survival, and Return Rates”. M. Evans, D. Lank, F. Cooke and W. Boyd. First North American Ornithological Conference: A Joint Meeting between the Society of Canadian Ornithologists, The American Ornithological Union, and The British Ornithological Union. St. John’s, Newfoundland. 2000.
“Natural Cavity Selection by Barrows Goldeneye and Bufflehead, and a Comparison to Nest Box Usage”. M. Evans, D. Lank, F. Cooke and W. Boyd.  Cooper's Ornithological Meetings, Riverside, California. 2000.
“Identification of Bufflehead Moulting Sites in Interior British Columbia. M. Evans and A. Breault. Cooper's Ornithological Meetings, Riverside, California. 2000.

## Presentations Co-authored at Scientific Meetings

“Using GIS to Model Habitat Selection and Nest Site Suitability of Peregrine Falcons in Arctic Canada”. B. Phillips and M. Evans. University of Illinois Science Research Symposium. 2008.
“Habitat Selection and Interspecific Competition in Four Species of Loons in Arctic Canada”. M. Villicana and M. Evans. University of Illinois Science Research Symposium. 2008.
“Monitoring Changes in Shorebird Abundance and Species Diversity in Response to Restoring Wetland Habitat”. M. Scharaf and M. Evans. University of Illinois Science Research Symposium. 2008.
“Shifts in Avian Biodiversity at the Emiquon Wetlands Restoration Preserve”. C. Simonson and M. Evans. University of Illinois Science Research Symposium. 2008.
“Snow Goose Conservation in the Canadian Arctic”. B. Dugan and M. Evans. University of Illinois Science Research Symposium. 2008.
“An Investigation of Wood Turtle Growth-rings in Relation to Climate Change Over the Past 150 years”. C. Robichaud, C. Laroque and M. Evans. 17th Annual Atlantic Division of the Canadian Association of Geographers Conference. St. John’s, Newfoundland. 2005.
“Modelling Brood and Clutch Survivorship from Laying to Fledging Using Barrow's Goldeneye as an Example”. B. Smith, M. Evans and W. Boyd. North American Duck Symposium, Sacramento, California. 2003.
“Two studies of Moulting Waterfowl in Canada”. A. Breault, J-F Gobeil, and M. Evans. North American Duck Symposium, Sacramento, California. 2003.
“A Statistical Model for Discriminating Gradual and Catastrophic Mortality from Laying to Fledging in Barrow's Goldeneye Clutches and Broods”. B. Smith, M. Evans and W. Boyd. North American Sea Duck Conference, Victoria, British Columbia. 2002.

“Evaluating the Importance of Endogenous Nutrient Contributions to Reproduction: An Isotope Approach Using Barrow’s Goldeneye”. K. Hobson, M. Evans and W. Boyd. North American Sea Duck Conference, Victoria, British Columbia. 2002.
“Natal Return and Survival Rates of Barrow’s Goldeneye in British Columbia”. W. Boyd and M. Evans. North American Sea Duck Conference, Victoria, British Columbia. 2002.
“Philopatry and Moult of After-hatch-year Female Buffleheads in Central British Columbia”. A. Breault and M. Evans. North American Sea Duck Conference, Victoria, British Columbia. 2002.
“Use of a Maximum Likelihood Model of Clutch and Brood Survivorship to Describe Inter-annual Variation in Breeding Success of Barrow's Goldeneye at Riske Creek, British Columbia”. B. Smith, M. Evans and W. Boyd. North American Duck Symposium, Saskatoon, Saskatchewan. 2000.
“Juvenile Survival in Barrows Goldeneye”. W. Boyd and M. Evans. North American Duck Symposium, Saskatoon, Saskatchewan. 2000.
“Identification of Sea Duck and Waterbird Moulting Areas in Interior British Columbia”. A. Breault and M. Evans. Pacific Flyway Symposium, Newport, Oregon. 2000.
“Waterfowl Moulting Sites in Interior British Columbia”. A. Breault and M. Evans. North American Duck Symposium, Saskatoon, Saskatchewan. 2000.

## Invited Lectures

“Defining Populations and Modelling Population Dynamics”. M. Evans. University of Toronto Scarborough, Department of Biology. 2010.
“The Evolution of Birds From Dinosaurs”. M. Evans. University of Toronto Scarborough, Department of Biology. 2010.
“The Potential Impacts of a Proposed Iron Mine on Canada’s Largest and Most Northern Population of Peregrine Falcons”. M. Evans. University of Illinois, Faculty of Science, Science Seminar Series. 2009.
“The Potential Impacts of a Proposed Iron Mine on Canada’s Largest and Most Northern Population of Peregrine Falcons”. M. Evans. University of Illinois, Environmental Studies Seminar Series. 2008.
“Ecology: The Measure of Species’ Abundance and Distribution”. M. Evans. Quest University, Squamish, British Columbia, Department of Biology, Departmental Seminar Series. 2007.
“The Effects of Oil Exploration in Northern Alaska on Caribou Populations and Behaviour”. M. Evans. Hiram College, Hiram Ohio, Department of Biology, Departmental Seminar Series. 2007.
“The Effects of Oil Exploration in Northern Alaska on Caribou Populations and Behaviour”. University of Illinois, Environmental Studies Seminar Series. 2007.
“The Effects of Oil Exploration in Northern Alaska on Caribou Populations and Behaviour”. University of Illinois, Faculty of Science, Science Seminar Series. 2007.
“The Effects of Oil Exploration in Northern Alaska on Caribou Populations and Behaviour”. M. Evans. Mount Allison University, Department of Biology, Departmental Seminar Series. 2006.
“The Effects of Oil Exploration in Northern Alaska on Caribou Populations and Behaviour”. M. Evans. Canadian Wildlife Service, Sackville, New Brunswick, Research Seminar Series. 2006.
“The Effects of Forestry on Wetland Ecosystems in Central British Columbia”. M. Evans. Mount Allison University, Department of Biology, Departmental Seminar Series. 2005.
“The Effects of Forestry on Wetland Ecosystems in Central British Columbia”. M. Evans. Canadian Wildlife Service, Sackville, New Brunswick, Research Seminar Series. 2005.
“The Effects of Forestry on Wetland Ecosystems in Central British Columbia”. M. Evans. Thompson Rivers University, Department of Natural Resources Seminar Series. 2003.

“The Effects of Forestry on Wetland Ecosystems in Central British Columbia”. M. Evans. British Columbia Institute of Technology, Natural Resources Program. 2003.
“The Effects of Forestry on Wetland Ecosystems in Central British Columbia”. M. Evans. Canadian Wildlife Service, Delta, British Columbia, Research Seminar Series. 2003.
“The Effects of Forestry on Wetland Ecosystems in Central British Columbia”. M. Evans. British Columbia Institute of Technology, Natural Resources Program. 2002.

# Jeff Balsdon, B.Sc., M.Sc.

**Terrestrial Ecologist**

## Professional summary

Mr. Balsdon is a terrestrial ecologist with 11 years of professional field and analytical experience. Mr. Balsdon obtained his Honours Bachelor of Science (B.Sc.) degree in biology from the University of Western Ontario and his Master of Science (M.Sc.) degree in biology from Trent University. Mr. Balsdon has a strong background in ornithology, wetlands, forestry, botany and zoology and has conducted project work in boreal and mixed forests, and Carolinian forests. He has regularly conducted ecological surveys for both federal and provincial Environmental Assessments (EA), with emphasis on flora and fauna (including species-at-risk) surveys, functional wetland assessments, and ecosystem and habitat mapping. As a component of the EA process, Mr. Balsdon has conducted desktop reviews and modelling exercises, project-environment effects analysis, cumulative effects analysis, and prepared and implemented wildlife management plans and mitigation measures to reduce project-related impacts of development on wetlands and sensitive flora and fauna. In addition, he has coordinated ecological monitoring programs as conditions of EA approval. Mr. Balsdon has conducted many species at risk assessments for the Canadian Wildlife Service and the Ontario Ministry of Natural Resources including extensive status reports on avian abundance, distribution, and habitat use. Mr. Balsdon's experiences have given him a broad range of skills such as coordinating and supervising fieldwork, conducting avian surveys, managing large datasets, conducting bio-statistical analysis, critical writing and report preparation.

## Education

M.Sc., Conservation Biology (Watershed Ecosystem Graduate Program), Trent University, 2009
B.Sc., Biology (Honours), University of Western Ontario, 2000

## Memberships/Affiliations

American Ornithologists' Union
Bird Studies Canada
Society of Wetland Scientists
Society of Canadian Ornithologists

## Languages

English

## Employment history

AMEC Earth & Environmental, Terrestrial Ecologist, Mississauga, Ontario (2010 to present)
Conestoga-Rovers & Associates, Terrestrial Ecologist, Dartmouth, Nova Scotia (2007 to 2010)
Ontario Ministry of Natural Resources, Wildlife Technician, London, Ontario (2001 to 2006)
Trent University, Teaching Assistant, Peterborough, Ontario (2004 to 2006)

## Representative projects

Mr. Balsdon has considerable experience conducting migratory and resident bird inventories in North America both professionally and recreationally. He has considerable nest searching experience

(located more than 1,500 bird nests) in boreal and mixed forests, and Carolinian forests and has contributed to the recently published Atlas of the Breeding Birds of Ontario (2007) and the ongoing Maritime Breeding Bird Atlas initiative. He has considerable experience managing studies and conducting baseline plant and wildlife inventories, including plant and vegetation community surveys and mapping, spring and migratory songbird point counts, waterfowl and raptor surveys, owl call-playback surveys, lichens surveys, large mammal surveys, amphibian surveys and population monitoring.

Mr. Balsdon has successfully completed the Ecological Land Classification (ELC) course for southern Ontario and has successfully completed the Federal 40 Hour Course for Wetland Identification, Delineation and Classification based on US Army Corp of Engineers Wetland Delineation Manual (REG IV) and is listed on the New Brunswick List of Recognized Wetland Delineators. Mr. Balsdon has conducted many ELC evaluations, and wetland evaluations and function analyses for various development sites and has experience in coordinating with hydrologists and hydrogeologists with respect to the hydrological functions of wetlands.

Mr. Balsdon has a strong background in bio-statistical analysis including general linear/non-linear models, non-parametric techniques, multivariate exploratory analyses, model selection criterion and power analysis, and has experience with various statistical and graphing programs.

## Environmental Impacts Assessments

- *Kingsbridge II Wind Farm Project, Capital Power (2010 to ongoing):* Prepare supporting documentation (e.g., project description, natural heritage reports) and conducting field inventories to fulfil the requirements of a Renewable Energy Approvals (REA) application for an approximately 250MW wind farm project in Huron County, Ontario.
- *Griffith Island Soil Remediation Project (2010 to ongoing)*: Project manager for the preparation of CEAA Screening Report. Works includes conducting a background review, environmental effects assessment and developing mitigation and follow-up monitoring strategies to fulfil the requirement of the environmental assessment.
- *Elliot Falls Dam Recapitalization and Gate Mechanization Project (2010 to ongoing)*: Project manager for the preparation of CEAA Screening Report. Works includes conducting a background review, field inventories, environmental effects assessment and developing mitigation and follow-up monitoring strategies to fulfil the requirement of the environmental assessment.
- *FarmTech Ethanol Facility Project (2010 to ongoing)*: Project manager for the preparation of CEAA Screening Report. Works includes conducting a background review, environmental effects assessment and developing mitigation and follow-up monitoring strategies to fulfil the requirement of the environmental assessment.
- *Delhi Research Facility Demolition of Building #30 and 60 Project (2010)*: Project manager for the preparation of CEAA Screening Report. Works includes conducting a background review, environmental effects assessment and developing mitigation and follow-up monitoring strategies to fulfil the requirement of the environmental assessment.
- *Niagara District Airport Infrastructure Project (2010)*: Project manager for the preparation of CEAA Screening Report. Works includes conducting a background review, field inventories,

environmental effects assessment and developing mitigation and follow-up monitoring strategies to fulfil the requirement of the environmental assessment.

- *Trent-Severn Waterway Swing Bridge # 60 and #43 Replacement Projects (2010)*: Project manager for the preparation of CEAA Screening Report. Works includes conducting a background review, field inventories, environmental effects assessment and developing mitigation and follow-up monitoring strategies to fulfil the requirement of the environmental assessment.
- *Highway 103 Interchange and Connector Road Project, Nova Scotia Transportation and Infrastructure Renewal (2009-2010):* Project coordinator and ecologist for the development of a CEAA Screening Report for the Highway 103 Interchange and Connector Road at Ingramport. Works includes conducting a background review, field inventories, environmental effects assessment and developing mitigation and follow-up monitoring strategies to fulfil the requirement of the environmental assessment.
- *Mine Permitting Projects, Acadian Mining Corporation (2008 to 2009):* Project coordinator and ecologist for the development of various Environmental Assessment Registration Documentations. Work conducted at various gold, lead/zinc and barite locations in Nova Scotia. Baseline environmental work included functional wetland assessments and delineations, and standardised surveys for breeding birds, vascular and non-vascular plants, mammals, herpetiles and lichens. Various locations, Nova Scotia.
- *Mine Permitting Projects, Canada Gypsum Company (CGC) Inc. (2008 to 2009):* Project ecologist for the development of a Focus Report. Baseline environmental work included functional wetland assessments and delineations, and standardised surveys for breeding birds, vascular and non-vascular plants, mammals, herpetiles and lichens. Developed mitigation measures and wildlife management plans to reduce project related environmental impacts on wildlife, and assisted in preparation of the Focus Report. Miller's Creek, Nova Scotia.
- *Mine Permitting Projects, Canada Gypsum Company (CGC) Inc. (2007 to 2008):* Project ecologist for the development of an Environmental Assessment Registration Document. Baseline environmental work included functional wetland assessments and delineations, and standardised surveys for breeding birds, vascular and non-vascular plants, mammals, herpetiles and lichens. Developed mitigation measures and wildlife management plans to reduce project related environmental impacts on wildlife, and assisted in preparation of the Registration Documentation. Miller's Creek, Nova Scotia.
- *Mine Permitting Projects, DDV Gold Inc. (2007 to 2008):* Project ecologist for the development of a Focus Report. Baseline environmental work included functional wetland assessments and delineations, and standardised surveys for breeding birds, vascular and non-vascular plants, mammals, herpetiles and lichens. Developed mitigation measures and wildlife management plans to reduce project related environmental impacts on wildlife, and assisted in preparation of the Focus Report. Moose River Gold Mines, Nova Scotia.
- *Seismic Exploration Project, NWest Energy (2007):* Project team member for development of offshore seismic exploration CEAA document. St. John's, Newfoundland.
- *Biomass Cogeneration Plant Project Souris Harbour Authority Inc. (2009):* Developed CEAA "Project Description" to initiate the CEAA process for the Souris Harbour Authority Inc. (SHAI) proposed Biomass Cogeneration Plant in Souris, Prince Edward Island.

## Avian/Ecological/Wetland Studies

- *Forest Silviculture Project, Ontario Ministry of Natural Resources (2002-2006):* Supervised, coordinated, and conducted ecological surveys for the Ontario Ministry of Natural Resources in the Carolinian forest zone of southern Ontario. Surveys included standardised songbird point count observations, nest searching and monitoring, amphibian surveys, microhabitat assessments, species mapping and identification of breeding status based on behavioural observations. Work also included assessing reproductive success and habitat requirements of species at risk for the Hooded Warbler and Acadian Flycatcher Recovery Team. London, Peterborough and Algonquin Park, Ontario.
- *Canadian Wildlife Service (2003-3005):* Conducted monthly avian Species at Risk (SAR) assessments in the Carolinian forest region of southern Ontario. London, Ontario .
- *Aspotogan Developments Limited (2008):* Project coordinator for golf course/residential development. Work includes wetland delineation, vegetative assessment, documentation and wetland alteration permitting. Mill Cove, Nova Scotia.

## Environmental Effects Monitoring

- *Acadian Mining Corporation (2009):* Project team member for the Scozinc Mine Metal Mining Effluent Regulations Environmental Effects Monitoring Program. Work included statistical analysis and interpretation, and report preparation. Gays River, Nova Scotia.
- *ExxonMobil Canada (2008):* Project team member for the Environmental Effects Monitoring Program (2008 Annual Report) for ExxonMobil's Sable Offshore Energy Project. Work included statistical analysis and interpretation, and report preparation. Sable Island, Nova Scotia.
- *Newfoundland and Labrador Mineral Development Division (2007):* Project team member for the Environmental Effects Monitoring Program for the Newfoundland and Labrador Mineral Development Division Rambler Mine Project. Work included statistical analysis and interpretation, and report preparation. St. John's, Newfoundland.

## Publications and presentations

"The Impacts of Experimental Selection Harvest on the Breeding Ecology of Wood Thrush (*Hylocichla mustelina*) in Southwestern Ontario, Canada". Balsdon, J.D. Master of Science Thesis, Trent University, Peterborough, Ontario, Canada, 2009.

"The Short-term Impacts of Experimental Selection Harvest on the Reproductive Success, Breeding Density and Productivity of a Neotropical Migrant, *Hylocichla Mustelina*". Balsdon, J.D., Burke, D.M., Nol, E. and Elliott, K.E. Submitted. Canadian Journal of Forest Research

"Can Forest Birds Cope in Managed Woodlands"? Dawn Burke, Ken Elliott, Jeff Balsdon, Lyndsay Smith, Kata Bavrlic, Steve Holmes, Lyle Friesen, and Mike Cadman. Paper presented at the 4th International Ornithological Conference, Veracruz, Mexico, October 2006.

# Jonathan S. Pleizier, B.Sc., B.Ed.

## Terrestrial Biologist

### Professional summary

Mr. Pleizier is a terrestrial biologist with 3 years of consulting experience. His areas of specialization include ornithology, bat habitat assessment and monitoring, and species at risk (SAR) habitat assessment. Mr. Pleizier is certified in Ecological Land Classification (ELC) and is able to provide a wide variety of ecological field skills including bird identification and habitat assessment, ELC, vegetations surveys, bat habitat assessment and remote monitoring, wildlife tracking, aerial wildlife surveys, herpetofaunal identification, odonate and butterfly inventories, and species at risk habitat assessment. Mr. Pleizier has also been involved in managing datasets, data analysis, and writing natural heritage components of Environmental Assessments. Much of Mr. Pleizier's has provided his expertise to many Renewable Energy Assessment (REA), mining, and MTO transportation projects.

### Education

B. Sc., Zoology, University of Guelph, Guelph, Ontario, Canada, 2007.
B. Ed., Education, Queen's University, Kingston. Ontario, Canada, 2008.

### Memberships/Affiliations

Ontario Field Ornithologists

### Certifications

Ecological Land Classification

### Languages

English and French

### Employment history

AMEC Earth & Environmental, Mississauga, Ontario, February 2011 to Present
AET Consultants, Wildlife Biologist, Kitchener, Ontario, 2010 to 2011
Stantec, Environmental Scientist, Guelph, Ontario, 2008-2010
University of Alberta, Field Technician, Edmonton, Alberta, 2006

### Representative projects

Mr. Pleizier has obtained considerable experience conducting baseline wildlife surveys, vegetation inventories and SAR inventory and habitat assessments for a variety of renewable energy, mining, transportation, and energy projects. He is knowledgeable in Natural Heritage Assessment guidelines and requirements for REA, Ministry of Transportation Terrestrial Ecosystem technical requirements, and exhibits a working knowledge of the Endangered Species Act (2007) of Ontario.

**Renewable Energy Assessments**

- *Samsung Sol-luce Kingston Solar PV Energy Project, Samsung C&T, City of Kingston and Loyalist Township, Ontario*
  Mr. Pleizier participated in baseline wildlife, vegetation and ELC studies and reporting for a 100 MW solar energy facility proposed by Samsung C&T. Mr. Pleizier participated in public consultations for the project as a resident biologist.

- *Kingsbridge II – Capital Power Corp, Huron Township, Ontario*
  Mr. Pleizier completed the Environmental Effects Management Plan as part of the Natural Heritage Assessment.

- *First Solar – Solar Farm Projects, Moore, Walpole and Sombra sites, Ontario*
  Mr. Pleizier participated in SAR habitat assessment, snake surveys, and SAR reporting during the REA process of this project

- *Little Current Wind Project, Manitoulin Island, Ontario*
  Mr. Pleizier participated in baseline environmental assessment of proposed wind project

- *St. Agatha Wind Project, L.I.F.E, St. Agatha, Ontario,*
  Mr. Pleizier completed bat and bat habitat assessment for a proposed single turbine project.

- *Arran Wind Energy Project, Leader Resources Services Corp, Municipality of Arran-Elderslie, Ontario*
  Mr. Pleizier completed bat and bat habitat assessment and reporting for the REA requirements of a proposed 115 MW wind project.

- *Twenty-two Degree Wind Energy Project, Leader Resources Services Corp, Goderich, Ontario,*
  Mr. Pleizier completed bat and bat habitat assessment and reporting for the REA requirements of a proposed 150 MW wind project.

- *Ernestown Wind Park LLC, Ernestown, Ontario,*
  Mr. Pleizier Completed bat and bat habitat assessment for a proposed 6 turbine wind project.

- *Wolfe Island Wind Project, Canadian Hydro Developers Inc. Wolfe Island, Ontario*
  Mr. Pleizier Participated post-construction field studies for 197.8 MW wind farm located within a recognized Important Bird Area. Field studies included mortality surveys, waterfowl staging and movement surveys, wintering Short-eared Owl surveys, and winter raptor surveys.

- *Melancthon Wind Plants I and II, Canadian Hydro Developers Inc., H, Amaranth/Melancthon TWP, Ontario*,
  Mr. Pleizier conducted post-construction field studies for the 197.5MW wind farm, which included mortality surveys and breeding bird surveys.

- *Port Dover and Nanticoke Wind Project, Capital Power Corp, Haldimand/Norfolk Counties, Ontario*
  Mr. Pleizier participated in baseline field studies for the proposed 104.4 MW wind project. Studies included bat monitoring using AnaBat detectors, breeding bird surveys, and fall raptor migration surveys.

- *Byran Wind Project, Skypower Corp, Prince Edward County, Ontario*
  Mr. Pleizier conducted baseline field studies for the proposed wind project. Studies included spring bird migration surveys, waterfowl staging surveys, Wilson's Snipe and American Woodcock surveys, bat monitoring, and fall raptor migration surveys

- *Ostrander Point Wind Energy Park, Gilead Power, Prince Edward County, Ontario*,

Mr. Pleizier conducted baseline field studies for the proposed wind 20MW project. Studies included bat monitoring and winter raptor surveys within alvar habitat.

- *Royal Road Wind Farm, Canadian Hydro Developers Inc, Prince Edward County, Ontario*
  Mr. Pleizier conducted baseline field studies for the proposed wind project within alvar/shrublands. Studies included spring and fall songbird migration surveys, breeding bird surveys, and fall raptor migration surveys

- *Port Alma Wind Farm, Kruger Energy, Port Alma, Ontario*,
  Mr. Pleizier conducted post-construction waterfowl and Tundra Swan inventory of 101.2MW wind farm.

- *Mica Bay Wind Project, Gilead Power, Algoma District, Ontario*,
  Mr. Pleizier participated in migratory raptor studies for this proposed wind project. Mr. Pleizier monitored raptor movement and established behavioural trends across a mountainous study area.

- *Parkhill Wind Farm,* Canadian *Hydro Developers Inc. Middlesex County, Ontario*
  Mr. Pleizier conducted baseline field studies for the proposed wind project. Studies included bat monitoring, spring bird migration, breeding bird surveys, wintering Short-eared Owl surveys and winter raptor surveys.

- *Plateau Wind Project,* AIM PowerGen Corp*. MelancthonTWP, Ontario*
  Mr. Pleizier conducted baseline field studies for the proposed wind project. Studies included breeding bird surveys, Wilson's Snipe and American Woodcock surveys, bat monitoring, and Henslow's Sparrow (Species at Risk) habitat assessment.

**Mining Projects**

- *DeBeers Canada, Victor Mine, Atawapiskat, Ontario*
  Mr. Pleizier conducted aerial Woodland Caribou surveys as part of the mine's environmental management plan.

- *Barrick Gold, Hemlo Mine, Marathon, Ontario*
  Mr. Pleizier conducted breeding bird surveys for proposed mine expansion.

- *Xstrata Copper Canada, Ontario and Quebec*
  Mr. Pleizier completed biodiversity studies which included breeding bird and winter tracking surveys for Kidd Mine and Metallurgical sites as well as the Horne Foundry. He completed the 2011 Environmental Conditions Report for the Kidd Mine and Metallurgical sites which described biodiversity at each site and provided measures for maintaining and increasing biodiversity within and around each site.

- *Rainy River*
  Mr. Pleizier completed baseline wildlife studies and environmental studies report for proposed gold mine. Studies included breeding bird, crepuscular bird, amphibian, nocturnal owl, and SAR habitat assessment

- *Detour Gold Mine, Ontario*

Mr. Pleizier conducted aerial Woodland Caribou surveys as part of the mine's environmental management plan and contributed to reporting of on-going study efforts.

- *Hanna-Hamilton, Huron East, Ontario*
  Mr. Pleizier conducted breeding bird surveys and general wildlife investigations for proposed gravel pit expansion.

**Energy Projects**

- *Windsor-Sarnia Pipeline, BP Canada, Lasalle, Ontario*
  Mr. Pleizier conducted wildlife and vegetation surveys which included SAR identification and habitat assessment and completed baseline environmental reporting for these studies which provided mitigation measures for further project activities.

**Ministry of Transportation**

- *Windsor-Essex Parkway, Windsor, Ontario*
  Mr. Pleizier participated as a SAR specialist for the Windsor Essex Mobility Group (WEMG) has been contracted to design, build, finance and maintain the Windsor-Essex Parkway for the Ontario Ministry of Transportation (MTO). WEMG assumes responsibility to deliver or comply with all obligations, commitments and responsibilities stated in the Environmental Assessments and Endangered Species Act (ESA 2007) permits. Mr. Pleizier participated in monitoring activities to ensure compliance with the ESA permit for all Species at Risk for this Project.

- *Highway 401 Widening, Regional Road 25 to Trafalgar Road, Ontario*
  The Ontario Ministry of Transportation (MTO) is proposing to widen Highway 401 from 6 to 12 lanes from Regional Road 25 to Trafalgar Road, Halton Region, Ontario. Mr. Pleizier participated in the records review and writing of the baseline existing conditions report and develop impact assessment with regards to wildlife and SAR.

- *Highway 21 Rehabilitation, Goderich to Bayfield, Ontario*
  The Ontario Ministry of Transportation (MTO) is proposing to rehabilitate 17.8 km of Highway 21 including 39 drainage features from Goderich to Bayfield, Ontario. Mr. Pleizier participated in the records review and writing of the baseline existing conditions report and develop impact assessment with regards to wildlife and SAR.

**Urban Land Projects**

- *Various projects across Ontario*
  Mr. Pleizier has participated in many urban land development projects though much of his involvement in such projects has been limited to breeding bird inventories and nest searches.

**Avian Studies**

- *Swiftwatch, Bird Studies Canada. Guelph, Ontario*
  Monitored Chimney Swift (Species at Risk), flight behaviour and utilization of chimneys as roost and nest sites.

- *Boreal Bird Monitoring, Department of Renewable Resources, University of Alberta*
  Conducted standardized boreal bird point count surveys and Swainson's Thrush behavioural studies in northern Alberta.

# Izabela Kalkowski, B.Sc. (Env.), M.F.C.

## Botanist

### Professional summary

Ms. Kalkowski is a botanist with over three years of professional field and analytical experience in the field of terrestrial ecology. Ms. Kalkowski is well versed in dendrology of the Great Lakes/St. Lawrence and Boreal forest regions and has conducted ecological field surveys and monitoring of both flora and fauna. Ms. Kalkowski has studied species at risk and developed mitigation plans for plants and wildlife impacted by forestry practices. She has undertaken ecosystem and vegetation mapping with the use of ArcGIS programs. Strengths also include a familiarity with the Ecological Land Classification (ELC) for soils, vegetation types, and community descriptions.

### Education

Master of Forest Conservation (M.F.C.), University of Toronto, 2010
Honours Bachelor of Science in Environmental Sciences (B.Sc. (Env.)), University of Guelph, 2009

### Memberships/Affiliations

Field Botanists of Ontario

### Languages

English and Polish

### Employment history

AMEC Environment & Infrastructure, Botanist, Mississauga, Ontario (2011 to present)
Toronto and Region Conservation Authority (Rouge Park), Natural Heritage Field Technician, Aurora, Ontario, 2011
Natural Heritage and Forestry Services, Regional Municipality of York, Special Projects Technician, Newmarket, Ontario, 2010
Environmental Services, Regional Municipality of York, Design Technician, Newmarket, Ontario, 2007 and 2008

### Representative projects

Ms. Kalkowski has experience conducting extensive plant and wildlife field studies. She has worked on Species at Risk protection and on the control of invasive plant species. Ms. Kalkowski has practical knowledge of ecosystem community dynamics and functions and how these relate to appropriate management plans and mitigation of project-related impacts.

### Ecological Field Surveys

- *Far North Terrestrial Biodiversity Study, Ministry of Natural Resources, Sandy Lake, Ontario*
  Conducted field studies in the remote areas of far north Ontario to provide a basis for biological resource assessment in support of strategic and community-based land use planning. Studies included plant, mammal, herpatofaunal, bird, insect, dragonfly, and aquatic surveys, and soil sampling and characterization.

- *Biodiversity Assessment, Haliburton Forest and Wildlife Reserve Ltd., Halibutron, Ontario*
  Created forest and natural resource management plans based on terrestrial biodiversity assessments. Studies included small mammal trapping and processing; vegetation, downed woody debris, and fungi surveys; and a variety of insect trapping.

### Toronto and Region Conservation Authority, Rouge Park

- *Dog-Strangling Vine Invasive Species Control Study, Rouge Park, Ontario*
  Developed the experimental design for research on the control of Dog-Strangling Vine, a non-native, invasive species, in Rouge Park.
- *American Ginseng Species at Risk Monitoring, Rouge Park, Ontario*
  Conducted field monitoring of American Ginseng, a species at risk, in order to gain insight on threats and recommend appropriate management plans the ensure survival.
- *Ecological Field Surveying, Rouge Park, Ontario*
  Conducted field survey and monitoring of vegetation, amphibians, salamanders, turtles, snakes, birds, and dragonflies as general inventory and breeding information for the Park.
- *Vegetation Restoration Monitoring, Rouge Park, Ontario*
  Undertook field monitoring of restoration sites to assess species survival. This work included ELC community classification and vegetation surveys.

### Natural Heritage and Forestry Services, Regional Municipality of York

- *Species at Risk Management Plan, Regional Municipality of York, York Region, Ontario*
  Conducted research on Species at Risk historically occurring in York Region, inclusive of several bird, turtle, snake, and plant species, and recommended changes to current forest management practices to mitigate impacts.
- *Woodland Cover Mapping, Regional Municipality of York, York Region, Ontario*
  Developed a new methodology for the interpretation of woodland cover from ortho imagery and digitally captured this cover to update the Region's ecosystem classification maps with ArcGIS software.

# Erin E. Donkers, B.Sc., Cert.Ecol.Rest.

**Junior Botanist**

## Professional summary

Ms. Donkers has her Bachelor of Science Honours Degree in Zoology and Ecology, as well as an Ontario College Graduate Certificate in Ecosystem Restoration. Her professional and academic experiences have provided her with a broad range of strong ecological knowledge, research and field skills. A lengthy employment at a large-scale greenhouse, enrolment at Niagara College, and employment as a Research Assistant with the OMNR conducting gravel pit and quarry vegetation rehabilitation experiments allowed her to advance her interest and skills in plant identification and ELC community classification. In addition to her botanical work experiences, she has academic experience in techniques such as various wildlife survey activities (i.e. Electro-fishing, Bank Swallow monitoring), aquatic bio-monitoring, Natural Channel Design and river corridor restoration (i.e. soil bioengineering), invasive species control, ecological field project design, and lab and field soil analysis.

## Education

Cert.Ecol.Rest. – Ecosystem Restoration Ontario College Graduate Certificate, Niagara College, Niagara-on-the-Lake ON, 2011

B.Sc.Honours, Zoology (major), Ecology (Minor), University of Guelph, Guelph ON, 2009

## Languages

English (native)

## Employment history

AMEC Earth & Environmental, Inc., Mississauga, ON, Junior Botanist, 2011 to present

Ontario Ministry of Natural Resources, Wildlife Research and Development Section, Peterborough, ON, Ecosystem Restoration Research Assistant, Summer 2011

Bradford Greenhouses Ltd., Barrie, ON, Customer Service Representative and Plant Care Specialist, 2006 to 2010

Science at Guelph Experience (S@GE) Camp, University of Guelph, Guelph, ON, “Extreme Aquatics” Module Instructor, May 2008

## Certifications and training

Ontario Benthos Bio-monitoring Network (OBBN) (2010)
Electro-fishing certificate (Backpack Crew Leader Class 2) (2010)
Heart &Stroke Foundation of Canada Heartsaver (A) CPR (2010)
Ontario Class G Driver’s License (2010)
St. John Ambulance, Standard First Aid, Level C CPR/AED (2011)

## Said Mohamed, B.Sc. (Hons.), Grad. Cert. Env. Mgt

**Botanist**

### Professional summary

Said Mohamed holds a baccalaureate in Animal Science, a Graduate certificate in Ecosystem Restoration and a Graduate certificate in Environmental Management and Assessment. In the Niagara Region, Said participated in a number of projects, these include: Natural Areas Inventory with the Niagara Peninsula Conservation Authority and assessing the ecological impact of fish barrier mitigation on the Welland River and its tributaries, under the management of the Niagara Restoration Council. During his studies at Niagara College Canada, he worked on a water quality assessment for the Dicks Creek watercourse in St. Catharines, with specific focus on macro invertebrates. Said Mohamed has a strong educational background, and both local and international experience, which he uses to develop innovative, and adaptable ecological solutions.

In addition to his strong academic background and training, Said also has extensive practical experience. In Africa, he has worked as a rural extension officer and an instructor at the Kizimbani Agricultural Institute. He has been employed by both private and public sectors, and was a field and laboratory technician for the Tanzanian Ministry of Agriculture. He was part of a research team, which developed and implemented Infection and treatment method of East Coast Fever in livestock and a sterilization technique used to control tsetse fly populations. These successful projects, managed by the International Atomic Energy Agency/ Food and Agriculture Organization (IAEA/FAO) and The Government of Tanzania eradicated the tsetse fly from the Islands of Zanzibar.

### Education

- Graduate Certificate in Environmental Management and Assessment, Niagara College, Ontario, 2006
- Graduate Certificate in Ecosystem Restoration, Niagara College, Ontario, 2005
- Bachelor of Science in Animal Science (Honors) (Certified Ontario's equivalent) Sokoine University, Tanzania, 1998

### Certifications

- Ecological Land Classification for Southern Ontario
- Ontario Wetland Evaluation System
- Class 2 Backpack Electro-fishing

### Workshops

- Data Sensitivity Training, Ontario Ministry of Natural Resources, Peterborough, ON, 2008
- Graminoid Identification, The Niagara Peninsula Conservation Authority, Welland ON, 2008
- Fish Barrier Mitigation, DFO, Burlington, ON, 2005

### Languages

English and Swahili

### Employment history

**Consulting:**

- AMEC Environment & Infrastructure, Botanist, Mississauga, Ontario (2011 to present)
- Quartek Group, Botanist, Niagara Falls, Ontario, 2009 – 2011
- The Colville Consulting Inc. St. Catharines, ON, Terrestrial Ecologist, 2009 - 2011

**Other:**

- Niagara Parks Commission, Niagara Falls, Ontario 2011
- Carolinian Canada Coalition, Species At Risk Ecologist, London Ontario 2011
- Credit Valley Conservation Authority, Biologist – Wetlands, Mississauga, ON 2010
- Niagara Peninsula Conservation Authority, Ecological Land Classification Technician, 2007 – 2009

## Representative projects

### 2011 BLUE SPRINGS CREEK STRUCTURE REPLACEMENT GUELPH LINE 1.9 KM NORTH OF 25 SIDE ROAD, Town of Milton, Halton Region, Ontario

As Wetland Biologist

- In collaboration with AMEC's Terrestrial and Aquatic biologists prepared the Environmental Impact Study Report for proposed bridge replacement and road resurfacing at Guelph Line, Town of Milton, ON.

### 2011 Samsung Sol-luce Kingston Solar PV Energy Project, Samsung C&T, City of Kingston and Loyalist Township, Ontario

As Botanist and Wetland Biologist,

- Delineated and evaluated wetlands using Southern Ontario Wetland Evaluation System Protocol and inventoried vegetation using ELC protocol for Southern Ontario and reporting for wetland sections of the study report under the supervision of the senior biologist.

### 2011 Kingsbridge II – Capital Power Corp, Huron Township, Ontario

As Botanist and Wetland Biologist,

- Delineated and evaluated wetlands using Southern Ontario Wetland Evaluation System Protocol and inventoried vegetation using ELC protocol for Southern Ontario and reporting for wetland sections of the study report under the supervision of senior biologist.

### 2009- 2011 - Terrestrial Vegetation Field Surveys

- Using Ecological Land Classification, conducted biological surveys as part of Environmental Impact Studies for various commercial and residential developments within Niagara Region under Quartek Group (Engineering Firm), Niagara Falls, ON and Colville Consulting Inc. St.

Catharines, ON.
- Using the Southern Ontario Wetland Evaluation System protocol delineated and evaluated wetlands as part of Environmental Impact Studies for various commercial and residential developments within the Niagara Region under Quartek Group (Engineering Firm)
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**2011 Spring Ephemeral Surveys - The Niagara Parks Commission**

As a Botanist,
- Conducted spring vegetation surveys at The Niagara Parks Commission owned woodlands — Queenston Heights, Dufferin Islands and Paradise Grove.
- Quantified and mapped spatial distribution of spring flowering species in the Niagara Parks owned woodlands.
- Delivered a report

**2011 Ecosystem Recovery Program - Carolinian Canada Coalition**

As Species At Risk Stewardship Technician,
- Researched and wrote “Best Management Practices” documents for Carolinian Action Plan priority extant Species At Risk (SAR).
- Presented Best Management Practices for Species At Risk at Landowner Stewardship Workshops in Ancaster, Hamilton and Elgin, Aylmer Ontario.

**2010 Natural Heritage Assessment – Wetlands, within the Region of Halton, ON**

As a Biologist working under the Supervision of Senior Wetland Biologist;
- Assisted with inventory of wetland flora and fauna as according to the Southern Ontario Wetland Evaluation System protocol.
- Collected plant samples and prepared herbarium.
- Characterized soils in the field.
- With an aid of orthophotos and GPS unit delineated and ground truthed vegetation communities.
- Organized collected data and entered it into MS access database.

**2009 Field Habitat Assessment and Inventory for Jefferson Salamander within Niagara Region**

As a Field Technician,
- Using aerial photos assessed potential Jefferson Salamander’s Habitat
- Conducted field survey for Jefferson Salamander in pre-determined potential habitat.
- Identified critical features or threats and opportunities for habitat enhancement.
- Prepared information package on Best Management Practices for Jefferson Salamander’s Habitat for private landowners.
- Delivered Survey Report.

## 2007– 2009 Natural Areas Inventory, Niagara Peninsula Conservation Authority

As Ecological Land Classification Technician,
- Conducted vegetation surveys in natural areas using Ecological Land Classification, delineated vegetation communities and wetland boundaries

- Kept photographic records of the surveyed sites, representative species and vegetation communities;
- Entered data into the project database;
- Maintained appropriate liaison with landowners and other interested stakeholders to minimize conflict and ensure timely and efficient project implementation.

### 2007 Species At Risk Stewardship for Spoon Leaved Moss (*Bryoandersonia illecebra*)

As a Species At Risk/ Land Stewardship Technician for Spoon-leaved Moss:

- Using vegetation survey protocols, inventoried, characterized and mapped the habitat associated with Spoon -leaved Moss
- Identified potential threats and possible mitigation requirements for protection and recovery of the species
- Researched, contacted and liaised with adjacent private landowners and stakeholders;
- Managed the project, analyzed data and prepared reports as required.

### 2005 Niagara Restoration Council, Welland, Ontario

As an intern,

- Assessed the impact of removal of barriers to fish movement on Welland River and its tributaries
- Inventoried fish species on the barriers removal sites
- Recommended management of sites post-barrier removal
- Prepared Interim and Final Study Reports as need.

### Academic Term Projects

2006 Environmental Assessment for Proposed Grey Gables School Construction Project, City of Thorold, Ontario,

- Conducted phase I environmental assessment
- Reported the findings and provided recommendations

2006 Water Quality Studies Six Mile and Dicks Creeks, St Catharines, Ontario

- Determined if the level of pollutants exceeds requirements for Ontario's Water Quality Standards
- Sampled benthic populations using Biomap and Ontario Benthos Biomonitoring Network protocols

# Tracy Wolowidnek (Shute), B.Sc., EPt

**Environmental Scientist**

## Professional summary

Ms. Wolowidnek has over nine years of experience working in the environmental field, and has been with AMEC for eight years. Tracy has managed or participated in a wide variety of projects including Phase I and II Environmental Site Assessments, site remediation, designated substance surveys, waste audits, natural heritage assessment and environmental impact assessment for various government, private, legal, financial and corporate clients. Tracy has been a project manager for over six years, managing all aspects of numerous small to mid-sized projects. Prior to joining AMEC, Tracy's previous work experience included watershed monitoring/habitat characterization, fish community assessment and benthic invertebrate sampling.

## Professional qualifications/registrations

EPt – Environmental Practitioner in Training (Canadian Environmental Certification Approvals Board), since 2007.

## Education

Post Graduate Certificate, Environmental Management and Assessment, Niagara College, Niagara-on-the-Lake, Ontario, 2004

B.Sc., Biology and Environmental Science, University of Western Ontario, London, Ontario, 2003

## Languages

English

## Employment history

Environmental Scientist, AMEC Earth & Environmental, Thorold, Ontario, 2004 to present.

Watershed Monitoring Technician, Toronto & Region Conservation Authority, Toronto, Ontario, 2003.

Lab Technician, Metal Tolerance & Toxicity in Plants Laboratory, University of Western Ontario, London, Ontario, 2002.

Field Assistant, Ontario Ministry of Agriculture, Food & Rural Affairs, London, Ontario, 2001.

## Project Management

Tracy has been an AMEC-certified project manager since 2008. Project management duties for a typical project would include: client relations, scoping, proposal writing, project initiation, scheduling, management of day to day project activities, including junior staff and subcontractors, preparation of reports, invoicing and project closure.

## Representative projects

**Environmental Site Assessments & Brownfield Redevelopment Projects**

*Former School, Niagara-on-the-Lake, Ontario, Project Manager:* Conducted all aspects of a Phase I ESA on the buildings / land associated with a former high school.

*Municipal Works Yard, Lincoln, Ontario, Project Manger:* Managed a project to delineate petroleum hydrocarbon contamination present in the vicinity of several USTs, and the remediation of identified impacted materials. Prepared report.

*Former Industrial Property, St. Catharines, Ontario:* Oversaw remediation of a large quantity of heavy metal-impacted fill material at an industrial brownfield Site. Field duties included remediation supervision, contamination delineation and verification sample collection. Additional responsibilities included report preparation. Property redeveloped for commercial use (grocery store and plaza).

*Former Lumber Yard, Dunnville, Ontario, Project Manager:* Conducted Phase I and II ESAs. Field work for Phase II ESA involved testpitting and drilling, soil and ground water sampling. An area of PAH-impacted soil was identified. Coordinated and supervised the PAH-impacted soil remediation, collected verification samples, and prepared report. Property redeveloped for residential use.

*Former Abrasives Plant, Niagara Falls, Ontario:* Assisted with all aspects of fieldwork for Phase II ESA, including layout of sampling locations, drilling and testpitting, soil and ground water sampling. Prepared report. Property redeveloped for recreational use (golf course).

**Environmental Impact Assessments**

*Watershed Monitoring:* Team member of Watershed Monitoring Crew, conducted habitat characterization, benthic invertebrate sampling and electro-fishing according to the Ontario Stream Assessment Protocol at numerous locations throughout the Toronto & Region Conservation Authority's watershed.

*Environmental Impact Assessments:* Tracy has participated in numerous environmental impact assessments for small development projects located throughout the Niagara Region.

*Multiple Metal Mine Sites, Ontario (clients confidential):* Assisted with preparation of Environmental Effects Monitoring Study reports for multiple mine sites, in accordance with their respective Environmental Effects Monitoring Programs, as required by the Metal Mining Effluent Regulations.

*Natural Environment Existing Conditions and Impact Assessments:* Tracy has prepared natural environment existing conditions reports and impact assessment reports for both terrestrial ecosystems and fish and fish habitat, typically for municipal or provincial road widening/reconstruction projects.

## Certifications

Standard First Aid/CPR Recertification, Canadian Red Cross, 2009, 2011.

Workplace Hazardous Materials Information System (WHMIS) Training, AMEC E&E. 2011.

Fundamentals of Project Management, AMEC, 2008.

Ecological Land Classification for Southern Ontario, Niagara Peninsula Conservation Authority, 2008.

Hazwoper Refresher (8 hour course), AMEC Geomatrix, 2008.

Hazwoper (40 hour course), National Environmental Trainers, 2007.

Screenings under the *Canadian Environmental Assessment Act*, Canadian Environmental Assessment Agency, 2006.

Asbestos Project Management & Inspector Training, Ontario Environmental & Safety Network, 2006.

Transportation of Dangerous Goods (TDG), AMEC E&E, 2004.

## Publications and presentations

"Cadmium and zinc accumulation in soybean: A threat to food safety?", Shute, T., Macfie, S. Science of the Total Environment, Volume 371, Issue 1-3, pp. 63-73, 2006.