Ernestown Wind Park

Migratory Butterfly Stopover Area Habitat-use Surveys Report

Prepared by: *M.K. Ince and Associates Ltd.*

Prepared for: *Ernestown Windpark LP*

July 18, 2013

M.K. INCE AND ASSOCIATES LTD.
Renewable Energy & Environmental Consulting

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1 INTRODUCTION

Site investigations of the Ernestown Wind Park project location determined the presence of two candidate migratory butterfly stopover areas (BMSA01 and BMSA02; see **Figure 1-1**). These candidate habitats were identified as areas that were > 10 ha in size with a combination of field and forest habitats located within 5 km of Lake Ontario. This habitat typically provides butterflies with a location to rest prior to their long migration south. Migratory butterfly stopover candidate habitats are normally fields or meadows with an abundance of preferred nectar plants and woodland edge to provide shelter. **Table 1-1** below presents additional information on the candidate habitats identified during the site investigation.

Table 1-1: Description of Candidate Migratory Butterfly Stopover Areas

Feature ID	Project Components within 120 m	Attributes and Composition		Function	Associated Natural Features
		Size	ELC Community		
BMSA01	Access Road (0m) Collector (0m) Hardstand (0m) Turbine (0m)	98 ha	Woodland communities: FODM7-6 (ELC ID: 35); FODM2-3 (ELC ID: 39); FODM9-4 (ELC ID: 41, 47, 57); SWDM2-1 (ELC ID: 36); and FODM6-1 (ELC ID: 37). Upland cultural meadow and thicket communities: MEMM3 (ELC IDs: 40, 42, 43, 45, 48, 49, 51, 52, 53) and THDM2-4 (ELC ID: 34).	The habitat, a minimum of 10 ha in size with a combination of field and forest habitat present, and located within 5 km of Lake Ontario, provides butterflies with a location to rest prior to their long migration south.	Woodland (WO04, WO06)
BMSA02	Access Road (0m) Collector (0m) Hardstand (0m) Turbine (0m)	136 ha	Deciduous and coniferous woodland communities: FODM7-1 (ELC ID: 68, 84), FODM7-2 (ELC IDs: 66, 74, 82), FOCM1-2 (ELC ID: 63) and FOCM2-1 (ELC IDs: 64, 71, 72). Upland cultural meadow and thicket communities: MEMM3 (ELC ID: 67) and THDM2-4 (ELC IDs: 76, 78).		Woodland (WO05-4, WO13)

The *Natural Heritage Evaluation of Significance Report* (MKI, 2012) did not report on the outcomes of the evaluation of significance for BMSA01 and BMSA02, due to seasonality constraints and surveys unable to be conducted prior to the submission of the Natural Heritage Assessment. Consequently, BMSA01 and BMSA02 were treated as significant and subject to additional habitat-use surveys to determine significance. This process of treating a habitat as significant and committing to undertake studies prior to construction is outlined in Appendix D of the Natural Heritage Assessment Guide (MNR, 2011).

This report presents the results from the pre-construction habitat-use surveys for BMSA01 and BMSA02.

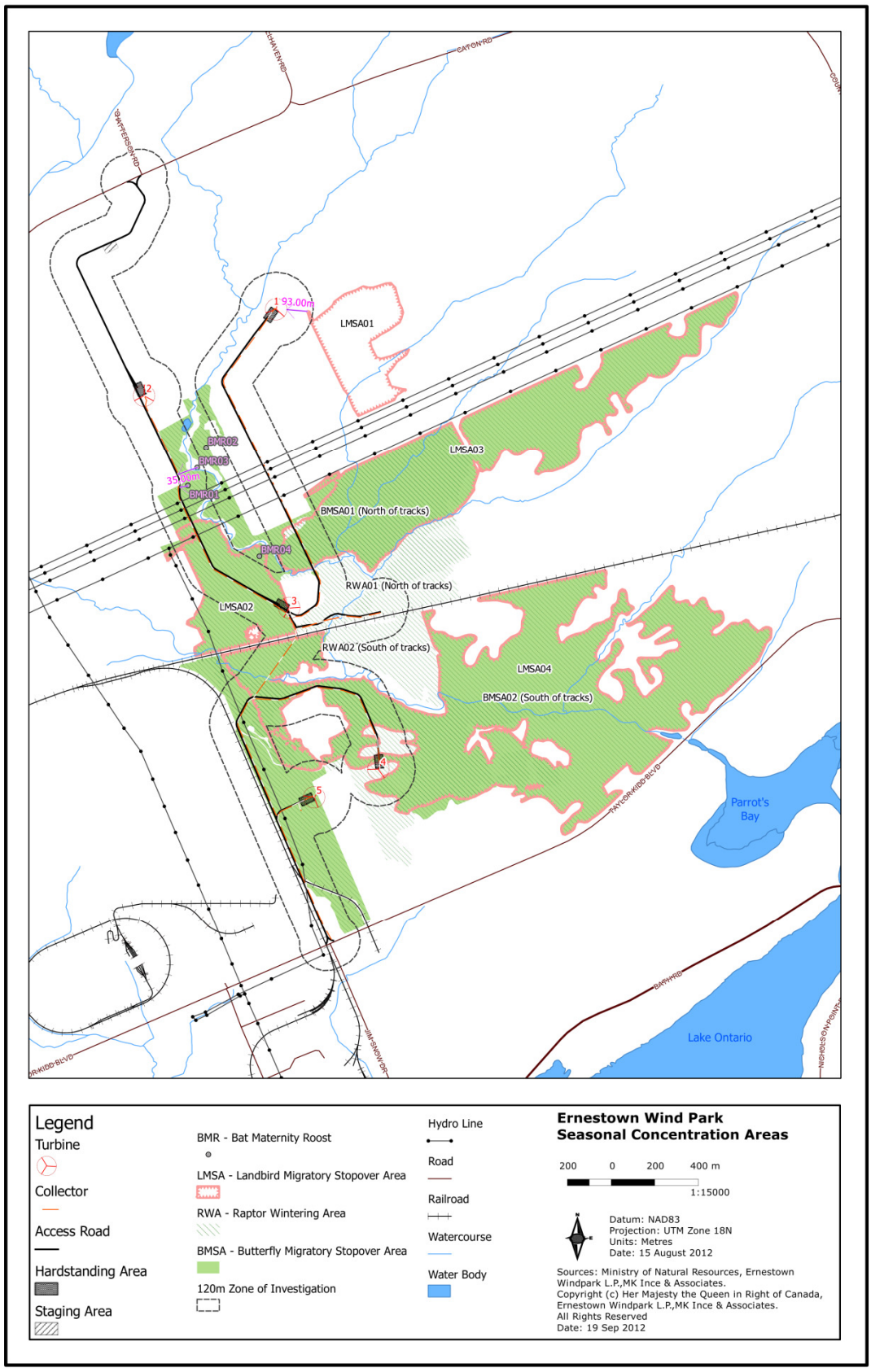

Figure 1-1: Map indicating location of candidate Butterfly Migratory Stopover Areas at Ernestown Wind Park

2 METHODOLOGY

2.1 Field Evaluations

Detailed methodology for pre-construction surveys to evaluate the significance of BMSA01 and BMSA02 was provided within the *Natural Heritage Environmental Impact Study Report* (MKI, 2012). In August 2012, prior to the commencement of surveys, the Ministry of Natural Resources (MNR) was contacted with a copy of the methodology copied from the *Natural Heritage Environmental Impact Study Report* (MKI, 2012) as well as a map outlining the proposed transect routes.

To summarize, field staff visited identified candidate migratory butterfly stopover areas to observe for the presence of migrating butterflies as well as to evaluate habitat according to the methodology outlined in the *Significant Wildlife Habitat Technical Guide* (MNR, 2000) and *Draft SWH Ecoregion 6E Criterion Schedule* (MNR, 2012). During the initial visit, transects were walked and flagged with tracks recorded on a GPS. Surveys were only conducted on calm day as these were less optimal for migration and provided conditions better for observing butterflies during stopover.

There was one modification made to the methodology presented in the *Natural Heritage Environmental Impact Study Report* (MKI, 2012). Although the methodology indicated that the transect was to be walked twice weekly between August and late October for a total of 20 visits, after discussions with the MNR it was agreed that visits once weekly would be appropriate until it was clear that migrants were arriving in significant numbers, at which point surveys would be increased to twice weekly. As it happened significant numbers of migrant butterflies were never observed. After seven weeks of weekly observations a review of data was conducted by the MNR to assess the need for continuing with the remaining surveys. It was concluded that the remaining surveys were not necessary and the data obtained to that point was sufficient to make appropriate determinations about the butterfly habitats. Please see **Appendix A** for a copy of the protocol reviewed by the MNR and all associated correspondence.

2.2 Analysis

Transect data was extrapolated for each habitat following methodology from Buckland et al. (2008) which calculates density for transect sampling using the following equation:

$$\widehat{D} = \frac{n}{a} = \frac{n}{2wL}$$

where n is the number of butterflies counted of the species of interest, L is the total length of the transect and w is the half width of the transect. Estimated habitat abundance is then calculated by multiplying the total area of the habitat (A) by the density ($\widehat{D}$).Total Monarch Use Days (MUD) were then calculated by using the following formula:

$$MUD = A\widehat{D}\frac{d_{season}}{d_{survey}}$$

where d_{season} and d_{survey} are the number of days in the season (90) and the number of days during which surveys occurred (7), respectively.

3 RESULTS

A summary of the pre-construction habitat-use surveys for BMSA01 and BMSA02 at the Ernestown Wind Park Project is provided in **Table 3-1** below. Details on the dates, time, weather conditions during each site visit, as well as the names of each of the investigators is provided.

Table 3-1: Summary of Site Visits

Date	Purpose / Habitat Surveyed	Start/ End Time	Weather Conditions	Site Investigators
2012-08-30	BMSA01	10:00 AM – 12:30 PM	Temp:18°C Cloud Cover:0/10 Wind (Beaufort): 1 Precipitation: None	Rob Tymstra
2012-08-31	BMSA02	10:00 AM – 12:00 PM	Temp: 21 - 28°C Cloud Cover:10/10 Wind (Beaufort): 2 - 4 Precipitation: Rain started at 12 PM	Rob Tymstra
2012-09-06	BMSA01	10:40 AM – 1:04 PM	Temp: 26°C Cloud Cover:3/10 Wind (Beaufort): 1 - 2 Precipitation: None	Rhiannon Leshyk
2012-09-07	BMSA02	10:05 AM – 1:30 PM	Temp: 25°C Cloud Cover:0/10 Wind (Beaufort): 0 - 1 Precipitation: None	Rhiannon Leshyk
2012-09-11	BMSA02	11:10 AM – 3:10 PM	Temp: 21°C Cloud Cover:7/10 Wind (Beaufort): 0 - 3 Precipitation: None	Rhiannon Leshyk
2012-09-12	BMSA01	10:00 AM – 12:30 PM	Temp: 20 - 26°C Cloud Cover:0/10 Wind (Beaufort): 2 - 4 Precipitation: None	Rhiannon Leshyk
2012-09-19	BMSA01	10:45 AM – 1:15 PM	Temp: 10 - 15°C Cloud Cover:0/10 Wind (Beaufort): 2 - 3 Precipitation: None	Rhiannon Leshyk
2012-09-20	BMSA02	9:30 AM – 11:30 AM	Temp: 15 - 18°C Cloud Cover:1/10 Wind (Beaufort): 2 – 3, gusts of 4-5 Precipitation: None	Rhiannon Leshyk

2012-09-27	BMSA01	11:30 AM – 1:55 PM	Temp: 12 - 18°C Cloud Cover:1/10 Wind (Beaufort): 1 – 2 Precipitation: None	Rhiannon Leshyk
2012-09-28	BMSA02	10:15 AM – 12:30 PM	Temp: 12°C Cloud Cover:4/10 Wind (Beaufort): 0 – 1 Precipitation: None	Rhiannon Leshyk
2012-10-02	BMSA02	11:10 AM – 1:20 PM	Temp: 14-15°C Cloud Cover:10/10 Wind (Beaufort): 0 – 1 Precipitation: None	Rhiannon Leshyk
2012-10-03	BMSA01	11:15 AM – 12:50 PM	Temp: 15°C Cloud Cover:10/10 Wind (Beaufort): 0 – 1 Precipitation: None	Rhiannon Leshyk
2012-10-04	BMSA02	10:30 AM – 12:00 PM	Temp: 17°C Cloud Cover:10/10 Wind (Beaufort): 0 – 1 Precipitation: None	Rhiannon Leshyk
2012-10-05	BMSA01	10:45 AM – 12:10 PM	Temp: 17-24°C Cloud Cover:10/10 Wind (Beaufort): 0 – 3 Precipitation: None, rain prior to survey	Rhiannon Leshyk

All butterfly observations made during the site visits can be seen in **Table 3-2** below. Please see **Appendix B** for a copy of all field forms.

Table 3-2: All butterfly observations during pre-construction habitat-use surveys of BMSA01

Species	30/08/2012	06/09/2012	12/09/2012	19/09/2012	27/09/2012	03/10/2012	05/10/2012
Monarch	9	4	0	1	0	1	2
Painted Lady	0	0	0	0	0	0	0
White Admiral	0	0	0	0	0	0	0

Table 3-3: All butterfly observations during pre-construction habitat-use surveys of BMSA02

Species	31/08/2012	07/09/2012	11/09/2012	20/09/2012	28/09/2012	02/10/2012	04/10/2012
Monarch	3	4	4	5	0	0	5
Painted Lady	0	0	0	0	0	0	0
White Admiral	0	0	2	0	0	0	0

Table 3-4: Monarch Use Days (MUD) calculations for BMSA01 and BMSA02

Habitat	BMSA01	BMSA02
n	17	21
L (m)	3338	4073
w (m)	100	100
$\widehat{D}$ (m^{-2})	2.55E-5	2.58E-5
A (m^2)	1.27E+6	1.90E+6
n (adjusted)	32.3	49.0
MUD (days)	416	630

To evaluate each habitat, the *Significant Wildlife Habitat Ecoregion 6E Criterion Schedule* (MNR, 2012) was used. This document states that MUD of >5000 or >3000 with the presence of Painted Ladies or White Admirals is to be considered significant. There were insufficient butterfly observations made during the site visits to meet the requirements for significance for either BMSA01 or BMSA02.

4 CONCLUSION

There were fourteen site visits made to Ernestown Wind Park for the evaluation of two candidate migratory butterfly stopover habitats treated as significant in the *Natural Heritage Evaluation of Significance Report* (MKI, 2012). Pre-construction habitat-use surveys were conducted in August through October 2013. Some Monarchs and two White Admirals were observed, however, there were insufficient observations of butterflies to meet the requirements for significance. Consequently, the potential negative environmental effects and mitigation measures as well as the environmental effects monitoring plan for BMSA01 and BMSA02, presented in the *Natural Heritage Environmental Impact Study Report* (MKI, 2012), are not applicable to the Ernestown Wind Park Project, as the habitats have been determined to be not significant.

5 REFERENCES

M.K. Ince and Associates. 2012. *Natural Heritage Evaluation of Significance Report.* 133p.

M.K. Ince and Associates. 2012. *Natural Heritage Environmental Impact Study Report.* 78p.

Ministry of Natural Resources. 2012. *Significant Wildlife Habitat Ecoregion 6E Criterion Schedule*. 42p.

Ministry of Natural Resources. 2011. *Natural Heritage Assessment Guide for Renewable Energy Projects.* 99p.

6 QUALIFICATIONS AND LIMITATIONS

M. K. Ince & Associates Ltd. (MKI) has prepared this report in accordance with its proposal and information provided by its Client. The information and analysis contained herein is for the sole benefit of the Client and save for regulatory review purposes may not be relied upon by any other person.

MKI's assessment was made in accordance with guidelines, regulations and procedures believed to be current at this time. Changes in guidelines, regulations and enforcement policies can occur at any time and such changes could affect the conclusions and recommendations of this report.

The reports, maps and related documents may rely on information provided to MKI by the Client. This information may include but is not limited to manufacturer and construction specifications and other related information. Maps are created using a Geographic Information System (GIS) that compiles records, information, and data from various sources which may contain errors. While we have referred to and made use of reports, maps and geospatial data and specifications prepared by others, we assume no liability for the accuracy of the information contained within.

Maps and documents made available by MKI are not legal surveys and are not intended to be used as such. No original surveying is included as part of these maps. If any contradictions exist between this document and relevant municipal, provincial or federal laws, regulations, codes, or policies, the text of the laws, regulations, codes or policies will be the legal authority.

APPENDIX A – PROTOCOL AND CORRESPONDENCE

- Survey protocol, extracted from Natural Heritage Environmental Impact Study Report, September 28, 2012 (2 pages)
- Email correspondence, August 30, 2013, October 16, 2013 (4 pages)

minimum of 10 subsequent visits will take place to confirm that the site is not a roost. Acoustic stations will be positioned within 10 m of the potential roost with monitoring commencing at dusk.

Acoustic monitoring will be done using modern broadband bat detectors with condenser microphones. The system will allow the surveyor to determine the signal to noise ratio of the recorded signals (i.e. from oscillograms or time-amplitude displays). Microphones will be positioned to maximize bat detection (i.e. situated away from nearby obstacles to allow for maximum range of detection, microphones angled slightly away from the prevailing wind to minimize wind noise). The same acoustic monitoring system will be used throughout the survey. All relevant information on the acoustic equipment will be recorded, including information on all adjustable settings (i.e. gain level), the position of the microphones, dates and times by station when recorded was conducted. Additionally, at each visit field staff will record: date, start time, end time, weather, species observed, number of individuals and behavior in field notes.

Data attained from acoustic surveys will be analyzed to identify species whenever possible. Any unidentified species will be included in analysis and reporting. Collected information will include the total and mean bat passes (i.e. sequence of two or more echolocation calls) per detector hour and per night as a function of bat activity at the survey station.

Species of particular interest (focal species) include: Big Brown Bat, Little Brown Myotis, Eastern Pipistrelle (Tri-coloured Bat), Northern Long-eared Myotis, Eastern Small-footed Myotis, and Silver-haired Bat.

The 2009 *Draft SWH Ecoregion 6E Criteria Schedules* (OMNR, 2009) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant with the presence of twenty or more Eastern Pipistrelle (Tri-coloured Bats) or Northern Long-eared Myotis, ≥30 Big Brown Bats, ≥50 Little Brown Myotis or >10 Adult Female Silver-haired Bats.

MIGRATORY BUTTERFLY STOPOVER AREA (BMSA01 & BMSA02)

Field staff will visit identified candidate migratory butterfly stopover areas to observe for the presence of migrating butterflies and will evaluate habitat according to methodology outlined in the *Significant Wildlife Habitat Technical Guide* (OMNR, 2000) and *Draft SWH Ecoregion 6E Criterion Schedule* (OMNR, 2012). Preselected transect routes will be selected within the candidate habitat. Prior to conducting surveys the MNR district office will be contacted to approve transect routes.

During the initial visit, transects will be walked in field and GPS tracks will be recorded. The route will also be flagged where possible with fluorescent tags, so that the route can be followed on subsequent visits.

Surveys will be conducted by an individual experienced in identifying the butterflies of eastern North America, especially focal species (see below). Transects will be walked twice weekly in the fall, from August to late October. In total, 20 visits will be made during fall. No surveys will be conducted during severe weather events such as high winds and/or heavy precipitation, as this can bias results. Surveys will be conducted on calm days, as these are less optimal for migration and provide conditions better for observing butterflies during stopover. All butterflies seen will be recorded and flyovers will be clearly indicated. Surveyors will record the following data at each visit on standardized data forms (see **Appendix A2**):

- Date

- Names of people conducting the work
- Time (start and end time of transect; duration of time it took to walk the transect)
- Weather conditions (temperature, %cloud cover, Beaufort wind scale, visibility)
- GPS track of each transect
- Species observed and total number of individuals of each species detected along the transect
- Height estimate
- Flight direction
- Direction and distance from observer

Species of particular interest (focal species) include: Painted Lady, White Admiral, and Monarch (COSSARO: Special Concern).

The *Draft Ecoregion 6E Criterion Schedule* (OMNR, 2012) will be used to evaluate candidate habitat for significance. This document states that a habitat is considered significant if the presence of Monarch Use Days (MUD) during fall migration (Aug/Oct) is >5000 for Monarchs or >3000 with the presence of Painted Ladies or White Admirals.

LANDBIRD MIGRATORY STOPOVER AREA (LMSA01, LMSA02, LMSA03 & LMSA04)

Field staff will visit identified candidate landbird migratory stopover areas to observe for the presence of migrating birds and will evaluate habitat according to methodology outlined in the *Bird and Bird Habitats: Guidelines for Wind Power Projects* (OMNR, 2011) for "stopover counts". Preselected transect routes will be selected within the candidate habitat. Prior to conducting surveys the MNR district office will be contacted to approve transect routes. Transects spaced at least 200 m apart will run north to south within candidate habitat. This will ensure that the majority of the habitat is sampled for the presence of migrating birds.

During the initial visit, transects will be walked in field and GPS tracks will be recorded. The route will also be flagged with fluorescent tags spaced ~20 m apart or within reasonable visual distance, so that the route can be followed on subsequent visits.

Surveys will be conducted by an individual experienced in identifying the birds of eastern North America both aurally and visually. Transects will be walked twice weekly in the spring, from mid-March to late May, and in the fall, from mid-August to late October. In total, 20 visits will be made during fall and another 20 during spring. All surveys will commence at sunrise and continue to no later than four hours after sunrise. No surveys will be conducted during severe weather events such as high winds and/or heavy precipitation, as this can bias results. All birds heard or seen will be recorded and flyovers will be clearly indicated. Surveyors will record the following data at each visit on standardized data forms (see **Appendix A3**):

- Date
- Names of people conducting the work
- Time (start and end time of transect; duration of time it took to walk the transect)
- Weather conditions (temperature, %cloud cover, Beaufort wind scale, visibility)
- GPS track of each transect
- Species observed and total number of individuals of each species detected along the transect

MKI

Thomas Bernacki <thomas.bernacki@mkince.ca>

Ernestown: Fall field work, Butterfly and Landbird Migratory Stopover surveys

Bonnie Van Tassel <bvantassel@horizonlegacy.com> Thu, Aug 30, 2012 at 12:03 PM
To: Thomas Bernacki <thomas.bernacki@mkince.ca>

Hi Tom,

Please review Eric's comments and copy me on your reply.

Bonnie Van Tassel, Project Coordinator
Horizon Legacy Energy Corp.

801 - 2300 Yonge Street Toronto ON M4P 1E4
Tel 416.864.9977 x 8222 Fax 416.864.9568
bvantassel@horizonlegacy.com

---------- Forwarded message ----------
From: **Prevost, Eric (MNR)** <eric.prevost@ontario.ca>
Date: Thu, Aug 30, 2012 at 12:00 PM
Subject: RE: Ernestown: Fall field work, Butterfly and Landbird Migratory Stopover surveys
To: Bonnie Van Tassel <bvantassel@horizonlegacy.com>

Hello Bonnie,

I have reviewed the methodology and have the following comments.

The survey routes do not include the entire extent of the habitat. Transects along Taylor Kidd BLVD and the rail tracks would be appropriate to capture the entire extend of the habitat.

Field sheets should include the distance of birds or flocks from the transect line. This data later analyzed, will assist in calculating species densities and abundance at a later date.

Based on the methodologies outlined in MNR's guidelines, behavioural and flight data may not be required for subsequent analysis of significance for the habitats being surveyed.

Should you have any questions or concerns with these comments, please feel free to contact me directly.

Best wishes,

Eric R. Prevost

Renewable Energy

Planning Ecologist

Ontario Ministry of Natural Resources

Peterborough District

300 Water Street

Peterborough, ON K9J 8M5

Eric.Prevost@Ontario.ca

Phone: (705) 755-3134

From: Bonnie Van Tassel [mailto:bvantassel@horizonlegacy.com]
Sent: August 30, 2012 11:03 AM
To: Prevost, Eric (MNR)
Subject: Fwd: Ernestown: Fall field work, Butterfly and Landbird Migratory Stopover surveys

Bonnie Van Tassel, Project Coordinator
Horizon Legacy Energy Corp.

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[Quoted text hidden]

MKI

Thomas Bernacki <thomas.bernacki@mkince.ca>

Ernestown Landbird and Migratory Butterfly Stopover Area Data Analysis

Prevost, Eric (MNR) <eric.prevost@ontario.ca> Tue, Oct 16, 2012 at 11:32 AM
To: Thomas Bernacki <thomas.bernacki@mkince.ca>

Hello Thomas,

Thank you for your email. I have the following points for your consideration.

- Data are currently sufficient to make appropriate determinations for butterfly habitats. No further surveys are required at this time.
- Survey efforts (routes) for LMSA 03 and 04 represent only a portion of the overall habitat. Given that these two habitats have close to 35 species, with a number of days with more than 10 species, it is quite likely that these habitat are significant. The total number of birds seen, may actually be a factor of the area surveyed as abundance is likely density and area dependent within these habitats. Based on the data presented, these habitats could be considered significant. Further discussion on this matter may be of some value.
- I would suggest that continued surveying within all LMSA (with the exception of LMSA 01) continue for the time being and that further consideration be made for how the un surveyed portions of the habitats may contribute to conclusions of significance for these habitats.

Should you have any questions, or wish to discuss with matter in more detail, please feel free to contact me directly.

Best wishes,

Eric R. Prevost

Renewable Energy

Planning Ecologist

Ontario Ministry of Natural Resources

Peterborough District

300 Water Street

Peterborough, ON K9J 8M5

Eric.Prevost@Ontario.ca

Phone: (705) 755-3134

From: Thomas Bernacki [mailto:thomas.bernacki@mkince.ca]
Sent: October 16, 2012 10:41 AM
To: Prevost, Eric (MNR)
Subject: Ernestown Landbird and Migratory Butterfly Stopover Area Data Analysis

Hi Eric,

We have attached a summary of the data collected for candidate landbird and migratory butterfly migratory stopover areas within the

area of the proposed Ernestown Wind Park. Currently, data collected from fall surveys has not confirmed any candidate habitat as significant under the 6E Ecoregion Criteria Schedule. Given that the migratory season is almost over and that studies have not yet confirmed the habitats as significant, we propose that the data collected up to this point is adequate for the fall season and that no further surveys are required this season. We would appreciate feedback on the attached summary as soon as possible so that we can make additional field plans as necessary.

--

Thomas Bernacki, P.Eng.

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APPENDIX B – FIELD FORMS AND MAPS

- Field Forms, August 30, 2012 through October 5, 2012 (14 pages)
- Transect Map (1 page)

Butterfly Stop Over Count Observations

Date: 30 Aug 2012 Surveyor(s): Reb Tymstra

Start Time: 10:00 12:30 Duration of transect:

Eastings: Station #: Transect I

Cld. Cover: 0 Wind W-1 Temp Range: 18°C

Bar. Pr. (increased to Beaufort 3 after 12:30)

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	9	0-5m	W+S	5-25m	9
Painted Lady	0				
White Admiral	0				
Other Identified Species					
Giant Swallowtail	1	3m	S	5m	1
Eur. Cabbage White	12	0-3m	all	5-20m	12
Clouded Sulphur	2	0-5m	"	5-10m	2

Butterfly Stop Over Count Observations

Date:	31 AUG 12	Surveyor(s):	ROB TYMSTRA
Start Time:	10:00 / 12:00	Duration of transect:	2 HRS*
Eastings:	362873 / 4898128	Station #:	South of tracks
Cld. Cover:	100% / Wind - SW 2→4	Temp Range:	21 - 28°C
Bar. Pr.			

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	3	5 m	S, W	5-10 m	3
Painted Lady	0	—	—	—	—
White Admiral	0	—	—	—	—
Other Identified Species					
Mourning Cloak	7	0-3 m	N/A	2-5 m	7
Question Mark	2	0-2 m	"	3 m	2
Great spangled Fritillary	2	0-1 m	"	1 m	2
Red Admiral	4	0-2 m	"	2 m	4
Viceroy	2	0-1 m	"	2 m	2
Eur. Cabbage White	11	0-2 m	"	2-10 m	11
Buckeye	1	1 m	"	2 m	1
Giant Swallowtail	2	0-3 m	"	3 m	2
Clouded Sulphur	8	0-5 m	"	3-10 m	8

* 3/4 of transect walked. quit after wind increased + rain started

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Butterfly Stop Over Count Observations

Date:	2017-09-06	Surveyor(s):	RFL
Start Time:	10:40 / 1:04	Duration of transect:	2.5hrs.
Eastings:		Station #:	BMSA01
Cld. Cover:	30%	Temp Range:	26°C
Bar. Pr.	wind 1-2		

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	IIII	20m.	W.	<10 W	4
Painted Lady					
White Admiral					
Other Identified Species					
Sulphur SP.	II	0	W.	N 10m	2
~~Cabbage~~ White	~~IIII~~ ~~IIII~~ IIII	0	W.	N 10M	16
Orc. Sulphur	I	0	—	1 M	1
Pink Sulphur	II	0	—	1 m	2
Tailed Blue	I	0	—	1 m.	1
Mourning Cloak	I	10M	N	<10 N	1

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Butterfly Stop Over Count Observations

Date:	2012-09-07	Surveyor(s):	RFL
Start Time:	10:05 / 1:30	Duration of transect:	3.5 HRS
Eastings:		Station #:	BMSA02
Cld. Cover:	0% / WIND 0-1	Temp Range:	25°C
Bar. Pr.	—		

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	||||				4
Painted Lady	—	—	—	—	—
White Admiral	—	—	—	—	—
Other Identified Species					
Cabbage Wt.	~~||||~~ ~~||||~~ ~~||||~~	0	S	5	31
Vic Roy	|||| ~~||||~~	0	N.	"	9
Morning Cloak	||	0	N	"	2
Sulphur sp	|||	0	W	10m	3
Org. Sulphur	||	0	W	10m	2

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CABBAGE WHITE
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Butterfly Stop Over Count Observations

Date: 2012-09-17 Surveyor(s): RFL

Start Time: 10 DO End Time: 12:30PM Duration of transect: 2.5 HRS

Cld. Cover: Ø WIND 2. GUSTS OF 4. Station #: BMSA01

Temp Range: 20°C - 26°C

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	Ø				
Painted Lady	Ø				
White Admiral	Ø				
Other Identified Species					
SULPHUR SP	II	Ø	E	10M E	
ORANGE SULPHUR	I	Ø	E	10M E	
CABBAGE WHITE	SEE BELOW	Ø	—	5-10M N	
MOURNING CLOAK	1	Ø	N	<1M S	

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CABBAGE WHITE
HH III

NEXT 26TH/12 @ 9:00AM.

Butterfly Stop Over Count Observations

Date: 2012-09-11 Surveyor(s): RFL

Start Time: 11:10 End Time: 3:10 PM Duration of transect: 4hrs.

Cld. Cover: 7/10 Wind: 0-3 (GUSTS LATER IN DAY) Station #: BMSA02

Temp Range: 21°C

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	1111	Ø	S	5-10m S.	4
Painted Lady	Ø				
White Admiral	11	Ø	W	5-10m S.	2
Other Identified Species					
American Copper	1	Ø	—	<1m E	1
Sulphur sp	~~HH~~ 1111	Ø	S	10m W.	9
Tailed Blue	1	Ø	—	<1m S	1
Cabbage Whites	~~HH~~ ~~HH~~ ~~HH~~	Ø	—	10m N	15
Viceroy	1111	Ø	E	5m E	4
Red Admiral	1	Ø	N	10m N	1
Orange Sulphur	1	Ø	E	15m S	1

SEE BELOW

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CABBAGE WHITE- ~~HH~~ ~~HH~~ ~~HH~~ ~~HH~~ ~~HH~~ ~~HH~~ 1~~HH~~ 1

Butterfly Stop Over Count Observations

Date:	2012-09-19	Surveyor(s):	RPL
Start Time:	10:45	1:15 PM	Duration of transect: 2.5 Hrs
Eastings:			Station #: BMSA01
Cld. Cover:	0/10	Wind 0-3 (kmhs)	Temp Range: 10°C - 15°C
Bar. Pr.			

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	1	Ø	S.	5m W	1
Painted Lady					
White Admiral					
Other Identified Species					
Clouded Sulphur	HHT HHT I	Ø	-	5m NW	11
Orange "	IIII	Ø	S.	10m S	4
Mourning Cloak	I	Ø	Perched	5m S	1
Cabbage White	HHT I	Ø	NE	10m N	6
Common Ringlet	I	Ø	Flew over	1m W	1
Skipper Sp.	III				3

Butterfly Stop Over Count Observations

Date: 2012-09-26

Surveyor(s): RFL

Start Time: 9:30 AM

End Time: 11:30 AM

Duration of transect:

Cld. Cover: <1/10

WIND: 2-3 GUSTS OF 4-5

Station #: BMSA02

Temp Range: 13°C - 18°C

RAIN: Ø

↳ A BIT WINDY BUT WINDY YESTERDAY, CALLING TOM WINDY; RAIN ALL WEEKEND

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	~~IIII~~	Ø	FORAGING "	5-10M (S) flying from asters	5
Painted Lady					
White Admiral					
Other Identified Species					
VICROY	I	Ø.	W	5m S	1
CABBAGE WHITE	II	Ø	—	5m N	2
CLOUDED SULPHUR	~~IIII~~ II	Ø	W	1m W	7
ORANGE SULPHUR	~~IIII~~ III	Ø	—	1m S	8
SULPHUR SP.	I	Ø	—	5m S	1

Butterfly Stop Over Count Observations

Date: 2012-09-27 Surveyor(s): RFL

Start Time: 11:20 End Time: 13:35 Duration of transect: 2.25 hrs

Cld. Cover: 1/10 WINDS 1-2 Station #: BMSA01

Temp Range: 12°C - 18°C (ALL WOODLAND NORTH OF RAIL LINE)

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	Ø	—	—	—	—
Painted Lady	Ø	—	—	—	—
White Admiral	Ø	—	—	—	—
Other Identified Species					
CABBAGE WHITE	IIII I	Ø	—	1m SE	6
CLOUDED SULPHUR	IIII IIII	Ø	—	3m S - 10m W	9
SULPHUR SP.	IIII IIII I	Ø	—	1 - 10m N-S	11
MOURNING CLOAK	II	Ø	E-S	5-10m E	2
GIANT SWALLOWTAIL LARVA	II	Ø	—	<1m	2
ORANGE SULPHUR	I	Ø	—	5m SW	1

LGN PRICKLY ASH

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Butterfly Stop Over Count Observations

Date: 2012-09-18 Surveyor(s): RFL

Start Time: 10:15 AM End Time: 12:30PM. Duration of transect:

Cld. Cover: 4/10 WIND: 0-1 Station #: BMSA02

Temp Range: 12°C RAIN: Ø (ALL WOODLANDS & MEADOWS SOUTH OF RAIL LINE).

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	Ø				
Painted Lady	Ø				
White Admiral	Ø				
Other Identified Species					
Sulphur SP	𝍸 𝍸 𝍸 |	1	W	5-40m N to S	17
Cabbage White	𝍸 ||||	Ø	—	1m N	9
Pink-Edged Sulphur	||	Ø	—	2m S	2
Viceroy	||	Ø ; 1	— ; E	1m W ; 5m E	2
Orange Sulphur	|||	Ø	—	5m W	3
Clouded Sulphur	|	Ø	—	2m N	1

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Butterfly Stop Over Count Observations

Date: 2012-10-03 Surveyor(s): RFL ; DCS

Start Time: 11 5 AM | END: 12:50 PM Duration of transect: 95 MINS

Eastings: | Station #: BMSA01

Cld. Cover: 10/10 | WIND: 0-1

Bar. Pr. | RAIN: 0

Temp Range: 15°C

see associated maps for transect route

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	1	0	W	5m N.	1
Painted Lady	0				
White Admiral	0				
Other Identified Species					
CABBAGE WHITE	~~IIII~~ III	0	—	5ms.	8
SULPHUR SP	~~IIII~~	0	E	10m E	5
ORANGE SULPHUR	III	0	E	1m E	3
CLOUDED SULPHUR	III	0	E	1m N	3

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Butterfly Stop Over Count Observations

Date:	2012-10-02	Surveyor(s):	RFL & DCS
Start Time:	11:10 AM / END: 1:20 PM	Duration of transect:	130 mins.
Eastings:		Station #:	BMSA02 — see associated maps for transect routes.
Cld. Cover:	10/10 / WIND: 0-1 → @end 3	Temp Range:	14°C - 15°C
Bar. Pr.	RAIN: Ø		

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	Ø				
Painted Lady	Ø				
White Admiral	Ø				
Other Identified Species					
Sulphur Sp.	I	1	NW	5m N.	1
Giant Swallowtail Larva	II	Ø	←	4m. E	2 — ON PRICKLY ASH.
Cabbage WH	~~||||~~	Ø	—	<1m S	5
Clouded Sulphur	III	Ø	W	<1m S	3

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Butterfly Stop Over Count Observations

Date:	2012-10-05	Surveyor(s):	RPL.
Start Time:	10:48 / 12:10 PM	Duration of transect:	95 mins
Eastings:		Station #:	BMSA01
Cld. Cover:	10/10 / WIND: 0-5	Temp Range:	17°C -24°C
Bar. Pr.	RAIN: 0 - WAS RAINING		

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	ll	0 & 1	W & W	10m N	2
Painted Lady	Ø				
White Admiral	Ø				
Other Identified Species					
Sulphur sp.	ll	0	–	20m S	2
Cabbage Wh.	~~llll~~	0	–	20m W	5
Cloudy Sulphur	ll	0	–	5m W	2

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Butterfly Stop Over Count Observations

Date: 2012-10-04 Surveyor(s): RFL ; DCS

Start Time: 10:30 12:00PM Duration of transect: 90MINS

Eastings: Station #: BMSA02

Cld. Cover: 10/10 WINDS Ø-1 Temp Range: 17°C

Bar. Pr. RAIN: Ø

Species	Tally of Individuals	Height Estimate	Fight Direction (N, S, E, W)	Direction and Distance from Observer	Total Individuals
Focal Species					
Monarch	IIII	Ø ; Ø ; Ø ; Ø ; Ø	W. ; Ø ; E< E ; E	5m(W) <5m(SW) 20m(E) ; <1m <2m(S)	5
Painted Lady	Ø				
White Admiral	Ø				
Other Identified Species					
CLOUDED SULPHUR	IIII 1	Ø	—	5m. Ø-S.	6
CABBAGE WH	IIII IIII III	Ø	—	5-10m N-S	13
SULPHUR SP.	IIII	Ø	S.	10m S	5
ORANGE SULPHUR	1	Ø	S.	<1m (S)	1
NORTHERN (RESCU)	1	Ø	—	<1m (W)	1

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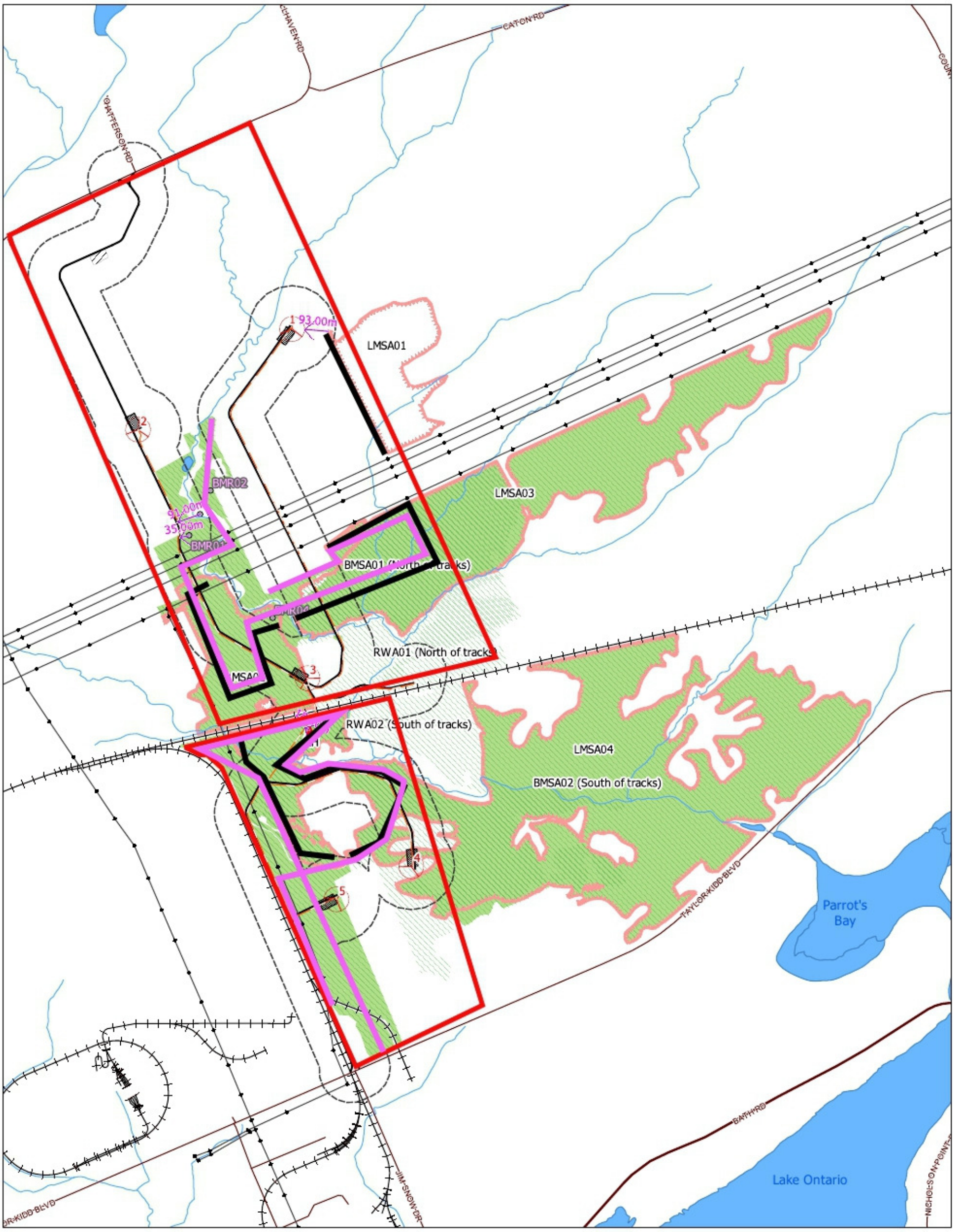

Legend

Turbine

Collector

Access Road

Hardstanding Area

Staging Area

RH - Reptile Hibernacula

BMR - Bat Maternity Roost

LMSA - Landbird Migratory Stopover Area

RWA - Raptor Wintering Area

BMSA - Butterfly Migratory Stopover Area

120m Zone of Investigation

Hydro Line

Road

Railroad

Watercourse

Water Body

Transect Route (BMSA)

Land Access Boundary

Transect Route (LMSA)

Ernestown Wind Park
Seasonal Concentration Areas

200 0 200 400 m

1:15000

Datum: NAD83
Projection: UTM Zone 18N
Units: Metres
Date: 15 August 2012

Sources: Ministry of Natural Resources, Ernestown Windpark L.P.,MK Ince & Associates.

Date: 06 Sep 2012