

Appendix E

2012 Bat Monitoring Report and Environmental Impact Study (NRSI, 2012)

BLUEWATER WIND ENERGY CENTRE 2011 Bat Monitoring Report and Environmental Impact Study

Prepared for: AECOM 300 Town Centre Blvd., Suite 300 Markham, ON L3R 5Z6

Project No. 1075B

Date: March 2012



BLUEWATER WIND ENERGY CENTRE 2011 Bat Monitoring Report and Environmental Impact Study

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1.0 Project Description

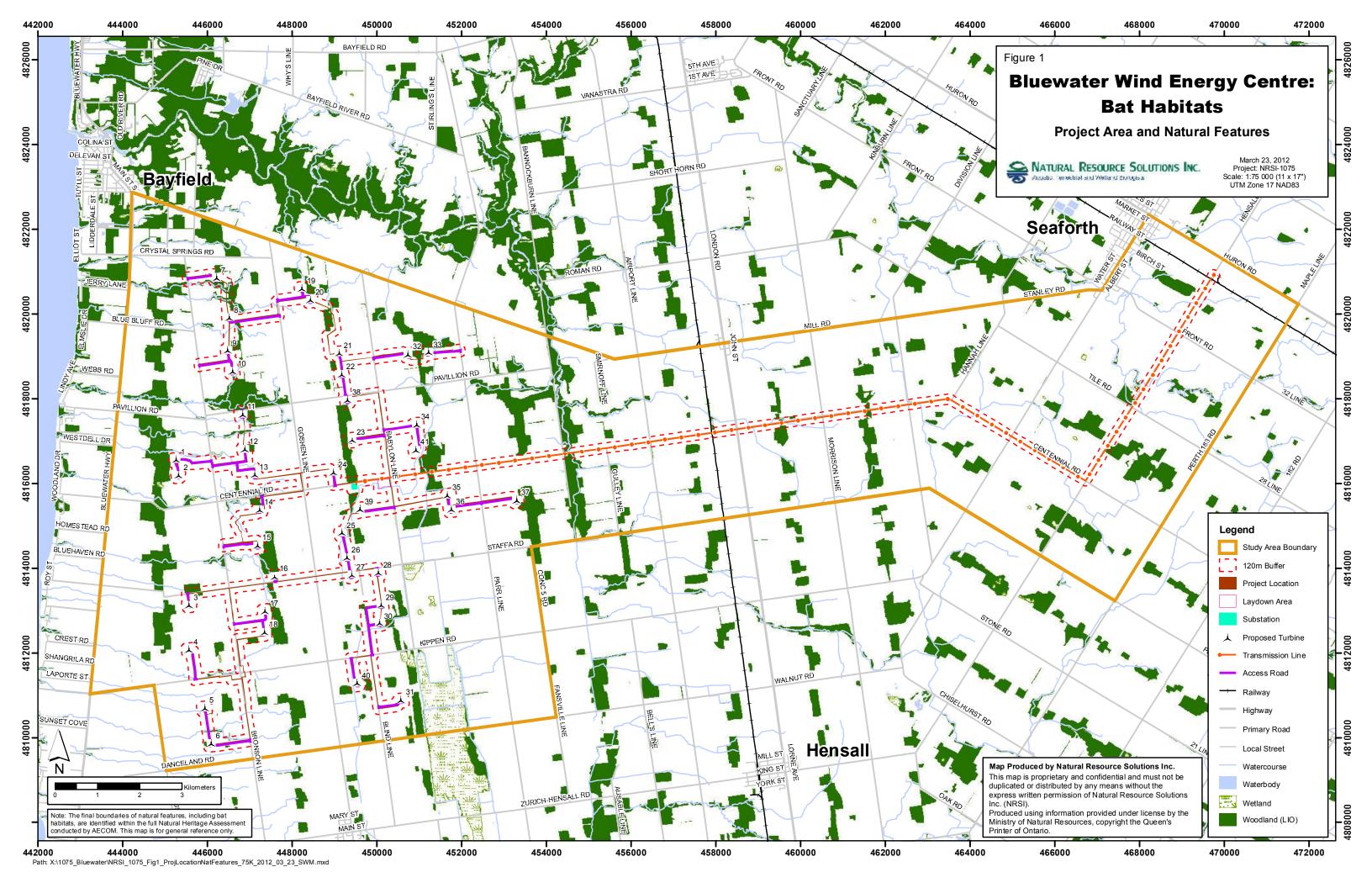
Natural Resource Solutions Inc. (NRSI) was retained in June 2010 by AECOM, on behalf of NextEra Energy Inc., to conduct a natural environment resource assessment specific to bats and bat habitat, in accordance with the Renewable Energy Approval (REA) regulation. This assessment includes a records review, site investigation, and evaluation of significance and impact assessment of any potentially significant natural features at a proposed 60MW wind energy facility in Huron County and the Municipalities of Bluewater and Huron East, Ontario.

The Bluewater Wind Energy Centre, proposed by NextEra Energy Inc., is located approximately 2.5km southeast of the Town of Bayfield. This wind energy generating facility is proposed to be 60MW in size, consisting of up to 41 operational 1.6MW wind turbines, as well as supporting infrastructure and development activities. This includes access roads, construction areas, connector lines, a transmission line and a substation, temporary laydown areas, and an operation/maintenance building.

As identified the REA regulation, the proposed layout of these features is collectively referred to as the 'project location'. In accordance with Section 25 of the Renewable Energy Approval (REA) Regulation (O. Reg. 359/09 of the Environmental Protection Act), AECOM has conducted a thorough records review of available background resources to identify any potentially significant bat habitats within 120m of the project location. This includes areas within 120m of turbine blade tip as well as any areas that may be used as temporary laydown areas, substation, and operations building. For the purposes of this report, NRSI will refer to the areas within 120m of the project location as the 'project area'.

The project area represents habitat and landscape features typical of a southern Ontario landscape. The approximate boundaries of the area proposed for turbine placement are Mill Road to the north, Bannockburn Line the to the east, Bluewater Highway (Highway 21) to the west, and Danceland Road/ Walnut Road to the south (Figure 1). The project area is dominated by agricultural habitats, including both actively tilled cropland and

pasture. Fallow fields, hedgerows, woodlots, creek valleys and wetlands are also present throughout the project area.



2.0 REA Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the REA Regulation) made under the *Environmental Protection Act* identifies the requirements for the development of renewable energy projects in Ontario. In accordance with the REA Regulation, the project is classified as a Class 4 wind energy generating facility, and is required to complete a Natural Heritage Assessment.

2.1 Records Review

Section 25 of the REA Regulation requires proponents of Class 4 wind projects to undertake a natural heritage records review to identify whether the project location is:

- 1. in a provincial park or conservation reserve
- 2. within 120m of a provincial park or conservation reserve
- 3. in a natural feature
- 4. within 50m of an area of natural and scientific interest (earth science), or
- 5. within 120m of a natural feature that is not an area of natural and scientific interest (earth science)

Natural Features are defined in Section 1.1 of the REA Regulation to be all or part of

- (a) an area of natural and scientific interest (ANSI) (earth science)
- (b) an ANSI (life science)
- (c) a coastal wetland
- (d) a northern wetland
- (e) a southern wetland
- (f) a valleyland
- (g) a wildlife habitat, or
- (h) a woodland.

Subsection 3 of Section 25 of the REA Regulation requires the proponent to prepare a report "setting out a summary of the records searched and the results of the analysis" (O. Reg. 359/09). Dillon Consulting Ltd. has conducted a records review of available background resources to satisfy the conditions of the Regulation.

2.2 Site Investigation

Section 26 of the REA Regulation requires proponents of Class 4 wind projects to undertake a natural heritage site investigation for the purpose of determining:

- 1. whether the results of the analysis summarized in the [Natural Heritage Records Review] report prepared under subsection 25 (3) are correct or require correction, and identifying any required corrections.
- 2. whether any additional natural features exist, other than those that were identified in the [Natural Heritage Records Review] report prepared under subsection 25 (3).
- 3. the boundaries, located within 120m of the project location, of any natural feature that was identified in the records review or the site investigation.
- 4. the distance from the project location to the boundaries determined under clause (c).

Natural Features, as defined in Section 1.1 of the REA Regulation, are identified in Section 3.1 above.

Subsection 3 of Section 26 of the REA Regulation requires the proponent to prepare a report which includes the following:

- 1. A summary of any corrections to the report prepared under subsection 25 (3) and the determinations made as a result of conducting the site investigations under subsection (1).
- 2. Information relating to each natural feature identified in the records review and in the site investigations, including the type, attributes, composition and function of the feature.
- 3. A map showing
 - a) the boundaries mentioned in clause (1) (c)
 - b) the location and type of each natural feature identified in relation to the project location, and
 - c) the distance mentioned in clause (1) (d).
- 4. The dates and times of the beginning and completion of the site investigation.
- 5. The duration of the site investigation.
- 6. The weather conditions during the site investigation.
- 7. A summary of methods used to make observations for the purposes of the site investigation.
- 8. The name and qualifications of any person conducting the site investigation.
- 9. Field notes kept by the person conducting the site investigation.

This Bat Monitoring Report has been organized and prepared to satisfy the conditions of

the requirements outlined above for candidate significant bat habitats.

2.3 Evaluation of Significance

Section 27 of the REA Regulation requires that, if any candidate significant natural feature is identified within 120m of the project location, a natural heritage evaluation of significance should be undertaken. This evaluation of significance should utilize evaluation criteria or procedures established or accepted by the Ministry of Natural Resources. In conjunction with the evaluation of significance, Subsection 4 of Section 27 of the REA Regulation requires that a report be prepared that sets out the following:

- 1. For each natural feature shown on the map mentioned in paragraph 3 of subsection 26 (3), a determination of whether the natural feature is provincially significant, significant, not significant, or not provincially significant.
- 2. A summary of the evaluation criteria or procedures used to make the determinations mentioned in paragraph 1.
- 3. The name and qualifications of any person who applied the evaluation criteria or procedures mentioned in paragraph 2.
- 4. The dates of the beginning and completion of the evaluation

This Bat Monitoring Report has been organized and prepared to satisfy the requirements of the evaluation of significance for candidate significant bat habitats as outlined in the REA Regulation.

2.4 Environmental Impact Study

Section 38 of the REA Regulation specifies that no development activities shall be permitted within 120m of a significant natural feature unless an environmental impact study report is prepared in accordance with any procedures established by the Ministry of Natural Resources. As per Subsection 2, this report should:

- 1. Identify and assess any negative environmental effects of the project on a natural feature, provincial park or conservation reserve,
- 2. Identify mitigation measures in respect of any negative environmental effects mentioned in the subclause above,
- 3. Describe how the environmental effects monitoring plan...addresses any negative environmental effects mentioned in subclause 1, and
- 4. Describe how the construction plan report...addresses any negative environmental effects mentioned in subclause 1.

This Bat Monitoring Report has been organized and prepared to satisfy the requirements of the environmental impact study for significant bat habitats as outlined in the REA Regulation.

3.0 Records Review

3.1 Records Review Methodology

In accordance with the REA Regulation, AECOM consulted several information sources and agencies for the purposes of assessing natural features and wildlife habitat within 120m of the project location. The results of this consultation process have been documented in the Bluewater Wind Energy Centre Natural Heritage Assessment (AECOM 2011). In addition, NRSI has consulted several additional information sources specific to bats and bat habitats. The results of these records consulted are listed below in Table 1.

Information Source	Consultation Date(s)	Type of Records Reviewed
Ministry of Natural Resources, Land Information Ontario	December 2, 2011	Woodlands Significant Wildlife Habitat
Ministry of Northern Development and Mines, Ontario Geological Survey	December 6, 2011	Significant Wildlife Habitat (Karst of Southern Ontario and Manitoulin Island, Abandoned Mines Information System)
Huron County Official Plan (Amendment No. 3, 2010)	November 25, 2011	Woodlands
Municipality of Bluewater Official Plan (2005)	November 25, 2011	Woodlands
Ministry of Natural Resources, NHIC and Biodiversity Explorer	December 12, 2011	Significant Wildlife Habitat
Atlas of the Mammals of Ontario	November 25, 2011	Significant Wildlife Habitat

Table 1. Summary of Records Consulted for the Bluewater Wind Energy Centre

3.2 Records Review Results

Based on results of the records review, there are no bat hibernacula, maternity colonies, or migratory stopover locations known from within 120m of the project location. However, there are 22 woodlands within 120m of wind turbines which may be suitable to contain bat maternity colonies.

There are no known abandoned mines within 120m of the project location. However, there is known karst topography overlapping the eastern portion of the project area containing wind turbines. There are known sinkholes within this unit of known karst. Karst is susceptible to the creation of geologic features, such as caves, which may be

suitable for bat hibernacula (OGS 2011). The closest sinkhole to the project location is found approximately 2.75km to the northeast of the access road for turbine 33. Other sinkholes are found approximately 3.25km southeast of turbine 37.

The remainder of the project location is found within areas of inferred karst topography. As a result there are no known features which may be suitable for bat hibernacula within 120m of the project location, but there may be previously unknown features within areas of karst or inferred karst which could provide suitable habitat for bat hibernacula. These features will be considered in the site investigation.

Bat species which are known from the vicinity of the project location include big brown bat (*Eptesicus fuscus*) and eastern red bat (*Lasiurus borealis*) (Dobbyn 1994). No species of conservation concern have been identified from the vicinity of the project location (OMNR 2010a).

Wildlife Habitat Type	Present Within 120m of Project Location	Present Within Project Location	Details	Site Investigation Required		
Seasonal Concentra	ation Areas					
Bat Hibernacula	Unknown	Unknown	No abandoned mines, but there is inferred karst topography and karst topography <120m from and overlapping the project location. Site investigation will be conducted to identify any potential caves.	Yes		
Bat Maternity Colonies	Unknown	Unknown	Project located <120m from woodlands which may contain suitable trees.	Yes		
Species of Conservation Concern						
S1-S3, and SH Species and Communities	No	No	No records of bat species of conservation concern from the vicinity of the project area.	No		

Table 2. Summary of Significant Wildlife Habitats Identified Near the Bluewater Wind	
Energy Centre	

4.0 Site Investigation

Comprehensive site investigations to document the environmental and biological characteristics of the Bluewater Wind Energy Centre relating to bats and bat habitats were undertaken in accordance with the REA regulation and the requirements of the MNR. These site-specific field investigations focused on habitat assessments to support and build on the information collected during the records review phase of this project, aiding in identifying candidate significant bat habitats. The results of these site investigations will be used to identify and map the boundaries of wildlife habitats within 120m of the project location. Information collected at this stage will subsequently be used to help evaluate the significance of identified wildlife habitats.

4.1 Site Investigation Methods

4.1.1 Staff Roles

The requirements of the REA Regulation indicate that the name and qualifications of all staff participating in the site investigation should be included. As a result, the qualifications and roles of all staff participating in the site investigations at the Bluewater Wind Energy Centre have been outlined in the following sections.

Andrew G. Ryckman, B.Sc.

Andrew is a Terrestrial and Wetland Biologist with 7 years of environmental experience. He routinely manages the natural heritage aspects of renewable energy projects, with specific expertise relating to bats and herpetofauna. Andrew is certified in Ecological Land Classification (2010), and has successfully completed a Bat Conservation International (BCI) Acoustic Monitoring Workshop (2008).

Andrew's role in the project was to act as the project manager, overseeing all aspects of the site investigation, including all associated field work and reporting. Andrew reviewed photos and habitat descriptions of potentially significant habitats and provided input into habitat characteristics.

Christy Humphrey, B.E.S.

Christy is a Terrestrial and Wetland Biologist with more than 3 years of environmental consulting experience, working on a variety of project tasks. Her primary areas of expertise are vegetation mapping and floral inventories, but she has experience conducting bird and bat assessments, amphibian studies, and other fauna assessments. Christy is certified in both the Ecological Land Classification (ELC) for Southern Ontario (2010) and Northeastern Ecological Land Classification (2010), and participated in the Ontario MNR Bat Monitoring Workshop for Wind Power Projects (2010).

Christy organized field work to be conducted for the site investigation, and conducted site specific habitat assessments, assessing qualitative characteristics of potential wildlife trees. Christy also compiled, interpreted, and reported on the results of the site investigation.

Andrew Dean, B.E.S.

Andrew is a Terrestrial and Wetland Biologist with 2 years of environmental consulting and not-for-profit work experience, monitoring both for the protection of natural areas within construction projects and for the rehabilitation of former aggregate extraction sites. He has a keen interest in botany and plant ecology and is a member of the Field Botanists of Ontario, the North American Native Plant Society and the Society for Ecological Restoration of Ontario (SERO) and is certified in the Ecological Land Classification (ELC) for Southern Ontario (2011). Andrew has participated in field investigations inventorying flora and fauna, their respective habitats and sensitive natural heritage features.

Andrew conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Ashley Nathan, M.Sc.

Ashley is a Field Technician with two years of technical experience in environmental consulting and research. Ashley completed her Master of Science in Elementary Education at Medaille College, NY after acquiring her Bachelor of Science degree in Biology with Environmental Science from the University of Western Ontario. Ashley has experience conducting vegetation, mammal, and bird surveys for a variety of environmental projects.

Ashley conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Brian Watson, F.W.T.

Brian is a Field Biologist with more than one year of work experience in the environmental field. His areas of expertise are fish habitat surveys, fisheries sampling, and environmental monitoring, but he also has experience with benthic invertebrate surveys, bird surveys and tree species identification.

Brian conducted site specific habitat assessments for the Bluewater Wind Energy Centre, including qualitatively assessing the characteristics of potential wildlife trees, as well as quantitatively assessing the number of wildlife trees per hectare within woodlands.

Carolyn Knapper, F.W.T.

Carolyn is a Field Biologist with 8 months of experience as a technician in the environmental field. She has experience monitoring aquatic ecosystems and

conducting mammal and herpetofauna surveys in both the public and private sectors.

Carolyn conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Charlotte Moore, B.E.S.

Charlotte is a Terrestrial and Wetland Biologist with three field seasons of experience in butterfly ecology and various other environmental projects. Charlotte has completed her Bachelor of Environmental Studies and is a candidate for a Master of Environmental Studies (2013) at the University of Waterloo. Her Masters research will involve measuring the success of past restoration efforts using butterfly abundance and diversity in the riparian zones of several creeks. Other environmental projects Charlotte has worked on include the use of Ecological Land Classification (ELC) and the Ontario Wetland Evaluation System (OWES), bat habitat assessments, breeding bird surveys, reptile studies and amphibian surveys.

Charlotte conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Heather Wright, B.E.S.

Heather is a Terrestrial and Wetland Biologist with over one year of environmental experience in both the private and public sectors. She has experience in conducting vegetation inventories and reptile and mammal surveys. Heather graduated with a Bachelor of Environmental Studies from the University of Waterloo and completed a post-graduate certificate program in Ecosystem Restoration from Niagara College.

Heather conducted site specific habitat assessments for the Bluewater Wind Energy Centre, quantitatively assessing the number of wildlife trees per hectare within woodlands.

lan Riemenschneider, B.Sc.

Ian is a Field Biologist with three years of experience in environmental consulting and research. He completed the Fish and Wildlife Technology program from Sir Sandford Fleming College, before completing a Bachelor of Science degree in Biology. He specializes in assessing fish populations and aquatic ecosystems, but has experience in identifying and conducting mammal surveys as well.

Ian conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Jessica Pang, B.Sc. Candidate 2012

Jessica Pang is an undergraduate student at the University of Waterloo completing her degree in Biology, with a specialization in animal physiology. During her co-operative education term with NRSI, she worked as a Field

Technician, participating in a wide variety of field work from habitat assessment to wildlife surveys.

Jessica conducted site specific habitat assessments for the Bluewater Wind Energy Centre, quantitatively assessing the number of wildlife trees per hectare within woodlands.

Julia Lawler, B.E.S. Candidate 2012

Julia Lawler is an undergraduate student at the University of Waterloo completing her degree in Environment and Resource Studies. During her co-operative education term with NRSI, she worked as a Field Technician, participating in a wide variety of field work from habitat assessment to wildlife surveys.

Julia conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Kaitlin N. Powers, B.E.S.

Kaitlin is a Terrestrial and Wetland Biologist with over 2 years experience working as an environmental technician in both public and private sectors. As a graduate in Environment and Resources Studies from the University of Waterloo, Kaitlin specialized her studies in ecological restoration and is a member of the Society for Ecological Restoration of Ontario (SERO). She is certified in Ecological Land Classification (ELC) for Northeastern Ontario (2011) and has been involved in completing ELC surveys, wildlife habitat assessments, bat monitoring, migratory bird and reptile surveys, as well as assisting in wetland evaluations.

Kaitlin conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Katherine Clapham, F.W.T.

Katherine is a Field Biologist with over one year of experience as a technician in the environmental field. She has experience in monitoring wildlife and the success of restoration projects, and the development of fish culture in hatcheries.

Katherine conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

Ken Burrell, B.E.S.

Kenneth is a terrestrial and wetland biologist who has 6 years of experience working on a variety of environmental projects. He specializes in bird ecology but has over 4 years of experience conducting floral inventories and wildlife studies focused on amphibians, reptiles, bats, and mammals. Kenneth has worked on multiple stages for a variety of renewable energy projects, primarily focusing on wind power. Kenneth has completed his Bachelor of Environment and Resource Studies and is a candidate for a Masters of Environment and Resource Studies (2013) at the University of Waterloo. His Masters research will involve studying spring bird migration at Pelee Island, Ontario. Ken conducted site specific habitat assessments for the Bluewater Wind Energy Centre, quantitatively assessing the number of wildlife trees per hectare within woodlands.

Nathan Miller, M.Sc.

Nathan graduated from the University of Guelph with a B.Sc. in Wildlife Biology and a M.Sc. in Integrative Biology. Research for Nathan's M.Sc. focused on the migration and conservation of the monarch butterfly throughout Canada and the United States. Nathan also has extensive experience conducting research on a wide range of wildlife species including birds, mammals, herpetofauna, insects and plants acquired while working as a naturalist for the Ministry of Natural Resources in Algonquin Park and an environmental consultant. Nathan is also certified in Northeastern Ecological Land Classification (ELC).

Nathan conducted site specific habitat assessments for the Bluewater Wind Energy Centre, quantitatively assessing the number of wildlife trees per hectare within woodlands.

Tara Lessard, B.Sc.

Tara is a Terrestrial and Wetland Biologist with more than 4 years of experience working in the environmental field. During her consulting experience, Tara has conducted bird and bat assessments, amphibian studies, and other fauna assessments throughout Ontario. Tara has participated in field investigations and reporting for wind power projects in Ontario and New Brunswick.

Tara conducted site specific habitat assessments for the Bluewater Wind Energy Centre, assessing qualitative characteristics of potential wildlife trees.

4.1.2 Survey Dates

In accordance with the REA Regulation, NRSI recorded dates, times, duration, and weather conditions during each site investigation. This information has been summarized in the following table. Detailed descriptions of staff roles and qualifications can be found in Section 4.1.1 of this report, and detailed field forms have been appended to this report.

Table 3. Site Investigation Survey Dates

Purpose	General Methods	Feature ID	Date(s)	Time(s) and Duration	Weather	Staff
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	518 463 548	June 2, 2010	11:15 – 19:55 8 hrs 40 minutes	18°C, 100%CC, Light rain, Wind 3 from W.	AGR, ACN
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	477 448 514	June 3, 2010	14:06 – 16:20 2hrs 14 minutes	21°C, 100%CC, No precipitation, Wind 1.	AGR, ACN
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	542	June 4, 2010	13:09 – 15:00 1 hr 51 minutes	23°C, 100%CC, No precipitation, Wind 2 from S.	ACN
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	437 524	June 9, 2011	12:00 – 18:30 8 hrs 30 minutes	15°C, Wind 3 from NW	CLH, JHL
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	541 542	June 15, 2011		24C, No precipitation, Wind 3 from S. CC 55%	JHL, JB
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	483	June 16, 2011		20C, 100%CC, light precipitation	JHL, JB
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	504	June 19, 2011	16:00 -	27C, 50%CC, no precipitation, wind 2	KTC, AMD
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	532	June 21, 2011	14:02 – 15:00	24C, 70%CC, no precipitation, Wind 2	TAL, AMD
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	518 534	June 23, 2011	13:58 -	20C, 100%CC, no precipitation, Wind 1 from SW	TAL, KNP
Bat Habitat Characterization	Qualitative assessment of wildlife trees, Area search for caves or crevices	480 510 532	June 24, 2011	13:39 - 16:30	18C, 100%CC, Periodic rain, Wind 2 from West	TAL, KNP
Bat Habitat Assessment	Quantitative assessment of wildlife trees	508	Nov. 23, 2011	12:20 – 13:30 50 minutes	1C, Sunny, No precipitation, 15%CC, Wind 1	JSP, BWW

Bat Habitat Assessment	Quantitative assessment of wildlife trees	470 484 498 460	Nov. 24, 2011	08:15 – 17:00 8 hrs 45 minutes	6C, 100%CC, No precipitation, Wind 0.	JSP, BWW
Bat Habitat Assessment	Quantitative assessment of wildlife trees	544 427 492 481	Dec.9, 2011	09:02 - 09:56 09:58 - 10:42 12:14 - 12:32 13:08 - 13:40 2 hrs 28 minutes	-2C, 100%CC, Snow, Wind 4.	NGM, KGB

4.1.3 Identification of Bat Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000) and the Significant Wildlife Habitat Ecoregion Criteria Schedules Addendums (OMNR 2009, OMNR 2011a) outline general characteristics that may be used to identify candidate significant bat habitats, including seasonal concentration areas. The general characteristics used to identify candidate seasonal concentration areas relating to bat habitats are outlined in Table 4 below.

Bat Habitat	Appendix Q Suggested Criteria	Significant Wildlife Habitat Technical Guide and Addendum Habitat Criteria
Bat Hibernacula	 Relative importance of the site Presence of species of conservation concern Species diversity Abundance Habitat quality Location of site Level of disturbance 	Caves, mine shafts, underground foundations, Karsts or one of the following Community Types: Crevice (CCR), Cave (CCA). Does not include buildings (OMNR 2010b, 2011a).
Bat Maternity Colonies (2009)	N/A	Tree cavities, vegetation, buildings (OMNR 2009, 2010b).
Bat Maternity Colonies (2011)	N/A	Any of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) that have >10/ha wildlife trees (snags or cavity trees) which are >25cm dbh. Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). Maternity roosts are not found in caves and mines in Ontario (OMNR 2011a).
Bat Migratory Stopover Area	N/A	Location and characteristics of stopover habitats are generally unknown (OMNR 2011a).

Table 4. General Characteristics Used to Identify Candidate Significant Bat Habitats
Within the Bluewater Wind Energy Centre

Site investigations conducted in June of 2010 and 2011 were conducted according to the general guidance that was available at the time, from the Ecoregion Criteria Schedules Addendum (OMNR 2009) and from the document *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR 2010a). As a result of the lack of information on identifying suitable habitats for bat maternity colonies available at the time, NRSI used the information available from OMNR documents, combined with secondary research

conducted and the experience of the company to identify candidate bat maternity colonies in woodlands. Criteria used to identify candidate bat maternity colonies included the presence of snags or live cavity trees which were >20cm dbh. Snags which were considered suitable habitat had exfoliating bark or cavities. In addition, any suitable candidates had a clear entranceway to the cavity or surrounding exfoliating bark. Field notes for these assessments are included in Appendix I.

New information obtained through discussion with MNR in late June 2011, in combination with the revised MNR guidance document released in July 2011 identified that suitable maternity colony habitat would include at least 10 quality wildlife trees/ha. As a result, a rough estimation of the quantity of candidate trees was introduced into subsequent site investigations conducted in June 2011 (for natural features 480, 510, and 534).

Site investigations conducted after June of 2011 followed the most recent OMNR guidance document, *Bats and Bat Habitats: Guidelines for Wind Power Projects* (2011b), which indicates that the number of wildlife trees per hectare can be determined using 0.05ha plots (circular plots with a radius of 12.6m), which are randomly placed throughout each woodland being investigated. The document stipulates that a minimum of 10 plots should be used for woodlands which are 10ha or less in size, with one additional plot for every additional hectare for larger woodlands (up to a maximum of 35 plots). NRSI followed this protocol after June 2011, randomly selecting circular plots 12.6m in radius within the portions of woodlands for which access was granted. The number of snags or cavity trees within these plots which were >25cm dbh were counted. Field notes for these assessments are included in Appendix I.

4.1.4 Identification of Generalized Candidate Significant Bat Habitats

As operational impacts have been determined not to occur to bat habitats located further than 120m from a proposed wind turbine (OMNR 2011c), woodlands located within 120m of other project components may be treated as significant, with generalized candidate significant wildlife habitat mitigation measures applied in the EIS to address potential impacts to these habitats during construction only. However, not all woodlands have the potential to contain a sufficient quantity of suitable snags or wildlife trees to indicate they may contain a significant bat maternity colony. As a result, not all

woodlands located further than 120m from wind turbines, but less than 120m from other project components, will be considered as generalized candidate significant wildlife habitat. NRSI has utilized the Ecological Land Classification information collected by AECOM in order to narrow down the list of woodlands considered as generalized candidate significant wildlife habitat for bat maternity colonies.

A woodland is identified as generalized candidate significant wildlife habitat if it consists of suitable deciduous or mixed mid-age to mature forests with the canopy stand description (top 4 species) containing the following species: white pine (*Pinus strobus*), maple (*Acer* spp.), aspen (*Populus tremuloides*), ash (*Fraxinus* sp.), oak (*Quercus* sp.). These species are identified as tree species providing good cavity habitat in the 2011 *Bats and Bat Habitats: Guidelines for Wind Power Projects* document (OMNR 2011b). In addition these woodlands must contain a sufficient quantity of trees and snags >25cm DBH to allow for the potential for >10 suitable trees per hectare to occur (at least occasionally occurring live trees >25cm DBH and rarely occurring snags >25cm DBH). This information is obtained from the tree and snag size class analysis which utilizes a scale of none, rare, occasional, or abundant for size categories <10cm, 10-24cm, 25-50cm, and >50cm DBH. If cavity trees were specifically noted by AECOM biologists, and there are at least occasionally occurring live trees >25cm DBH, although snags were not noted, this habitat is considered as generalized candidate significant wildlife habitat as well.

If a natural area meets any of the following criteria, it is not considered as generalized candidate significant wildlife habitat: plantation; has a canopy dominated by coniferous trees; has <60% canopy cover; contains a significant component of weedy tree species such as common buckthorn (*Rhamnus cathartica*) or common apple (*Malus pumila*); or contains no trees >25cm DBH.

4.2 Site Investigation Results

The majority of the Bluewater Wind Energy Centre is dominated by agricultural habitats, including both actively tilled cropland and pasture. Fallow fields, hedgerows, and some woodlands are also present throughout the project area. NRSI used habitat criteria outlined by the Significant Wildlife Habitat Technical Guide (OMNR 2000), Ecoregion Criteria (OMNR 2009, 2011a), and Bats and Bat Habitat Guidelines (OMNR 2010b,

2011b) to compare site-specific habitat conditions to potential bat habitats. The results of the site investigation are provided in the sections below.

4.2.1 Bat Winter Hibernacula

According to the 2011 Addendum to the SWHTG, caves, mine shafts, underground formations and Karsts are considered examples of locations where bat hibernacula may be found (OMNR 2011a). No candidate bat hibernacula were identified by NRSI or AECOM biologists within the Bluewater Wind Energy Centre.

4.2.2 Bat Maternity Colony

NRSI conducted assessments to determine the potential for candidate significant bat maternity colonies using a qualitative assessment method for habitats examined prior to the release of quantitative criteria, as well as a plot-based approach to calculate the number of snags or cavity trees per hectare within each woodland examined after the release of the 2011 *Bat and Bat Habitats* guidelines (OMNR 2011b). The results of these exercises are included in Table 5 below. This table is followed by another which indicates the size, composition, attributes, and functions of those habitats which are considered Candidate Significant Bat Maternity Colonies (Table 6).

	<120m		Qualitative Assessment	Quantit	ative Assessment	Evaluation of
Feature ID	from Turbine No.	Size (ha)	Qualitative Characteristics of Habitat	Number of Sample Plots	# Wildlife Trees per ha	Significance Required (Y/N)
504	1, 2	92.53	AECOM's ELC information indicates this is a suitable mid-age sugar maple deciduous forest with abundant trees 25-50cm DBH. There is a candidate tree which is a large sugar maple located approximately 20m in from the edge of the woodland. It is approximately 100 cm dbh and contains a large cavity. The overhead vegetation cover is 80% in this location.			Yes
427	6	0.73		2	10.00	Yes
544	7	3.79		9	15.56	Yes
541	7	29.65	AECOM's ELC information indicates this contains suitable mid-age to mature deciduous upland and lowland forests, with some swamp. This forest contains a willow snag in a very open clearing, which is largely hollow. It also has exfoliating bark and woodpecker holes. The snag is located 7m north of a creek running through the woodland.			Yes
532	8, 9	8.68	AECOM's ELC information indicates this is a younger sugar maple deciduous forest, containing occasional trees 25-50cm DBH and rare trees >50cm DBH, with some rare snags 25-50cm DBH. This woodland has an area containing some young, small snags, largely of ash (<i>Fraxinus</i> sp.) and white elm (<i>Ulmus americana</i>), however none contain cavities and there is little exfoliating bark. There is an area in the southeast section of the woodland containing several candidate maple (<i>Acer</i> sp.) and American beech snags which are 4-15m in height, and 20-40cm dbh. There are a few weaker candidate snags within 30m of this group as well.			Yes
518	10, 11	76.82	AECOM's ELC information indicates that this woodland does not contain trees >25cm DBH. In addition, only one area recorded rarely occurring snags >50cm DBH. As a result, this woodland is			No

Table 5. Summary of Site Investigation Results and Consideration for Candidate Significant Bat Habitats

508	11	7.45	unlikely to contain a sufficient number of suitable wildlife trees to qualify as candidate significant habitat for bat maternity colonies. NRSI identified one weak candidate tree, which was a small white birch snag. As this is also not a preferred roost tree, this habitat is not considered candidate significant habitat for bat maternity colonies.	10	8.00	No
498	12	2.66		10	8.00	No
481	14	4.24		10	8.00	No
480	15, 16	30.29	This woodland is a deciduous forest containing many young trees, however there are some mid- size and large trees up to 80cm dbh throughout. There are some snags on the property which was assessed (~8) which are >20cm dbh, >5m in height, and contained cavities. However, at the time of assessment in June 2011 the quantity was estimated to be insufficient to compare to new information obtained part-way through the field season regarding the quantity of snags required per ha.			No
463	17, 18	32.01	AECOM's ELC indicates this is a mid-age dry-fresh sugar maple-white ash deciduous forest, with abundant trees 25-50cm DBH, and occasional trees >50cm DBH. It also lists rare snags 25-50cm DBH. NRSI identified a suitable candidate tree found on the edge of the woodland, which is a dead elm snag. This edge of the woodland is found adjacent to a wet meadow riparian corridor. The overhead vegetation cover above the candidate tree is 20%.			Yes
542	19, 20	15.22	This is a lowland deciduous maple-beech dominated forest, determined to have relatively weak candidate trees because there are many young trees, and the large trees which exist are very healthy. Some snags are present, but most are very small or without holes, cracks or exfoliating bark. Canopy cover is dense. There is one candidate tree, which is a large dying black cherry.			Yes
524	21, 22	3.05	AECOM's ELC information indicates this is a dry-			Yes

			fresh sugar maple deciduous forest with abundant trees 25-50cm DBH and rarely occurring trees >50cm DBH. No snags were noted. NRSI identified a suitable candidate tree which is a large, living basswood 10m into the woodlot. It contains a large cavity ~ 3m long, which begins at ground level. The DBH of this tree is ~70cm.			
510	Alt1, 23	41.52	This woodland is a young to middle-age deciduous forest, containing a variety of maple species. Several snags were noticed, however, at the time of assessment in June 2011 the quantity was estimated to be insufficient to compare to new information obtained part-way through the field season regarding the quantity of snags required per ha.			No
492	24	1.42		3	40.00	Yes
483	Alt2	6.88	AECOM's ELC information indicates this feature contains deciduous swamp and fresh-moist sugar maple –hardwood deciduous forest. Abundant trees 25-50cmDBH were recorded in both areas, with at least rarely occurring trees >50cm DBH as well. Abundant snags and cavities were also noted. NRSI identified a suitable candidate tree, which is a live silver maple, ~1m dbh. One large branch has snapped off, and the tree has a crack and hollow. The hollow is 3m above the ground, 15-20cm wide at its widest, with an opening 1m in length.			Yes
470	25	1.50		10	12.00	Yes
460	30	18.98		27	5.93	No
437	Alt3	5.31	AECOM's ELC indicates this is a swamp maple deciduous swamp, also containing green ash. It was noted that there were occasional trees 25- 50cm DBH. NRSI identified two suitable candidate trees within 15m of each other, including two large silver maples (<i>Acer saccharinum</i>) with dead branches, exfoliating bark, woodpecker holes, and enclosed cavities. The overhead vegetation cover is 40%.			Yes
534	32,33	51.79	AECOM's ELC information indicates this is a mid- age to mature sugar maple deciduous forest as well			Yes

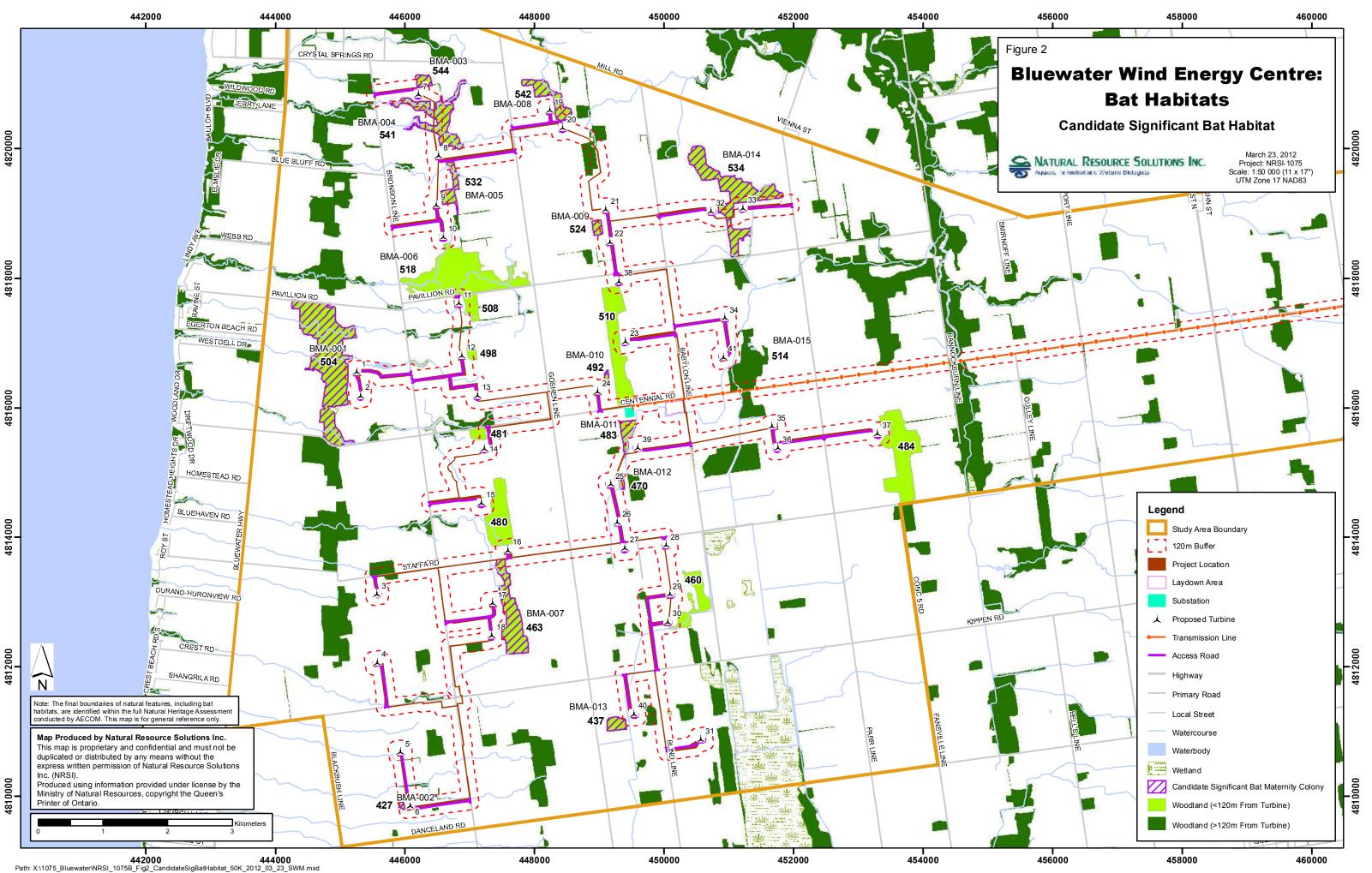
	07	50.40	as mature red maple swamp. The feature contains occasional to abundant trees 25-50cm DBH and rare to occasional trees >50cm DBH. Rarely occurring snags 25-50cm DBH were also noted. NRSI identified that this woodland contains several weaker candidates and one good candidate. Two weak candidate snags are found adjacent to each other. One is 10m tall, and the other 20m tall. Both are 20-30cm dbh and contain many woodpecker holes up to 5cm wide and exfoliating bark. Two additional weak candidate snags abut one another. One is 20m in height, and the other 1.5m in height. The taller has no cavities, but contains some exfoliating bark. The shorter has a large cavity at the top of it. Both are 25-30cm dbh. A single good candidate tree is a large (~70cm dbh) beech snag, which is ~30m tall with a large cavity 3m from the ground and some exfoliating bark.	24	5.00	Na
484	37	50.19		24	5.83	No

Wildlife Habitat ID	Feature ID	Size (ha)	Composition	Attributes	Functions	Distance to Wind Turbine (blade tip)	Figure	EOS Required (Y/N)
BMA-001	504	92.53	<i>Acer saccharum</i> (sugar maple) – <i>Fagus grandifolium</i> (American beech) forest.	Contains a large sugar maple located approximately 20m in from the edge of the woodland. It is approximately 100 cm DBH and contains a large cavity. The overhead vegetation cover is 80% in this location.	Habitat for bat maternity colonies	84m (Turbine 1)	2	Yes
BMA-002	427	0.73	Dominant <i>Fraxinus</i> sp. (ash species). Abundant <i>Acer saccharum</i> (sugar maple).	10.00 wildlife trees per hectare	Habitat for bat maternity colonies	43m (Turbine 6)	2	Yes
BMA-003	544	3.79	Dominant <i>Fraxinus</i> <i>americana</i> (white ash). Occasional <i>Ostrya virginiana</i> (ironwood), <i>Acer saccharum</i> (sugar maple), <i>Tilia</i> <i>americana</i> (basswood), and <i>Fagus grandifolia</i> (American beech).	15.56 wildlife trees per hectare	Habitat for bat maternity colonies	73m (Turbine 7)	2	Yes
BMA-004	541	29.65		Contains a willow snag in a very open clearing, which is largely hollow. It also has exfoliating bark and woodpecker holes. The snag is located 7m north of a creek running through the woodland.	Habitat for bat maternity colonies	43m (Turbine 7)	2	Yes
BMA-005	532	8.68		Contains an area with several maple (Acer	Habitat for	53m	2	Yes

Table 6. Summary of Candidate Significant Bat Maternity Colonies within 120m of Wind Turbines in the Bluewater Wind Energy Centre

				sp.) and American beech snags which are 4-15m in height, and 20-40cm dbh. There are a few weaker candidate snags within 30m of this group as well.	bat maternity colonies	(Turbine 9)		
BMA-007	463	32.01	This woodland contains basswood (<i>Tilia americana</i>) and hickory (<i>Carya</i> sp.).	Contains a candidate tree is found on the edge of the woodland, which is a dead elm snag. This edge of the woodland is found adjacent to a wet meadow riparian corridor. The overhead vegetation cover above the candidate tree is 20%.	Habitat for bat maternity colonies	80m (Turbine 16)	2	Yes
BMA-008	542	15.22	This is a lowland deciduous maple-beech dominated forest, determined to have relatively weak candidate trees because there are many young trees, and the large trees which exist are very healthy. Some snags are present, but most are very small or without holes, cracks or exfoliating bark. Canopy cover is dense.	Contains one candidate tree, which is a large dying black cherry.	Habitat for bat maternity colonies	40m (Turbine 19)	2	Yes
BMA-009	524	3.05	Acer saccharum (sugar maple)-mixed hardwood deciduous forest.	Contains a candidate tree which is a large, living basswood 10m into the woodlot. It contains a large cavity ~ 3m long, which begins at ground level. The DBH of this tree is ~70cm.	Habitat for bat maternity colonies	110m (Turbine 22)	2	Yes

BMA-010	492	1.42	Abundant Acer saccharum (sugar maple). Occasional Fraxinus americana (white ash) and Acer rubrum (red maple). Rare Prunus serotina (black cherry) and Ostrya virginiana (ironwood).	40.00 wildlife trees per hectare	Habitat for bat maternity colonies	118m (Turbine 24)	2	Yes
BMA-011	483	6.88		Contains a live silver maple, ~1m dbh. One large branch has snapped off, and the tree has a crack and hollow. The hollow is 3m above the ground, 15-20cm wide at its widest, with an opening 1m in length.	Habitat for bat maternity colonies	94m (Turbine Alt2)	2	Yes
BMA-012	470	1.50	Dominant <i>Fraxinus</i> <i>americana</i> (white ash). Abundant <i>Ulmus americana</i> (white elm) and <i>Acer</i> <i>saccharum</i> (sugar maple).	12.00 wildlife trees per hectare	Habitat for bat maternity colonies	89m (Turbine 25)	2	Yes
BMA-013	437	5.31	Ash (<i>Fraxinus</i> sp.) swamp.	Contains two candidate trees within 15m of each other, including two large silver maples (<i>Acer saccharinum</i>) with dead branches, exfoliating bark, woodpecker holes, and enclosed cavities. The overhead vegetation cover is 40%.	Habitat for bat maternity colonies	91m (Turbine Alt3)	2	Yes
BMA-014	534	51.79		Contains a candidate tree which is a large (~70cm dbh) beech snag. It is ~30m tall with a large cavity 3m from the ground and some exfoliating bark.	Habitat for bat maternity colonies	39m (Turbine 33)	2	Yes



Feature ID	Criteria Rationale	Distance from Suitable Habitat to Nearest Project Component (m)	Generalized Candidate Significant Wildlife Habitat (Y/N)	EOS Required (Y/N)
426	This woodland was identified as a mid- aged, deciduous forest dominated by silver maple, ash and black walnut. Size class analysis unknown, however one cavity was noted.	0 (road and collection line)	Yes	Yes (Treat As Significant)
439	Mid-age deciduous forest containing ash and aspen in the canopy, with abundant trees 25-50cm DBH, but rarely occurring snags only at <25cm DBH. Abundance of appropriately sized trees which the potential to contain cavities suggests the habitat may be suitable for bat maternity colonies.	66 (road)	Yes	Yes (Treat As Significant)
442	Contains mineral cultural woodland (<60% canopy cover) which does not qualify. Also contains meadow and swamp thicket communities which do not qualify.	No Suitable Habitat	No	No
450	Contains coniferous plantation which does not qualify. Remainder is suitable dry-fresh sugar maple forest, mid-aged to mature. However, no trees or snags >25cm DBH were noted.	No Suitable Habitat	No	No
456	Contains suitable mature white ash- beech and sugar maple-dominated deciduous forest and green ash swamp. Suitably sized trees are snags are found throughout, with abundant trees 25-50cm DBH occurring particularly in the sugar-maple dominated component.	0 (road)	Yes	Yes (Treat As Significant)
459	Mid-aged green ash dominated lowland deciduous forest, however no trees or snags >25cm DBH were noted.	No Suitable Habitat	No	No
462	Contains suitable mid-aged fresh-moist green ash dominated lowland deciduous forest. Although one cavity was noted, there were no snags or trees >25cm DBH.	No Suitable Habitat	No	No
475	Suitable mid-aged dry-fresh sugar maple dominated deciduous forest. Abundant trees >25cm DBH and occasional >50cm DBH, as well as occasional snags >25cm DBH and rare snags >50cm DBH.	65 (collection line)	Yes	Yes (Treat As Significant)

Table 7. Assessment of Generalized Candidate Significant Wildlife Habitat

487	Contains coniferous plantation, which does not qualify. However it also contains suitable mature dry-fresh sugar maple forest, with abundant trees >25cm DBH and occasional >50cm, occasional snags >25cm DBH and rare >50cm.	15 (road and collection line)	Yes	Yes (Treat As Significant)
488	Contains mid-aged green ash deciduous swamp, and maple mineral deciduous swamp which could contain suitable habitat. Note the thicket portion, which is found within 120m of a proposed turbine, does not qualify for candidate bat maternity colony habitat.	18 (transmission line)	Yes	Yes (Treat As Significant)
490	Consists of coniferous plantation.	No Suitable Habitat	No	No
494	Contains fresh-moist willow lowland deciduous forest, containing some Freeman's maple (<i>Acer</i> x <i>freemanii</i>).	16 (transmission line)	Yes	Yes (Treat As Significant)
495	Contains some deciduous plantation. Note that swamp thicket also does not qualify.	No Suitable Habitat	No	No
496	Contains some deciduous plantation. Note that meadow marsh also does not qualify.	No Suitable Habitat	No	No
501	Consists of white pine coniferous plantation and black walnut deciduous plantation.	No Suitable Habitat	No	No
506	This feature contains mid-aged dry- fresh sugar maple deciduous forest, however this habitat is located >120m from the project location. Other habitats within this feature are not suitable candidates for bat maternity colonies.	No Suitable Habitat	No	No
512	Within 120m of the project location, contains fresh-moist lowland deciduous forest ecosite containing some Manitoba maple (<i>Acer negundo</i>). Mature trees (height category 1) noted. Some mixed swamp is also located within 120m of the project location, however this area in particular (within 120m) is represented by coniferous trees and as a result does not qualify.	5 (transmission line)	Yes	Yes (Treat As Significant)
514	Potentially suitable habitat is found within 120m of the project location in maple mineral deciduous swamp and sugar maple deciduous forest. Abundant trees 25-50cm DBH were noted, as well as occasional trees >50cm DBH.	3 (transmission line)	Yes	Yes (Treat As Significant)
520	Mature deciduous forest containing sugar maple and trembling aspen.	81 (transmission	Yes	Yes (Treat As

	Additional information was not able to be obtained due to the distance of the	line)		Significant)
	woodland from the roadside.			
525	Mid-aged dry-fresh sugar maple deciduous forest, however no trees or snags >25cm DBH were recorded.	No Suitable Habitat	No	No
537	Mature dry-fresh sugar maple-beech, sugar maple-basswood deciduous forest, and swamp maple deciduous swamp. Contains abundant trees 25- 50cm DBH and occasional trees >50cm DBH, as well as occasional snags both 25-50cm DBH and >50cm DBH.	0 (collection line)	Yes	Yes (Treat As Significant)
539	Contains mid-aged fresh-moist black walnut lowland deciduous forest, with some ash. There was no access to this property to confirm size class analysis.	22 (road)	Yes	Yes (Treat As Significant)
545	Mature dry-fresh sugar maple-beech deciduous forest. There was no access to this property to confirm size class analysis.	17 (road)	Yes	Yes (Treat As Significant)
551	Contains young to mid-aged white pine-black walnut mixed forest. It contains abundant trees >25cm DBH and rare trees >50cm DBH which could contain appropriate cavities.	19 (transmission line)	Yes	Yes (Treat As Significant)
552	Consists of cultural woodland containing some white ash trees, however there are only occasional trees 25-50cm DBH and no snags noted. FOD is also found within 120m of the transmission line and due to a lack of site access and the inability to see this from the property line, this polygon may contain candidate bat maternity colony habitat.	105 (transmission line)	Yes	Yes (Treat As Significant)
553	Consists of Scots pine (<i>Pinus</i> sylvestris) coniferous plantation.	No Suitable Habitat	No	No
555	Fresh-moist oak-maple-hickory deciduous forest, containing abundant trees 25-50cm DBH and rare trees >50cm DBH.	24 (transmission line)	Yes	Yes (Treat As Significant)
556	Dry-fresh sugar maple deciduous forest, containing abundant trees 25- 50cm DBH and rare trees >50cm DBH	0 (transmission line)	Yes	Yes (Treat As Significant)
561	Swamp maple mineral deciduous swamp and lowland deciduous forest. There was no access to this property to confirm size class analysis.	9 (transmission line)	Yes	Yes (Treat As Significant)
562	Contains fresh -moist lowland deciduous forest and swamp. None of	No Suitable Habitat	No	No

	the species listed in the stand description are preferred maternity roost trees.			
563	Consists of white spruce coniferous plantation.	No Suitable Habitat	No	No

4.3 Site Investigation Summary

NRSI did not identify any candidate bat hibernacula in the vicinity of the Bluewater Wind Energy Centre. However, 15 candidate significant bat maternity roost habitats were identified in woodlands found within 120m of wind turbines. These are summarized in Table 8 below. An additional 18 woodlands were identified as generalized candidate significant wildlife habitat for bat maternity roosts, as woodlands <120m from the project location (but >120m from a turbine) with the potential to contain a sufficient quantity of suitable roost trees.

Wildlife Habitat ID	Feature ID	Distance to Closest Turbine (from blade tip)	Evaluation of Significance Required (Y/N)
BMA-001	504	84 m (T1)	Yes
BMA-002	427	43 m (T6)	Yes
BMA-003	544	73 m (T7)	Yes
BMA-004	541	43 m (T7)	Yes
BMA-005	532	53 m (T9)	Yes
BMA-007	463	80 m (T16)	Yes
BMA-008	542	40 m (T19)	Yes
BMA-009	524	110 m (T22)	Yes
BMA-010	492	118 m (T24)	Yes
BMA-011	483	94 m (TAlt2)	Yes
BMA-012	470	89 m (T25)	Yes
BMA-013	437	91 m (TAlt3)	Yes
BMA-014	534	39 m (T33)	Yes

 Table 8. Summary of Candidate Bat Habitats within 120m of the Bluewater Wind Energy

 Centre

5.0 Evaluation of Significance

In accordance with the REA Regulation, NRSI biologists conducted field surveys to evaluate the significance of the 15 candidate bat maternity colonies identified as part of the site investigation. The evaluation of significance followed bat monitoring protocol that was current at the time of the field investigations, *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR 2010b).

5.1 Evaluation of Significance Methods

5.1.1 Staff Roles

The requirements of the REA process indicate that the name and qualifications of all staff participating in the evaluation of significance should be included. As a result, the qualifications and roles of all staff participating in the evaluations of significance at the Bluewater Wind Energy Centre have been outlined in the following sections.

Qualifications of staff who also assisted in the site investigation are listed in Section 4.1.

Andrew G. Ryckman, B.Sc.

Andrew's role in the project was to act as the project manager, overseeing all aspects of the evaluation of significance, including all associated field work and reporting. Andrew reviewed photos and habitat descriptions of potentially significant habitats, provided quality assurance screening for species identification of recorded calls, and provided input into determinations of significance.

Christy Humphrey, B.E.S.

Christy organized field work to be conducted for the evaluation of significance, and conducted evening visual surveys and set up and maintained equipment for through-the-night surveys. Christy also interpreted the results of surveys to determine significance, and reported the results for the evaluation of significance.

Alyson Smith, B.A.

Alyson Smith was an undergraduate student in Geography at Wilfred Laurier University when she completed her co-operative education term with NRSI in the summer of 2010. She has since completed her degree in Arts (2011). During her time with NRSI, she worked as a Field Technician, participating in a wide variety of field work from habitat assessment to wildlife surveys.

Alyson conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Andrew Dean, B.E.S.

Andrew conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Ashley Nathan, M.S.

Ashley conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Brett Kibbler

Brett worked as a Field Technician for NRSI and is familiar with acoustic bat monitoring equipment.

Brett assisted with evening visual surveys, and set up and maintained equipment for through-the-night surveys.

Brian Watson, F.W.T.

Brian conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Brydon MacVeigh, F.W.T.

Brydon is a Field Biologist with over 3 years of work experience in the environmental field. His areas of expertise are aquatic Species At Risk and fish community assessments, but he also has experience with terrestrial related functions. Brydon has experience conducting Ecological Land Classification, turtle surveys, and salamander and anuran trapping surveys.

Gina conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Carolyn Knapper, F.W.T.

Carolyn conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Charlotte Moore, B.E.S.

Charlotte conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Gina MacVeigh, F.W.T.

Gina is a Field Biologist with over 5 years of work experience in the environmental field. Her areas of expertise are fish habitat surveys, aquatic habitat mapping, and fish community assessments, but she also has experience with terrestrial surveys. Gina has conducted bat mortality surveys around operational turbines, winter moose habitat surveys, deer habitat and movement surveys, vegetation inventories, salamander and anuran trapping surveys, and habitat assessments and tagging of turtle Species at Risk. Gina conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

W. Graham Wright, B.E.S.

Graham is a Terrestrial and Wetland Biologist and a recent graduate of the University of Waterloo with a Bachelor of Environmental Studies. He has a combined year of experience working both as a field technician and as an Information Officer working with protected areas and Species At Risk in Ontario. He has also participated in various terrestrial and aquatic environmental monitoring projects.

Graham analyzed both abundance and species data obtained through evaluation of significance surveys.

Julia Lawler, B.E.S. Candidate 2012

Julia conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Kaitlin N. Powers, B.E.S.

Kaitlin conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Katherine Clapham, F.W.T.

Katherine conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Katherine St. James, M.Sc.

Katherine is a Terrestrial and Wetland Biologist with more than 3 years of experience working in the environmental field. She specializes in environmental sciences, ecology, and bio-geographical studies, and completed her master's research on potential barrier effects on salamander populations. During her master's research and consulting experience, Katherine has routinely conducted ecological assessments and collected field information on vegetation, birds, amphibians, and other wildlife species throughout Ontario.

Katherine analyzed both abundance and species data obtained through evaluation of significance surveys.

Megan Anevich, B.E.S. Candidate 2012

Megan Anevich is an undergraduate student at the University of Waterloo completing her degree in Environment and Resource Studies. During her cooperative education term with NRSI, she worked as a Field Technician, participating in a wide variety of field work from habitat assessment to wildlife surveys. Megan conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Patrick Deacon, B.E.S.

Patrick is a Terrestrial Biologist with 4 years of environmental consulting experience. He regularly conducts vegetation inventories and community mapping, and specializes in ecological restoration with particular focus on Species At Risk, tallgrass prairie ecosystems, and invasive species management. He also has experience conducting a variety of wildlife studies, including birds and mammals.

Patrick conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

Tara Lessard, B.Sc.

Tara conducted evening visual surveys and set up and maintained equipment for through-the-night surveys.

5.1.2 Evaluation Dates

In accordance with the REA Regulation, NRSI recorded dates, times, duration, and weather conditions during each evaluation of significance. This information has been summarized in the following table, and detailed in Appendix II. Detailed descriptions of staff roles and qualifications can be found in Section 5.1.1 of this report, and detailed field forms have been appended to this report.

Purpose	urpose General Methods		Feature ID	Station	Date	Start & End Time	Duration	Staff
	Acoustic Through- the-night Monitoring: Station Maintenance	BMA-007	463	BAT-004	June 2, 2010	11:15 – 20:10	8hrs 55 minutes	AGR, ACN
	Evening Visual Survey	BMA-007	463	BAT-004		20:57 – 22:30	1hr 33 minutes	
	Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey	BMA-007	463	BAT-004	June 3, 2010	21:15 – 22:50	1 hr 35 minutes	AGR, ACN
Quantitative assessment of bats at candidate	Acoustic Through- the-night Monitoring: Station Maintenance	BMA-008	542	BAT-008	June 4, 2010	13:09 – 14:30	1 hr 21 minutes	ACN
maternity roosts	Evening Visual Survey	BMA-008	542	BAT-008	June 6, 2010	22:18 – 23:52	1hr 34 minutes	ACN, PWD
	Evening Visual Survey	BMA-007 BMA-008	463 542	BAT-004 BAT-008	June 7, 2010	21:14 - 00:26	3hrs 12 minutes	ACN, PWD
	Evening Visual Survey	BMA-007 BMA-008	463 542	BAT-004 BAT-008	June 8, 2010	21:20 – 00:02	2 hrs 42 minutes	PWD, MA, ACN
	Evening Visual Survey	BMA-008	542	BAT-008	June 9, 2010	21:06 – 21:16	10 minutes	ACN, BK
	Acoustic Through- the-night Monitoring: Station Maintenance	BMA-007 BMA-008	463 542	BAT-004 BAT-008	June 10, 2010	10:40 – 20:15	9 hrs 25 minutes	ACN, BK, MA
	Evening Visual Survey	BMA-007 BMA-008	463 542	BAT-004 BAT-008	2010	20:45 – 00:05	3 hrs 20 minutes	ACN, BK
	Evening Visual	BMA-007	463	BAT-004	June 13,	21:51 – 00:08	2 hrs 17	ACN, BK

Table 9. Evaluation of Significance Survey Summary

Survey	BMA-008	542	BAT-008	2010		minutes	
Acoustic Through- the-night Monitoring: Station Maintenance	BMA-008	542	BAT-008	June 14,	14:00 – 14:30	30 minutes	ВК
Evening Visual Survey	BMA-007 BMA-008	463 542	BAT-004 BAT-008	2010	21:14 – 00:16	3 hrs 2 minutes	ACN, BK
Evening Visual Survey	BMA-007 BMA-008	463 542	BAT-004 BAT-008	June 15, 2010	20:53 – 23:58	3 hrs 5 minutes	ACN, BK
Acoustic Through- the-night Monitoring: Station	BMA-007	463	BAT-004	June 16,	13:07 – 13:37	30 minutes	
Maintenance Evening Visual Survey	BMA-007 BMA-008	463 542	BAT-004 BAT-008	2010	21:01 – 00:03	3 hrs 2 minutes	ACN, BK
Acoustic Through- the-night Monitoring: Station Maintenance	BMA-008	542	BAT-008	June 18, 2010	12:15 – 14:15	4 hrs	PWD, BK
Acoustic Through- the-night Monitoring: Station Maintenance	BMA-007 BMA-008	463 542	BAT-004 BAT-008	June 21, 2010	11:05 – 14:15	3 hrs 10 minutes	ACN, PWD
Acoustic Through- the-night Monitoring: Station Maintenance	BMA-013 BMA-009	437 524	BAT-010 BAT-012	June 9, 2011	12:00 – 12:30, 17:45 – 18:15	60 minutes	CLH, JHL
Evening Visual Survey	BMA-013 BMA-009	437 524	BAT-010 BAT-012	,	22:55 – 23:00, 00:05 – 00:10	10 minutes	,
Evening Visual Survey	BMA-013 BMA-009	437 524	BAT-010 BAT-012	June 10, 2011	20:33 – 20:43 21:56 – 22:06	20 minutes	CLH, JHL
Evening Visual Survey	BMA-013 BMA-009	437 524	BAT-010 BAT-012	June 13, 2011	21:26 – 22:29	57 minutes	JHL, BWW
Acoustic Through- the-night	BMA-013 BMA-009	437 524	BAT-010 BAT-012	June 14, 2011	13:30 – 14:30	60 minutes	JHL, BWW

Monitoring: Station	1 1				23:20 - 00:20	60 minutes	
Maintenance	BMA-013	437	BAT-010		23.20 - 00.20	00 minutes	
	BMA-009	524	BAT-012				
Evening Visual		0_ .					
Survey							
Evening Visual	BMA-013	437	BAT-010	June 15,	23:38 - 00:30	52 minutes	JHL, BWW
Survey	BMA-009	524	BAT-012	2011			,
Evening Visual	BMA-009	524	BAT-012	June 16,	00:05 - 00:15	10 minutes	JHL, BWW
Survey				2011			
Evening Visual	BMA-013	437	BAT-010	June 17,	21:10 - 22:00	50 minutes	BWW, KTC
Survey	BMA-009	524	BAT-012	2011			, -
Acoustic Through- the-night	BMA-013	437	BAT-010				
Monitoring: Station	BMA-009	524	BAT-012		16:20 – 17:30	1hr 10 minutes	BWW, KTC
Maintenance	2	02.	2,11 012	June 18,	10.20 11.00		
	BMA-013	437	BAT-010	2011	21:15 – 21:55	40 minutes	
Evening Visual	BMA-009	524	BAT-012				BWW, KNP
Survey							
Evening Visual	BMA-013	437	BAT-010	June 19,	21:49 – 22:46	57 minutes	KTC, AMD
Survey	BMA-009	524	BAT-012	2011			
Acoustic Through-	BMA-004	541	BAT-011				
the-night Monitoring: Station	BMA-001	504	BAT-014			1 hr 33	
Maintenance			D A T A (A	June 20,	18:27 – 20:00	minutes	
	BMA-013	437	BAT-010	2011			TAL, AMD
	BMA-009	524	BAT-012		21:32 – 00:36	3 hrs 4	
Evening Visual	BMA-004	541	BAT-011			minutes	
Survey	BMA-001	504	BAT-014				
Acoustic Through- the-night	BMA-011	483	BAT-013				
Monitoring: Station			DAT ALL			28 minutes	
Maintenance	BMA-013	437	BAT-010	June 21,	18:17 – 18:45		TAL 110
	BMA-004	541	BAT-011	2011	04.00 00.04	2 hrs 29	TAL, AMD
	BMA-009	524	BAT-012	-	21:02 – 23:31	minutes	
Evening Visual	BMA-011	483	BAT-013				
Survey	BMA-001	504	BAT-014				
Acoustic Through-	BMA-013	437	BAT-010	June 22,	12:19 – 18:30	6 hrs 11	
the-night Manitaring: Station	BMA-004	541	BAT-011	2011		minutes	TAL, KTC
Monitoring: Station	BMA-009	524	BAT-012		23:13 – 00:04		

Maintenance	BMA-001	504	BAT-014			51 minutes	
Evening Visual Survey	BMA-013 BMA-009	437 524	BAT-010 BAT-012				
Acoustic Through- the-night Monitoring: Station	BMA-011 BMA-014	483 534	BAT-013 BAT-016	June 23,	17:37 – 21:15	2 hrs 38 minutes	TAL, KNP, AGR
Evening Visual Survey	BMA-004 BMA-011	541 483	BAT-011 BAT-013	2011	21:29 – 23:37	2 hrs 8 minutes	TAL, KNP
Evening Visual Survey	BMA-011 BMA-001 BMA-005	483 504 532	BAT-013 BAT-014 BAT-017	June 24, 2011	21:11 – 00:07	2 hrs 6 minutes	TAL, KNP
Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey	BMA-004 BMA-001 BMA-005 BMA-004 BMA-011 BMA-001 BMA-005	541 504 532 541 483 504 532	BAT-011 BAT-014 BAT-017 BAT-011 BAT-013 BAT-014 BAT-017	June 25, 2011	15:15 – 17:40 20:45 – 23:42	2 hrs 25 minutes 2 hrs 57 minutes	TAL, KNP
Evening Visual Survey	BMA-005	532	BAT-017	June 26, 2011	23:45 – 23:55	10 minutes	KNP, AMD
Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey	BMA-011 BMA-004 BMA-011 BMA-001 BMA-005	483 541 483 504 532	BAT-013 BAT-011 BAT-013 BAT-014 BAT-017	June 27, 2011	20:40 – 20:50 20:50 – 23:36	10 minutes 2 hrs 46 minutes	KNP, IAR
Acoustic Through- the-night Monitoring: Station Maintenance	BMA-004 BMA-005 BMA-004 BMA-011	541 532 541 483	BAT-011 BAT-017 BAT-011 BAT-013	June 30, 2011	19:50 – 21:00 21:05 – 23:43	1 hr 10 minutes 2 hrs 38 minutes	CTK, KNP
	Evening Visual Survey Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey Evening Visual Survey Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey Evening Visual Survey Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey Acoustic Through- the-night Monitoring: Station	Evening Visual SurveyBMA-013 BMA-009Acoustic Through- the-night Monitoring: Station MaintenanceBMA-011 BMA-014Evening Visual SurveyBMA-011 BMA-011Evening Visual SurveyBMA-011 BMA-001 BMA-001 BMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004 BMA-004 BMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004 BMA-004 BMA-005Evening Visual SurveyBMA-004 BMA-005Evening Visual SurveyBMA-004 BMA-005Evening Visual SurveyBMA-005Evening Visual SurveyBMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004 BMA-001 BMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004 BMA-004 BMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004 BMA-004 BMA-004 BMA-005	Evening Visual SurveyBMA-013 BMA-009437 524Acoustic Through- the-night MaintenanceBMA-011483 BMA-014Monitoring: Station MaintenanceBMA-014534Evening Visual SurveyBMA-011483 BMA-011Evening Visual SurveyBMA-001504 BMA-001Evening Visual SurveyBMA-001504 BMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004541 BMA-005Evening Visual SurveyBMA-004541 BMA-005Evening Visual SurveyBMA-004541 BMA-005Evening Visual SurveyBMA-004541 BMA-005Evening Visual SurveyBMA-005532Evening Visual SurveyBMA-005532Evening Visual SurveyBMA-001504 BMA-001Evening Visual SurveyBMA-005532Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004541 BMA-001BMA-001504 BMA-005532Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004541 BMA-005BMA-005532BMA-004541 BMA-005BMA-004541 BMA-005BMA-004541 BMA-005BMA-004541 BMA-005BMA-004541 BMA-005BMA-004541 BMA-005BMA-004541 BMA-005BMA-004541 BMA-005BMA-004541 BMA-005BMA-001504 BMA-005532Acoustic Through-	Evening Visual SurveyBMA-013 BMA-009437 524BAT-010 BAT-012Acoustic Through- the-night Monitoring: Station MaintenanceBMA-011 BMA-014483 534BAT-013 BAT-016Evening Visual SurveyBMA-011 BMA-011483 483BAT-013 BAT-013Evening Visual SurveyBMA-011 BMA-011483 483BAT-013 BAT-013Evening Visual SurveyBMA-001 BMA-001504 504 BAT-017BAT-011 BAT-011 BMA-005Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004 BMA-001541 504 BAT-017BAT-017Evening Visual SurveyBMA-004 BMA-001541 S04 BAT-011 BMA-005BAT-011 BAT-011 BMA-005BAT-011 BAT-011 BMA-005Evening Visual SurveyBMA-004 BMA-005532 S22 BAT-017BAT-011 BMA-011 BMA-001 S04 BAT-013 BAT-017Evening Visual SurveyBMA-005 BMA-005532 S22 BAT-017Acoustic Through- the-night Monitoring: Station MaintenanceBMA-004 BMA-001 S04 BMA-001 S32 BAT-013BAT-013 BAT-011 BMA-011 483 BAT-013 BAT-013Evening Visual SurveyBMA-004 BMA-005 S32 BAT-017BAT-011 BAT-011 BMA-011 483 BAT-013BAT-013 BAT-013Evening Visual SurveyBMA-004 BMA-005 S32 BAT-017BAT-011 BAT-011 BMA-005 S32 BAT-017BAT-011 BAT-011 BMA-011 A83 BAT-013	Evening Visual Survey BMA-013 BMA-009 437 524 BAT-010 BAT-012 Acoustic Through- the-night Monitoring: Station Maintenance BMA-011 483 BMA-014 BAT-013 534 June 23, 2011 Evening Visual Survey BMA-011 483 BMA-011 BAT-013 483 June 23, 2011 Evening Visual Survey BMA-011 483 BMA-011 BAT-013 483 June 24, 2011 Evening Visual Survey BMA-004 541 BMA-005 BAT-014 504 BAT-017 June 24, 2011 Acoustic Through- the-night Monitoring: Station Maintenance BMA-004 541 BMA-005 BAT-011 504 BAT-017 June 25, 2011 Evening Visual Survey BMA-004 541 BMA-005 BAT-013 Survey June 25, 2011 Evening Visual Survey BMA-004 541 BMA-005 BAT-017 June 26, 2011 Evening Visual Survey BMA-001 504 BMA-001 BAT-013 June 26, 2011 Acoustic Through- the-night Monitoring: Station Maintenance BMA-001 541 BMA-001 BAT-013 June 27, 2011 Acoustic Through- the-night Monitoring: Station Maintenance BMA-004 541 BMA-005 BAT-017 June 27, 2011 <td< td=""><td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td><td>Evening Visual Survey BMA-013 BMA-009 437 524 BAT-010 BAT-012 Image: Construct of the system and the system of the system</td></td<>	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Evening Visual Survey BMA-013 BMA-009 437 524 BAT-010 BAT-012 Image: Construct of the system and the system of the system

Survey	BMA-005	532	BAT-017				
Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual	BMA-001 BMA-004 BMA-011 BMA-001 BMA-005	504 541 483 504 532	BAT-014 BAT-011 BAT-013 BAT-014 BAT-017	July 1, 2011	14:10 – 14:50 21:07 – 23:42	40 minutes 2 hrs 35 minutes	KNP, KTC
Survey Acoustic Through- the-night Monitoring: Station Maintenance	BMA-011	483	BAT-013	July 2, 2011	15:10 – 15:30	20 minutes	GKM, BM
Evening Visual Survey	BMA-004 BMA-011 BMA-001 BMA-005	541 483 504 532	BAT-011 BAT-013 BAT-014 BAT-017	July 4, 2011	21:40 – 00:10	2 hrs 30 minutes	CM, KNP
Acoustic Through- the-night Monitoring: Station Maintenance Evening Visual Survey	BMA-005 BMA-004 BMA-011 BMA-001 BMA-005	532 541 483 504 532	BAT-017 BAT-011 BAT-013 BAT-014 BAT-017	July 5, 2011	14:05 – 14:30 21:43 – 00:12	25 minutes 2 hrs 29 minutes	CM, KNP
Acoustic Through- the-night Monitoring: Station Removal Evening Visual Survey	BMA-004 BMA-011 BMA-001 BMA-004 BMA-001 BMA-005	541 483 504 541 504 532	BAT-011 BAT-013 BAT-014 BAT-011 BAT-014 BAT-017	July 6, 2011	12:10 – 14:30, 20:00 – 20:30 21:30 – 22:37	2 hrs 20 minutes, 30 minutes 1 hr 7 minutes	CM, KNP
Acoustic Through- the-night Monitoring: Station Removal Evening Visual Survey	BMA-005 BMA-005	532 532	BAT-017 BAT-017	July 7, 2011	20:50 – 21:00 21:00 – 21:10	10 minutes 10 minutes	KNP, AMD

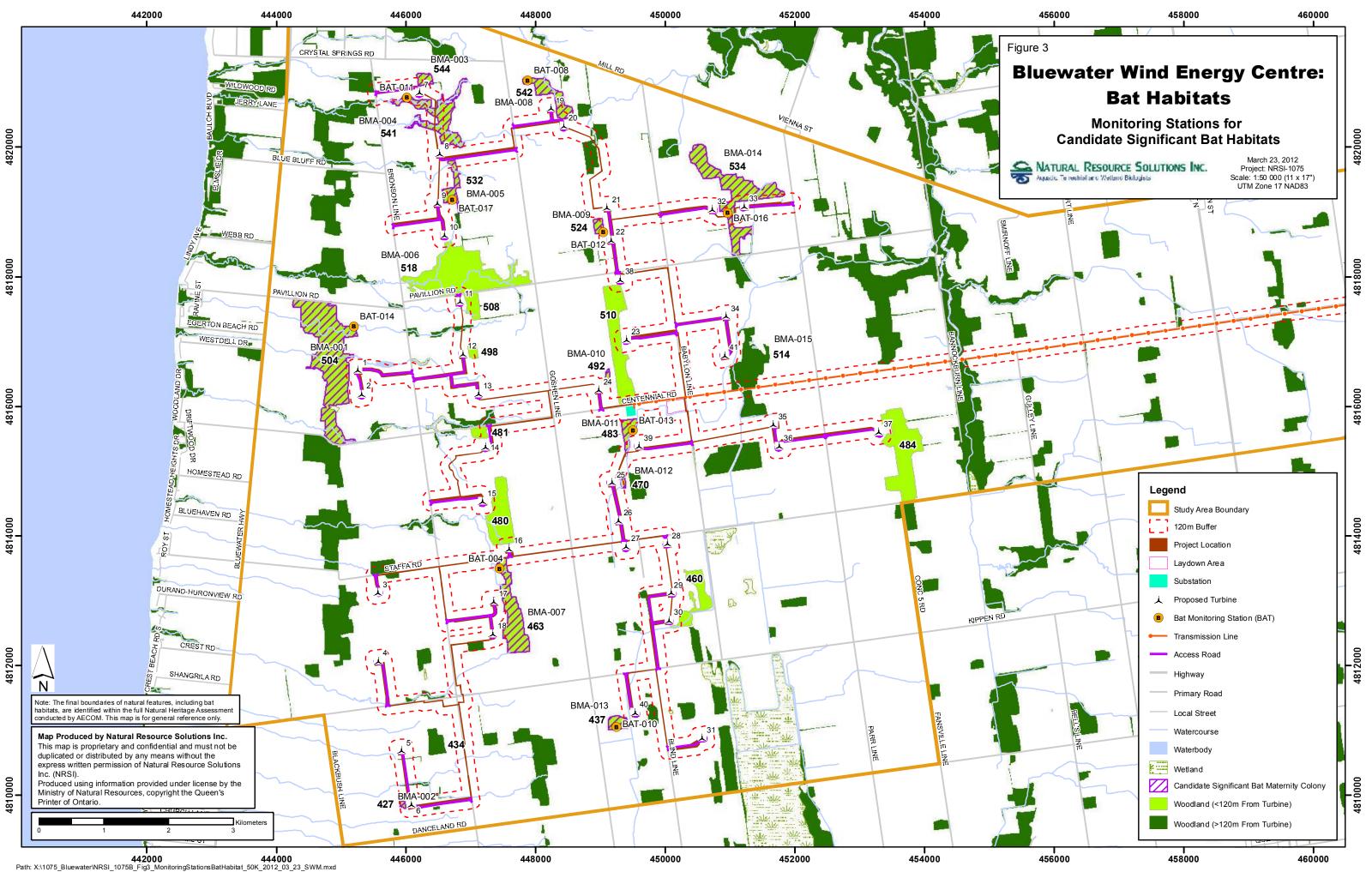
5.1.3 Evaluating Bat Maternity Colonies

5.1.4 Through-the-Night Acoustic Bat Monitoring

According to the 2010 guidance document *Bats and Bat Habitats: Guidelines for Wind Power Projects* (OMNR 2010), NRSI biologists conducted through-the-night acoustic bat monitoring at 12 locations in woodlands within 120m of proposed wind turbines in 2010 and 2011 (see Figure 3). The guidance document indicates that monitoring should be conducted beginning at dusk and continuing for 5 hours. NRSI conducted this monitoring on a total of 25 and 29 nights for 2010 and 2011 respectively, totaling more than 1070 hours of monitoring data. In 2010 monitoring began on the night of June 2/3 and lasted through the night of June 26/27. In 2011 monitoring began on the night of June 09/10 and lasted through the night of July 6/7. On some of the monitoring nights, monitoring occurred at more than one station on the same night, contributing to an overall 52 and 73 nights of monitoring, respectively. Detailed information on monitoring effort can be seen in Appendix I. While monitoring was typically conducted for more than 5 hours each night, the data was analyzed using the results from dusk until 5 hours after (2000–0100hrs).

On each monitoring night, a Pettersson D240X ultrasound bat detector was paired with a portable computer to record all bat activity. This monitoring system was powered by gel deep cycle batteries and left to record between 2-5 nights of data at a time. The portable computer recorded wave files at a moderate sampling rate of 22.2 kHz/sec, which typically provides ample sonogram resolution to identify the call sonograms of Ontario's bat species.

Each passive monitoring station was designed to record both Heterodyne and Time Expansion data simultaneously to allow for a full analysis of activity in the vicinity of monitoring stations. Although Time Expansion records broadband data, the Heterodyne setting typically records narrowband data within approximately 5kHz of the recording frequency. Based on call frequencies of Ontario bat species, a recording frequency of 35kHz was chosen to provide the most accurate representation of bat abundance through the study area. Representative calls of all of Ontario's bat species demonstrate that at least some of the call will overlap with the 30-40kHz detectable range. It is



possible that some distant or uncharacteristic calls were not picked up by the Heterodyne recordings, however when paired with the broadband recordings of the Time Expansion data, this data is expected to give an accurate representation of the bat activity and species found at each monitoring station.

5.1.5 Visual Bat Surveys

In addition to the passive monitoring described above, active visual and acoustic monitoring was undertaken to establish if any snags monitored may contain bat maternity colonies. These surveys occurred at a total of 2 and 6 locations in 2010 and 2011, respectively, and were conducted 18 and 62 times during the 2010 and 2011 monitoring seasons. Visual surveys were conducted at the same location as through-the-night acoustic monitoring stations, and can be seen on Figure 3. Visual surveys were not conducted at BMA-014 (BAT-016) as a result of a change in site investigation criteria used shortly after the station was set up. Surveys were conducted between sunset and midnight, and consisted of ten minute surveys at each point count location. During each survey, the observer used the manual trigger setting of the Pettersson D240X ultrasound detector, paired with an audio recorder, to record bat calls while listening to and observing the total number of bat passes during the survey.

The Heterodyne and species data collected from these visual monitoring surveys have been analyzed separately from the data collected from through-the-night acoustic monitoring.

Wildlife Habitat ID	Feature ID	Station	Woodland Composition	Wildlife Tree Characteristics
BMA-001	504	BAT-014	Acer saccharum (sugar maple) – Fagus grandifolium (American beech) forest.	A large sugar maple located approximately 20m in from the edge of the woodland. It is approximately 100 cm DBH and contains a large cavity. The overhead vegetation cover is 80%.
BMA-004	541	BAT-011		A willow snag in a very open clearing, which is largely hollow. It also has exfoliating bark and woodpecker holes. The snag is located 7m north of a creek running

Table 10.	Bat Monitoring	Conducted at the	Bluewater Wind	Enerav Centre
	Bat monitoring	oonaaotoa at tho	Bidomator mina	

				through the woodland.
BMA-005	532	BAT-017		Contains an area with several maple (<i>Acer</i> sp.) and American beech snags which are 4-15m in height, and 20-40cm dbh. There are a few weaker candidate snags within 30m of this group as well.
BMA-007	463	BAT-004	Deciduous woodland containing basswood (<i>Tilia americana</i>) and hickory (<i>Carya</i> sp.).	A dead elm found on the edge of the woodland. The edge is adjacent to a wet meadow riparian corridor. The overhead vegetation cover above the candidate tree is 20%.
BMA-008	542	BAT-008	This is a lowland deciduous maple- beech dominated forest.	A large dying black cherry.
BMA-009	524	BAT-012	Acer saccharum (sugar maple)-mixed hardwood deciduous forest.	A large, living basswood 10m into the woodlot. It contains a large cavity ~ 3m long, which begins at ground level. The DBH of this tree is ~70cm.
BMA-011	483	BAT-013		A live silver maple, ~1m dbh. One large branch has snapped off, and the tree has a crack and hollow. The hollow is 3m above the ground, 15-20cm wide at its widest, with an opening 1m in length
BMA-013	437	BAT-010	Ash (<i>Fraxinus</i> sp.) swamp.	Station set up at one of two large diameter candidate silver maples within 15m of each other. The east tree was monitored; it has one large dead limb, with exfoliating bark, woodpecker holes, and a cavity. This tree was monitored because its cavity is enclosed at the top (the neighbouring tree has a hollow limb which is broken off at the top, leaving it exposed).
BMA-014	534	BAT-016		A large (~70cm dbh) American beech snag. It is ~30m tall with a large cavity 3m from the ground and some exfoliating bark.

Table 11. Bat Habitat Evaluation of Significance Criteria

Concentration Area	Standards of Significance
Bat Maternity Colony	- Significant maternity colonies include at least 20 northern long- eared bats (<i>Myotis septentrionalis</i>) or little brown bats (<i>Myotis lucifugus</i>), 10 big brown bats (<i>Eptesicus fuscus</i>), or 5 adult, female, silver-haired bats (<i>Lasionycteris noctivagans</i>) (OMNR 2011a).
	NRSI has used acoustic monitoring passage rates of 1.0 passes/hr, 2.0 passes/hr and 4.0 passes/hr to represent baseline values for candidate SWH. These values roughly correspond to a maximum of 5, 10 or 20 individual bats per night (1.0 passes/hr, 2.0 passes/hr or 4.0 passes/hr through 5 hours of flight time). These values of 5, 10 and 20 individual bats will assist with the identification of significant bat maternity colony habitat for silver-haired bats (<i>Lasionycteris noctivagans</i>) and the two most common bat species in Ontario, big brown bat (<i>Eptesicus fuscus</i>), and little brown bat (<i>Myotis lucifugus</i>), respectively. As northern long-eared bats tend to be identified less frequently, NRSI has used the identification of 20 or more calls of the species recorded in a single night of acoustic monitoring, or during a 10-mintue visual survey, to represent a maximum of 20 individuals present at a station.

5.2 Pre-Construction Evaluation of Significance Survey Methodology

As a result of site investigations which were completed after the end of the 2011 bat monitoring period, NRSI has identified an additional 5 woodlands that were identified as having suitable habitat for a bat maternity colony, but could not be evaluated for significance during the appropriate monitoring season. For the purposes of this report, NRSI has treated these habitats as significant with the commitment to conduct pre-construction monitoring within these habitats to confirm whether these features are significant. Pre-construction monitoring will be conducted in accordance with the July 2011 *Bat and Bat Habitats* provincial guidelines, and results will be compared to the appropriate provincial standards discussed previously in this report. Any of these habitats determined to be significant will be subject to the potential impacts, mitigation measures, and follow-up monitoring programs outlined in Table 18. If any of these habitats are identified as being not significant when compared with provincial standards of significance, no specific mitigation measures are required, however generalized mitigation measures are recommended to be applied.

The features for which this pre-construction evaluation of significance survey will occur include BMA-002, BMA-003, BMA-010, BMA-012, and BMA-014.

Acoustic bat monitoring will occur at 10-30 candidate maternity colony trees in each candidate significant bat maternity colony habitat. Each tree will be surveyed once in June 2012 from one half hour before dusk until one hour after dusk to observe evidence of bats exiting. Monitoring will use high-powered spotlights and acoustic detectors to record species calls. Significant maternity colonies include at least 20 northern long-eared bats (*Myotis septentrionalis*) or little brown bats (*Myotis lucifugus*), 10 big brown bats (*Eptesicus fuscus*), or 5 adult, female, silver-haired bats (*Lasionycteris noctivagans*) (OMNR 2011a). The number of individuals observed exiting or entering candidate trees, combined with species recorded and their representation of total calls recorded at each tree, will be used to determine the number of individuals of each species utilizing a candidate tree.

The above monitoring program assumes that site access will be gained for each of the sites requiring monitoring. If site access cannot be granted, NRSI will discuss potential alternative evaluation methods to determine the significance of these habitats.

5.3 Evaluation of Significance Results

In accordance with the REA Regulation, the presence of candidate significant bat maternity colonies within the project area has been reviewed by NRSI biologists. NRSI has used the results of the site investigation to evaluate the significance of each of the candidate significant bat maternity colonies identified within the project area. This evaluation of significance has been conducted using evaluation criteria outlined in applicable guidance documents, including the Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000), and the Ecoregion Criteria Schedules addendum to the Significant Wildlife Habitat Technical Guide, for Ecoregion 6E (OMNR 2011a).

5.3.1 Bat Maternity Colonies

Bat maternity colonies are critical to the survival of local bat populations. These colonies are day roosts, inhabited specifically by females and juveniles, used for giving birth and raising young according to the Significant Wildlife Habitat Ecoregion Criteria Schedules for Ecoregion 6E (Draft, OMNR 2011a). Maternity colonies are located in both human

and natural formations. According to the 2011 Addendum to the SWHTG, maternity colonies can be found in tree cavities, vegetation and often in buildings. NRSI biologists have identified a total of 15 candidate significant bat maternity colonies located within 120m of the Bluewater Wind Energy Centre project location. The results of monitoring at each of these candidate bat maternity colonies which are within 120m of the project location are indicated below.

<u>BMA-001 (BAT-014)</u>

A total of 150 passes were recorded in 12 nights of acoustic monitoring at BAT-014. The number of passes recorded on a given night varied from 0 to 54. It had an overall passage rate of 2.91 passes/hour during the time period of 2200–0100hrs. The vast majority of bat calls (94%) were identified to the 30kHz range, which represents the call of either a big brown or a silver-haired bat. A total of 21 passes were recorded in 10 tenminute visual point count surveys, with the number of passes observed during point counts ranging from 0 to 6. This results in an average passage rate of 12.6 passes/hour. A total of 4 calls were recorded during visual surveys, all of which were identified to the 30kHz range (big brown or silver-haired bat).

BMA-004 (BAT-011)

A total of 100 passes were recorded in 9 nights of acoustic monitoring at BAT-009. The number of passes recorded on a given night varied from 0 to 29. It had an overall passage rate of 2.63 passes/hour during the time period of 22:00 – 01:00hrs. No species calls were obtained from acoustic monitoring at this station. A total of 43 passes were recorded in 10 ten-minute visual point count surveys, with the number of passes observed during point counts ranging from 0 to 22. This results in an average passage rate of 25.80 passes/hour. A total of 20 calls were obtained from visual surveys, 40% of which were identified as eastern red bat, and 30% of which were identified to the 30kHz range (big brown or silver-haired bat).

BMA-005 (BAT-017)

A total of 2 passes were recorded in 9 nights of acoustic monitoring at BAT-017, which were both recorded on the night of July 5, 2011. This results in an overall passage rate of 0.06 passes/hour during the time period of 22:00 – 01:00hrs. No species calls were obtained from acoustic monitoring at this station. One pass was recorded in 10 tenminute visual point count surveys. This results in an average passage rate of 0.60 passes/hour. No calls were obtained from visual surveys.

BMA-007 (BAT-004)

A total of 560 passes were recorded in 9 nights of acoustic monitoring at BAT-004. The number of passes recorded on a given night varied from 8 to 181. It had an overall passage rate of 12.44 passes/hour during the time period of 22:00 – 01:00hrs. Of the 147 calls obtained, 69% of these were little brown bats, with an additional 18% identified within the 30kHz range (big brown or silver-haired bat). A total of 76 passes were recorded in 9 ten-minute visual point count surveys, with the number of passes observed

during point counts ranging from 0 to 38. This results in an average passage rate of 50.67 passes/hour. A total of 34 calls were recorded from visual surveys at BAT-004. 21% of these were identified to the 30kHzrange (big brown or silver-haired bat), and 18% were identified as little brown bats.

BMA-008 (BAT-008)

A total of 67 passes were recorded in 9 nights of acoustic monitoring at BAT-008. The number of passes recorded on a given night varied from 0 to 36. It had an overall passage rate of 1.49 passes/hour during the time period of 22:00 – 01:00hrs. A total of 4 calls were identified from this acoustic monitoring station, 3 of which were identified to the 30kHz range (big brown or silver-haired bat), with the remaining identified as a little brown bat. A total of 3 passes were recorded in 9 ten-minute visual point count surveys, with the 3 passes observed during one point count. This results in an average passage rate of 2.00 passes/hour. Two calls were recorded during visual surveys. Both of these were identified as little brown bats.

BMA-009 (BAT-012)

A total of 3 passes were recorded in 13 nights of acoustic monitoring at BAT-012. One of these passes was observed on one night, with the remaining 2 observed on another. It had an overall passage rate of 0.05 passes/hour during the time period of 22:00 – 01:00hrs. Two calls were recorded, both of which were identified to the 30kHz range (either big brown bat or silver-haired bat). A total of 1 pass was recorded in 11 tenminute visual point count surveys and 1 five-minute point count survey, with the 3 passes observed during one point count. This results in an average passage rate of 0.52 passes/hour. No calls were obtained from visual surveys.

BMA-011 (BAT-013)

A total of 2 passes were recorded in 14 nights of acoustic monitoring at BAT-013. These passes were observed on separate nights. This station had an overall passage rate of 0.04 passes/hour during the time period of 22:00 – 01:00hrs. Two calls were recorded, both of which were identified to the 30kHz range (either big brown bat or silver-haired bat). A total of 4 passes were recorded in 11 ten-minute visual point count surveys and 1 five-minute point count survey, with the 3 passes observed during one point count. This results in an average passage rate of 0.52 passes/hour. No calls were obtained from visual surveys.

BMA-013 (BAT-010)

A total of 369 passes were recorded in 13 nights of acoustic monitoring at BAT-010. The number of passes recorded on a given night varied from 0 to 85. This station had an overall passage rate of 6.05 passes/hour during the time period of 22:00 – 01:00hrs. The majority of bat calls (82%) were identified to the 30kHz range, which represents the call of either a big brown or a silver-haired bat. Another 9% of calls were identified as silver-haired bat. A total of 27 passes were recorded in 9 ten-minute visual point count surveys and 1 five-minute point count survey. On most nights, no bat passes were observed, however on one night, 26 passes were observed. These observations resulted in an average passage rate of 17.05 passes/hour. Visual monitoring at this station resulted in 12 calls, 7 of which were identified to the 30kHz range (big brown or silver-haired bat).

BMA-014 (BAT-016)

A total of 1 pass was recorded in 3 nights of acoustic monitoring at BAT-016. This station was removed after only 3 nights as a result of re-analysis of woodland and snag characteristics and prioritization of effort. This station had an overall passage rate of 0.07 passes/hour during the time period of 22:00 - 01:00 hrs. This bat call was identified as belonging to a *Myotis* sp. Visual surveys were not conducted at this station. This woodland will be re-evaluated prior to construction to determine its significance.

NRSI has used overall passage rates and species data obtained from acoustic monitoring to estimate the number of individuals of a species found at candidate maternity colony habitats. The equation utilized to determine the number of individuals present is as follows:

$$I = 5P \times S_p$$

where I = number of individuals of a species P= average passage rate S_p = proportion of overall species composition

The average passage rate is multiplied by 5 to represent the estimated total number of individuals present in 5 hours (the acoustic monitoring period). The results of this analysis are displayed in Table 12 below.

The passage rates for visual surveys generally correspond to the results of acoustic monitoring, i.e., those stations with lower acoustic passage rates also had lower visual passage rates. Those stations with higher acoustic passage rates likewise had higher visual passage rates. However, the passage rates for visual surveys have not been used to specifically identify the number of individuals. While the trends in visual survey results generally reflect the results of acoustic monitoring, activity recorded during the 10-minute visual survey period does not necessarily represent typical activity of bats which are residing in close proximity to the station location (such as bats which would be exiting or entering a maternity colony), but may include bats which forage in the area on a particular night. Acoustic monitoring allows for the continual collection of data, and records bats foraging near the station location, but also bats which are entering or

exiting a maternity colony at the station. Bats were not directly observed to enter or exit a potential maternity colony during visual surveys at any of the candidate habitats evaluated.

For instances where no calls were obtained from acoustic monitoring to allow for species identification, the proportion of species present during visual surveys (combined with the passage rate acquired from acoustic monitoring) was utilized to interpret the number of individuals of a species present.

		ĺ	Aco	oustic Through-the-n	ight Surveys	Vis	ual Surveys
Wildlife Habitat ID	Station	Natural Feature ID	Average Passage Rate (P) (passes/hr)	Species Composition (S _p)	No. of Individuals I = 5P x S _p	Average Passage Rate (passes/hr)	Species Composition
BMA-001	BAT-014	504	2.91	Total # calls:3130kHz (BB/SH):94%Hoary:3%Silver-haired:3%	Total Individuals: 14.55 30kHz (BB/SH): 13.67 Hoary: 0.44 (1) Silver-haired: 0.44 (1)	12.60	Total # calls: 4 30kHz (BB/SH): 100%
BMA-004	BAT-011	541	2.63	No calls obtained	Total individuals: 13.15Species proportions usedfrom Visual Surveys:30kHz (BB/SH):3.9540kHz (Red/Tric)0.66(1)E. Red:5.26Silver-haired:0.66(1)Little Brown:0.66(1)Myotis sp.:1.97	25.80	Total # calls: 20 30kHz (BB/SH): 30% 40kHz (Red/Tric) 5% E. Red: 40% Silver-haired: 5%. Little Brown: 5% Myotis sp.: 15%
BMA-005	BAT-017	532	0.06	No calls obtained	Total Individuals: 0.3 (1)	0.60	No calls obtained
BMA-007	BAT-004	463	12.44	Total # calls: 147 30kHz (BB/SH): 18% 40kHz (Red/Tric) <1% Big Brown: 9% Hoary: 2% Silver-haired: 1%. Little Brown: 69% Myotis sp.: <1%	Total Individuals: 62.20 30kHz (BB/SH): 11.00 40kHz (Red/Tric) 0.42 (1) Big Brown: 5.50 Hoary: 1.27 Silver-haired: 0.85(1) Little Brown: 42.74 Myotis sp.: 0.42(1)	50.67	Total # calls: 34 30kHz (BB/SH): 21% 40kHz (Red/Tric) 6% Big Brown: 3% Little Brown: 18% Myotis sp.: 9%
BMA-008	BAT-008	542	1.49	Total # calls: 4 30kHz (BB/SH): 75% Little Brown: 25%	Total Individuals:7.4530kHz (BB/SH):5.59Little Brown:1.86	2.00	Total # calls: 2 Little Brown: 100%
BMA-009	BAT-012	524	0.05	Total # calls: 2 30kHz (BB/SH): 100%	Total Individuals: 0.25 (1) 30kHz (BB/SH): 0.25 (1)	0.52	No calls obtained

Table 12. Bat Monitoring Results for the Bluewater Wind Energy Centre

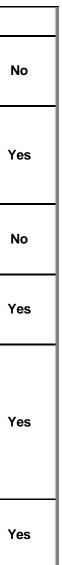
BMA-011	BAT-013	483	0.04	Total # calls: 2 30kHz (BB/SH): 100%	Total Individuals: 0.2 (1) 30kHz (BB/SH): 0.2 (1)	2.40	No calls obtained
BMA-013	BAT-010	437	6.05	Total # calls:19830kHz (BB/SH):82%Big Brown:<1%	Total Individuals: 30.25 30kHz (BB/SH): 24.81 Big Brown: 0.15 (1) Eastern Red: 0.15 (1) Silver-haired: 2.72 Little Brown: 0.15 (1) N. Long-eared: 0.61 (1) Myotis sp.: 1.51 Unknown: 0.15 (1)	17.05	Total # calls: 12 30kHz (BB/SH): 58% 40kHz (Red/Tric): 8% Hoary: 8% Little Brown: 17% Unknown: 8%
BMA-014	BAT-016	534	0.07	Total # calls: 1 Myotis sp.: 100%	Total Individuals: 0.35 (1) Myotis sp: 0.35 (1)	Nc	ot Evaluated

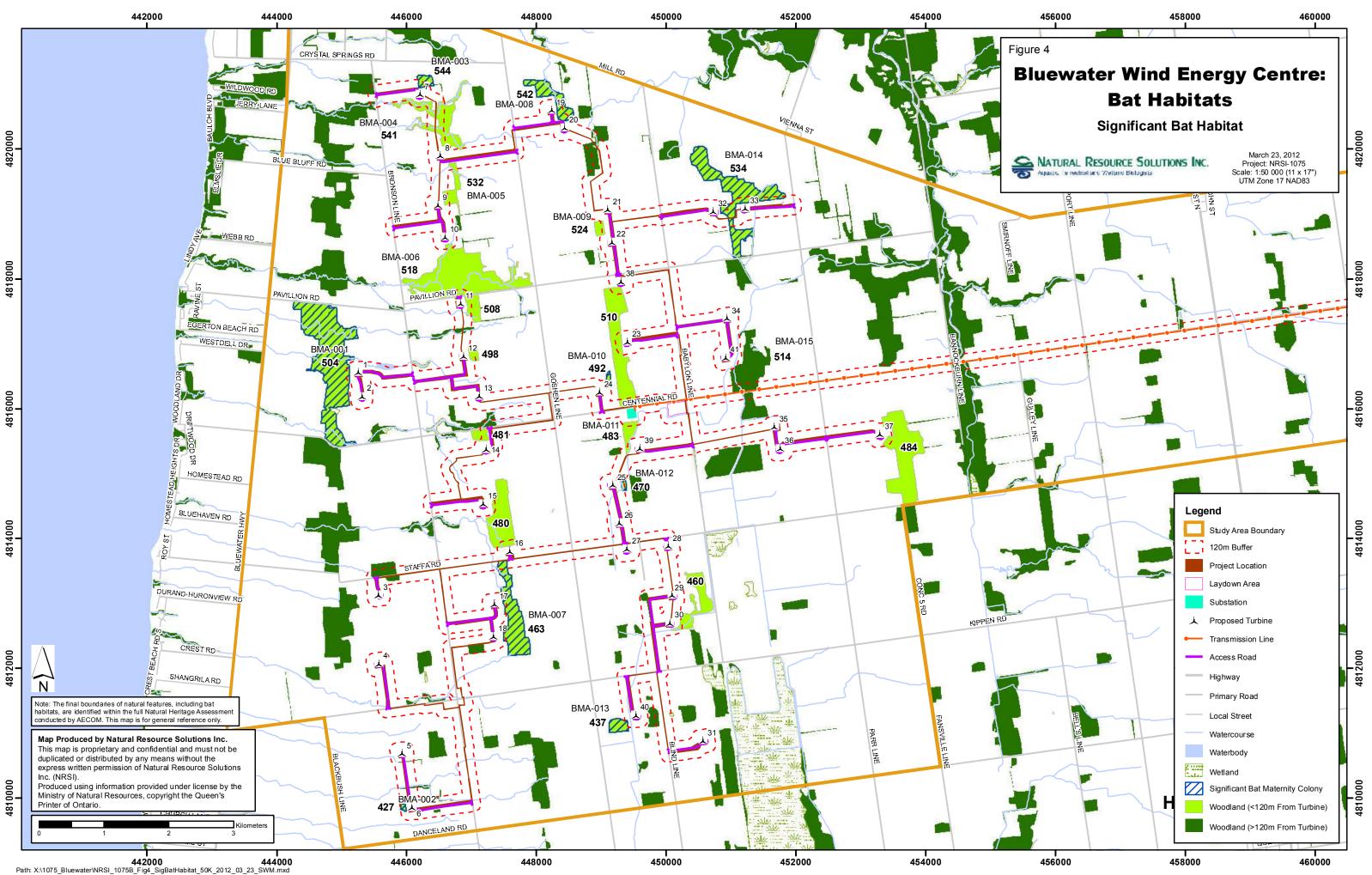
Wildlife Habitat ID	Feature ID	Size (ha)	Composition	Distance to Project Location	Evaluation Methods	Evaluation Results	Provincial Criteria	Significance	Figure	El Requ (Y/
BMA-001	504	92.53	Acer saccharum (sugar maple) – Fagus grandifolium (American beech) forest.	84 m (T 1)	Acoustic Monitoring	Acoustic Results: 13.67 Big Brown or Silver-haired Bats 1 Hoary Bat 1 Silver-haired Bat	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Significant	4	Ye
BMA-002	427	0.73	Dominant <i>Fraxinus</i> sp. (ash species). Abundant <i>Acer saccharum</i> (sugar maple).	43 m (T 6)	Not Evaluated	Not Evaluated	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Assumed Significant	4	Ye
BMA-003	544	3.79	Dominant <i>Fraxinus americana</i> (white ash). Occasional Ostrya virginiana (ironwood), <i>Acer saccharum</i> (sugar maple), <i>Tilia americana</i> (basswood), and <i>Fagus grandifolia</i> (American beech).	73 m (T 7)	Not Evaluated	Not Evaluated	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Assumed Significant	4	Ye
BMA-004	541	29.65		43 m (T 7)	Acoustic Monitoring Supplemented with Visual Species Data	Acoustic Results: 3.95 Big Brown or Silver- haired Bats 1 E. Red or Tricoloured Bat 5.26 E. Red Bats 1 Silver-haired Bat 1 Little Brown Bat 1.97 Myotis sp.	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Not Significant	4	N
BMA-005	532	8.68		53 m (T 9)	Acoustic Monitoring	Acoustic Results: 1 Individual Species Unknown	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Not Significant	4	N
BMA-007	463	32.01	This woodland contains basswood (<i>Tilia americana</i>) and hickory (<i>Carya</i> sp.).	80 m (T 16)	Acoustic Monitoring	Acoustic Results: 11.00 Big Brown or Silver-haired Bats 1 E. Red or Tricolored Bats 5.50 Big Brown Bats 1.27 Hoary Bats 1 Silver-haired Bat 42.72 Little Brown Bats 1 Myotis sp.	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Significant	4	Ye
BMA-008	542	15.22	This is a lowland deciduous maple- beech dominated forest, determined to have relatively weak candidate trees because there are many young trees, and the large trees which exist are very healthy. Some snags are present, but most are very small or without holes,	40 m (T 19)	Acoustic Monitoring	Acoustic Results: 5.59 Big Brown or Silver-haired Bats 1.86 Little Brown Bats	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Significant	4	Y

Table 13. Evaluation of Significance for Wildlife Habitat within 120m of the Bluewater Wind Ene	rgy Centre
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EIS equired (Y/N)			
Yes			
Yes			
Yes			
No			
No			
Yes			
Yes			
	-		

					-					
			cracks or exfoliating bark. Canopy cover is dense.							
BMA-009	524	3.05	Acer saccharum (sugar maple)- mixed hardwood deciduous forest.	110 m (T 22)	Acoustic Monitoring	Acoustic Results: 1 Big Brown or Silver- haired Bat	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Not Significant	4	1
BMA-010	492	1.42	Abundant Acer saccharum (sugar maple). Occasional Fraxinus americana (white ash) and Acer rubrum (red maple). Rare Prunus serotina (black cherry) and Ostrya virginiana (ironwood).	118 m (T 24)	Not Evaluated	Not Evaluated	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Assumed Significant	4	Y
BMA-011	483	6.88		94 m (T Alt2)	Acoustic Monitoring	Acoustic Results: 1 Big Brown or Silver- haired Bat	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Not Significant	4	1
BMA-012	470	1.50	Dominant <i>Fraxinus americana</i> (white ash). Abundant <i>Ulmus americana</i> (white elm) and <i>Acer saccharum</i> (sugar maple).	89 m (T 25)	Not Evaluated	Not Evaluated	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Assumed Significant	4	Y
BMA-013	437	5.31	Ash (<i>Fraxinus</i> sp.) swamp.	91 m (T Alt3)	Acoustic Monitoring	Acoustic Results: 24.81 Big Brown or Silver-haired Bats 1 Big Brown Bat 1 Eastern Red Bat 2.72 Silver-haired Bats 1 Little Brown Bat 1 N. Long-eared Bat 1.51 Myotis sp. 1 Unknown sp.	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Significant	4	Y
BMA-014	534	51.79		39 m (T 33)	Acoustic Monitoring	Acoustic Results: 1 Myotis sp. Data Deficient	20 N. Long-eared Bats 20 Little Brown Bats 10 Big Brown Bats 5 adult, female Silver- haired Bats	Assumed Significant	4	Y





5.4 Evaluation of Significance Summary

Based on the records review and site investigation, no significant bat hibernacula were found within the project area. Based on criteria in the SWTHG (OMNR 2000), DRAFT Ecoregion Criteria Schedules Addendum to the SWHTG (OMNR 2009), DRAFT Significant Wildlife Habitat Ecoregion Criteria Schedules for Ecoregion 6E (OMNR 2011a), and Bats and Bat Habitats guidelines (OMNR 2010b, 2011b), NRSI identified 15 locations with candidate significant bat maternity habitat.

NRSI followed appropriate provincial guidelines to collect data during June and early July of 2010 and 2011, and has been able to evaluate the significance of 10 these locations. The remaining 5 potential bat habitats could not be surveyed during the appropriate monitoring season prior to the completion of this report.

Based on NRSI's data collection, 4 potential bat habitats (BMA-001, BMA-007, BMA-008, and BMA-013) were identified as significant habitats for bat maternity colonies as a result of passage rates and species assemblages which indicate the overall presence of a number of bats at these locations determined by provincial criteria to be significant. Although surveys could not be completed at habitats BMA-002, BMA-003, BMA-010, BMA-012, and BMA-014 due to constraints in site accessibility at the time surveys were conducted, as well as changes in site investigation critera, these features were identified as containing suitable habitat for roosting bats, and have been identified as being presumed significant for the purposes of the Environment Impact Study. The evaluation of significance of these ten habitats has been summarized in Table 14 below.

Wildlife Habitat ID	Feature ID	Feature Type	Distance to Closest Turbine (from blade tip)	Type of Significance	EIS Required (Y/N)
BMA-001	504	Significant Bat Maternity Colony	84 m (T 1)	Evaluated	Yes
BMA-002	427	Significant Bat Maternity Colony	43 m (T 6)	Assumed	Yes
BMA-003	Significant Bat		73 m (T 7)	Assumed	Yes
BMA-007	463	Significant Bat	80 m (T 16)	Evaluated	Yes

 Table 14. Summary of Significant Bat Habitats within 120m of the Bluewater Wind Energy

 Centre

	l	Maternity Colony			
BMA-008	542	Significant Bat Maternity Colony	40 m (T 19)	Evaluated	Yes
BMA-010	492	Significant Bat Maternity Colony	118 m (T 24)	Assumed	Yes
BMA-012	470	Significant Bat Maternity Colony	89 m (T 25)	Assumed	Yes
BMA-013	437	Significant Bat Maternity Colony	91 m (T Alt3)	Evaluated	Yes
BMA-014	534	Significant Bat Maternity Colony	39 m (T 33)	Assumed	Yes

According to the REA Regulation, if any significant natural features are present within 120m of the project location an Environmental Impact Study (EIS) must be completed. Potential impacts, mitigation measures, and follow-up programs associated with these 10 significant bat habitats are discussed in Section 6.0 below.

Other woodlands which are located within 120m of access roads, connection cabling, temporary construction and laydown areas, the substation, the operations and maintenance building, and the transmission line may contain suitable habitat for bat maternity colonies. These habitats are listed below in Table 15. These will be treated as significant, and generalized mitigation measures for these habitats will be applied. Generalized mitigation measures have been detailed as part of the EIS.

Feature ID	Criteria Rationale	Type of Significance	EIS Required (Y/N)
426	This woodland was identified as a mid-aged, deciduous forest dominated by silver maple, ash and black walnut. Size class analysis unknown, however one cavity was noted. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
439	Mid-age deciduous forest containing ash and aspen in the canopy, with abundant trees 25- 50cm DBH, but rarely occurring snags only at <25cm DBH. Abundance of appropriately sized trees which the potential to contain cavities suggests the habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures

 Table 15. Generalized Candidate Significant Bat Habitats identified within 120m of the

 Bluewater Wind Energy Project

456	Contains suitable mature white ash-beech and sugar maple-dominated deciduous forest and green ash swamp. Suitably sized trees are snags are found throughout, with abundant trees 25-50cm DBH occurring particularly in the sugar-maple dominated component. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
475	Suitable mid-aged dry-fresh sugar maple dominated deciduous forest. Abundant trees >25cm DBH and occasional >50cm DBH, as well as occasional snags >25cm DBH and rare snags >50cm DBH. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
487	Contains coniferous plantation, which does not qualify. However it also contains suitable mature dry-fresh sugar maple forest, with abundant trees >25cm DBH and occasional >50cm, occasional snags >25cm DBH and rare >50cm. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
488	Contains mid-aged green ash deciduous swamp, and maple mineral deciduous swamp which could contain suitable habitat. As a result this habitat may be suitable for a significant bat maternity colony. Note the thicket portion, which is found within 120m of a proposed turbine, does not qualify for candidate bat maternity colony habitat.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
494	Contains fresh-moist willow lowland deciduous forest, containing some Freeman's maple (<i>Acer x freemanii</i>). As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
512	Within 120m of the project location, contains fresh-moist lowland deciduous forest ecosite containing some Manitoba maple (<i>Acer</i> <i>negundo</i>). Mature trees (height category 1) noted. As a result this habitat may be suitable for a significant bat maternity colony. Some mixed swamp is also located within 120m of the project location, however this area in particular (within 120m) is represented by coniferous trees and as a result does not qualify.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
514	Potentially suitable habitat is found within 120m of the project location in maple mineral deciduous swamp and sugar maple deciduous forest. Abundant trees 25-50cm DBH were noted, as well as occasional trees >50cm DBH. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures

520	Mature deciduous forest containing sugar maple and trembling aspen. Additional information was not able to be obtained due to the distance of the woodland from the roadside. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
537	Mature dry-fresh sugar maple-beech, sugar maple-basswood deciduous forest, and swamp maple deciduous swamp. Contains abundant trees 25-50cm DBH and occasional trees >50cm DBH, as well as occasional snags both 25-50cm DBH and >50cm DBH. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
539	Contains mid-aged fresh-moist black walnut lowland deciduous forest, with some ash. There was no access to this property to confirm size class analysis. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
545	Mature dry-fresh sugar maple-beech deciduous forest. There was no access to this property to confirm size class analysis. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
551	Contains young to mid-aged white pine-black walnut mixed forest. It contains abundant trees >25cm DBH and rare trees >50cm DBH which could contain appropriate cavities. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
552	Consists of cultural woodland containing some white ash trees, however there are only occasional trees 25-50cm DBH and no snags noted. FOD is also found within 120m of the transmission line and due to a lack of site access and the inability to see this from the property line, this polygon may contain significant bat maternity colony habitat.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
555	Fresh-moist oak-maple-hickory deciduous forest, containing abundant trees 25-50cm DBH and rare trees >50cm DBH. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
556	Dry-fresh sugar maple deciduous forest, containing abundant trees 25-50cm DBH and rare trees >50cm DBH. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures
561	Swamp maple mineral deciduous swamp and lowland deciduous forest. There was no access to this property to confirm size class analysis. As a result this habitat may be suitable for a significant bat maternity colony.	Treat As Significant	Yes - Generalized Candidate Significant Wildlife Habitat Mitigation Measures

6.0 Environmental Impact Study

In accordance with the REA Regulation, any significant bat maternity colonies found within 120m of the project location require an Environmental Impact Study (EIS) to identify potential impacts and mitigation measures. The Evaluation of Significance for the Bluewater Wind Energy Centre has identified that 9 significant bat maternity colonies are present within 120m of the project location, with the potential to incur operational impacts from this development. The potential impacts on these features are discussed in more detail in the following sections.

6.1 Description of the Proposed Undertaking

The Bluewater Wind Energy Centre, proposed by NextEra Energy Inc., is located approximately 2.5km southeast of the town of Bayfield. This wind energy generating facility is proposed to be 60MW in size, consisting of up to 41 operational wind turbines, as well as supporting infrastructure and development activities. This includes access roads, construction areas, buried connector lines and overhead collector lines, substations, temporary laydown areas, and an operation/maintenance building. The turbine model chosen for this project is the GE Energy 1.6-100 turbine. It stands 80m to the height of the hub with a blade length of 50m.

The installation of each turbine will involve a subterranean concrete base, and a temporary above-ground lay-down area where turbine components will be stored. Access roads will be gravel and will be placed throughout the project area, to allow for regular maintenance activities at each of the turbines. Connector cabling will be underground and will primarily follow the placement of the access road. Minor grading activities and site alteration is expected to occur along proposed access road routes and at turbine locations.

Based on current layouts, minor vegetation removal may occur during the construction of the Bluewater Wind Energy Centre and associated infrastructure. The extent of vegetation clearing, if any, and potential impacts of this project on vegetation communities and other significant wildlife habitat has been examined by AECOM, and is discussed in more detail in the full Natural Heritage Assessment reports. A summary of the potential impacts that the proposed development may have on significant bat habitat is provided in Table 16 below.

Project Phase	Project Component	Description of Activity	Potential Impact(s)
Construction	Supporting Infrastructure	Installation of access roads, cabling, maintenance yards, auxiliary buildings, etc.	Habitat LossNoise
Construction	Wind Turbine Erection	Turbine pad grading, concrete pouring, turbine assembly.	 Noise
Operation	Wind Turbine Operation	Operation of 41 wind energy generating turbines.	 Noise Direct Bird/Bat Mortality
Decommissioning	Wind Turbine Removal	Removal of and disassembly of 41 wind energy generating turbines.	Noise

Table 16. Summary of Potential Impacts to Significant Bat Habitat

The potential environmental impacts to bats and bat habitats associated with the development of the Bluewater Wind Energy Centre have been provided in detail in the following sections.

6.2 Potential Impacts to Significant Bat Habitat

6.2.1 Habitat Loss

As a result of the proposed development of the Bluewater Wind Energy Centre, it is not anticipated that significant bat maternity colonies will be impacted by direct habitat loss. Current layouts indicate that all proposed development is located outside of the boundaries of any significant bat habitats. Some cabling will be directionally drilled under the assumed significant feature BMA-014. As a result, this cabling will not be located within the feature, and will not involve the removal of any snags, cavity trees, or other specific locations suitable for maternity colonies, and no direct impacts from habitat loss are expected.

6.2.2 Noise Disturbance

Bat activity is generally limited to the period of twilight through sunrise. As with most wildlife, the noise associated with the construction activity has the potential to disturb regular bat activity. This disturbance, if any, will be a temporary disturbance limited to

the construction and decommissioning phases of this project and is not expected to permanently impact local bat populations.

In order to minimize any temporary disturbances to local bat populations, NRSI recommends that construction activity within 120m of significant bat habitat be limited to occur during daylight hours during the summer months (May 1st-August 31st) when bats are typically most active.

To assess any potential noise disturbances to local bat populations as a result of the regular operation of the wind turbines, NRSI recommends that post-construction acoustic bat monitoring be conducted at each of the significant bat habitats that are located within 120m of operational turbines. These surveys should occur for at least 3 years, in conjunction with mortality monitoring (discussed below). Since pre-construction monitoring surveys already conducted were completed following the 2010 Bat and Bat Habitats guidelines, NRSI recommends that the pre-construction monitoring approach be repeated during post-construction studies, rather than implementing the revised July 2011 approach for consistency and comparability. This monitoring will be further discussed in a separate document entitled the Environmental Effects Monitoring Plan.

6.2.3 Direct Bat Mortality

The placement of wind turbines within 120m of significant bat maternity colonies have the potential to result in direct bat mortality due to the operation of large-scale wind turbines. Overall bat mortality levels have been shown to be extremely variable through projects in North America, with an MNR summary of available literature indicating ranges of 0.07 - 47.5 bats/turbine/year (OMNR 2006).

Bat mortality resulting from collision with operational wind turbines is discussed in a separate document, called the Environmental Effects Monitoring Plan, which is a part of the Design and Operations Report for the Renewable Energy Approval application. As a result, impacts, mitigation, and monitoring concerning bat mortality are included within that document and will not be discussed in further detail within this report.

6.3 Approach to Impact Assessment

Following guidelines set out by the REA Regulation with regards to bats and bat habitats associated with wind turbines an impact assessment is required for a project of this scope. This impact assessment discusses potential impacts to significant bat habitats, in each of the construction, operation, and decommissioning phases of this project. In addition, NRSI has also considered generalized mitigation measures that should be applied in areas where non-operational impacts on bat habitats may occur. These generalized mitigation measures are meant to limit the temporary disturbance that may occur during the construction or decommissioning phases of this project.

6.3.1 Project Location within Significant Bat Habitat

NRSI has reviewed the project location and significant bat habitats and has confirmed that the project location does not overlap with any significant bat habitats. In one location, cabling is proposed to be directional drilled underneath a significant bat habitat, however since this activity will occur below the feature it is not considered to be within.

6.3.2 Project Location within 120m of Confirmed Significant Bat Habitat

Through extensive acoustic monitoring that occurred in 2010 and 2011 within the Bluewater Wind Energy Centre, NRSI has confirmed the significance of 4 bat maternity colonies within the project area. The potential impacts, proposed mitigation measures, objectives, and follow-up programs associated with these 4 significant wildlife habitats have been provided in Table 17 below.

Feature ID	Potential Impacts	Mitigation Measures	Objectives, Monitoring, and Contingency Plans
BMA-001 BMA-007 BMA-008 BMA-013	1. Habitat loss from construction activities within 120m.	 1a. Construction activities will occur outside the boundaries of all significant bat habitats. 1b. The areas proposed for construction within 30m of significant bat habitats will be clearly delineated to avoid accidental impacts to significant bat habitat. 	1. Avoid direct habitat loss of significant habitat to local bat populations.
	2. Noise	2. Focus construction	2. Disturbance to bat

Table 17. Summary of Impacts and Mitigation Measures Associated with Confirmed Significant Bat Habitat within 120m of the Bluewater Wind Energy Centre

construction activities within 120m.feature during daylight hours during the period of May 1 st to August 31 st .minimized as much as possible during the construction phase.

6.3.3 Project Location within 120m of Assumed Significant Bat Habitat

As a result of site investigations which were completed after the end of the 2011 bat monitoring period, NRSI has identified an additional 5 woodlands that were identified as having suitable habitat for a bat maternity colony, but could not be evaluated for significance during the appropriate monitoring season. For the purposes of this report, NRSI has treated these habitats as significant with the commitment to conduct pre-construction monitoring will be conducted in accordance with the July 2011 *Bat and Bat Habitats* provincial guidelines, and results will be compared to the appropriate provincial standards discussed previously in this report. Any of these habitats determined to be significant will be subject to the potential impacts, mitigation measures, and follow-up monitoring programs outlined in Table 18. If any of these habitats are identified as being not significant when compared with provincial standards of significantes are required.

Feature ID	Pre-construction Surveys	Evaluation of Significance Standards
BMA-002 BMA-003 BMA-010 BMA-012 BMA-014	Pre-construction surveys will follow July 2011 <i>Bat and Bat</i> <i>Habitats</i> guidelines to be consistent with other monitoring that has already occurred, and will occur, at the project area.	Significant maternity colonies include at least 20 northern long-eared bats (<i>Myotis</i> <i>septentrionalis</i>) or little brown bats (<i>Myotis</i> <i>lucifugus</i>), 10 big brown bats (<i>Eptesicus</i> <i>fuscus</i>), or 5 adult, female, silver-haired bats (<i>Lasionycteris noctivagans</i>) (OMNR 2011a).
	Acoustic bat monitoring will occur at 10-30 candidate maternity colony trees in each woodland. Each tree will be surveyed once in June 2012 from one half hour before dusk until one hour after dusk to observe evidence of bats exiting. Monitoring will use	NRSI will use the number of individuals observed exiting or entering candidate trees, combined with species recorded and their representation of total calls recorded at each tree, to determine the number of individuals of each species utilizing a candidate tree.

 Table 18. Summary of Pre-construction Surveys and Evaluation Standards to Confirm

 Significance of the Assumed Significant Bat Habitat within 120m of the Bluewater Wind

 Energy Centre

high-powered spotlights and acoustic detectors to record species calls.	
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After the results of the above studies are compared against provincial standards of significance, NRSI will identify whether any of these bat maternity colonies warrant significant consideration. If they do, the following table of potential impacts, mitigation measures, and follow-up programs should be applied.

Mitigation Measures (if **Potential Impacts Objectives**, Monitoring, Feature ID significant) and Contingency Plans (if significant) 1. Avoid direct habitat loss of 1. Habitat loss 1a. Construction activities from construction will occur outside the significant habitat to local activities within boundaries of all significant bat populations. 120m. bat habitats. 1b. The areas proposed for construction within 30m of BMA-002 significant bat habitats will BMA-003 be clearly delineated to BMA-010 avoid accidental impacts to BMA-012 significant bat habitat. BMA-014 2. Noise 2. Focus construction 2. Disturbance to bat activities within 30m of this disturbance from populations should be feature during daylight minimized as much as construction hours during the period of activities within possible during the May 1st to August 31st. 120m. construction phase.

 Table 19. Summary of Impacts and Mitigation Measures Associated with Bat Habitats

 Confirmed to be Significant Through Pre-construction Monitoring Surveys

6.3.4 Generalized Mitigation Measures

In addition to the specific significant bat maternity colonies identified above, where operational impacts may occur, there are a number of additional potential bat habitats that are located within 120m of project components that are not expected to result in operational impacts to these habitats, as per Appendix D of the Natural Heritage Assessment Guide (OMNR 2011c). As a result, NRSI is recommending generalized mitigation measures that should be applied to development activities within 120m of the 18 identified generalized candidate significant bat maternity colony habitats. These generalized mitigation measures are provided in Table 20 below.

Development Phase	Potential Impacts	Mitigation Measures
	Habitat Loss	 Keep vegetation removal to a minimum and limited to non-significant habitats. Clearly delineate construction boundaries where construction will occur within 10m of habitats to avoid accidental damage to tree species.
Construction/ Decommissioning	Wildlife Disturbance	 Construction and decommissioning activities within 30m of woodlands or wetlands should occur during daylight hours, wherever possible. Maintain the largest possible distance between construction activity and wooded habitats, respecting the limits of the constructible area.

Table 20. Summary of Generalized Mitigation Measures within 120m of the BluewaterWind Energy Centre

6.4 Impact and Mitigation Summary

The records review, site investigation, and evaluation of significance have all been used to guide the proposed development and assess the potential impacts that the Bluewater Wind Energy Centre may have on bats and bat habitats.

Proposed development activities indicate that most turbines are located further than 120m away from significant bat habitat with the exception of T1, T6, T7, T16, T19, T24, T25, TAlt3, and T33, which are all located within 120m of significant bat habitat. A summary of the 10 significant bat habitats, all identified as bat maternity colonies, found within the project area, including distance to project location, can be seen in Table 21 below.

Type of Natural Feature	Wildlife Habitat ID	Turbine No.									
Seasonal Concentration	Seasonal Concentration Area										
Bat Maternity Colony	BMA-001	84m	T 1								
Bat Maternity Colony	BMA-002	43m	Τ6								
Bat Maternity Colony	BMA-003	73m	Τ7								
Bat Maternity Colony	BMA-007	80m	T 16								

Table 21.	Summary of Significant Bat Maternity Colonies and Proximity to Project	ct
Location f	for the Bluewater Wind Energy Centre area	

Bat Maternity Colony	BMA-008	40m	T 19
Bat Maternity Colony	BMA-010	118m	T 24
Bat Maternity Colony	BMA-012	89m	T 25
Bat Maternity Colony	BMA-013	91m	T Alt3
Bat Maternity Colony	BMA-014	39m	T 33

The impacts to bat populations within the Bluewater Wind Energy Centre project area, excepting mortality impacts as discussed above, will be minimal, as no loss of significant habitat is anticipated. Pre-construction monitoring results at the Bluewater Wind Energy Centre have identified 9 woodlands that support significant bat maternity colonies. The results of this monitoring indicate that bat use of the area is generally low, with an average passage rate from dusk to 5 hours after ranging from 0.04 passes/hr to 12.44 passes/hr. Based on the presence of significant bat habitats within 120m of the Bluewater Wind Energy Centre location, NRSI has recommended a series of mitigation measures that should be applied during the development of this facility. A summary of these mitigation measures is provided in Table 22 below.

Development Phase	Potential Impact	Mitigation Measure
		Construction activities will occur outside the boundaries of significant bat habitats.
Construction, Decommissioning	Habitat Loss	Areas proposed for construction within 30m of significant bat habitat will be clearly delineated to avoid accidental impacts to significant bat habitat
	Noise Disturbance	Construction activities that must occur during the critical period for bat roosting (May 1 st to August 31 st) will occur during daylight hours.
		Maintain the largest possible distance from construction activities to wooded habitats, respecting limits of the constructible area.
Onemation	Direct Mortality	Addressed in a separate document,
Operation	Noise Disturbance	entitled the Environmental Effects Monitoring Plan.

 Table 22. Summary of Mitigation Commitments for the Development within 120m of

 Significant Bat Habitats at the Bluewater Wind Energy Centre

In addition to mitigation measures to limit the potential impact to bats and bat habitats, a series of monitoring commitments are also recommended to occur at the Bluewater Wind Energy Centre. These monitoring commitments include both behaviour (disturbance) surveys and mortality surveys, and are designed to assess the impacts of this facility on local bat populations and habitat. These monitoring commitments are summarized in Table 21 below.

Survey Type	Generalized Methods	Wildlife Habitat/ Feature	Purpose
Evaluation of Significance Surveys	Visual surveys of unevaluated candidate significant bat maternity colony habitats, following July 2011 MNR protocol, to occur prior to construction in June of 2012.	BMA-002 / 427 BMA-003 / 544 BMA-010 / 492 BMA-012 / 470 BMA-014 / 534	To confirm or deny the significance of bat maternity colonies in unevaluated candidate significant habitats (currently assumed significant).
Bat Behaviour Surveys	Visual and acoustic surveys of these significant bat habitats found within 30m of the project location. Discussed within the Environmental Effects Monitoring Plan.	BMA-001 BMA-007 BMA-008 BMA-013	To confirm bat abundance and species associations within this habitat have not been impacted by the Bluewater Wind Energy Centre.
Bat Behaviour Surveys	Visual surveys of confirmed significant bat maternity colony habitats. Discussed within the Environmental Effects Monitoring Plan.	If Significant: BMA-002 / 427 BMA-003 / 544 BMA-010 / 492 BMA-012 / 470 BMA-014 / 534	To confirm bat abundance and species associations within this habitat have not been impacted by the Bluewater Wind Energy Centre.
Post-construction Mortality Monitoring	Mortality monitoring for at least 3 years following July 2011 MNR guidelines. A detailed program will be prepared as part of the Environmental Effects Monitoring Plan.	Subset of the up to 41 operational turbines	To confirm direct impacts to bats as a result of the Bluewater Wind Energy Centre.

Table 23	Summary of Monitoring	Commitments for the Bluewater	Wind Energy Centre
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7.0 Summary and Conclusions

A detailed assessment of the bat habitats and bat activity within the proposed Bluewater Wind Energy Centre occurred through the use of a records review, comprehensive site investigation, and evaluation of significance by Natural Resource Solutions Inc. biologists.

The proposed Bluewater Wind Energy Centre is a 60MW wind energy facility located in Dufferin County, Ontario, and consists of the proposed installation of up to 41 wind energy turbines and associated infrastructure, primarily in agricultural habitat. In accordance with the Renewable Energy Approval (REA) Regulation, a records review, comprehensive site investigation, and evaluation of significance were all completed at the Bluewater Wind Energy Centre. This information has been compiled into this *Bat Monitoring Report and Environmental Impact Study*.

The results of the preliminary site investigation identified 13 potentially significant bat habitats within 120m of project components deemed to have a potential operational impact (i.e. wind turbines), or within which the project will be located (i.e. access road and cabling for Turbine 5). In order to confirm significance, extensive bat monitoring occurred at 9 of these habitats in 2010 and 2011. Monitoring at the remaining 4 habitats was not conducted because of site accessibility at the time of the 2011 monitoring period. Based on the results of the both the site investigation and evaluation of significance, NRSI has determined that 9 of the 13 habitats warrant significant consideration for bat maternity habitats. This determination is based on a combination of habitat present, overall bat abundance, and species associations observed at these habitats. As a result of the significant determination, NRSI has outlined numerous mitigation measures and monitoring commitments that should be specifically applied to any development activity within 120m of these significant habitats.

The monitoring conducted at one of the 9 habitats surveyed did not gain enough data to confirm or deny significant consideration, and as a result it has been assumed significant. In addition to this habitat, the remaining 4 unsurveyed habitats have also been assumed significant for the purposes of this report.

NRSI has also identified the presence of other suitable bat habitats within 120m of project components that are not expected to have operational impacts on bat habitats (i.e. access roads, cabling, etc.). In accordance with the Natural Heritage Assessment Guide, Appendix D, generalized mitigation measures can be applied to these features to mitigate against potential disturbances during the construction and decommissioning phases of this project. NRSI has provided several mitigation measures that should be applied during the development of this project to ensure impacts to bats and bat habitats are limited.

Providing that the appropriate recommendations are followed and that best management practices are implemented, the anticipated impacts of this facility on significant bat habitat and local bat populations are expected to be minimal.

8.0 References

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Appendix I Evaluation of Significance Survey Dates

Appendix II. Evaluation of Significance Survey Dates

Purpose	Wildlife Habitat ID	Feature ID	Station Number	General Methods	Date	Time(s) and Duration	Weather	Staff
Acoustic Through	-the-night Mo	onitoring		•	•			
				Monitoring Station Set Up	June 20, 2011	18:27	23°C, 100%CC, No precipitation, Wind 1 from SW.	TAL, AMD
					June 22, 2011	16:36	24°C, 40%CC, No precipitation, Wind 3 from SE.	KTC, TAL
	BMA-001	504	BAT-014	Replacing memory and power supply for monitoring station	June 25, 2011	17:15	25°C, 20%CC, No precipitation, Wind 3-4 from W.	TAL, KNP
					July 1, 2011	14:10	26°C, 35%CC, No precipitation, Wind 2 from W.	KTC, KNP
				Monitoring Station Removed	July 6, 2011	12:10		CM, KNP
	BMA-002	427	n/a	Not Evalu	uated. Assumed S	Significant. Survey	s to be completed in 2012.	
	BMA-003	544	n/a	Not Evaluated. Assumed Significant. Surveys to be completed in 2012.				
	BMA-004	541	BAT-011	Monitoring Station Set Up	June 20, 2011	19:40	25°C, 50%CC, No precipitation, Wind 0.	TAL, AMD
Quantitative				PAT-011 Replacing memory and power supply for monitoring station	June 22, 2011	17:49	24°C, 80%CC, No precipitation, Wind 2 from SE.	KTC, TAL
assessment of bats at candidate					June 25, 2011	15:15	25°C, 40%CC, No precipitation, Wind 3 from W.	TAL, KNP
maternity roosts					June 30, 2011	20:50	17°C, 0%CC, No precipitation, Wind 0.	CTK, KNP
				Monitoring Station Removed	July 6, 2011	13:35	31°C, 80%CC, No precipitation, Wind 1 from W.	CM, KNP
				Monitoring Station Set Up	June 25, 2011	16:05	25°C, 25%CC, No precipitation, Wind 2 from W.	TAL, KNP
	BMA-005	532	BAT-017	Replacing memory and power	June 30, 2011	19:50	18°C, 0%CC, No precipitation, Wind 0.	CTK, KNP
	BIVIA-005	J3∠	BA1-017	supply for monitoring station	July 5, 2011	14:05	31°C, 80%CC, No precipitation, Wind 1 from W.	CM, KNP
				Monitoring Station Removed	July 7, 2011	20:50	19°C, 95%CC, No precipitation, Wind 0.	KNP, AMD
	BMA 007	462		Monitoring Station Set Up	June 2, 2010	19:55	100%CC, No precipitation, Wind 1 from N.	AGR, ACN
	BMA-007	463	BAT-004	Replacing memory and power supply for monitoring station	June 10, 2010	11:00	15°C, 75%CC, No precipitation, Wind 2 from NW.	ACN, BK

					June 16, 2010	13:07	18°C, 100%CC, No precipitation, Wind 4 from SW.	ACN, BK	
				Monitoring Station Removed	June 21, 2010	11:30			
				Monitoring Station Set Up	June 4, 2010	13:09	32°C, 70%CC, No precipitation, Wind 2 from S.	ACN	
					June 10, 2010		20°C, 0%CC, No precipitation, Wind 3 from N.	PWD, MA	
	BMA-008	542	BAT-008	Replacing memory and power supply for monitoring station	June 14, 2010	14:00	20°C, 90%CC, No precipitation, Wind 2 from NW	BK	
					June 18, 2010	13:45	27°C, 30%CC, No precipitation, Wind 2 from W.	PWD, BK	
				Monitoring Station Removed	June 21, 2010	13:52			
				Monitoring Station Set Up	June 9, 2011	17:45	15°C, 85%CC, No precipitation, Wind 3 from NW.	CLH, JHL	
	DMA 000	504	BAT-012	Replacing memory and power	June 14, 2011	13:30	21°C, 10%CC, No precipitation, Wind 2 from NE.	JHL, BWW	
	BMA-009	524	BAT-012	supply for monitoring station	June 18, 2011	17:15	26°C, 10%CC, No precipitation, Wind 3 from NW.	BWW, KTC	
				Monitoring Station Removed	June 22, 2011	13:24	24°C, 40%CC, No precipitation, Wind 3 from SE.	TAL, KTC	
	BMA-010	492	n/a	Not Evalu	uated. Assumed Sig	gnificant. Surve	ys to be completed in 2012.		
			BAT-013		Monitoring Station Set Up	June 21, 2011	18:17	24°C, 70%CC, No precipitation, Wind 2 from E.	TAL, AMD
				Replacing memory and power supply for monitoring station	June 23, 2011	21:07	21°C, 100%CC, Rain, Wind 1 from SW	TAL, KNP, AGR	
	BMA- 0011	483			June 27, 2011	20:50	22°C, 95%CC, No precipitation, Wind 2 from SW.	IAR, KNP	
					July 2, 2011	15:10	28°C, 50%CC, No precipitation, Wind 1.	GKM, BM	
				Monitoring Station Removed	July 6, 2011	20:00		CM, KNP	
	BMA-012	470	n/a	Not Evalu	uated. Assumed Sig	gnificant. Surve	ys to be completed in 2012.		
				Monitoring Station Set Up	June 9, 2011	12:00	20°C, 100%CC, No precipitation, Wind 2 from NE.	CLH, JHL	
	BMA-013	BMA-013 437	BAT-010	Replacing memory and power	June 14, 2011	14:00	23°C, 10%CC, No precipitation, Wind 2 from NE.	JHL, BWW	
	DIVIA-013	437	BA1-010	supply for monitoring station	June 18, 2011	16:20	26°C, 5%CC, No precipitation, Wind 3 from NW.	BWW, KTC	
				Monitoring Station Removed	June 22, 2011	12:19	24°C, 40%CC, No precipitation, Wind 3 from SE.	TAL, KTC	
	BMA-014	534	BAT-016	Monitoring Station Set Up	June 23, 2011	17:37	21°C, 100%CC, No	TAL, KNP,	

							precipitation, Wind 2 from SW.	AGR	
Evening Visual Su	rveys		<u>.</u>	<u>+</u>	<u>.</u>	•	<u>.</u>		
					June 20, 2011	23:28 - 23:38 10 minutes	24°C, 50%CC, No precipitation, Wind 0.	TAL, AMD	
					June 21, 2011	22:50 - 23:00 10 minutes	25°C, 80%CC, No precipitation, Wind 3 from SE. Thunder and lightning in the distance.	TAL, AMD	
					June 24, 2011	22:37 - 22:47 10 minutes	17°C, 100%CC, No precipitation, Wind 1 from W.	TAL, KNP	
					June 25, 2011	22:20 - 22:30 10 minutes	16°C, 30%CC, No precipitation, Wind 0.	TAL, KNP	
	BMA-001	504	BTR-014	Visual Survey with Manual Acoustic Recording	June 27, 2011	22:27 - 22:37 10 minutes	22°C, 95%CC, Light rain starting at 22:30, Wind 2 from SW.	IAR, KNP	
					June 30, 2011	22:15 - 22:25 10 minutes	17°C, 0%CC, No precipitation, Wind 0.	KNP, CTK	
					July 1, 2011	21:07 - 21:17 10 minutes	21°C, 35%CC, No precipitation, Wind 0.	KNP,KTC	
					July 4, 2011	21:40 - 21:50 10 minutes	16°C, 10%CC, No precipitation, Wind 1 from S.	CM, KNP	
Quantitative assessment of					July 5, 2011	23:06 - 23:16 10 minutes	21°C, 50%CC, No precipitation, Wind 1 from NW.	CM, KNP	
bats at candidate maternity roosts					July 6, 2011	22:27 - 22:37 10 minutes	17°C, 20%CC, No precipitation, Wind 3 from SW.	CM, KNP	
	BMA-002	427	n/a	Not Evaluated. Assumed Significant. Surveys to be completed in 2012.					
	BMA-003	544	n/a	Not Evaluated. Assumed Significant. Surveys to be completed in 2012.					
					June 20, 2011	22:30 - 22:40 10 minutes	24°C, 50%CC, No precipitation, Wind 0.	TAL, AMD	
					June 21, 2011	23:21 - 23:31 10 minutes	25°C, 80%CC, No precipitation, Wind 3 from SE. Thunder and lightning in the distance.	TAL, AMD	
				Visual Survey with Manual	June 23, 2011	23:27 - 23:37 10 minutes	20°C, 100%CC, Rain, Wind 2 from SW.	TAL, KNP	
	BMA-004	541	BTR-011	Acoustic Recording	June 25, 2011	23:32 - 23:42 10 minutes	16°C, 30%CC, No precipitation, Wind 0.	TAL, KNP	
					June 27, 2011	23:26 - 23:36 10 minutes	22°C, 95%CC, No precipitation, Wind 2 from SW.	IAR, KNP	
					June 30, 2011	21:05 - 21:15 10 minutes	17°C, 0%CC, No precipitation, Wind 0.	KNP, CTK	
					July 1, 2011	21:34 - 21:44 10 minutes	21°C, 35%CC, No precipitation, Wind 0.	KNP,KTC	

					1		
				July 4, 2011	22:35 - 22:45 10 minutes	16°C, 10%CC, No precipitation, Wind 1 from S.	CM, KNP
				July 5, 2011	00:02 - 00:12 10 minutes	21°C, 50%CC, No precipitation, Wind 1 from NW.	CM, KNP
				July 6, 2011	21:30 - 21:40 10 minutes	17°C, 20%CC, No precipitation, Wind 3 from SW.	CM, KNP
				June 24, 2011	23:57 - 00:07 10 minutes	17°C, 100%CC, No precipitation, Wind 1 from W.	TAL, KNP
				June 25, 2011	22:56 - 23:06 10 minutes	16°C, 30%CC, No precipitation, Wind 0.	TAL, KNP
				June 26, 2011	23:45 - 23:55 10 minutes	16°C, 0%CC, No precipitation, Wind 0.	AMD, KNP
				June 27, 2011	22:58 - 23:08 10 minutes	22°C, 95%CC, Light rain, Wind 2 from SW.	IAR, KNP
	532		Visual Survey with Manual	June 30, 2011	21:43 - 21:53 10 minutes	17°C, 0%CC, No precipitation, Wind 0.	KNP, CTK
BMA-005	532	532 BTR-017	Acoustic Recording	July 1, 2011	22:08 - 22:18 10 minutes	21°C, 35%CC, No precipitation, Wind 0.	KNP, KTC
				July 4, 2011	22:08 - 22:18 10 minutes	16°C, 10%CC, No precipitation, Wind 1 from S.	CM, KNP
				July 5, 2011	23:34 - 23:44 10 minutes	21°C, 50%CC, No precipitation, Wind 1 from NW.	CM, KNP
				July 6, 2011	22:05 - 22:15 10 minutes	17°C, 20%CC, No precipitation, Wind 3 from SW.	CM, KNP
				July 7, 2011	21:00 - 21:10 10 minutes	19°C, 95%CC, No precipitation, Wind 0.	AMD, KNP
				June 2, 2010	20:57 - 21:07 10 minutes	100%CC, No precipitation, Wind 1 from N. Heavy rain with thunderstorms earlier in the day.	AGR, ACN
				June 3, 2010	21:15 - 21:25 10 minutes	17°C, 30%CC, No precipitation, Wind 3 from NW.	AGR
BMA-007	463	BTR-004	Visual Survey with Manual	June 7, 2010	21:39 - 21:49 10 minutes	11°C, 0%CC, No precipitation, Wind 2 from NW. Cool.	ACN, PWD
DIVIA-007	403	BTK-004	Acoustic Recording	June 8, 2010	21:20 - 21:30 10 minutes	15°C, 100%CC, No precipitation, Wind 2 from E.	PWD, MA
				June 10, 2010	22:11 - 22:22 10 minutes	17°C, 100%CC, No preciptiation, Wind 2 from N.	ACN, BK
				June 13, 2010	22:14 - 22:24 10 minutes	16°C, 100%CC, No precipitation, Wind 1 from NE.	ACN, BK
				June 14, 2010	22:35 - 22:45 10 minutes	19°C, 90%CC, No precipitation, Wind 1 from N.	ACN, BK

-	-	1					
				June 15, 2010	22:16 - 22:26 10 minutes	21°C, 80%CC, No precipitation, Wind 3 from E.	ACN, BK
				June 16, 2010	22:22 - 22:32 10 minutes	14°C, 100%CC, Light rain, Wind 5 from NW.	ACN, BK
				June 6, 2010	22:18 - 22:28 10 minutes	12°C, 90%CC, No precipitation, Wind 2. Wet, cool.	ACN, PWD
				June 7, 2010	00:16 - 00:26 10 minutes	11°C, 0%CC, No precipitation, Wind 2 from NW. Cool.	ACN, PWD
				June 8, 2010	23:52 - 00:02 10 minutes	15°C, 100%CC, No precipitation, Wind 2 from E.	PWD, MA
			Visual Survey with Manual	June 9, 2010	21:06 - 21:16 10 minutes	19°C, 90%CC, No precipitation, Wind 3 from S. Heavy rain started after end of survey.	ACN, BK
BMA-008	542	BTR-008	Acoustic Recording	June 10, 2010	20:45 - 20:55 10 minutes	17°C, 100%CC, No preciptiation, Wind 2 from N.	ACN, BK
				June 13, 2010	20:51 - 21:01 10 minutes	16°C, 100%CC, No precipitation, Wind 1 from NE.	ACN, BK
				June 14, 2010	21:14 - 21:24 10 minutes	19°C, 90%CC, No precipitation, Wind 1 from N.	ACN, BK
				June 15, 2010	20:53 - 21:03 10 minutes	21°C, 80%CC, No precipitation, Wind 3 from E.	ACN, BK
				June 16, 2010	21:01 - 21:11 10 minutes	14°C, 100%CC, Light rain, Wind 5 from NW.	ACN, BK
				June 9, 2011	00:05 - 00:10 10 minutes	11°C, 10%CC, No precipitation, Wind 1 from NW.	CLH, JHL
				June 10, 2011	20:33 - 20:43 10 minutes	16°C, 55%CC, No precipitation, Wind 3 from NW.	CLH, JHL
				June 13, 2011	21:26 - 21:36 10 minutes	15°C, 80%CC, No precipitation, Wind 3 from NW.	JHL, BWW
				June 14, 2011	23:20 - 23:30 10 minutes	12°C, 15%CC, No precipitation, Wind 0-1.	JHL, BWW
BMA-009	524	BTR-012	Visual Survey with Manual	June 15, 2011	00:20 - 00:30 10 minutes	75%CC, No precipitation, Wind 1 from S.	JHL, BWW
	-		Acoustic Recording	June 16, 2011	00:05 - 00:15 10 minutes	15°C, 20%CC, No precipitation, Wind 1.	JHL, BWW
				June 17, 2011	21:50 - 22:00 10 minutes	18°C, 10%CC, No precipitation, Wind 1.	BWW, KTC
				June 18, 2011	21:15 - 21:25 10 minutes	18°C, 10%CC, No precipitation, Wind 3 from NW.	BWW, KNP
				June 19, 2011	21:49 - 21:59 10 minutes	22°C, 20%CC, No precipitation, Wind 2 from SE.	KTC, AMD
				June 20, 2011	00:26 - 00:36	24°C, 50%CC, No precipitation,	TAL, AMD

					10 minutes	Wind 0.	
				June 21, 2011	22:14 - 22:24 10 minutes	25°C, 80%CC, No precipitation, Wind 3 from SE. Thunder and lightning in the distance.	TAL, AMD
				June 22, 2011	23:54 – 00:04 10 minutes	18°C, Light rain, Wind 1 from SW. Post-thunderstorm survey: some lightning in the distance.	TAL, KTC
BMA-010	492	n/a	Not Evalu	uated. Assumed S	Significant. Survey	s to be completed in 2012.	
				June 20, 2011	21:32 - 21:42 10 minutes	24°C, 50%CC, No precipitation, Wind 0.	TAL, AMD
				June 21, 2011	21:38 - 21:48 10 minutes	25°C, 80%CC, No precipitation, Wind 3 from SE. Thunder and lightning in the distance.	TAL, AMD
				June 23, 2011	21:29 - 21:39 10 minutes	20°C, 100%CC, Rain, Wind 2 from SW.	TAL, KNP
				June 24, 2011	21:11 - 21:21 10 minutes	17°C, 100%CC, No precipitation, Wind 1 from W.	TAL, KNP
BMA-011	483	BTR-013	Visual Survey with Manual Acoustic Recording	June 25, 2011	20:45 - 20:55 10 minutes	16°C, 30%CC, No precipitation, Wind 0.	TAL, KNP
			Acoustic Recording	June 27, 2011	20:50 - 21:00 10 minutes	22°C, 95%CC, No precipitation, Wind 2 from SW.	IAR, KNP
				June 30, 2011	23:33 - 23:43 10 minutes	17°C, 0%CC, No precipitation, Wind 0.	KNP, CTK
				July 1, 2011	23:32 - 23:42 10 minutes	21°C, 35%CC, No precipitation, Wind 0.	KNP,KTC
				July 4, 2011	00:00 - 00:10 10 minutes	16°C, 10%CC, No precipitation, Wind 1 from S.	CM, KNP
				July 5, 2011	21:43 - 21:53 10 minutes	21°C, 50%CC, No precipitation, Wind 1 from NW.	CM, KNP
BMA-012	470	n/a	Not Evalu	uated. Assumed S	Significant. Survey	s to be completed in 2012.	
				June 9, 2011	22:55 - 23:05 10 minutes	11°C, 10%CC, No precipitation, Wind 1 from NW.	CLH, JHL
				June 10, 2011	21:56 - 22:06 10 minutes	16°C, 55%CC, No precipitaiton, Wind 3 from NW.	CLH, JHL
BMA-013	437	BTR-010	Visual Survey with Manual	June 13, 2011	22:19 - 22:29 10 minutes	15°C, 80%CC, No precipitation, Wind 3 from NW.	JHL, BWW
			Acoustic Recording	June 14, 2011	00:10 - 00:20 10 minutes	12°C, 15%CC, No precipitation, Wind 0-1.	JHL, BWW
				June 15, 2011	23:38 - 23:48 10 minutes	75%CC, No precipitation, Wind 1 from S.	JHL, BWW
				June 17, 2011	21:10 - 21:20	18°C, 10%CC, No precipitation,	BWW, KTC

					10 minutes	Wind 1.	
				June 18, 2011	21:45 - 21:55 10 minutes	18°C, 10%CC, No precipitation, Wind 3 from NW.	BWW, KNP
				June 19, 2011	22:36 - 22:46 10 minutes	22°C, 20%CC, No precipitation, Wind 2 from SE.	KTC, AMD
				June 21, 2011	21:02 - 21:12 10 minutes	25°C, 80%CC, No precipitation, Wind 3 from SE. Thunder and lightning in the distance.	TAL, AMD
				June 22, 2011	23:13 - 23:23 10 minutes	18°C, Light rain, Wind 1 from SW. Post-thunderstorm surveys: some lightning in the distance.	TAL, KTC
BMA-014	534	n/a	Not Evalu	ated. Assumed S	ignificant. Survey	s to be completed in 2012.	



Appendix F

Ecological Land Classification (ELC) Abbreviations

Appendix F ELC Abbreviations

Cultural Thicket Communities

CUT1a:......Sour Cherry Mineral Cultural Thicket Type CUT1b:.....Nannyberry-Common Pear-Hawthorn Mineral Cultural Thicket Type CUT1e:.....Sandbar Willow Mineral Cultural Thicket Type CUT1f:.....White Elm-Buckthorn Mineral Cultural Thicket Type

Cultural Woodland Communities

CUW1a:Beech-Sugar Maple Mineral Cultural Woodland Type CUW1f:Common buckthorn – Apple – Trembling Aspen Mineral Cultural Woodland Type CUW1h:White Elm Mineral Cultural Woodland Type CUW1o:.....White Pine – Scot's Pine – Black Walnut Cultural Woodland Type

Cultural Savannah Communities

CUS1a:White Pine-White Ash Mineral Cultural Savannah Type

Forest Communities

FOD4a:Dry-Fresh White ash-Beech Deciduous Forest Type FOD7b:Fresh-Moist Basswood – Sugar Maple Lowland Deciduous Forest Type



Appendix G

Wildlife Species List

Appendix G. Wildlife Species List

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Туре	COMMON NAME	SCIENTIFIC NAME	Global Status G Rank	Ontario Status S Rank	COSEWIC	SARA Status	SARA Schedule	COSSARO (SARA Status)2	Species at Risk - Provincial (a)	Provincially Rare (NHIC breeding season SRANK) (b)	PIF Priority Species. Identified in Partners in Flight Ontario BCR 13 Landbird Conservation Plan	Area-sensitive - OMNR (c)	Significant in Region 6 (south-central)	Significant in Region 7 (south)	REGIOIN LEVEL	REGION HABITAT
Amphibian	Spotted Salamander	Ambystoma maculatum	G5	\$4										(000000)		
Amphibian	Eastern Red-backed Salamander	Plethodon cinereus	G5	S5												
Amphibian	Gray Treefrog (tetraploid species)	Hyla versicolor	G5	S5												
Amphibian	Spring Peeper	Pseudacris crucifer	G5	S5			-									-
Amphibian	Green Frog	Rana (Lithobates) clamitans	G5	S5												
Amphibian Brid	Wood Frog Canada Goose	Rana (Lithobates) sylvatica	G5 G5	S5 S5			ł									
Bird	Mallard Duck	Branta canadensis Anas Platyhynchos	G5	\$5 \$5			1									
Bird	Turkey Vulture	Cathartes aura	G5	S5B											Level 3	Forest
Bird	Northern Harrier	Circus cyaneus	G5	S4B							V	A			Level 4	Marsh
Bird	Red-tailed Hawk	Buteo jamaicensis	G5	S5							,	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			ECVCI 4	Maron
Bird	American Kestrel	Falco sparverius	G5	S4											Level 2	Open Country
Bird	Killdeer	Charadrius vociferus	G5	S5B,S5N												
Bird	American Woodcock	Scolopax minor	G5	S4B											Level 4	Forest
Bird	Mourning Dove	Zenaida macroura	G5	S5												
Bird	Great Horned Owl	Bubo virginianus	G5	S4												
Bird	Ruby-Throated Hummingbird	Archilochus colubris	G5	S5B											Level 3	Forest
Bird	Red-Bellied Woodpecker	Melanerpes carolinus	G5	S4											Level 2	Forest
Bird	Downey woodpecker	Picoides pubescens	G5	S5												
Bird	Hairy Woodpecker	Picoides villosus	G5	S5								A				
Bird	Northern Flicker	Colaptes auratus	G5	S4B							N					_
Bird	Eastern Wood-Pewee	Contopus virens	G5	S4B							√				1	F
Bird	Least Flycatcher	Empidonax minimus	G5	S4B							1	A			Level 3	Forest
Bird	Great Crested Flycatcher	Myiarchus crinitus	G5	S5B S4B			<u> </u>				-1				Louis 2	Open Court
Bird	Eastern Kingbird	Tyrannus tyrannus Virop divacous	G5 G5	S4B S5B			<u> </u>				N				Level 3	Open Country
Bird Bird	Red-eyed Vireo Blue-headed Vireo	Vireo olivaceus	G5 G5	S5B S5B			<u> </u>		<u> </u>		1	A	Y	v	Level 3	Forest
Bird		Vireo solitaries	G5	S5B S5			<u> </u>	+	ł	1	1	м		T	Level 3	FUIESL
Bird	Blue jay American Crow	Cyanocitta cristata Corvus brachyrhynchos	G5	55 S5B			<u> </u>	+	ł	1	1		+		ł	+
Bird	Horned Lark	Eremophila alpestris	G5 G5	S5B S4N			1	1							Level 3	Open Country
Bird	Barn Swallow	Hirundo rustica	G5	S4B											Level 3	Open Country
Bird	Tree Swallow	Tachycineta bicolor	G5	S4B			ł	1	1				1		207010	open country
Bird	Black-capped Chickadee	Poecile atricapillus	G5	S5											Level 4	Forest
Bird	White-breasted Nuthatch	Sitta carolinensis	G5	S5								А			201011	1 01001
Bird	Red-breasted Nuthatch	Sitta canadensis	G5	S5								A			Level 3	Forest
Bird	House Wren	Troglodytes aedon	G5	S5B												
Bird	Wood Thrush	Hylocichla mustelina	G5	S4B											Level 4	Forest
Bird	American Robin	Turdus migratorius	G5	S5B												
Bird	Gray Catbird	Dumetella carolinensis	G5	S4B											Level 4	Forest
Bird	Cedar Waxwing	Bombycilla cedrorum	G5	S5B												
Bird	Yellow Warbler	Dendroica petechia	G5	S5B												
Bird	Magnolia Warbler	Dendroica magnolia	G5	S5B								A		Y	Level 1	Forest
Bird	Yellow-rumped Warbler	Dendroica coronata	G5	S5B										Y	Level 4	Forest
Bird	American Redstart	Setophaga ruticilla	G5	S5B								A			Level 2	Forest
Bird	Common Yellow Throat	Geothlypis trichas	G5	S5B												
Bird	Oven Bird	Seiurus aurocapillus	G5	S4B								A			Level 4	Forest
Bird	Rose-breasted Grosbeak	Pheucticus Iudovicianus	G5	S4B							√					
Bird	Indigo Bunting	Passerina cyanea	G5	S4B			-									-
Bird	Northern Cardinal	Cardinalis cardinalis	G5	S5			-								1	0
Bird	Field Sparrow	Spizella pusilla	G5 G5	S4B S4B							, ,				Level 3	Open Country
Bird Bird	Vesper Sparrow	Pooecetes gramineus	G5 G5	S4B S4B							, ,	A			Level 2 Level 3	Open Country Open Country
Bird	Grasshopper Sparrow	Ammodramus Savannarum	G5	S4B							7	A			Level 3	
Bird	Savannah Sparrow Song Sparrow	Passerculus sandwichensis Melospiza melodia	G5	S5B							v	A			Level I	Open Country
Bird	Lincoln's Sparrow	Melospiza lincolnii	G5	S5B									Y	Y		
Bird	White Throated Sparrow	Zonotrichia albicollis	G5	S5B			1								Level 2	Forest
Bird	Dark-eyed Junco	Junco hvemalis	G5	S5B									Y	Y		
Bird	Baltimore Oriole/ Northern Oriole	Icterus galbula	G5	S4B			1				\checkmark					
Bird	Red-Winged Blackbird	Agelaius phoeniceus	G5	S4												
Bird	Brown-headed cowbird	Molothrus ater	G5	S4B												
Bird	Rose-breasted Grosbeak	Pheucticus Iudovicianus	G5	S4B							√					
Bird	American Goldfinch	Cardeulis tristis	G5	S5B											Level 3	Open Country
Butterfly	American/Bronze Copper	Lycaena phlaeas/hyllus	G5	S5												L
Butterfly	Cabbage White	Pieris rapae	G5	SNA												
Butterfly	Common Sulphur AKA Clouded Sulpher	Colias philodice	G5	S5			ļ									1
Butterfly	Eastern Comma	Polygonia comma	G5	S5		~~							ļ			
Butterfly	Monarch	Danaus plexippus	G5	S2N,S4B	SC	SC	Schedule 1	SC			l		+			+
Butterfly	Pearl Crescent	Phyciodes tharos	G5	S4							l					+
Crayfish	Chimney Crayfish AKA Digger Crayfish	Fallicambarus fodiens	G5	S4				1			l					1
nsect	Annual Cicada Canada Darner	Tibicen pruinosa Aeshna canadensis	no data available G5	no data available												
nsect				S5 no data available			<u> </u>		<u> </u>		1			[l	
nsect nsect	Carolina Grasshopper Common Green Darner	Dissosteira carolina Anax junius	no data available G5	no data available S5			<u> </u>	+	l				+		<u> </u>	+
nsect Vammal	Common Green Darner Coyote	Canis latrans	G5 G5	\$5 \$5			<u> </u>	+	ł	1	1		+		ł	+
Varnnai Mammal	Black Bear	Ursus americanus	G5 G5	\$5 \$5	NAR		1	NAR								1
Varininai Vammal	Racoon	Procyon lotor	G5 G5	\$5 \$5	14/513		1	INCALA								1
Mammal	Eastern Chipmunk	Tamias striatus	G5	S5			<u> </u>	t	l				<u> </u>			1
Mammal	Least Chipmunk	Tamias minimus	G5	S5			1	1	1				1		1	1
Vammal	Grey Squirrel	Sciurus carolinensis	G5	S5			ł	1	1				1		1	1
Vammal	Red Squirrel	Tamiasciurus hudsonicus	G5	S5			1	1		İ						1
Vammal	White-tailed Deer	Odocoileus virginianus	G5	S5			İ	1		İ	1					1
	Meadow Vole	Microtus pennsylvanicus	G5	S5			1	1		İ						1
Mammal				S3			1	1	i i i i i i i i i i i i i i i i i i i				1		1	1
Mammal Reptile	Snapping turtle	Chelydra serpentina	G5													
		Chelydra serpentina Thamnophis sirtalis sirtalis	G5 G5T5	\$5 \$5												
Reptile	Snapping turtle															

^a National Species at Risk are those listed by COSEWIC = Committee on the Status of Endancered Wildlife in Canada
^b SRANK (from Natural Heritace Information Centre) shown for breeding status if: S1 (Critically Imperiled, often < 5 occurrences), c Ontario Ministry of Natural Resources (OMNR), 2000. Significant Wildlife Habitat Technical Guide (Appendix G). 151 p plus appendices.</p>

AECOM



Appendix H

Vascular Plant Species List

	6201WJ8103		CUP3-2
	9201WJ8 864	-98	FOD5-2
		195 4	
	495 BLW1542		SWT2-2
	493/ 496 BLW1502	493/ 496	CUM1-1
		-	S-SMAM
	BT3	492	FOD7
	492 BLW1078	492	FOD6-5
		_	-
	490 BLW1031	490	CUP3-9
	488 BLW1601	488	CUM1-1
	487 BLW1023/1032		COL1P EOD2-5
		487	
	487 BLW1023	-	CNb3-5 2MD5-5
	484 BLW1438	484	2 20///S
	484 BLW4737	4	FOD7-2
	483 BLW1089	483	FOD6-5
		_	SWD3-2
	481 BLW1085	481	FOD5-1
	480 BLW1011	Ì	61T1e
	480 BLW1011		CUS1
	480 BLW1011		FOD6-5
	480 BLW1011		CUM1-1
	480 BLW1085/1074	_	61WU3
	480 BLW1085/1074	480	CUM1-1
	480 BLW1085/1074		01-SMAM
	480 BLW1085/1074		61TU3
	480 BFM1254		FOD5-7
	480 BLW1499		CUM1-1
	480 BLW1011		CUM1-1
	412 BLW1005	475	FOD5-2
			5-700F
	410 BLW1450	470	r-imuo
	1522/1055		5-700-1
	1222/1025 463 BLW1497/1521/	~	EOD5-8
	463 BLW1497/1621/	463	FOD5-8
	463 BLW1053		EODe 6 EODe-1
~	462 BFM1022	462	FODE 1
extera - Bluewater Study Area		4(
Ā	460 BLW1619	460	FOM3-1
Š	460 BLW1619		11TUO
pr	469 BLW1557	459	FOD7-2
ы Ц	001 1 1175 001	456	L-SODS
5	426 BLW1455	4	FOD4a / SWD2-2 /
ē	450 BLW167	0	CUP3-2
a,	420 BLW1067	450	FOD5-1
Š	445 BLW1063		SWT2-10
ň	442 BLW1459/1063	442	CUW1F
8	442 BLW1459/1063		CUM1-1
	439 BLW1854/1856	439	FOD7-2
ra		7 4	
ē	437 BLW1082	437	SWD3-3
X	427 BLW1819	427	FOD7-2
	426 BLW1813	126	8DM3
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Appendix H. Plant Species List	Coefficient of Conservatistim Provincial Status Conservatistim Wetness Index Wetness Index Provincial Status Conservatistim Wetness Index Methess Index Conservatistim Methess Index Methess Index Met		Oldham et al Oldham et al Newmaster Newmaster

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COMMON NAME			FERNS & ALLIES Wood Fern Family	Jorthern Lady Fern	Spinulose Wood Fern Everareen Wood Fern	Aarginal Wood Fern	Ostrich Fern Sensitive Fern	Christmas Fern	ield Horsetail	Scouring-rush Meadow Horsetail	Iorestail species	Marsh Fern Family	New York Fern CONIFERS	ine Family	arriarack Jorwav Spruce	White Spruce	Colorado Spruce Austrian Pine	ked Pine	castern White Pine	Eastern Hemlock	edar ramity astern Red Cedar	astern White Cedar	Aaple Family	Red Maple	Sugar Maple	lanitoba Maple	Freeman's Maple	streen Amaranth Breen Amaranth	Sumac or Cashew Family Stachorn Sumac	Poison-ivy	lonewort		Vild Parsnip Dodbane Family	ndian Hemp	temp species Duchman's-pipe Family	Vild Ginger	Swamp Milkweed	Composite or Aster Family	Common Yarrow	vnite Snakeroot Common Raqweed	Common Burdock	oren's Beggar-ticks	Brown Knapweed Chicery	Canada Thistle
BOTANICAL NAME				emina var. angustum	carthusiana (intermedia	tinalis	struthioptens (oides		var. affine	species Friend American States and American St			L	abies			resinosa		lensis	Eiter E	occidentalis			saccharmum		freemanii	retroflexus (C		radicans ssp. negundo	canadensis F		sativa	cannabinum	SS	canadense	ta ssp. incarnata	synaca (ar. millefolium	artemisiifolia 000 000 000 000 000 000 000 000 000 0	minus		jacea E	
BO			PTERIDOPHYTES Drvonteridaceae	Athynum	Dryopteris	Dryopteris	Matteuccia Onoclea	Polystichum	Equisetum	Equisetum Equisetum	Equisetum	Thelypteridaceae	GYMNOSPERMS	Pinaceae	Picea	Picea	Pinus	Pinus	Pinus	Tsuga	Juniperus		Aceraceae	Acer	Acer	Acer	Acer X	Amaranthaceae	Anacardiaceae	Toxicodendron	Cryptotaenia	Daucus	Pastinaca Apocvnaceae	Apocynum	Apocynum Aristolochiaceae	Asarum	Asciepiauaceae	Asciepias	Achillea	Ageratina Ambrosia	Arctium	Bidens	Centaurea	Cirsium

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x H. Plant Species List	BOTANICAL NAME COMMON NAME			Ideare Bull Thistle Dadensis Horseweed	nus niladelphicus ssp. philadelphicus Philadelphia Fleabane			graminifolia Elat-topped Bushy Goldenrod	n B	Species Lettuce species	minis prioritation prioritatio	vulgare Ox-eye Daisy Daubercula Balsam Groundsel		rta Black-eyed Susan	tissima Tall Goldenrod Blue-stemmed Goldenrod	anadensis Canada Goldenrod	exicaulis Zig-zag Goldenrod	ncea Early Goldenrod	. nemoralis	vensis ssp. arvensis Eield Sow-thistle	ordifolium Heart-leaved Aster	ricoides White Heath Aster	nceolatum Tall White Aster	iovae-angliae New England Aster Nilosus Hairy Aster	Inceum Purple-stemmed Aster	officinale Common Dandelion	ninosum Spiny Cocklebur	I ouch-me-not Family Spotted Touch-me-not	Diraconteridore	andrordes Ende Contosti Aftatum May-apple	Birch Family I vallow Birch	2	aroliniana Blue Beech cainiana Hop Hornbeam - Ironwood	Borage Family	Ifficinale Euleweed.common vipersougloss	Mustard Family Garlie Mustard	vulgaris Vencoret Vencoret	nata	phylla Broad-leaf Toothwort	ensylvanica Pensylvania bitter-cress atronalis Dame's Rocket	asturtium-aquaticum Water-cress	Tarica Tarian Honevsuckle		canadensis
Appendix H.	BOTANIC			Cirsium Vu.	Erigeron an	Erigeron str. Eupatorium per	Eupatorium me	Euthamia gro	Hieracium ca Inula		Lactuca	Leucanthemum vul Packera	Prenanthes alt	Prenarures Rudbeckia hirt	Solidago alt. Solidago cau	Solidago car	Solidado file. Solidado		Solidado Spie Solidado nei	Sonchus an	Symphyotrichum	Symphyotrichum en Symphyotrichum lati	Symphyotrichum	L L	Symphyotrichum pu. Tanacetum	Taraxacum offi	Xanthium spi	Balsaminaceae cat	Berberidaceae	Podophyllum per	Betulaceae Retrifa	Betula	Carpinus ca Ostrva virc	Boraginaceae	0		Barbarea	Cardamine bu Cardamine cou	Cardamine	Cardamine De Hesperis ma	Rorippa nas	Lonicera		Sambucus

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492 EOD6-5

490 CUP3-9

1001 /1301WJ8 808

1601WJB 905

1601WJB 903

204 BFM1245 204 BFM1245 6701 BLW1079 6701 BLW1079 498 BLW1075

495 BLW1542

493/ 496 BLW1502 BT3

492 BLW1078

490 BLW1031

Appendix H. Plant Species List

Nextera - Bluewater Study Area

1501W 18 005	4	CIIE3-9					
488 BLW1601	488	CUM1-1 CUT1b					
487 BLW1023/1032	487	FOD5-2					
487 BLW1023	₩	CUP3-2					
484 BLW1438	484	2MD5-2		7			
484 BLW4737	4	EOD3-3 FOD7-2	⊢	F	H	H	Η
483 BLW1089	483	FOD6-5					
		SWD3-2					
481 BLW1085	481	FOD5-1					
480 BLW1011		SUT1e					
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480 BFM1011		EOD6-5 CUM1-1	┝	⊢	H	-	Η
480 BLW1085/1074		61WU3	⊢	H	H	Н	Η
480 BLW1085/1074	480	CUM1-1					
480 BLW1085/1074		01-SMAM					7
480 BLW1085/1074		61TU3					
480 BLW1524		FOD5-7	L	L		H	_
480 BLW1499 480 BLW1011		CUM1-1 CUM1-1	┝	-	⊢	H	-
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475 BLW1005	47	FOD5-2 FOD7-2	L	L			
410 BLW1450	470	CUM1-1					
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1222/1022 463 BFM1467/1521/	0	FOD5-8					
463 BLW1022	463	FOD5-8				٨	
463 BLW1055		FOD5-1					
462 BLW1555	462	5-7007	ſ		ſ		T
6191WJ8 094	-	FOM3-1				Η	H
460 BLW1619	460	CUT1f					
469 BLW1557	459	EOD7-2					Т
		FOD5-7	F	H	۲	Η	Η
426 BLW1455	456	SWD2-2 /					
420 BLW1067	-	EOD49 / COP3-2	⊢	H	H	Н	Н
2901/M18 097	450	EOD2-1			H	H	Η
445 BLW1063		SWT2-10	⊢	H	H	H	Η
442 BLW1459/1063	442	CUW1F					
442 BLW1459/1063		r-imuo					
439 BLW1854/1856	139	5-700F					
437 BLW1082	37 4	2-EDW2					Η
	7 43		⊢	L	H	H	Н
427 BLW1819	427	FOD7-2					
426 BLW1813	426	8DM3					
County		£661				×	\times
Local Status Huron		Oldham	┝	-	⊢	H	Η
Sutet2 ledol		Newmaster		G5		G5	GS
COSEWIC Status			┝	H	H	H	Η
sutet2 2IW3202			⊢	⊢	H	Η	Н
Provincial Status		Newmaster	⊢	S4	H	S5	SS
			L	S		S	S
xebnl szenteW xebnl szenibeeW		Oldham et al Oldham et al	┝	0	H	ĥ	2
		le te medhlO	⊢	F	H	Ŷ	Ϋ́
Conservatistm		Oldham et al		ß		ო	ო
Coefficient of							
COMMON NAME			Catbrier Family	Herbaceous Carrion Flower	Cattail Family	Narrow-leaved Cattail	Broad-leaved Cattail
BOTANICAL NAME				herbacea		angustifolia	latifolia
			Smilacaceae	Smilax	Typhaceae	Typha	Typha

FLORISTIC SUMMARY & ASSESSMENT

70.94% 29.06%

351 249	102	10000	3.51%			234		4.39	76	145	28	0	69.27		-1.67	53	30	19		0.67	90	76	50	70	04
		Region, Source)		ICIES			Co-efficient of Conservatism and Floral Quality Index	sm (CC) (average)	lowest sensitivity	moderate sensitivity	high sensitivity	highest sensitivity	0	vasive Species		low potential invasiveness	moderate potential invasiveness	high potential invasiveness	ecies						
Species Uiversity Total Species: Native Species:	Exotic Species	Total Taxa in Region (List Region, Source)	% Kegional Taxa Kecorded	Regionally Significant Species	o 1-oo opecies S4 Snecies	S5 Species	Co-efficient of Conserva	Co-efficient of Conservatism (CC) (average)	CC 0 to 3	CC 4 to 6	CC 7 to 8	CC 9 to 10	Floral Quality Index (FQI)	Presence of Weedy & Invasive Species	mean weediness	weediness = -1	weediness = -2	weediness = -3	Presence of Wetland Species	average wetness value	upland	facultative upland	facultative	facultative wetland	philant atomic

30.52% 58.23% 11.24% 0.00%

51.96% 29.41% 18.63%

25.64% 21.65% 14.25% 19.94% 14.25%

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BOTANICAL NAME	COMMON NAME	Coefficient of Conservatistm Wetness Index	Weediness Index Provincial Status	Global Status COSEWIC Status	510 BLW1049	0101W18 013 610 BLW1679	512 BLW1656 512 BT3 512 BT3	B11 214 BFM1028 214 BFM1028 214 BFM1020	218 BLW1005 518 BLW1056/1047 518 BLW1056	624 BLW1002 620_BT2	232 BLW1087	234 BFM1069/1028 235 BFM1048/1082 235 BFM1202	234 BFM1028/1000 234 BFM1028/1000 234 BFM1022	232 BFM1086/1016 234 BFM1642	239 BFM1428 235 BFM1032/1016	291 BLW1065 541 BLW1508	241 BFM1062 241 BFM1062 241 BFM1062	244 BFM1210 245 BFM1056 245 BFM1056	814 842 [–] 87M1479	8T4 BT4	8T8 8T5	8T13 8T13	8713 87138
					5.	10	512	514	518	520 524	525	532	534	5	37 539	541		542 544	545 551	552 553	555 556	561 562	563 564/565
		Oldham et al Oldham et al	Oldham et al Newmaster	Newmaster	2MD 1 EOD2-1 EOD9-2	2MD5-5 EOD6-2 2MD3-3	SMAM FOD7	COM4 2MD3 2MD3 WWWS-5	EOW3-5 CNW1-1 EOD2-5	EOD2-1 EOD2	SWT2-5 FOD5-1	FOD5-1 FOD5-10 FOD5-1	EOD2-5 2MD3-3 2MD3-3 2MD3-3	EOD2-5 2MD3-3	EOD2-4 EOD2-6	SWT2-2 CUP2-1 SWD2-2 FOD5-6	EOD7-1 FOD7b CUW1h	EOD2-1 EOD2-5 2MD4	EOM2 FOD5-2	CUP3 CUW10	EOD2-2 EOD2-2 EOD3-2	2MD4-5 EOD2-5 2MD3-3	MAM2 CUP3
	FERNS & ALLIES Wood Fern Family																						
lix-femina var. angustum	Northern Lady Fern	4 0	S5	G5T	2	H	Ħ			F	H	H	╞	H	Ħ					Π	H	H	Н
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ivense	Horsetail Family Field Horsetail	0	T	G5		2	╞				~					~							-
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subours	Eastern White Pine		S5	<u>G5</u>	E	Ħ	Ħ		E			H	╞		E	7		V	~	F			┝
	Scotch Pine		-3 SE5	62									>						~	~			+
S	Eastern Hemlock Cedar Family	ک ک	Я	3					>								>			+	+		+
irginiana	Eastern Red Cedar			G5	E	Ē	Ħ		E	F	E	H	╞	╞	>	~	E	╞		F	F		┝
occidentalis	Eastern White Cedar	П		G5	H	H	~ ~	>		H		H	╞	H	7	~					H	7	7
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	Custaturapple railing		53		f	F	ŧ			$\left[\right]$	F	F		╞		~		F		F	F		┝
	Carrot or Parsley Family					F	F					F											
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a	Cariada Tristie	0	010	2]									~	~			
	nira var. angustum elsena alatsa alatsa alatsa alatsa alatsa alatsa bersis else ensis ensi	FERNS & ALLIES Inviention ver, and ustum Nothern Lash Fern Inviention Nothern Lash Fern Nothern Lash Fern Nothern Lash Fern Nothern Lash Fern Statich Fern Nothern Lash Fern Statich Fern Arrendia Statich Fern Nothern Lash Fern Statich Fern Arrendia Statich Fern Arrendia Statich Fern Arrendia Massion Morentials Distribution Statich Fern Arrendia Massion Morentials Distribution Massion Morentials <td>Pierens Saluties Saluties Allies Outham et al. Rine var, anoustum Nool Ferni Jay Nool Ferni Jay 9 9 Rine var, anoustum Nool Ferni Jay Nool Ferni Jay 9 9 Rine Saluties Erens & Allies Fernis 9 9 Rine Saluties Ferni Nool Ferni Jay 7 7 7 Rine Saluties Ferni Contactions Nool Ferni Jay 7 7 Rine Saluties Ferni Constance Ferni Nool Ferni Jay 7 7 Rine Saluties Ferni Maxsh Ferni Juk Nool Ferni Juk 7 7 Rine Saluties Maxsh Ferni Juk 7 7 7 Rine Saluties Maxsh Ferni Juk 7 7 7 Rine Saluties Nool Ferni Juk 8 8 8 8 Rine Saluties Contract Saluties 8 8 8 8 8 Rine Saluties Contract Saluties Nool Ferni Juk 7 7 7 Rist</td> <td>FEINS & ALLIES Oldname et al allo Alloname et al oldname et al sinta Alloname et al allo Alloname et al bloname et al allo Alloname et al oldname et al alloname et al a</td> <td>Image: Section of the first sectin second section of the first section of the first section</td> <td>Product in the form of the form</td> <td>Main Main <th< td=""><td>Image: constraint in the second of</td><td>Mathematical and and and and and and and and and and</td><td>Result Result Result<</td><td>Image: constraint of the second of</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<></td>	Pierens Saluties Saluties Allies Outham et al. Rine var, anoustum Nool Ferni Jay Nool Ferni Jay 9 9 Rine var, anoustum Nool Ferni Jay Nool Ferni Jay 9 9 Rine Saluties Erens & Allies Fernis 9 9 Rine Saluties Ferni Nool Ferni Jay 7 7 7 Rine Saluties Ferni Contactions Nool Ferni Jay 7 7 Rine Saluties Ferni Constance Ferni Nool Ferni Jay 7 7 Rine Saluties Ferni Maxsh Ferni Juk Nool Ferni Juk 7 7 Rine Saluties Maxsh Ferni Juk 7 7 7 Rine Saluties Maxsh Ferni Juk 7 7 7 Rine Saluties Nool Ferni Juk 8 8 8 8 Rine Saluties Contract Saluties 8 8 8 8 8 Rine Saluties Contract Saluties Nool Ferni Juk 7 7 7 Rist	FEINS & ALLIES Oldname et al allo Alloname et al oldname et al sinta Alloname et al allo Alloname et al bloname et al allo Alloname et al oldname et al alloname et al a	Image: Section of the first sectin second section of the first section of the first section	Product in the form of the form	Main Main <th< td=""><td>Image: constraint in the second of</td><td>Mathematical and and and and and and and and and and</td><td>Result Result Result<</td><td>Image: constraint of the second of</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Image: constraint in the second of	Mathematical and and and and and and and and and and	Result Result<	Image: constraint of the second of												

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Appendix H.		Plant Species List	-is	ب				Ň	exte	- La	Bluev	Nextera - Bluewater Study Area	Stu	dy A	rea																		<u> </u>	AECOM
BOTA	BOTANICAL NAME	соммои и Аме	Coefficient of Conservatistm	xəbnl szəntəW xəbnl szənibəəW	Provincial Status OMNR Status	COSEMIC Status	Global Status 510 BLW1049	210 BLW1010	0101WJ8 018 670 BLW1010	512 BT3	214 BFM1020 214 BFM1020 215 BL3	814 BLW1658	218 BLW1056/1047 518 BLW1056	620_BT2 618 BLW1005	254 BFM1005	232 BLW1047	235 BLW1505 532 BLW1505	234 BLW1069/ 1058 232 BLW1048/1087	234 BLW1058/1069 534 BLW1057	234 BFM1642 234 BFM1642	6101/9801WJB 752	233 BFM1428 235 BFM1032/1016	8051W18 142	241 BFM1062 241 BFM1062 241 BFM1062	245 BFM1056 241 BFM1062	642 BLW1029	244 BFM1479	874	BT4 BT4	eta ata	BT5 BT12	втіз	8T13	81138
				E	┢			510		512		514	518	8 520	524	525	532	H	534		537	539	541		ω	542 54	544 545	551	552 553	555	556 561	562	563 56	564/565
			ls te mertblO	ls tə marblO Oldham et al	Newmaster		Rewmaster	2MD3-3 2MD4 EOD2-1	2MDS-5 EOD6-2	WWWS 2MC1 \	EOD7 FOD7	EOD2 CAM4 2MD3 2MD3	COMI-1 EOD2-5	EOD2 EOW3-5	EODS-1	FOD5-1	FOD5-1 SWT2-5	FOD5-10 F-2DD5-10	2MD3-3 2MD3-3 2MD3-3	2MD3-3 2MD3 EOD2-5	ZMD3-3 EOD2-5	EOD2-4 EOD2-6	FOD4-2 / SWT2-2 CUM1-1 / CUP2-1 FOD5-4 / SWD2-2 FOD5-1 / FOD5-6	FOD7b CUW1h FOD7b	EOD7-1	FOD5-2	EOD2-5 EOD2-1	EOM2	CUP3 CUW10	EODe e EOD-2	2MD3-3 EOD2 EOD2-2	2MD4-5 EOD2-5	CUP3	SMAM
Cirsium	vulgare canadensis	Bull Thistle Horseweed	c	4 -1	SE5 S5		35	~	~		╞	ļ	╟	╟	F	Ħ	~	\square	Ħ	H	Ħ	F	2	╞╪			\square	╓	H	Ħ			$\left \right $	Π
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Eurybia	macrophylla	Spotted Joe-pye-weed Large-leaved Aster	20	٩	R R	ن از		T	f	Ħ	Ħ	H	╞	-	П	\mathbf{T}	Ħ	F	Ħ	॑	T	Ħ	~		~		Ħ	H	\mathbb{H}	╞	+		Н	Π
Euthamia Hieracium	graminifolia caesninsum	Flat-topped Bushy Goldenrod	2	-2-2-	SE5		35		Ŧ		+		+	+	Ţ		+		+	f		1	>	~					ſ					
Inula	helenium	Elecampane	Π	5 -2	SE5		25	∏	H	Π			∄	╞	Π	∄	Ħ	П	Ħ	H	Π	Π		Ħ	H	╢	Π	\parallel	H	∄	$\left \right $	Π	H	Π
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Leucanthemum	vulgare	Ox-eye Daisy	ľ	7	SE5			H	H	H	Ħ	H	H	╟	П	H	Ħ	H	Ħ	H	Ħ	Ħ			H	>	H	H	Ц	Ħ			H	Π
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Prenanthes	altissima	White lettuce	5	П	S	Ú	5?	Ӈ	H	Ħ	Ħ	H	╞	╞┤	П	∄	Ħ	Н	H	H	Π	Ħ		Ħ			Π	∏	H	Ħ			H	
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Solidago	juncea	Early Goldenrod	e	Π	SS		35	Ħ	H	Ħ	H		∄	╞┤	Π	Ӈ	Ħ	H	Ħ	H	Ħ	Ħ		Ħ	H	H	Π	H	H	Ħ			H	Π
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Symphyotrichum	latentlorum	Calico Aster	<i>с</i> о с		SS	ÖČ	5T5		2			ļ		╞	Ţ	ľ		-	2	H	~	Ŧ	ſ				7		H				+	
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Symphyotrichum	pilosus	Hairy Aster	4		SS	ບັບ	572	╞	Ŧ			\square	╞┼	╞┼	Ţ	┢	Ħ	+	-	Ŧ	T	ļ			-		ļ		\square				+	Т
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Balsaminaceae		Touch-me-not Family		>		1	ſ		f	Γ						T	Ħ			f								t	H				Η	Π
Impatiens Berberideeeee	capensis	Spotted Touch-me-not	4	ņ	Я	4	35	>	~		╡	~	╡	╡	~		1	+	~	┫	>	1	7	-	7		1		-	1			╉	T
Caulophyllum	thalictroides	Blue Cohosh	9	5	SS	Ĭ	7 0	7	2	Ħ	Ħ	H	H	2	2	7	7	7	7	H	2	7	~	7		~	ļ	H	H	Ħ	Н		Н	Π
Podophyllum	peltatum	May-apple	T		ઝ	1	55	1	╉		+	ļ	>	╡	1	~	7	7	7	┦	1	1		†	1	1	ļ		┦	╡	+		╉	T
Betulaceae	alleqhaniensis	Yellow Birch	9		S5		55 1	t	>	t	F	Ĺ	t	>	F	t	t	F	7	f	t	t	~	ľ		t	F	t	F	t	ŀ		t	Γ
Betula	papyrifera	White Birch	П	Π	SS		35	Ħ	H	Ħ	Ħ	╟	Ħ	Ħ	П	Ħ	Ħ	H	Ħ	H	Ħ	Ħ		Ħ	H	Í	-	H	Н	Ħ	μ		H	Π
Carpinus Ostrva	caroliniana virdiniana	Blue Beech Hop Hornbeam - Ironwood	94	04	ავ	ن و.	55		~ ~				+	+	~	>	7		~	╀	>	~	~ ~				~		+		7			
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Echium Lithospermum	vulgare	Blueweed/common vipersbugloss		5 -2	SE5 SE5				Ŧ		+	ſ	╈	+	Ţ	╈	+	Ŧ	+	f	ļ	ļ		+	+	╈	+		ł	1	╀		╉	T
Brassicaceae	onomano	Mustard Family					ſ	ť	f	T				Ħ	Π	Ħ	Ħ	H	H	H		ľ		Ħ			F			t			Η	Π
Alliaria	petiolata	Garlic Mustard	ļ	ώ.	SE5		35 <	╈	~		>	$\left \right $	>	23	Ţ	~	7	7	>	~	~	7	7	╞	+	~	7	~	~		+		╉	Т
<u>Cardamine</u>	huldans	Pulbour Kocket Bulbous Cress	Т	-	CH2		22	t	╀				\pm	>	Ţ		-	+	+	f	Ţ	ļ		╞			Ţ		ļ	t	_		+	T
Cardamine	concatenata	Cut-leaved Toothwort	9	n N	SS		35	╞	H	∐	Ħ	H	╞	╞	П	∄	Ħ	Н	H	H	∏	Π		Ħ			Π	╞	H	Ħ			H	Π
Cardamine	diphylla ponetytranico	Broad-leaf Toothwort	7 3	Т	សូន		4		╉		+	$\left[\right]$	╈	╈	Ţ	~	7	Ŧ	+	╉	ļ	1	Ť	╡	+	1	~		ſ	╞	+	Ţ	╉	T
Hesperis	matronalis	Dame's Rocket		ကိ	SES	5	.G5	t	f	t	F	ļ	╞	╞	T	Í	Ļ	F	F	╀	t	ļ		╞		t	F	\mathbf{t}	Ĺ	t	╞		╀	T
Rorippa	nasturtium-aquaticum	Water-cress	Π	-5-1-0	SE?	Ĩ	- 	Ħ	H	Ħ	Ħ	H	Ħ	⋕	П	∄	Ħ	Π	Ħ	H	Ħ	П		Ħ	Ħ	Н	Π	H	H	Ħ	Ш	Π	Η	Π
Caprifoliaceae	tatarica	Honeysuckle Family Tartarian Honeysuckle		۳. ۲	S ES		- ;;		f	t					T		t	F	F	f	t	ļ		t		t			F	t			┢	T
Sambucus	canadensis	Common Elderberry	5	202	SS	50	35	Ħ	1	Ħ	Ħ	H	Н	Н	П	Ħ	Ħ	H	Ħ	H	П	Ħ	7	7			Ħ	H	H	Н			Η	Π
Sambucus	racemosa var. racemosa	Red-berried Elderberry	5		S5	22	T4T		┦	1	+	\downarrow	>	╡	1	╈	+	+	+	┦	>	>		+			1		┦	1	-		┥	T
Sampucus	Species	Elderberry species]	1	4	-		+	1			1	╞	1	-	1	-	-	+	1	1		4	1	-	1	1	-		~		+	1

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Appendix H.		Plant Species List	_ist	ų			Ž	exte	- ra	Bluew	Nextera - Bluewater Study Area	Stud	y Ar	ea																1	AECOM
BOTAN	BOTANICAL NAME	COMMON NAME	Coefficient of Conservatistm	Xebril zsenibeeW Xebril zsenibeeW	Provincial Status OMNR Status COSEWIC Status	Sutat2 ledolD	210 BLW1010 510 BLW1049	0101W18 013	512 BT3	214 BFM1626 214 BFM1626 215 BL3	814 BLW1658	218 BLW1056/1047	518 BLW1005 520_BT2	256 BLW1047 524 BLW1002	232 BLW1087 525 BLW1087 526 BLW1047	232 BLW1048/1087 532 BLW1048/1087	234 BFM1028/1028 234 BFM1022 234 BFM1020, 1028	234 BFM1042	235 BLW1086/1019 534 BLW1647	8241M18 689 633 BLW1036/1019	8051W18 142	241 BFM1062 241 BFM1062	245 BFM1053 245 BFM1053 241 BFM1062	6271M18_575	BT4	BT4	8T5	BT5 BT12	BT13	BT13	86178
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Vibumum	lentago	Nannyberry	H	H	S5		П	╟	Ħ		Ħ	Ħ	П	╟	Ħ	Ħ	Ħ								Ħ	╟	Ħ			╟	Π
Caryophyllaceae	snindo	nignousn cranberry	0	Н	2	0		╞				T	T	╢	T	H	H		-			~								Н	Π
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Euonymus	obovata	Running Strawberry-bush	9	2 2	S5	65	ļ	7	Ħ	Ħ	Ħ	Ħ	П	∦	Ħ	Ħ	H		H	\square		H	~	Η	Ħ	Η	Ħ	H	Π	Н	П
Convolvulaceae Convolvulus	arvensis	Morning-glory Family Field Bindweed		5 -1 SE	E5	G?	T		t			F	T		Ħ	F	F		-												
Cornaceae	altamifolia	Dogwood Family			L L		ļ	╟						ľ					7		~	2		7						$\left \right $	
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Cornus	rugosa	Round-leaved Dogwood	ωu	2 V	SS 4	G5 G5T7		+	1		>	+	Ţ	╈	~	+	-									+		_		+	T
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Cucurbitaceae Echinocystis	lobata	Gourd Family Prickly Cucumber	m	-2 S	35	G5				ł		t	T	+	t	Ŧ	Ŧ		+		7			>		╋	t	┢		╋	T
Dipsacaceae		Teasel Family					Ħ	H	Ħ			Ħ		Ӈ	Ħ	Ħ	Ħ						╞		Π	╢	Ħ		Π	╢	Π
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Elaeagnus	angustifolia	Russian Olive	Í	4 -1 SE	E3	G?	П	Ħ	Ħ	Ħ	Ħ	Ħ	П	∦	Ħ	Ħ	Ħ	Π	Н	\square		Ħ	H	H	П	Η	Ħ	H	Π	Н	П
Euphorbiaceae	rhomhoidea	Spurge Family Three-seeded Mercury	c	0. 	SF SF	GSTS				ł		t	T		t	Ŧ			+							+		+		+	
Fabaceae		Pea Family						╞	ľ			Ħ	ļ	╢	Ħ															H	
Coronilla	varia triacanthos	Variable Crown-vetch Honey Locust	~	5 -2 SE	3E5	د. ب	1	╈	t			+	Ŧ		Ŧ	+	+		+				+		1	╉	1	╀		╉	T
Lotus	comiculatus	Bird's-foot Trefoil		1 -2 St	E5	6. 9	П	H	Ц	Ħ	Ħ	Ħ	F	H	Ħ	Ħ	Ħ	Π	H		7	H				Η		H		Н	Π
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Melilotus	alba	White Sweet-clover	Í	3 -3 SE	ES		Ħ	H	Ħ	Ħ	Ħ	Ħ	П	Ӈ	Ħ	H	H				,	Η			~	+				Η	Π
Melilotus Patricio	officinalis	Yellow Sweet-clover		3 -1 SI	155	G, 2						Ħ	4	┢	Ħ	+	+									+		_		+	
Trifolium	pseudo-acacia hybridum ssp. elegans	Black Locust Alsike Clover	ľ	4 -3 0	E5	ß	ļ	╞	t		ļ	Ŧ	T	╁	t	Ŧ	ŧ	ļ	+			Ŧ	╞	╞	T	╀	t	╞	T	╀	T
Trifolium	pratense	Red Clover	Í	2 -2 St	E5	6.2 G	Π	╟	Ħ	Ħ	Ħ	Ħ	Д	Ӈ	Ħ	Ħ	Ħ		μ				H		>	7	Ħ	$\left \right $	Π	H	Π
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Vicia	tetrasperma	Slender Vetch	Í	5 -1 St	E5	G?	Ħ	ℍ	Ħ		Ħ	Ħ	П	Ӈ	Ħ	Ħ	Ħ	Π	μ	\square		Ħ	H	H	П	Η	Ħ	\parallel	Π	H	П
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Quercus	macrocarpa	Bur Oak Red Oak	د د به به		22	99 99	ļ	>	Ţ	╞	ļ	+	Ţ		╞	Ŧ	Ŧ	Ţ	+		T	Ŧ	+	╎	T	╉	1	+	>	╉	T
Quercus	species	Oak species	Ħ	П	Ħ	ľ	Π	╢	Ħ	Ħ	Ħ	Ħ	П	Ӈ	Ħ	Ħ	Ħ	Π	Ц	Η		Ħ	H	H	П	Η	Π	H	Π	Н	Π
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Grossulariaceae		Currant Family		П		П	Π	╞	ľ			Ħ	P	┢	Ħ		H									$\left \right $				H	Π
Ribes	amencanum cvnoshati	Wild Black Currant Prickly Gooseberry	44	n N N	ઝઝ	256		~ ~	1		ļ	-	-	ľ		-	ľ		>		77	Ŧ	╈	>	Ţ	╉	t	╀	T	╉	T
Ribes	lacustre	Swamp Black Currant	~	П	35		Π	╟	Ħ	Ħ	Ħ	Ħ	Д	Ӈ	Ħ	Ħ	Ħ	Π	>			H	H	\mid	Π	╟	Ħ		Π	H	Π
Ribes	rubrum	Red Currant	ų	-2	5E5		1	╎	ļ	+		+	Ţ	╈	+	+	7		_	~	>				1		1	_		+	1
Ribes	species	Currant species	0	П	3	3		Ħ	Ħ			Ħ	П	╢	Ħ	Ħ	-	T	\parallel	1		Ħ	╞	\square	T	H	T	+	Γ	+	Π
Guttiferae		St. John's-wort Family							ļ					H	Ħ		Ħ										Ħ			H	
Hypencum Hamamelidaceae	pertoratum	Common St. John's-wort		5 -3 SE	E5	2.5	>	╎				+	T		>	Ŧ	ŧ		+		Ì		>		>	> >	>	+		╉	T
Hamamelis	virginiana	Witch-hazel	9	3 3	55	G5	Ħ	H	Ħ	Ħ	Ħ	Ħ	П	Η	Ħ	Ħ	Ħ		Η		7	7	H	Η	Π	Н		Н		Н	п
Hydrophyllaceae	virainianum	Water-leaf Family	ų	0	4	GF GF						-				~														+	
Hippocastanaceae		Buckeye Family				3			ľ						þ																
Aesculus	hippocastanum	Horse Chestnut	Í	5 -1 SE	SE2	G?	Д	Н	Ц	Ħ	Ħ	Ħ	П	Н	Ħ	Ħ	Ħ	П	Н	H		Ħ	Ħ	Н	Д	Н	Д	Н	Д	Н	П

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Appendix H.		Plan	Plant Species List	<u>-i</u>	÷			Next	tera -	Bluew	Nextera - Bluewater Study Area	tudy ,	Area													A	A=COM	Ň
BOTAN	BOTANICAL NAME		COMMON NAME	Coefficient of Conservatistm	Wetness Index Weediness Index Provincial Status	COSEWIC Status	Global Status 510 BLW1049	6291W18019	610 BLW1010	214 BLW1658 214 BLW1658 214 BLW1656 215 BT3	214 BLW1056 BT1 514 BLW1658	218 BFM1002 218 BFM1020/1042 218 BFM1020	254 BLW1002 524 BLW1002	235 BFM1082 235 BFM1082 252 BFM1042	234 BFM1069/1028 235 BFM1048/1082 235 BFM1202	234 BFM1642 234 BFM1028/1069 234 BFM1022	232 BFM1080/1016 234 BFM1042	829 BFM1428 835 BFM1032/1016	801 BLW1965	241 BFM1062 241 BFM1062 241 BFM1062	244 BFM1210 245 BFM1056 245 BFM1056	BT4 545_BLW1479	814 814	eta eta	BT12	8713 8713	85178	
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daceae	versicolor		Iris Family Multi-coloured Blue-flag	5	-5 S5		35																					
uglandaceae arva	cordiformis		Walnut Family Bitternut hickory	9			35 V	7	~							~								~				
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lentha eneta	arvensis cataria		American Wild Mint Cathip	m	-2	Ŧ	67	Ŧ	ļ	╞	+	+	╀	>	7		7	ļ			>	╞	╞	t	t	Ŧ		
nganum	vulgare	Í	Wild Mariarom	Д	-2	5 63		Ħ	H		╞				Ħ											H	Π	
runella sutellaria	vulgaris dalericulata	Ī	Heal-all Hooded Skullcan	y		~	512	>>	22			+		╞	╡	>			>	>		+		>	Ţ	-		
auraceae			Laurel Family											Ħ														
ndera	benzoin		Spicebush Mallow Family	9	-2 St	5	35					>]					~		+			+				
alva	moschata		Musk Mallow	Í	5 -1 SE5	5	32	Ħ	Ħ	Ħ	Ħ	Ħ	7	Ħ	Ħ	H	H				Ħ	H	H	H	Ħ	F	Π	
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oraceae	- 14		Mulberry Family				5																					
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nagraceae	li dotio no		Evening-primrose Family	•			с <u>т</u> е									7					-					-		
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Oenothera	biennis		Common Evening-primrose	0	3 S5	-	35	+					+		H		_				+							
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	Appendix H.		Plant Species List	L	Ļ				Nex	tera	191	Nextera - Bluewater Study Area	er vt	iudy	Are	g																A=CON	5
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FLORISTIC SUMMARY & ASSESSMENT

70.94% 29.06%

351 249	102 1000	3.51%	0	1	7	234		4.39	76	145	28	0	69.27		-1.67	53	30	19		0.67	06	76	50	70	50
	Perion Source)		cies				Co-efficient of Conservatism and Floral Quality Index	m (CC) (average)	lowest sensitivity	moderate sensitivity	high sensitivity	highest sensitivity		asive Species		low potential invasiveness	moderate potential invasiveness	high potential invasiveness	cies						
Species Diversity Total Species: Native Species:	Exotic Species Trial Tava in Reminn (List Reminn, Source)	% Regional Taxa Recorded	Regionally Significant Species	S1-S3 Species	S4 Species	S5 Species	Co-efficient of Conservate	Co-efficient of Conservatism (CC) (average)	CC 0 to 3	CC 4 to 6	CC 7 to 8	CC 9 to 10	Floral Quality Index (FQI)	Presence of Weedy & Invasive Species	mean weediness	weediness = -1	weediness = -2	weediness = -3	Presence of Wetland Species	average wetness value	upland	facultative upland	facultative	facultative wetland	obligate wetland

30.52% 58.23% 11.24% 0.00% 51.96% 29.41% 18.63% 25.64% 21.65% 14.25% 19.94% 14.25%

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Appendix I

Breeding Bird Survey Data

Appendix I. Breeding Birds Survey Data

			Status	s															Ν	latura	al Fea	ture	Num	ber														
Common Name	Scientific Name	Species	Species	Significant	Area Sensitive Species ^d	504	426 427 429	541 5 544 5	41 53 44 54	32 11 53	2 532	532	518 525	518	508 518	508 518	498	498	190 49	90 48 [,]	481	463 480	463 480	542	542	524 5	24 52	4 510	510	510	510	492	492 510	483			433 437 439	437 439
		at Risk ^a	at Risk ^b	SRANK ^c	opooloo	Visit 1	Visit 1		VISIT Z	Visit 2		Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 2 Visit 3	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2 Visit 1	Visit 1	Visit 2	Visit 1	Visit 2	Visit 2	Visit 1		Visit 2	Visit 1		Visit 2
Great Blue Heron Green Heron	Ardea herodias Butorides virescens																																					
Canada Goose	Branta canadensis																																					
Wood Duck Mallard	Aix sponsa Anas platyrhynchos							1	_	_	-								_	_	-	+						_		-								
Turkey Vulture	Cathartes aura							<u> </u>	-	1	1															1		7										1
Northern Harrier	Circus cyaneus				A					1																												
Cooper's Hawk Red-tailed Hawk	Accipiter cooperi Buteo jamaicensis				A	+ +		-+-		1									_		+	1							+	-	-			1	1		\rightarrow	
Wild Turkey	Meleagris gallopavo																			1																		
Killdeer Spotted Sandpiper	Charadrius vociferus Actitis macularia					1		1	_	_	1								1	_	-							_	_		_							
Mourning Dove	Zenaida macroura					+ ' +		-+-	2		-		1					1	1	-	-	1						-		-	-							
Black-billed Cuckoo	Coccyzus erythropthalmus																																					
Eastern Screech-Owl Ruby-throated Hummingbird	Megascops asio Archilochus colubris							_		1	_						-			_	-					1	1	_		-	-							
Ruby-throated Hummingbird Yellow-bellied Sapsucker Red-bellied Woodpecker	Sphyrapicus varius Melanerpes carolinus				А																					,											\pm	
Red-bellied Woodpecker Downy Woodpecker	Melanerpes carolinus Picoides pubescens]		+				4	_	1	2	1			1			1	-		22	1	1		1		1	1			1	+			-+	
Hairy Woodpecker Northern Flicker	Picoides villosus				А		-+			+ ¹	-					2				<u> </u>	1	1		1	1		<u>'</u>	+	+ '	+	1					-+	-+	
Northern Flicker	Colaptes auratus					1										1							1		1		1		1	1			1		1	1	\square	
Pileated Woodpecker Eastern Wood-Pewee	Dryocopus pileatus Contopus virens				A	1	1	1	<u> </u>	1 1	_		1	4	1	2	1			_	-	-	1 2	2		1	1	_	_	1	1		1					1
Yellow-bellied Flycatcher ^e	Empidonax flaviventris							·						· ·	1	-							-	1						· ·	· ·		•					
Willow Flycatcher Least Flycatcher	Empidonax traillii Empidonax minimus				•				_	_	_									_	_								_	_	_							1
Eastern Phoebe	Sayornis phoebe				A	1					_						-											_										
Great Crested Flycatcher	Myiarchus crinitus							1	1 '	1	1	2	1	1	3	1	2			1		L .	1	3	1	1		1	2	1	1		2	2			2	1
Eastern Kingbird Horned Lark	Tyrannus tyrannus Eremophila alpestris					+	4			_	_	1	1					1	3	_		1		2	1		1	_						1		2		_1
Tree Swallow	Tachycineta bicolor						5		1										<u> </u>					2	- '											2		
Bank Swallow Cliff Swallow	Riparia riparia Petrochelidon pyrrhonota							_		1	_									_	_							_		_	_							
Barn Swallow	Hirundo rustica	THR						1	1	_	2	4					-		1 1		-	-						_		-	-			2				
Blue Jav	Cyanocitta cristata							1	1				1	2	1	1	1	1		2			2			1							2	_	1			
American Crow	Corvus brachyrhynchos Poecile atricapillus								1 · 1	1	1	1	1			2		2	1	_	1	1		2	1		1	1	1	_	2		1		1		1	
Black-capped Chickadee White-breasted Nuthatch	Sitta carolinensis				А			<u>'</u>	<u>'</u>		-				_			-	1		1 '	1 '					- '	- 2			1						1	
House Wren	Troglodytes aedon Polioptila caerulea							1	3	1		2	1	4	1	2				1	1		2		2	1	1 1	1	1	1	1			2	1		1	2
Blue-gray Gnatcatcher Eastern Bluebird	Sialia sialis				A				-	1	-		1				-	-	_		-							_		-								
Veery	Catharus fuscescens				A											1																						
Wood Thrush American Robin	Hylocichla mustelina Turdus migratorius					3		1	<u> </u>	1 1			1	3	2	7	1	1		4		3	3		3		1	1	2	1	2	1	1		1 3	1	-1	
Gray Catbird	Dumetella carolinensis					2	1		3	· - ·			1	3		2				1		1	1		-		•	- ·			1	1			1	-	1	1
Brown Thrasher	Toxostoma rufum							1						-		_				<u> </u>		1	-		_											~	1	
Cedar Waxwing European Starling	Bombycilla cedrorum Sturnus vulgaris								2		-	1		5		-2				<u> </u>	1	1	5		1	2	1	-	1	-	6		1	4		2	-1	
Yellow-throated Vireo	Vireo flavifrons				A																		1															
Warbling Vireo Red-eved Vireo	Vireo gilvus Vireo olivaceus					1			3	1	_	1	1	3	4	2	1	1		1	3	-		2	1	2	1	1	1	1	1		1	3	1		1	2
Yellow Warbler	Dendroica petechia							1	1	- '			1	, , , , , , , , , , , , , , , , , , ,	4	2	-'			- '	ľ			2	- '	2								3			1	4
Chestnut-sided Warbler American Redstart	Dendroica pensylvanica Setophaga ruticilla				٨	4					_		1							_	_			4				1	1	_	_			2				
Ovenbird	Seiurus aurocapillus				A	1 2		2	-	1	1		1	3		2	-+			1	+	1		1				1	1	1						-+	-+	
Mourning Warbler	Oporornis philadelphia					2																															\square	
Common Yellowthroat Scarlet Tanager	Geothlyphis trichas Piranga olivacea				А	1		2	3	+		+	1	\vdash	2	1	1			+-	+	2						+	+	+	-	1		¹			-+	1
Northern Cardinal	Cardinalis cardinalis											1		1	-						1				_													
Rose-breasted Grosbeak Indigo Bunting	Pheucticus Iudovicianus Passerina cyanea					2		1	2	1 2	_	2	2	3		5	1	1	_	1	2	3	1	2	2		2 1	1	2	2	2		2	1 2	1	1		2
Eastern Towhee	Pipilio erythrophthalmus					<u> </u>		<u> </u>		·		2						·		- '		– – –			-		2 1		+ '		- '			2	-'	-		
Chipping Sparrow Clay-colored Sparrow	Spizella passerina Spizella pallida					1						1							1				1							1						1	1	
Field Sparrow	Spizella pallida Spizella pusilla					+ +		1	1			1	2	\vdash			-+		1	_	+	-						-	-	-				+		1	-+	—
Vesper Sparrow	Pooecetes gramineus					1		1		2 1			2	1			1					1		1		1	1 1	_			1		1	1	1			
Savannah Sparrow Grasshopper Sparrow	Passerculus sandwichensis Ammodramus savannarum]	A	↓		4 1		2	2	10	2	\vdash		[2 1		-	<u> </u>	2		1		1	_	<u> </u>	1	<u> </u>	$\left - \right $	<u> </u>	1		3	3	
Song Sparrow	Melospiza melodia				A			3		1 2	2	9	_ 1	_6	_	5		2	4 3	3 1	1	3	1	1	2	2	2 1	1	2	1	2	1	2		3	5	_1	7
Red-winged Blackbird	Agelaius phoeniceus	TUD					1	2		1	2	17	2	2		1			1			1					1	2						2		3		3
Eastern Meadowlark Common Grackle	Sturnella magna Quiscalus quiscula	THR			A	+	—							\vdash		-+	-+			1		1	1		1			_						+			2	
Brown-headed Cowbird	Molothrus ater					1		1					2							2	1	1	2	1	· ·		1	1	2		1		1	3	1	1	3	
Baltimore Oriole American Goldfinch	lcterus galbula Cardeulis tristis	<u> </u>				$+ \pm$		1	1 2	2 1	1	\square			2	— ——				$\frac{1}{2}$		2	5	1		1	1	1	2		2		4	3			+]
Number of Species:			1	II		17	5	25 3	21 1	6 11	9	17	25	17	10	18	10	10	10 7	/ L			21	15	17	11 1	1 10) 13	18	12	20	3	15	22	14	12	16	15
Number of Individuals						23	12	33 4	9 1	9 13	18	56	32	50	19	45	11	12	16 1	6 24	11	26	40	22	24	14 [·]	13 10) 21	25	13	30	3	20	44	18	22	24	30
						Number								ionally s			-																					



Number of National Species at Risk: 2 Number of regionally significant OWES species (6): Number of Provincial Species at Risk: 0 Number of regionally significant OWES species (7): Number of S1 to S3 (provincially significant) Species: 0 KEY a National Species at Risk are those listed by COSEWIC = Committee on the Status of Endangered Wildlife in Canada: END = Endangered, THR = Threatened, SC = Special Concern b Provincial Species at Risk are those listed by COSEWIC = Committee on the Status of Species at Risk in Ontario: END = Endangered, THR = Threatened, SC = Special Concern c SRANK (from Natural Heritage Information Centre) shown only if: S1 (Critically Imperiled), S2 (Imperiled) or S3 (Vulnerable); not shown if: S4 (apparently secure, uncommon), S5 (secure, common). d Area Sensitive Species according to OMNR (2000) Significant Wildlife Habitat Technical Guide (Appendix G) e Late Migrant, Non-breeding

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Appendix I. Breeding Birds Survey Data

		Status												Na	tural	Feat	ture	Num	ber								
Common Name	Scientific Name	National Species	Provincial Species	Provincially Significant	Area Sensitive Species ^d	534	477 488	477 488	515 523	534	468 476	476	468	468	468	463	463	463	450 463	457	457	480	480	463	463	510	510
		at Risk ^a	at Risk ^b	SRANK °	oponio	Visit 1	Visit 1	Visit 2	Visit 1	Visit 1	Visit 1	Visit 2	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 2	Visit 1
Great Blue Heron Green Heron	Ardea herodias Butorides virescens																			1	1						
Canada Goose	Branta canadensis																										
Wood Duck Mallard	Aix sponsa Anas platyrhynchos							9					1			1											
Turkey Vulture	Cathartes aura						1						4														
Northern Harrier	Circus cyaneus				A																						
Cooper's Hawk Red-tailed Hawk	Accipiter cooperi Buteo jamaicensis				A			1					1									1					
Wild Turkey	Meleagris gallopavo							2													1						
Killdeer Spotted Sandpiper	Charadrius vociferus Actitis macularia												1														
Mourning Dove	Zenaida macroura								2				-			1				1		1	1				
Black-billed Cuckoo	Coccyzus erythropthalmus																				1						
Eastern Screech-Owl Ruby-throated Hummingbird	Megascops asio Archilochus colubris																										
Yellow-bellied Sapsucker	Sphyrapicus varius				А											1											
Red-bellied Woodpecker Downy Woodpecker	Melanerpes carolinus Picoides pubescens									1		1												1			
Hairy Woodpecker	Picoides villosus	ł			A					1				1							1						
Northern Flicker	Colaptes auratus					1	1			1	1		1	1	1	1	1					1	1	2			
Pileated Woodpecker Eastern Wood-Pewee	Dryocopus pileatus Contopus virens				A			1		1	1	1	1	1	1	2	1				1			1	1	1	
Yellow-bellied Flycatcher ^e	Empidonax flaviventris												-	- '		~	- '				<u> </u>						
Willow Flycatcher	Empidonax traillii						1	1	1													2	1	1		1	
Least Flycatcher Eastern Phoebe	Empidonax minimus Sayornis phoebe				A																					1	1
Great Crested Flycatcher	Myiarchus crinitus									1	1	1		1	1	1	1		2						1	1	1
Eastern Kingbird Horned Lark	Tyrannus tyrannus Eremophila alpestris						2		2			1	1	1				1	1	1		1	1				1
Tree Swallow	Tachycineta bicolor							1	2			- 1					1	- 1	3					1			
Bank Swallow	Riparia riparia												1														
Cliff Swallow Barn Swallow	Petrochelidon pyrrhonota Hirundo rustica	THR					2						1 18								2		2				
Blue Jay	Cyanocitta cristata										2	1	10		1				1		-	1					
American Crow Black-capped Chickadee	Corvus brachyrhynchos Poecile atricapillus					2	3	1	2	2				1	1	2	1			2		1	2				2
White-breasted Nuthatch	Sitta carolinensis				A	1								- 1	1												1
House Wren	Troglodytes aedon					1		2		3	2	2		2	2		1	3	5		1	1		1	3	5	2
Blue-gray Gnatcatcher Eastern Bluebird	Polioptila caerulea Sialia sialis				A																						
Veery	Catharus fuscescens				A																						
Wood Thrush American Robin	Hylocichla mustelina Turdus migratorius					1 2	1	2	1 2	2	1	1	2	1	3	2	1	1	1	1		2	3	1	2	6 2	2
Gray Catbird	Dumetella carolinensis					2	1	2	1	1	- 1		-			-		-	-	2	1	1	1	2	1	1	1
Brown Thrasher	Toxostoma rufum						1	1	1		4					1					1						
Cedar Waxwing European Starling	Bombycilla cedrorum Sturnus vulgaris					1		3	2	1	1				1	2	1				2	1	3	1	2		1
Yellow-throated Vireo	Vireo flavifrons				A																						
Warbling Vireo Red-eyed Vireo	Vireo gilvus Vireo olivaceus					1		1		1 4	2	1	2	2	1	2	1	1	2	1	1	1				1	1
Yellow Warbler	Dendroica petechia						2			4	2	1	2	2		3					1		2			۷	1
Chestnut-sided Warbler	Dendroica pensylvanica				٨																					2	4
American Redstart Ovenbird	Setophaga ruticilla Seiurus aurocapillus	1			A					2									2	<u> </u>	<u> </u>	<u> </u>				3	1
Mourning Warbler	Oporornis philadelphia						1	_																			
Common Yellowthroat Scarlet Tanager	Geothlyphis trichas Piranga olivacea				A		1	2		1												2	2	1	1		
Northern Cardinal	Cardinalis cardinalis																				1						
Rose-breasted Grosbeak Indigo Bunting	Pheucticus ludovicianus Passerina cyanea					1	1	2	2	2	2	1	1	2	1 2	1	1	1	2		1 2	3	2	3	2	5	1
Eastern Towhee	Pipilio erythrophthalmus	ł					- 1	- 1		3	2			3	–				_		1	4	_	<u> </u>	3		1
Chipping Sparrow	Spizella passerina						1		1														1				
Clay-colored Sparrow Field Sparrow	Spizella pallida Spizella pusilla	ł					1	1													I	1	2				
Vesper Sparrow	Pooecetes gramineus					1	3				1			1		1			1	1			1				
Savannah Sparrow Grasshopper Sparrow	Passerculus sandwichensis Ammodramus savannarum				A	1			1		2	2		1		1			2		<u> </u>	1	1	2	1	1	
Song Sparrow	Melospiza melodia				A	2	2	7	4	3	1	4	1	2	1	1		5	2	3	6	5	3	3	5		1
Red-winged Blackbird	Agelaius phoeniceus	TUD				1		2		2			1			2		_	1		7	1		2			
Eastern Meadowlark Common Grackle	Sturnella magna Quiscalus guiscula	THR			A	1		30											1			1			1		
Brown-headed Cowbird	Molothrus ater	1				2	9	- 55	2	3	2		1		1	1				1	2	2	3	1	· ·	1	2
Baltimore Oriole American Goldfinch	lcterus galbula Cardeulis tristis					1		1	1	2	1		1			1		3	1	1	1	1	2	1 2	3	1	1
Number of Species:		1	1			18	19	21	17	21	17	12	19	15	15	21		7	16	12	20	24	20	18	13	16	18
Number of Individuals						22	35	73	27	39	24	17		21			11	15		16	35	38	36	28	26	33	23



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