

Confirmation Letter
Ministry of Natural Resources
January 25, 2013

Ministry of Natural Resources

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January 25, 2013

Kelly Matheson-King
Nodin Kitagan Limited Partnership
Nodin Kitagan 2 Limited Partnership
Suite 200, 4723 – 1st Street S.W.
Calgary, Alberta T2G 4Y8

SUBJECT: Bow Lake Wind Farm Natural Heritage Assessment Confirmation

Dear Ms. Matheson-King:

In accordance with the Ministry of the Environment's (MOE's) Renewable Energy Approvals (REA) Regulation (O.Reg.359/09), the Ministry of Natural Resources (MNR) has reviewed the Final Natural Heritage Assessment (NHA) submitted by Stantec on January 24, 2013 for the Bow Lake Wind Farm to be located approximately 80km north of Sault Ste. Marie and approximately 6km east of Montreal River Harbour, Ontario.

In accordance with Section 28(2) and 38(2)(b) of the REA Regulation, MNR provides the following confirmations following review of the Natural Heritage Assessment:

1. The MNR confirms that the determination of the existence of natural features and the boundaries of natural features was made using applicable evaluation criteria or procedures established or accepted by MNR.
2. The MNR confirms that the site investigation and records review were conducted using applicable evaluation criteria or procedures established or accepted by MNR, if no natural features were identified.
3. The MNR confirms that the evaluation of the significance or provincial significance of the natural features was conducted using applicable evaluation criteria or procedures established or accepted by MNR.
4. The MNR confirms that the project location is not in a provincial park or conservation reserve.
5. The MNR confirms that the requirement for an environmental impact study report (EIS) was completed and accepted by MNR.

Kelly Matheson-King
January 25, 2013
Page 2

This confirmation letter is valid for the project as proposed in the NHA, including those sections describing the Environmental Effects Monitoring Plan and Construction Plan Report. Should any changes be made to the proposed project that would alter the NHA, MNR may need to undertake additional review of the NHA.

Where specific commitments have been made by the applicant in the NHA with respect to project design, construction, rehabilitation, operation, mitigation, or monitoring, MNR expects that these commitments will be considered in MOE's Renewable Energy Approval decision and, if approved, be implemented by the applicant.

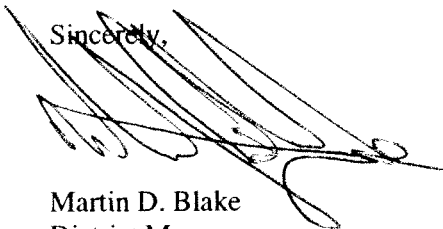
MNR notes that the proponent has committed to completing pre-construction habitat use surveys of turtle wintering areas, snake hibernacula, waterfowl nesting areas, moose aquatic feeding habitat, amphibian breeding habitat, marsh breeding bird habitat, and habitat of Canada warbler and olive-sided flycatcher; post-construction disturbance monitoring of those bird habitats within 120m of a turbine found to be significant as a result of pre-construction habitat use surveys; and post-construction mortality monitoring of birds and bats as outlined in the Environmental Impact Study.

In accordance with S.12 (1) of the Renewable Energy Approvals Regulation, this letter must be included as part of your application submitted to the MOE for a Renewable Energy Approval.

Please be aware that your project may be subject to additional legislative approvals as outlined in the Ministry of Natural Resources' Approvals and Permitting Requirements Document. These approvals are required prior to the construction of your renewable energy facility.

If you wish to discuss any part of this confirmation or additional comments provided, please contact Derek Goertz, Renewable Energy Biologist at (705) 941-5106 or Derek.Goertz@ontario.ca.

Sincerely,

A handwritten signature in black ink, appearing to read 'Martin D. Blake', written over the word 'Sincerely,'.

Martin D. Blake
District Manager
Sault Ste. Marie District

cc. Erin Nixon, Renewable Energy Planner, Sault Ste. Marie District MNR
Christine Greenaway, Northeast Region Renewable Energy Coordinator, Regional
Operations Division, MNR

Natural Heritage Assessment
and
Environmental Impact Study



Stantec

BOW LAKE WIND FARM
NATURAL HERITAGE ASSESSMENT AND
ENVIRONMENTAL IMPACT STUDY

File No. 160960734
January 2013

Prepared for:

**Nodin Kitagan Limited Partnership and
Nodin Kitagan 2 Limited Partnership**
by its General Partners Shongwish Nodin Kitagan
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Prepared by:

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BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY****Table of Contents**

1.0 INTRODUCTION	1.1
1.1 PROJECT OVERVIEW	1.1
1.2 REPORT REQUIREMENTS	1.2
1.3 GUIDANCE DOCUMENTS	1.5
2.0 RECORDS REVIEW	2.1
2.1 METHODS	2.1
2.2 RESULTS	2.3
2.2.1 Wetlands	2.3
2.2.2 Woodlands	2.4
2.2.3 Valleylands	2.5
2.2.4 Wildlife Habitat	2.5
2.2.4.1 Seasonal Concentration Areas of Animals	2.6
2.2.4.2 Rare Vegetation Communities or Specialized Habitat for Wildlife	2.9
2.2.4.3 Habitat for Species of Conservation Concern	2.14
2.2.4.4 Animal Movement Corridors	2.15
2.2.4.5 Exceptions for EcoRegion 5E	2.17
2.2.5 Areas of Natural and Scientific Interest (ANSIs)	2.17
2.2.6 Natural Features in Specified Provincial Plan Areas	2.18
2.2.7 Provincial Parks and Conservation Reserves	2.18
2.3 SUMMARY OF NATURAL FEATURES AND BOUNDARIES IDENTIFIED	2.18
3.0 SITE INVESTIGATION	3.1
3.1 METHODS	3.1
3.1.1 Aerial and Reconnaissance Surveys	3.1
3.1.2 Vegetation Community and Vascular Plants Assessment	3.2
3.1.3 Wetland Confirmation and Delineation	3.3
3.1.4 Wildlife and Wildlife Habitat	3.4
3.1.4.1 Seasonal Concentration Areas of Animals	3.4
3.1.4.2 Rare Vegetation Communities or Specialized Habitats for Wildlife	3.9
3.1.4.3 Species of Conservation Concern	3.20
3.1.4.4 Animal Movement Corridors	3.22
3.2 RESULTS	3.23
3.2.1 Vegetation Community and Vascular Plants Assessment	3.23
3.2.2 Wetlands	3.24
3.2.2.1 Provincially Significant Wetlands	3.24
3.2.2.2 Non-provincially Significant Wetlands	3.24
3.2.2.3 Additional/Unevaluated Wetlands	3.24
3.2.3 Wildlife and Wildlife Habitat	3.25
3.2.3.1 Seasonal Concentration Areas of Animals	3.25
3.2.3.2 Rare Vegetation Communities or Specialized Habitats for Wildlife	3.28
3.2.3.3 Species of Conservation Concern	3.34
3.2.3.4 Animal Movement Corridors	3.39
3.2.4 Provincial Parks and Conservation Reserves	3.40

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY****Table Of Content**

3.3 SITE INVESTIGATION RESULTS SUMMARY	3.41
--	------

4.0 EVALUATION OF SIGNIFICANCE	4.1
4.1 METHODS	4.1
4.2 WETLANDS	4.2
4.3 WILDLIFE AND WILDLIFE HABITAT	4.3
4.3.1 Seasonal Concentration Areas of Animals	4.3
4.3.2 Rare Vegetation Communities or Specialized Habitat for Wildlife	4.5
4.3.3 Habitat for Species of Conservation Concern	4.7
4.4 RESULTS	4.10
4.4.1 Wetlands	4.10
4.4.2 Wildlife and Wildlife Habitat	4.11
4.4.2.1 Seasonal Concentration Areas	4.11
4.4.2.2 Rare Vegetation Communities or Specialized Habitat for Wildlife	4.12
4.4.2.3 Habitat for Species of Conservation Concern	4.14
4.5 SUMMARY	4.16

5.0 ENVIRONMENTAL IMPACT STUDY	5.1
5.1 PROJECT FOOTPRINT	5.2
5.2 EIS OVERVIEW	5.5
5.3 GENERAL MITIGATION MEASURES	5.5
5.3.1 Vegetation Removal	5.5
5.3.2 Sediment and Erosion Control Measures	5.6
5.3.3 Dewatering	5.8
5.4 NATURAL AREAS MANAGEMENT STRATEGY	5.9
5.5 WETLANDS	5.10
5.6 SIGNIFICANT WILDLIFE HABITAT	5.11
5.6.1 Turtle Wintering Areas	5.11
5.6.2 Snake Hibernacula	5.12
5.6.3 Waterfowl Nesting Areas	5.14
5.6.4 Moose Aquatic Feeding Habitat	5.16
5.6.5 Seeps and Springs	5.18
5.6.6 Amphibian Breeding Habitat (Woodland and Wetland)	5.21
5.6.7 Habitat for Bird Species of Conservation Concern – Canada Warbler and Olive-sided Flycatcher	5.25
5.6.8 Habitat for Bird Species of Conservation Concern – Marsh Breeding Birds	5.28
5.6.9 Habitat for Plant Species of Conservation Concern – Oval-leaved Bilberry, Boreal Bedstraw and Braun's Holly-fern	5.30
5.6.10 Generalized Wildlife Habitat	5.32
5.7 POST-CONSTRUCTION MONITORING	5.32
5.8 SUMMARY OF IMPACTS AND MITIGATION	5.32

6.0 CLOSURE	6.1
--------------------------	------------

Table of Contents

7.0 CITED LITERATURE.....	7.1
----------------------------------	------------

LIST OF TABLES*

Table 2.1: Natural Features Carried Forward to Site Investigation.....	2.18
Table 3.1: Characteristics Used to Identify Candidate Seasonal Concentration Areas	3.5
Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat.....	3.11
Table 3.3: Characteristics Used to Identify Candidate Habitat for Species of Conservation Concern.....	3.21
Table 3.4: Characteristics Used to Identify Candidate Habitat for Animal Movement Corridors	3.23
Table 3.5: Summary of Site Investigation Results for Seasonal Concentration Areas.....	3.26
Table 3.6: Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat.....	3.29
Table 3.7: Summary of Site Investigation Results for Habitat for Species of Conservation Concern.....	3.35
Table 3.8: Summary of Site Investigation Results for Habitat for Animal Movement Corridors	3.40
Table 3.9: Natural Features Carried Forward to Evaluation of Significance	3.41
Table 3.10: Generalized Candidate Significant Wildlife Habitat	3.43
Table 4.1: Criteria and Methods Used to Evaluate Seasonal Concentration Areas of Animals	4.3
Table 4.2: Criteria and Methods Used to Evaluate Rare Vegetation Communities or Specialized Habitat for Wildlife.....	4.5
Table 4.3: Criteria and Methods Used to Evaluate Habitat for Species of Conservation Concern	4.8
Table 4.4: Summary of Evaluation of Significance Results for Seasonal Concentration Areas	4.11
Table 4.5: Summary of Evaluation of Significance Results for Rare Vegetation Communities or Specialized Habitat for Wildlife.....	4.12
Table 4.6: Summary of Evaluation of Significance Results for Habitat for Species of Conservation Concern	4.14
Table 4.7: Significant Natural Features Carried Forward to Environmental Impact Study	4.16
Table 4.8: Natural Features Treated as Significant and Carried Forward to Environmental Impact Study, with Commitment to Undertake Study of Habitat Use.....	4.17
Table 4.9: Generalized Candidate Significant Wildlife Habitat	4.18

* Note that additional tables are provided in **Appendix B**.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY****Table Of Content**

LIST OF APPENDICES

Appendix A Figures
Appendix B Additional Tables
Appendix C ELC and Plant List
Appendix D Wildlife List
Appendix E Field Notes (Stantec Consulting Ltd.) (CD)
Appendix F Field Notes (M.K. Ince & Associates and Natural Resource Solutions Inc.)
Appendix G Curricula Vitae
Appendix H Technical Appendices
Appendix H-1 Wildlife Survey Locations
Appendix H-2 Bat Surveys
Appendix H-3 Rare Plants
Appendix H-4 Seeps, Springs, and Other Groundwater Attributes
Appendix H-5 Generalized Candidate Significant Wildlife Habitat

LIST OF FIGURES**Appendix A**

Figure 1.0: Project Location & Study Area – Overview
Figure 2.0: Natural Features – Records Review
Figure 3.0: ELC/FEC Vegetation Communities – Overview
Figure 3.1-3.9: ELC/FEC Vegetation Communities
Figure 4.0: Wetlands – Overview
Figure 4.1-4.9: Wetlands
Figure 5.0: Candidate Significant Wildlife Habitat – Overview
Figure 5.1-5.9: Candidate Significant Wildlife Habitat
Figure 6.0: Significant Natural Heritage Features – Overview
Figure 6.1-6.9: Significant Natural Heritage Features
Figure 7.1-7.27: Avoidance and Mitigation of Significant Wildlife Habitat and Wetlands
Figure 8.0: Avoidance and Mitigation of Significant Wildlife Habitat and Wetlands
Figure 9.0: Avoidance and Mitigation of Significant Wildlife Habitat and Wetlands

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY****Table of Contents**

LIST OF ADDITIONAL TABLES**Appendix B**

Table 1: Agencies Contacted, Records Requested and Records Received

Table 2: Potential Wildlife Occurring within the Project Study Area

Table 3: Potential Species of Conservation Concern occurring within the Project Study Area

Table 4: Survey Dates, Methods, Weather Conditions and Personnel

Table 5: Summary of Corrections to Records Review

Table 6: Natural Heritage Feature Descriptions

Table 7: WCEFA Wetland Assessment

Table 8: Summary of Potential Negative Effects, Mitigation Measures and Monitoring

Table 9: Summary of Potential Effects and Mitigation Measures for Generalized Wildlife Habitat

Table 10: Summary of Environmental Effects Monitoring Plan for Operation of the Bow Lake
Wind Farm

1.0 Introduction

1.1 PROJECT OVERVIEW

Nodin Kitagan Limited Partnership and Nodin Kitagan 2 Limited Partnership, by their General Partners Shongwish Nodin Kitagan GP Corp. and Shongwish Nodin Kitagan 2 GP Corp., respectively (the “Proponent”), are proposing to develop Phase 1 and Phase 2 of the Bow Lake Wind Farm predominantly on Provincial Crown Land within the unorganized Townships of Smilsky and Peever, in the District of Algoma, Ontario (the “Project”). The Project is located approximately 80 km north of Sault Ste. Marie and roughly 6 km east of Montreal River Harbour. The Project has three Feed-in Tariff (“FiT”) Contracts with the Ontario Power Authority (“OPA”) for the sale of electricity generated by the Project.

According to subsection 6(3) of Ontario Regulation 359/09 (“O. Reg. 359/09”), the proposed Project is classified as a Class 4 Wind Facility. The basic components of the Project include 36 wind turbines for a total maximum installed nameplate capacity of up to 58.32 MW. In addition, the operation of the Project will require 34.5 kV above and below ground electrical collector lines, communications lines, pad-mounted transformers, crane pads, two permanent meteorological (met) towers, access roads, an operations and maintenance building, welfare buildings, a Transformer Station (“TS”), construction compounds and laydown yards, and other ancillary facilities. The Project will connect to the provincial power grid via existing 115 kV transmission lines located adjacent to the Project’s TS. A full description of Project infrastructure is provided in the Project Description Report. The draft Project Site Plan is provided in **Figure 1.0¹**.

Road corridors of 60 m width are being assessed, in addition to a surrounding Zone of Investigation (described below), to allow for micro-siting of access road locations within the corridors based on site-specific conditions. Where required due to design considerations and/or natural features, road corridors have been reduced in specific locations.

Collector line corridors of 60 m width are being assessed to allow for micro-siting of collector lines within the corridors. Where required due to design considerations and/or natural features, collector line corridors have been reduced in certain locations. Where collector lines are located adjacent to a permanent access road, both the collector line and the access road will be located within a maximum 35 m cleared width located inside the assessed 60 m wide corridor.

When a collector line segment is not located adjacent to or within an access road, a 20 m cleared width is required. Construction of collector lines that are not located adjacent to a permanent access road will require the construction of a temporary construction trail to support

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

collector line installation during the construction period. The temporary construction trail will be approximately 6 m wide and designed for temporary construction use only. Temporary trail construction will be limited to grading along the trail route and will not require the installation of a permanent road base.

The Project Location includes all land and buildings/structures associated with the Project and any air space in which the Project will occupy. This includes structures such as turbines, access roads and collector lines that will be utilized during the operation of the Project.

1.2 REPORT REQUIREMENTS

This Natural Heritage Assessment and Environmental Impact Study (“NHA/EIS”) report has been prepared in accordance with O. Reg. 359/09, the Ministry of the Environment’s Technical Guide to Renewable Energy Approvals (MOE, 2011) and the ‘Natural Heritage Assessment Guide for Renewable Energy Projects’ [Ontario Ministry of Natural Resources (MNR), 2011a]. The NHA/EIS report is provided to the MNR for confirmation in advance of submission as part of the Renewable Energy Approval (“REA”) application to the MOE.

This NHA/EIS utilizes the definition of Project Location as provided in O. Reg. 359/09 and Section 2.3 of the ‘Natural Heritage Assessment Guide for Renewable Energy Projects’ (MNR, 2011a). As per the definition in the REA regulation, a renewable energy Project Location includes: “...*a part of land and all or part of any building or structure in, on or over which a person is engaging in or proposes to engage in the project and any airspace in which a person is engaging in or proposes to engage in the project*”.

A renewable energy project includes all activities associated with the construction, installation, use, operation, maintenance, changing or retiring of the renewable energy generation facility. Therefore, for the purposes of measuring the distance from the Project Location to a natural feature, a Project Location boundary is considered to be the outer limit where site preparation and construction activities will occur and where infrastructure will be located (e.g. temporary structures, lay down areas, storage facilities, generation equipment, access roads, etc.).

Sixty (60) metre wide road corridors are being assessed to allow for micro-siting of access road locations within the corridors based on site-specific conditions. Typically, a 35 m cleared width is required to construct the access road, associated ditches and embankments, and the adjacent collector line. Where required due to design considerations, local terrain conditions, or environmental constraints, cleared areas will be reduced where possible. Access roads will have a travelled surface width of 8 – 12 m. The Zone of Investigation (“ZOI”) has been established 120 m from the outer edge of these corridors and the rest of the Project Location boundary.

A NHA is required to determine whether any of the following natural heritage features exist in and/or within 120 m of the Project Location (i.e., within the ZOI):

- Wetlands and Coastal Wetlands;
- Woodlands;
- Valleylands;
- Wildlife habitat;
- Life Science Areas of Natural and Scientific Interest (“ANSIs”), or within 50 m of an Earth Science ANSI;
- Natural features in specified provincial plan areas; and
- Provincial parks and conservation reserves.

This report identifies the presence and boundaries of the natural heritage features specified above within 120 m of the Project Location based on a review of background records (**Section 2.0** Records Review) and on-site field investigations (**Section 3.0** Site Investigation).

In the case of wildlife habitat, the boundaries of the natural heritage “feature” as defined in O. Reg. 359/09 are defined in accordance with guidance in the the ‘Natural Heritage Assessment Guide for Renewable Energy Projects’ (MNR, 2011a) and the ‘Draft Significant Wildlife Habitat Ecoregion 5E Criterion Schedule’ (MNR, 2012). The ‘Draft Ecoregion 5E Criterion Schedule’ takes three different approaches to defining the boundaries of different types of wildlife habitat:

For several wildlife habitat “features” the habitat is defined as the entire Ecological Land Classification (“ELC”) ecosite polygon in which special “attributes” such as bat maternity colonies, seeps and springs, or rare plant habitats occur;

For other wildlife habitat “features” the boundaries are set by mapping site specific “attributes” such as active nests, an entrance to a bat hibernaculum, or mammal denning sites, and applying a set radius around the “attribute”, regardless of ELC ecosite boundaries;

For other habitat “features”, the boundary is defined by a combination of one or more ELC ecosites and a radius around the ecosite(s) based on habitat suitability (e.g. waterfowl staging, or aquatic feeding areas).

In this report all wildlife “features” are mapped, but in accordance with MNR guidance, certain “attributes” that contribute to the “feature” may not be individually displayed in the primary report mapping. This approach is only taken where the “attributes” are numerous, of a small scale and widely distributed across the ELC ecosites and/or landscape. Provided the attributes of the feature are assessed following criteria and procedures established by MNR, the encompassing feature may be evaluated for significance as one feature (MNR 2011a).

Examples of attributes that have not been mapped as individual points or polygons in the primary report mapping, but that nonetheless have been assessed as part of an encompassing wildlife habitat feature in accordance with MNR guidance, include:

- Potential habitat trees for bat maternity colonies. These trees are too numerous and diffusely spread to allow for efficient mapping at the scale of this report, however locations of all exit surveys conducted to evaluate significance of candidate significant wildlife habitat (“SWH”) have been mapped. No confirmed roost trees were encountered, but if they had been the individual specific confirmed roost trees would have been mapped as attributes;
- Extremely small and highly ephemeral woodland pools. These pools were distributed across the forested polygons of the site in a pattern that can be likened to “dimples on a golf ball”. Many of these pools were observed to support attempts by spring peepers and toads to breed. In all probability most of the pools would naturally dry up too quickly to support successful breeding. Larger woodland pools (>500 m² in area with distinct pool bottom morphology) and any wetland ponds or pools have been mapped.
- Some occurrences of provincially rare plants, in particular Oval-leaved bilberry which is locally common and not always restricted to well defined microhabitat sites. Sufficient representative occurrences of provincially rare plants were identified and mapped to allow for a complete and thorough impact assessment. This is appropriate in that species of conservation concern are attributes that support designation of SWH polygons. The focus of the SWH designation for species of conservation concern is to protect sufficient area and quality of habitat to allow for continued population dynamics.

When appropriate, the site-specific locations of “attributes” are mapped as points or polygons to assist in the analysis of potential effects and to formulate recommendations for mitigation. Additional attributes are mapped in the Technical Summaries for Bat Maternity Roosts, Rare Plants, and Seeps and Springs (**Appendix H**).

This report includes an evaluation of significance (**Section 4.0** Evaluation of Significance) for each identified feature or attribute based on either an existing MNR designation of the feature or by using evaluation criteria and procedures established or accepted by the MNR.

Where the Project Location is within 120 m of a significant or provincially significant natural feature based on the evaluation of significance, this report includes an environmental impact study (**Section 5.0** Environmental Impact Study). The EIS identifies and addresses, through mitigation, any potential negative environmental effects of the Project on the significant feature.

For the purposes of verifying the accuracy of the records review and to identify any additional natural features, a ZOI has been identified based on the requirements of O. Reg. 359/09 and the ‘Natural Heritage Assessment Guide for Renewable Energy Projects’ (MNR, 2011a). The ZOI, shown on **Figure 1.0**, encompasses the Project Location plus an additional 120 m surrounding the Project Location, and is the minimum area within which site-specific field investigations were completed. Within the ZOI, detailed field work was conducted to:

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Introduction

January 2013

- Verify whether the analysis of the Project Location undertaken through the records review is accurate, and make any necessary corrections to the determinations in the records review report;
- Determine whether any additional natural features exist in or within 120 m of the Project Location, other than those identified in the records review report;
- Determine the boundaries of any natural feature located in or within 120 m of the Project Location (identified through the records review report or during site investigation); and
- Determine the distance from the Project Location to the boundaries of any natural features.

This approach ensures that any negative environmental effects that may result from construction and operation of the Project will be assessed within this report as per the requirements of O. Reg. 359/09. Field investigations were also conducted beyond the regulated 120 m ZOI, in general a minimum of 150 m from the Project Location, as part of a risk management strategy in the event that changes to the location of Project infrastructure were required. The Project Location was modified several times in response to field work and analysis to avoid impacts, where possible, to natural heritage features. In addition, the evaluation of significance of natural heritage features, and impacts on such features, requires a broad landscape context. As a result, a much larger area than the 120 m ZOI was investigated. This area will be referred to the Project Study Area and includes a large portion of the landscape surrounding the Project Location. The Project Study Area is shown on **Figure 1.0** and generally extends from the Montreal River in the north to Trim Lake in the south and from Highway 17 in the west to Trim Lake in the east. Areas close to the Project Location were studied in more detail, but the context for the analysis included a general overview of the entire Project Study Area.

Also, some site specific “point” features (e.g. stick nests) may occur beyond the regulated 120 m ZOI, but the defined habitat associated with these features could extend into the regulated 120 m. Such features were investigated as part of the Project Study Area work, and where appropriate have been addressed in the NHA.

The results of the NHA/EIS are consolidated into this report, which is being submitted to MNR for confirmation in advance of submission of the REA application to the Ministry of Environment (“MOE”). Written confirmation from the MNR must be submitted along with the NHA/EIS to the MOE as part of the REA application.

1.3 GUIDANCE DOCUMENTS

During the preparation of this report, several guidance documents were referenced to ensure compliance with current standards and agency requirements. These documents include:

- Natural Heritage Assessment Guide for Renewable Energy Projects (“NHA Guide”) (MNR, 2011a);
- Bats and Bat Habitats Guidelines for Wind Power Projects (MNR, 2011b);

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Introduction

January 2013

- Birds and Bird Habitats Guidelines for Wind Power Projects (MNR, 2011c);
- Significant Wildlife Habitat Technical Guide (“SWHTG”) and Appendices (MNR, 2000a);
- Significant Wildlife Habitat Decision Support System (“SWHDSS”)(MNR, 2000b)
- Ontario Wetland Evaluation System, Northern Manual (MNR, 1993, updated 2002);
- Draft Significant Wildlife Habitat EcoRegion 5E Criterion Schedule (“Eco-Region Criteria”) (MNR, 2012)²; and,
- Technical Guide to Renewable Energy Approvals (MOE, 2011).

² As per direction received from MNR on June 2, 2012, the ‘Draft Significant Wildlife Habitat Ecoregion 5E Criterion Schedule’ will be the current standard used in the review of this NHA.

2.0 Records Review

2.1 METHODS

This records review report was prepared in accordance with O. Reg. 359/09, s. 25 (3).

Background data were collected and reviewed to identify natural heritage features located in the Project Location, or within 120 m of the Project Location (i.e. the ZOI). Documents reviewed and agencies contacted as part of the records review included:

Federal

- Committee on the Status of Endangered Wildlife in Canada (COSEWIC) database. 2002. Wildlife Species Assessment search, http://www.cosewic.gc.ca/eng/sct0/index_e.cfm (accessed August 20, 2012).

Provincial

- MNR, Sault Ste. Marie District. District NHA Records Review Bow Lake Wind Farm, Phase 1 and 2 – Sensitive Values dated April 4, 2012 received from MNR Sault Ste. Marie District on May 16, 2012;
- Regular consultation with the MNR Sault Ste. Marie District Renewable Energy Planner and Acting District Biologist, including weekly check-in calls from February 1 to September 26, 2012 and meetings on April 4, and May 30, 2012;
- Natural Heritage Information Centre (“NHIC”) database. 2010. Natural Areas and Species records search. Biodiversity explorer, MNR, Peterborough, <http://nhic.mnr.gov.on.ca/> (accessed August 20, 2012);
- MNR Land Information Ontario (“LIO”) digital mapping of natural heritage features (2011);
- Government of Ontario, Ministry of Northern Development and Mines (“MNDM”). Information regarding location of karst and mines within the Project Study Area. Source: http://www.mndmf.gov.on.ca/mines/ogs/default_e.asp;
- Renewable Energy Atlas (MNR, 2010) bat hibernacula mapping;
- Ontario Parks Planning and Management Information. Source: <http://www.ontarioparks.com/english/plan-res.html>;
- Checklist of Vascular Plants of Lake Superior Provincial Park (MNR, 1991); and
- Selected Wildlife and Habitat Features: Inventory Manual (MNR, 1998).

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

Local Municipal Government

- Smilsky and Peever are unorganized townships; as such, there are no local planning documents to consider. Development in this area is guided by Crown Land planning policies.

Conservation Authorities

- The Project Study Area is not located within an area under the jurisdiction of a Conservation Authority. As such, no records were requested from Conservation Authorities.

Other Data Sources

- 'Bow Lake Wind Farm Draft Environmental Screening Report', prepared by M.K. Ince and Associates Ltd. ("MKI") (January 2009);
- Draft 'Bow Lake Wind Farm Phase 1 Natural Heritage Records Review Report' (Nov. 26, 2010), 'Site Investigation Report' (Nov. 10, 2010), 'Evaluation of Significance Report' (Nov. 10, 2010) and 'Environmental Impact Study Report' (Dec. 2, 2010) prepared by MKI (these reports were confirmed by the MNR on Dec. 21, 2010);
- Draft 'Bow Lake Wind Farm Phase 1 Addendum - Natural Heritage Records Review Report, Site Investigation Report, Evaluation of Significance Report and Environmental Impact Study Report' prepared by MKI (January 13, 2012);
- Draft 'Bow Lake Phase 2 Wind Farm Ltd. – Bow Lake Wind Farm Phase 2 Natural Heritage Records Review Report, Site Investigation Report, Evaluation of Significance Report and Environmental Impact Study Report', prepared by MKI (August 16, 2011, and revised February 15, 2012);
- 'Class Environmental Assessment for Access Road Upgrades and Construction of 3 Spur Roads, Bow Lake Phase 1 Wind Farm', prepared by Great Lakes Environmental Services, a Division of Tulloch Engineering Inc. ("Tulloch"), June 2012;
- Moose Antler Wetland Complex wetland evaluation forms, prepared by Natural Resource Solutions Inc. ("NRSI") November 20, 2010 and revised March 9, 2012;
- Bullseye Wetland Complex wetland evaluation forms, prepared by NRSI November 20, 2010 and revised March 9, 2012;
- Question Mark Wetland Complex wetland evaluation forms, prepared by NRSI (November 20, 2010 and revised March 9, 2012);
- Lonely Wetland wetland evaluation forms, prepared by NRSI (November 19, 2010 and revised March 9, 2012);
- Isosceles Wetland Complex wetland evaluation forms, prepared by NRSI (November 13, 2010 and revised March 9, 2012);
- Bow Lake Wetland Complex wetland evaluation forms, prepared by NRSI (November 22, 2010 and revised March 15, 2012);

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

- Bear Paw Wetland complex, prepared by NRSI (November 10, 2010);
- Important Bird Areas database (Bird Studies Canada and BirdLife International, undated);
- Sault North Planning Board, Natural Heritage Values and Water Bodies Map: Bow Lake Wind Farm Phase 1 (May 15, 2012);
- Ontbirds Archives;
- Ontario Nature's online Reptile and Amphibian Atlas; and
- Wildlife atlases, including: 'Atlas of the Mammals of Ontario' (Dobbyn, 1994); the 'Ontario Herpetofaunal Summary' (Oldham and Weller, 2000); and, the 'Ontario Breeding Bird Atlas' (Cadman *et al.*, 2007).

A summary of agencies contacted, information requested and responses received is provided in **Table 1** (Appendix B).

The information received from each source and the manner in which it was used to identify natural heritage features, provincial parks or conservation reserves that exist in or within 120 m of the Project Location (50 m for Earth Science ANSIs), is presented in **Section 2.2**.

2.2 RESULTS

A review of available background information has indicated the presence of known natural heritage features (as defined in **Section 1.2**) occurring within the Project Study Area. The results of the records review were used to determine whether these natural heritage features occur in the Project Location and/or in the ZOI. The locations and boundaries of natural heritage features identified during the records review relative to the Project Location are provided on **Figure 2.0**, and described in **Sections 2.2.1 to 2.2.7**.

2.2.1 Wetlands

A review of LIO mapping and the NHIC database indicated the presence of previously unevaluated wetland features within the Project Study Area. Evaluations of these wetland communities were conducted by NRSI in 2010, according to the 'Ontario Wetland Evaluation System, Northern Manual' (MNR, 2002). Evaluation records were submitted to the MNR Sault Ste. Marie District in November 2010, revised based on MNR comments, and re-submitted in March 2012. Copies of the wetland evaluation records are provided in **Appendix F-10**. The wetland evaluations resulted in the identification of seven wetland complexes. One (1) wetland complex is considered provincially significant ("PSW"), while the remaining six (6) have been evaluated as not provincially significant. Details of these features are as follows:

Provincially Significant Wetlands

The Bullseye Wetland Complex PSW is composed of three wetland types; swamp, marsh and fen (77%, 9% and 14% respectively). This PSW complex covered an area of 15.19 ha, and was comprised of seven (7) individual wetlands. The Bullseye Wetland Complex was determined to

be provincially significant largely because of the presence of provincially rare plant species (i.e. oval-leaved bilberry and boreal bedstraw) and a bird species (i.e. Rusty Blackbird) that is tracked by NHIC. The wetland complex is generally located in the northeast portion of the Project Study Area, and is shown on **Figure 4.6**.

Non-Provincially Significant Wetlands

The remaining six (6) wetland complexes evaluated by NRSI were determined to be not provincially significant. These included:

- Moose Antler Wetland Complex – this complex consisted of two (2) individual wetlands, composed of swamp and marsh communities, and covered an area of 6.52 ha.
- Question Mark Wetland Complex – this complex consisted of two (2) individual wetlands, composed of swamp, marsh and fen communities, and covered an area of 6.36 ha;
- Lonely Wetland Complex – this complex consisted of three (3) individual wetlands, composed of marsh communities, and covered an area of 0.64 ha;
- Isosceles Wetland Complex – this complex consisted of three (3) individual wetlands, composed of swamp, marsh and fen communities, and covered an area of 3.75 ha;
- Bow Lake Wetland Complex – this complex consisted of fifteen (15) individual wetlands, composed of swamp and marsh communities, and covered an area of 118.1 ha.
- Bear Paw Wetland Complex – this complex consisted of three (3) individual wetlands, composed of swamp, marsh, fen, and open water communities and covered an area of 8.44 ha.

Unevaluated Wetlands

Based on the records review, there were no additional unevaluated wetlands identified in or within 120 m of the Project Location. Site investigations were undertaken to identify any previously unidentified wetlands in or within 120 m of the Project Location.

Wetlands Summary

One (1) provincially significant and six (6) non-provincially significant wetland complexes were identified in the Project Study Area. Site investigations were undertaken to determine whether these wetlands were located within 120 m of the Project Location, and to identify any previously unknown wetland features in or within 120 m of the Project Location.

2.2.2 Woodlands

The Project is located on the Canadian Shield. As per Section 5.4 of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), significant woodlands need only be considered when the Project Location is located on lands south and east of the Canadian Shield. Under O. Reg 359/09 proponents engaging in a renewable energy project are

not required to identify the presence and boundaries of woodlands that occur in or within 120 m of the Project Location in areas on the Canadian Shield.

2.2.3 Valleylands

The Project is located on the Canadian Shield. As per Section 5.4 of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a) significant valleylands need only be considered when the Project Location is located on lands south and east of the Canadian Shield. Under O. Reg 359/09 proponents engaging in a renewable energy project are not required to identify the presence and boundaries of valleylands that occur in or within 120 m of the Project Location in areas on the Canadian Shield.

2.2.4 Wildlife Habitat

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important to migratory and non-migratory species. The 'Draft Significant Wildlife Habitat EcoRegion 5E Criterion Schedule' (MNR, 2012) categorizes wildlife habitat in four groups:

- Seasonal concentration areas of animals;
- Rare vegetation communities or specialized habitat for wildlife;
- Habitat for species of conservation concern; and
- Animal movement corridors.

Within EcoRegion 5E, the Project is situated in EcoDistrict 5E-13. A compilation of background information on known wildlife use within the Project Study Area was undertaken. Using this information, wildlife habitat features were identified that may be present in, or within 120 m of the Project Location that either represent confirmed Significant Wildlife Habitat ("SWH") or indicate the potential for candidate SWH.

Air photo interpretation indicated that the Project Study Area is comprised largely of forested lands, and habitat for various species of wildlife is likely to be found throughout the Project Location and ZOI.

Secondary source data were used to determine potential wildlife use within the Project Study Area. Inventories of wildlife that have been recorded as occurring in the vicinity of the Project Study Area were compiled from available literature and resources including the 'Atlas of the Mammals of Ontario' (Dobbyn, 1994), the 'Ontario Herpetofaunal Summary' (Oldham and Weller, 2000) and the 'Ontario Breeding Bird Atlas' (Cadman *et al.*, 2007). Based on a review of background information, 52 species of birds, 41 species of mammals, 14 species of amphibians, and 2 species of reptiles are known to occur in the vicinity of the Project Study Area. These species are listed in **Table 2** (Appendix B). It is important to note that the exact locations of species occurrences are not available from these atlases, as records are presented in

10 x 10 km squares. The presence of species will depend on habitat suitability and availability, and some or all of the species recorded in these databases may not occur within the Project Location or the ZOI.

2.2.4.1 Seasonal Concentration Areas of Animals

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. The 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) identifies 13 potential types of seasonal concentration areas:

- Waterfowl stopover and staging areas (terrestrial);
- Waterfowl stopover and staging areas (aquatic);
- Shorebird migratory stopover areas;
- Raptor wintering areas;
- Bat hibernacula;
- Bat maternity colonies;
- Bat migratory stopover areas;
- Turtle wintering areas;
- Reptile hibernaculum;
- Colonially-nesting bird breeding habitat (bank and cliff);
- Colonially-nesting bird breeding habitat (tree/shrubs);
- Colonially-nesting bird breeding habitat (ground); and
- Deer yarding areas.

The Project is situated on the Canadian Shield, and inland from the eastern shore of Lake Superior. A review of background information to assess the potential for seasonal concentration areas associated with this regional landscape and the likelihood of seasonal concentrations areas in the Project Study Area is provided in the following sections.

Waterfowl Stopover and Staging Areas (terrestrial and aquatic)

Areas generally considered candidate SWH for aquatic waterfowl stopover and staging areas are very large wetlands, associated with lakes, with a diversity of vegetation communities interspersed with open water (MNR, 2000a). Marshes along Great Lakes shorelines are considered particularly valuable. Fields with sheet water during spring (mid-March to May) and fields flooding during spring melt and run-off provide important invertebrate foraging terrestrial habitat for migrating waterfowl, and are considered candidate SWH. Although agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH (MNR, 2012).

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

No known waterfowl stopover and staging areas occur within 120 m of the Project Location, although the seven evaluated wetland complexes identified within the Project Study Area could potentially support aquatic stopover and staging areas. Site investigations were undertaken to determine whether this type of seasonal concentration area was present in or within 120 m of the Project Location.

Shorebird Migratory Stopover Areas

Relatively undisturbed shorelines along lakes, rivers, and wetlands that produce abundant food (clams, insects, snails and worms) are used by shorebirds during migration (MNR, 2000a). No known shorebird migratory stopover areas were identified in the Project Study Area. Site investigations were undertaken to determine whether this type of seasonal concentration area was present in or within 120 m of the Project Location.

Raptor Wintering Areas

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

Wintering raptors are known to occur within the Project Study Area, although the Project is not located in a known concentration area for winter raptors. Site investigations were undertaken to determine whether this type of seasonal concentration area was present in or within 120 m of the Project Location.

Bat Hibernacula, Maternity Colonies and Migratory Stopover Areas***Hibernacula***

Bats require specific environmental conditions for hibernating. These conditions are provided by features such as caves or abandoned mines (MNR, 2000a). Karst topography and areas of exposed bedrock can be indicators of potentially suitable hibernacula habitat for bats. No known bat hibernacula have been identified within the Project Location or ZOI (MNR, 2010). MNR has identified one known bat hibernaculum in the Project Study Area, in excess of 1120 m from the Project Location. A review of abandoned mine data from the Ministry of Northern Development and Mines website indicated that four abandoned mines are located in the Project Study Area, which included the entrance identified above as a known hibernaculum and three open trenches. Open trenches are not suitable for use as bat hibernacula. Site investigations were undertaken to determine whether this type of seasonal concentration area was present in or within 120 m of the Project Location.

Maternity Colonies

Depending on the species, maternity roosts for bats can include tree foliage, tree cavities and crevices under loose bark, or buildings (although buildings are not considered to be SWH). Maternity roosts are not found in caves and mines in Ontario (MNR, 2012).

Candidate SWH for bat maternity roosts may be found in mixed wood or deciduous forests that contain a high density (10/ha or more) of large diameter (25 cm diameter at breast height (dbh) or more) snags or cavity trees (MNR 2011b). The best candidate trees or snags for bat maternity roosts within these habitats are considered according to the following criteria (in order of importance): those that are the tallest; have cavities or crevices; have a large dbh; are within the highest density of snags/cavity trees; have a large amount of loose, peeling bark; have a cavity or crevice high in the tree (more than 10 m); are tree species that provide good cavity habitat (i.e. aspen, maple, ash, oak or white pine), are within an open canopy; and exhibit early stages of decay.

No known maternity colonies occur within the Project Study Area. Site investigations were undertaken to determine whether this type of seasonal concentration area was present in or within 120 m of the Project Location.

Migratory Stopover Areas

Stopover areas for long distance migrant bats, including Hoary Bat, Eastern Red Bat and Silver-haired Bat, are important during fall migration. Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migrations concentrate these species of bats at stopover areas. The location and characteristics of stopover habitats are generally unknown, although Long Point has been identified as a significant stopover habitat for Silver-haired Bats (MNR, 2012) in southern Ontario.

No known migratory stopover areas occur within the Project Study Area. The Project is located inland, and not adjacent to a Great Lakes shoreline or other landform features that concentrate bats (ridges or peninsulas). As indicated in 'Bat and Bat Habitats Guidelines for Wind Power Projects' (MNR, 2011b), criteria for confirming bat migratory stopover areas are not currently defined in the SWHTG (MNR, 2000a). In the absence of criteria, bat migratory stopover areas cannot currently be evaluated. As such, this feature was not carried forward to the site investigation.

Turtle Wintering Areas

Over-wintering sites are found in permanent water bodies, large wetlands and bogs or fens. The sites must include the following characteristics: a soft mud substrate to allow burrowing; sufficient depth to prevent freezing to the bottom; and, adequate levels of dissolved oxygen. Over-wintering habitat typically occurs in the same general area as their core habitat.

No known turtle wintering areas occur within the Project Study Area. Site investigations were undertaken to determine whether this type of seasonal concentration area was present in or within 120 m of the Project Location.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

Reptile Hibernacula

Potential hibernacula are overwintering areas that include features such as animal burrows, rock crevices, fractured rocks at the base of cliffs or karst areas that provide an access for snakes to hibernate below the frost line (MNR, 2000a). These areas are often associated with water to prevent desiccation of the species.

The Project is located well outside the reported range of Five-lined Skink, but it is within the ranges of one common species of snake: Eastern Gartersnake (Oldham and Weller, 2000). There are no known reptile hibernacula within the Project Study Area. Site investigations were undertaken to determine whether snake hibernacula were present in or within 120 m of the Project Location.

Colonially-Nesting Bird Breeding Habitat (bank, cliff, tree/shrub, and ground)

Colonial bird nesting sites can be located in swamps and along large bodies of water for herons, islands or peninsulas for gulls and areas with exposed soil banks, sandy hills or borrow pits for swallows. Man-made structures such as bridges and buildings, or recently (2 years) disturbed areas, including licensed/permitted mineral extraction areas are not considered as SWH for swallows (MNR, 2012).

No known colonial bird nesting sites occur within the Project Study Area, although potential habitat may be present in the wetland areas. Site investigations were undertaken to determine whether this type of seasonal concentration area was present in or within 120 m of the Project Location.

Deer Yarding Areas

Deer yards are areas of key winter habitat for White-tailed Deer. They usually consist of a core area of coniferous forest, which provides shelter from snow and wind, adjacent to an area of deciduous forest or other foraging habitat. While White-tailed Deer are known to occur within the Project Study Area (Dobbyn, 1994), no known winter deer yards occur in the Project Study Area (LIO, 2011). The MNR District Offices are responsible for identifying and mapping deer yards. No deer yards have been mapped within the Project Study Area. As a result this feature was not carried forward into the site investigation.

2.2.4.2 Rare Vegetation Communities or Specialized Habitat for Wildlife**Rare Vegetation Communities**

The 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) identifies the following features as rare vegetation communities:

- Beach, beach ridge, bar and sand dunes;
- Shallow Atlantic coastal marsh;
- Cliffs and talus slopes;

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

- Rock barren;
- Sand barren;
- Alvar;
- Old growth forest;
- Bog;
- Tallgrass prairie;
- Savannah;
- Rare forest type – Red Spruce; and
- Rare forest type – White Oak.

A search of the NHIC database did not identify any records of known rare vegetation communities in or within 120 m of the Project Location. Aerial photo interpretation and a review of available background information also indicate that, with the exception of one cliff feature, there are no known rare vegetation communities in or within 120 m of the Project Location. Site investigations were undertaken to determine whether any of these rare vegetation communities were present in or within 120 m of the Project Location.

Specialized Habitat for Wildlife

- Specialized habitats are habitats with functions or attributes that make them critical to specific wildlife species, generally seasonally or at a specific stage in their life cycle. The SWH EcoRegion 5E Criterion Schedule identifies the following potential specialized habitats:
 - Waterfowl nesting area;
 - Bald Eagle and Osprey nesting, foraging, and perching habitat;
 - Woodland raptor nesting habitat;
 - Turtle and lizard nesting areas;
 - Seeps and springs;
 - Moose aquatic feeding habitat;
 - Mineral licks;
 - Denning sites for Mink, Otter, Marten, Fisher and Eastern Wolf;
 - Amphibian breeding habitat (woodland);
 - Amphibian breeding habitat (wetland); and
 - Mast producing areas.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

A review of background information to assess the potential for specialized habitats that are associated with this regional landscape, and may be present in the Project Study Area, is provided in the following sections.

Waterfowl Nesting Areas

Waterfowl nesting habitat typically includes upland habitat that is adjacent to marshes, ponds or lakes. Sites considered candidate SWH for waterfowl nesting typically contain a high density of small and medium sized ponds, or are single wetlands that are large and diverse (MNR, 2000a). The waterfowl nesting habitat extends 120 m into the adjacent upland habitats.

No known waterfowl nesting sites occur within the Project Study Area, although potential habitat may be present within and adjacent to wetland features. Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat

The SWHTG (MNR, 2000a) indicates that some raptors require somewhat specialized habitats. Under the criteria and guidelines outlined in Appendix Q of the SWHTG, critical habitat features that would support specialized Bald Eagle and Osprey nesting habitat are identified as waterbodies with fish populations and trees with good visibility and flight lines. The 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) suggests that potential habitat may be present in forest communities directly adjacent to riparian areas associated with rivers, lakes, ponds and wetlands.

The NHIC compiles all known nesting sites for Bald Eagles in Ontario and the LIO lists known nesting locations. The NHIC and LIO were reviewed and no known Osprey or Bald Eagle nests were identified within the Project Study Area. Bald Eagles are commonly observed at the dump site in the west of the Project Study Area along Hwy. 17. Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Woodland Raptor Nesting Habitat

The 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) indicates that woodland raptors may be found in all forested ELC community types including natural forests or conifer plantations, woodlands or forest stands. Stick nests may be found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests in the tops or crotches of trees. The NHIC and LIO indicate that there are records of Broad-winged Hawk and Red-tailed Hawk nests in the general vicinity of the Project Study Area, as well as noting that nest sites for woodland raptors are rarely identified (MNR, 2012). Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Turtle and Lizard Nesting Areas

Sandy or fine gravel soils are a requirement for turtle nesting (MNR, 2000a). Areas that would be considered candidate SWH for turtle nesting include areas containing sandy or fine gravel soils (i.e. shoreline beaches) adjacent to turtle habitat (weedy wetlands, lake or river shorelines).

The Five-lined Skink is the only lizard native to Ontario. A review of the Ontario Herpetofaunal Summary (Oldham and Weller, 2000) indicates that the Project Study Area is located well outside the range of the Five-lined Skink which occurs east of Georgian Bay and south of Sudbury (Ontario Nature, 2011). As a result lizard nesting sites are unlikely to occur in the Project Study Area, and this feature was not carried forward into the site investigation.

Based on the results of the records review, no known turtle nesting sites occur within the Project Study Area. Site investigations were conducted to determine the presence of candidate turtle nesting areas in or within 120 m of the Project Location.

Seeps and Springs

Seepage areas and springs provide habitat for numerous uncommon species and may support a high diversity of plant species (MNR, 2000a). In winter, these areas provide foraging opportunities for wildlife, including White-tailed Deer, Moose and Ruffed Grouse. Those that occur in headwater areas within forested habitats where the canopy maintains cool, shaded conditions are often at the source of coldwater streams and are considered most important. Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Aquatic Feeding Habitat

Aquatic feeding habitats are an extremely important habitat component for Moose and other wildlife as they supply important nutrients. Habitat may be found in all forested ecosites adjacent to water. MNR maps these locations on Crown land and rates the site on a scale of 0 – 4, with 4 being the best. Feeding sites classed 3 or 4 are potential/candidate SWH. Where Moose Aquatic Feeding Area (“MAFA”) habitat is in low supply, class 2 MAFA habitat could be considered candidate SWH. MNR records indicate 36 MAFAs in the Project Study Area, including 18 class 1 MAFAs, 17 class 2 MAFAs, and one class 3 MAFA. Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Mineral Licks

Mineral licks are a valuable habitat component, particularly for Moose and White-tailed Deer, but are also very rare on the landscape. Mineral licks may be found in all forested ecosites. This habitat component is found in upwelling groundwater and the soil around these seepage areas, and typically occurs in areas of sedimentary and volcanic bedrock. In areas of granitic bedrock, the site is usually overlain with calcareous glacial till (MNR, 2012). No known mineral licks occur

within the Project Study Area. Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Denning Sites for Mink, Otter, Marten, Fisher and Eastern Wolf

Mink, Otter, Marten, Fisher and Eastern Wolf are important fur-bearing mammals and denning sites may be found in all forested ecosites. Mink prefer shorelines dominated by coniferous or mixed forests with dens usually underground and will sometimes use old muskrat lodges. Otters prefer undisturbed shorelines along water bodies that support productive fish populations with abundant shrubby vegetation and downed woody debris for denning. They often use old beaver lodges or log jams and crevices in rock piles. Marten and Fisher share the same general habitat, requiring large tracts of coniferous or mixed forests of mature or older age classes, with denning sites often located in cavities in large trees or under large downed woody debris. Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Amphibian Breeding Habitat (woodland)

Woodland ponds may provide important habitat for local amphibian populations. Ponds that contain a variety of vegetation structures in and around the edge of the pond, are undisturbed, and are found adjacent to closed canopy woodlands with dense undergrowth that maintain a damp environment, typically provide the best ponds for breeding (MNR, 2000a).

The Ontario Herpetofaunal Summary (Oldham and Weller, 2000) indicates that the Project Study Area falls within the range of a number of common amphibian species. Woodlands dominate the Project Study Area and those with permanent ponds or those containing water in most years until mid-July are more likely to be used as amphibian breeding habitat. Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

Amphibian Breeding Habitat (wetland)

Wetland habitats that support breeding activity for a variety of amphibian species are important and are fairly rare within the Central Ontario landscape.

Various wetland amphibian species, including Bullfrog, are known to occur within the Project Study Area. Site investigations were conducted to determine whether this type of specialized habitat for amphibian breeding was present in or within 120 m of the Project Location.

Mast Producing Areas

Mast is a very important food requirement for many wildlife species, particularly Black Bear, White-tailed Deer and Ruffed Grouse. The most important areas are mature forests >0.5 ha in size containing numerous large American beech and red oak trees that supply the energy-rich mast that wildlife prefer. Sites providing long-term, relatively stable food supplies are important. Forest openings or barrens >1 ha in size provide excellent sites for mast producing shrubs. Sites such as clear-cuts or burns are a temporary source of food and are less significant (MNR,

2012). Site investigations were conducted to determine whether this type of specialized habitat for wildlife was present in or within 120 m of the Project Location.

2.2.4.3 Habitat for Species of Conservation Concern

Habitat for species of conservation concern includes wildlife species that are: listed as Special Concern or rare; have declining populations; or are featured species, as determined by the MNR. Species of conservation concern and associated habitat are listed in the 'Draft SWH Ecoregion 5E Criteria Schedule' (MNR, 2012). Habitats for species of conservation concern include:

- Marsh Bird Breeding Habitat;
- Open Country Bird Breeding Habitat;
- Shrub/early Successional Bird Breeding Habitat; and
- Special Concern and Rare Wildlife Species.

Habitats of species conservation concern do not include habitats of Endangered or Threatened Species as identified by the *Endangered Species Act, 2007*. Within the context of O.Reg 359/09, Endangered and Threatened species are addressed as part of MNR's 'Approval and Permitting Requirements Document for Renewable Energy Projects' ("APRD") requirements (MNR, 2009).

A review of background information to assess the potential for habitat for species of conservation concern that may be associated with the Project Location or the ZOI is provided in the following sections.

Marsh Bird Breeding Habitat

Wetlands for marsh bird species are very productive and rare in Central Ontario landscapes. Nesting occurs in wetlands and all wetland habitats are to be considered as long as there is shallow water with emergent aquatic vegetation. Site investigations were conducted to determine whether this type of habitat was present in or within 120 m of the Project Location.

Open Country Bird Breeding Habitat

Potential candidate open country bird breeding habitat includes large grassland areas (includes natural and cultural fields and meadows) >30 ha that are not class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years). Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Project Study Area is dominated by forested lands, and small wetlands. No abandoned agricultural land or natural grasslands are present and open country habitat in excess of 30 ha is not likely to be present. However, site investigations were conducted to determine whether this type of habitat was present in or within 120 m of the Project Location.

Shrub/Early Successional Bird Breeding Habitat

Potential candidate habitat includes large field areas succeeding to shrub and thicket habitats >30 ha in size that are not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or livestock pasturing in the last 5 years). Patches of shrub ecotones can be complexed into a larger habitat for some bird species. Larger shrub thicket habitats (>30 ha) are most likely to support and sustain a diversity of these species. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or lightly grazed pasturelands. The Project Study Area is located on primarily forested lands, and shrub/early successional habitat in excess of 30 ha is likely to be limited or absent. Site investigations were conducted to determine whether this type of habitat was present in or within 120 m of the Project Location.

Special Concern and Rare Wildlife Species

Rare species are considered at five levels: globally rare, nationally rare (with designations by the Committee on the Status of Endangered Wildlife in Canada, or COSEWIC), provincially rare (with designations by the Committee on the Status of Species at Risk in Ontario, or COSSARO), regionally rare (at the Site Region level), and locally rare (in the municipality or Site District). This is also the order of priority that should be assigned to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated SWH. Examples include species vulnerable to habitat loss and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final group of species of conservation concern includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

NHIC and wildlife atlases were used to identify historic records of special concern and rare wildlife species that occur in the Project Study Area. Special concern and rare wildlife species are those that are listed as special concern and provincially rare (S1-S3, SH) plant and animal species (see **Table 3**, Appendix B). Site investigations included habitat suitability assessments for each of these species, and were used to determine the potential for candidate SWH for rare species in or within 120 m of the Project Location.

2.2.4.4 Animal Movement Corridors

Animal Movement Corridors are elongated areas used by wildlife to move from one habitat to another. They are important to ensure genetic diversity in populations, to allow seasonal migration of animals (e.g. deer moving from summer to winter range) and to allow animals to move throughout their home range from feeding areas to cover areas. Animal movement corridors function at different scales often related to the size and home range of the animal.

Identifying the most important corridors that provide connectivity across the landscape is challenging because of a lack of specific information on animal movements. There is also some uncertainty about the optimum width and mortality risks of corridors. Furthermore, a corridor may be beneficial for some species but detrimental to others (e.g. increased access for

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

raccoons, cats, and other predators or narrow corridors dominated by edge habitat may encourage invasion by weedy generalist plants and opportunistic species of birds and mammals). Corridors often consist of naturally vegetated areas that run through more open or developed landscapes. However, sparsely vegetated areas including agricultural lands between natural areas can also function as corridors. Despite the difficulty of identifying exact movement corridors for all species, these landscape features are important to the long-term viability of certain wildlife populations.

Animal Movement Corridors should only be identified as SWH where a confirmed SWH has been identified based on documented evidence of a habitat identified within the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) or the SWHTG (MNR, 2000a). The identified habitats may rely on well-defined natural features for movements between habitats required by the species to complete its life cycle. The 'Draft SWH EcoRegion 5E Criterion Schedule' identifies three potential types of animal movement corridors:

- Amphibian movement corridors;
- Cervid movement corridors; and,
- Furbearer movement corridors.

Amphibian Movement Corridors

Movement corridors for amphibians moving from their terrestrial (summer) habitat to breeding habitat can be extremely important for local populations. Corridors may be found in all ecosites associated with water and will be determined based on identifying the significant breeding habitat for amphibian species. Based on the results of the records review, no known amphibian movement corridors were identified in the Project Study Area. Site investigations were conducted to assess the suitability of features as potential amphibian movement corridors in or within 120 m of the Project Location.

Cervid Movement Corridors

Corridors are important for Moose and White-tailed Deer to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling. Corridors may be found in all forested ecosites, and typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges), but must be determined when Deer Yarding Areas, Moose Aquatic Feeding Areas or Mineral Lick Habitat is confirmed as SWH. No known cervid movement corridors were identified in the Project Study Area. As discussed in **Section 2.2.4.1**, there are no Deer Yard Areas in the Project Study Area.

As such, site investigations were conducted to assess the suitability of features as potential cervid movement corridors as they relate to Moose Aquatic Feeding Areas and Mineral Licks in or within 120 m of the Project Location.

Furbearer Movement Corridors

The identification of denning sites is rare, and corridors to and from the habitat must be maintained as this habitat is extremely important for local populations. Potential candidate habitat is found in forested areas adjacent to or within shoreline habitats. Mink and Otter den sites are typically found within a riparian area of a lake, river, stream or wetland. The den site will potentially have a movement corridor associated with it. All Mink or Otter den sites identified under the habitat of Denning Sites for Mink, Otter, Marten, Fisher and Eastern Wolf are to be considered for an animal movement corridor. No known furbearer movement corridors were identified in the Project Study Area during the records review. Site investigations were conducted to assess the suitability of features as potential furbearer movement corridors in or within 120 m of the Project Location.

2.2.4.5 Exceptions for EcoRegion 5E

Exceptions are candidate wildlife habitats that will have different criteria than what is proposed in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) for an area within the Eco-region. Exceptions are based on Eco-Districts and within Eco-District 5E-13, which contains the Project Study Area, the following exception has been identified:

Late Winter Moose Habitat: This exception will be included under 'seasonal concentration areas' for the remainder of this report and all subsequent reports.

Late Winter Moose habitat is characterized by dense conifer cover with greater than 50% canopy closure and >10 m in height. Snow depth in excess of 70 cm restrict Moose movement during winter, however late summer thermal refuge is important in relieving heat stress. These habitats are extensively used by Moose during late spring and summer due to the shade provided. No known Late Winter Moose habitat was identified in the Project Study Area. Site investigations were conducted to determine whether this type of habitat was present in or within 120 m of the Project Location.

2.2.5 Areas of Natural and Scientific Interest (ANSIs)

MNR identifies two types of ANSIs: life science and earth science (MNR, 2010). Life Science ANSIs are significant representative areas of Ontario's biodiversity and natural landscapes, while Earth Science ANSIs are geological in nature and consist of some of the more significant representative examples of bedrock, fossils and landforms in Ontario. MNR assesses ANSIs as being provincially, regionally or locally significant. The REA Regulation specifies prohibitions on development within provincially significant Life Science and provincially significant Earth Science ANSIs (without preparation of an EIS, and specifies setbacks of 120 m and 50 m respectively). No provincially significant Life Science ANSIs were identified during the background review in or within 120 m of the Project Location. No provincially significant Earth Science ANSIs were located in or within 50 m of the Project Location, and as such, ANSIs were not carried forward through to site investigation.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

2.2.6 Natural Features in Specified Provincial Plan Areas

The Project Location is not within the Niagara Escarpment Plan Area, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

2.2.7 Provincial Parks and Conservation Reserves

The Montreal River Provincial Nature Reserve is located south of the mouth of the Montreal River and west of Highway 17. The Nature Reserve is separated from the Project Location by well in excess of 120 m and this feature was not carried forward to site investigation.

An addition (P292) to Lake Superior Provincial Park (LSPP) is located within 120 m of the Project Location. P292 is located west of Highway 17, and across the highway from the entrance to Dump Road. As such, this feature was carried through to site investigation.

2.3 SUMMARY OF NATURAL FEATURES AND BOUNDARIES IDENTIFIED

Table 2.1 provides a summary of the natural features that were carried forward to site investigation. The locations and boundaries of these features are shown on **Figure 2.0**.

Table 2.1: Natural Features Carried Forward to Site Investigation

Feature	Carried Forward to Site Investigation (Y/N)	Known Recorded Information
Wetlands	Yes	OWES Evaluations
Woodlands	N/A	N/A
Valleylands	N/A	N/A
Wildlife Habitat		
Seasonal Concentration Areas		
- Waterfowl stopover and staging areas (terrestrial)	Yes	None
- Waterfowl stopover and staging areas (aquatic)	Yes	None
- Shorebird migratory stopover areas	Yes	None
- Raptor wintering areas	Yes	None
- Bat hibernacula	Yes	Only known feature is >1120m from Project Location.
- Bat maternity colonies	Yes	None
- Bat migratory stopover areas	No	None
- Turtle wintering areas	Yes	None
- Reptile hibernacula	Yes (snake)	None
- Colonially-nesting bird breeding habitat (bank and cliff)	Yes	None
- Colonially-nesting bird breeding habitat (tree/shrub)	Yes	None
- Colonially-nesting bird breeding habitat (ground)	Yes	None
- Deer yarding areas	No	No deer yards have been identified by MNR in the Project Study Area.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

Table 2.1: Natural Features Carried Forward to Site Investigation

Feature	Carried Forward to Site Investigation (Y/N)	Known Recorded Information
Rare Vegetation Communities or Specialized Habitat for Wildlife		
<i>Rare Vegetation Communities</i>		
- Beach/Beach Ridge/Bar/Sand Dunes	Yes	None
- Shallow Atlantic coastal marsh	Yes	None
- Cliffs and talus slopes	Yes	One Cliff feature was identified by MKI
- Rock barren	Yes	None
- Sand barren	Yes	None
- Alvar	Yes	None
- Old growth forests	Yes	None
- Bog	Yes	None
- Tallgrass prairie	Yes	None
- Savannah	Yes	None
- Rare forest type – Red Spruce	Yes	None
- Rare forest type – White Oak	Yes	None
- Other rare vegetation communities	Yes	None
<i>Specialized Habitat for Wildlife</i>		
- Waterfowl nesting area	Yes	None
- Bald Eagle and Osprey nesting, foraging, and perching habitat	Yes	None
- Woodland raptor nesting habitat	Yes	MNR records indicate Broad-winged and Red-tailed Hawk nests in the general vicinity of the Project Study Area.
- Turtle and lizard nesting areas	Yes (turtle)	None
- Seeps and springs	Yes	None
- Moose aquatic feeding area	Yes	MNR records indicate 36 MAFAs in the Project Study Area.
- Mineral lick	Yes	None
- Denning sites for Mink, Otter, Marten, Fisher and Eastern Wolf	Yes	None
- Amphibian breeding habitat (woodland)	Yes	None
- Amphibian breeding habitat (wetland)	Yes	None
- Mast producing areas	Yes	None
Habitat for Species of Conservation Concern		
- Marsh Bird Breeding Habitat	Yes	None
- Open country bird breeding habitat	Yes	None
- Shrub/early successional bird breeding habitat	Yes	None
- Special Concern and Rare Wildlife Species	Yes	Rare plant and wildlife species as identified in Table 3 , Appendix B.
Animal Movement Corridors		
- Amphibian movement corridors	Yes	None
- Cervid movement corridors	Yes	None
- Furbearer movement corridor	Yes	None

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Records Review

January 2013

Table 2.1: Natural Features Carried Forward to Site Investigation

Feature	Carried Forward to Site Investigation (Y/N)	Known Recorded Information
Exceptions for Eco-District 5E-13		
- Late winter Moose habitat	Yes	None
Areas of Natural and Scientific Interest (ANSI)		
- Provincially Significant Life Science ANSI - Provincially Significant Earth Science ANSI	No	Not present in the Project Study Area.
Specified Provincial Plan Areas	No	Project Location is not in any specified provincial plan areas.
Provincial Parks and Conservation Reserves	Yes	An addition to LSPP (P292) is located across Hwy 17 from the Dump Road entrance.

3.0 Site Investigation

Site investigations were conducted in accordance with O. Reg 359/09, s. 26 (1), Natural Heritage Site Investigation. This report is prepared in accordance with s. 26 (3) with guidance provided from the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011).

Site investigations in support of this report were completed with the purpose of confirming the status and boundaries of natural features identified through the records review and identifying any additional features. Data collected during the records review regarding natural features and species occurrences were used to guide the scope and direction of site investigations. Natural features that have the potential to occur in or within 120 m of the Project Location, as identified through the records review, are listed in **Table 2.1**. Site investigations are required to confirm the presence and delineate the boundaries of candidate SWH features within 120 m of the Project Location.

3.1 METHODS

The site investigations undertaken detailed the current conditions in and within 120 m of the Project Location. Survey dates, times, duration, field personnel and weather conditions are presented in **Table 4** (Appendix B). All surveys conducted within the Project Study Area were completed by qualified personnel. *Curricula vitae* for personnel involved in conducting the site investigations are provided in **Appendix G**. Access was available for all lands where Project components are proposed, and all areas within 120 m of the Project Location were traversed on foot during site investigations.

All site investigations were carried out in accordance with O. Reg. 359/09, the Technical Guide to Renewable Energy Approvals (MOE, 2011), and the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), using guidance provided in the SWHTG and the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012).

3.1.1 Aerial and Reconnaissance Surveys

Given the size, relatively rugged topography and dense forest cover of the Project Study Area, a number of multi-purpose broad scale surveys were completed to obtain an overall understanding of the landscape ecology, and to put the detailed field studies in context.

Approximately two hours of helicopter (Bell 206 L4 Long Ranger) flight time were completed on April 17, 2012 to observe the landscape without leaf cover and at a time of pronounced hydrological activity (i.e. the tail-end of the spring melt). The flight path for the helicopter survey is shown in **Appendix H-1**. The flight included a wide range of elevations (30 m – 100 m) above the surface of the ground including low altitude (~30 m) passes over features of interest. Three terrestrial ecologists and one aquatic ecologist participated in the helicopter survey. At an

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

elevation of 30 m, accurate wildlife counts are possible along a 100 m wide transect (Ross *et al.*, 2004), while at 50 m above ground waterfowl can be observed within a 400 m wide transect (USFWS undated). Particular attention was paid to ground (i.e. seeps and springs) and surface water flow patterns that could be readily observed from the air at this time of year. The leaf-off conditions also allowed a thorough search for habitat features such as cliffs, potential denning areas, stick nests, and wetland-related attributes.

The helicopter flight was followed by on-the-ground surveys in late April and early May. These surveys were conducted on ATV and foot and included visits to points of interest noted during the helicopter flight. In addition to developing an understanding of site access to assist in planning the detailed site investigation field work, these visits focused on habitat functions best observed early in the season, including seeps and springs, waterfowl nesting, potential bat maternity roosting cavity trees, and vernal pooling among others. Maps of the areas visited during these early season reconnaissance surveys are presented in **Appendix H-1**.

In late May a project layout site confirmation visit was completed. Every turbine site and the majority of the collector line alignments were visited and, where appropriate, site-specific layout changes to the project components were made to avoid important natural features and attributes to minimize potential Project effects. This was the main component of the iterative design process but additional site-specific changes were made throughout the process to further minimize potential environmental effects.

At the end of the field season in August, ten (10) person days were spent revisiting and field verifying various types and locations of habitat features, including spot checks of ELC designations, confirmation of seeps and springs, confirmation of the density and quality of potential bat maternity roosting cavity trees, and reconfirming the overall impression of landscape ecology for the broad Project Study Area, that was first developed in April during the helicopter survey. These surveys were conducted on foot and by ATV and truck access. The areas visited during these surveys are shown in **Appendix H-1**.

Finally, while specific surveys were conducted to focus on specific aspects of the Project Location ecology, incidental observations of variations in ELC communities, rare plants, seeps, potential bat maternity roosts, amphibian breeding areas and any other notable habitat features were made as appropriate during all the surveys, and recorded using GPS readings.

3.1.2 Vegetation Community and Vascular Plants Assessment

Ecological Land Classification ("ELC") (Lee *et al.*, 1998), Forest Ecosystem Classification ("FEC") (Chambers *et al.*, 1997) and botanical inventories of the vegetation communities in and within the ZOI were conducted on June 18-22, 2012 and July 29-August 3, 2012.

Vegetation communities were delineated on a preliminary basis using the results of early season reconnaissance surveys and digital orthographic imagery. The preliminary delineations were refined based on the results of the focused field investigations. Community classifications

were initially completed using both the ELC system and the FEC system. Determination of woodland community classification was based on the keys provided in the FEC manual, using the finest level of the ecological hierarchy – Vegetation Type. Non-woodland communities (e.g. marshes, thickets, cultural meadows, etc.) were classified using the ELC system; this was used because the FEC manual only provides classification of treed community types.

Both methods of classification required the surveyor to identify recurring patterns found in the plant species assemblages associated with a particular Ecosite. Vegetation Types were generated by identifying and delineating plant communities with consistent species compositions and structures. These methods were employed using physical assessments and representative plot-based analysis. Previous environmental consultant reports were used as an aid during orthographic imagery interpretation.

Once Vegetation Type mapping was interpreted, ground-truthed, and digitized, community classification codes were then converted to a new coding system, as recommended by the MNR. To accomplish this, codes were first converted to their most appropriate FEC Ecosite code, and then again converted to their most appropriate code using Ecosites of Ontario (Banton *et al.*, 2009). This is the newest system of classification intended to amalgamate all Ontario ecosystem classification guides into one consistent provincial publication series. Code conversions were facilitated by Wester *et al.*, (2011). These codes are segregated by geography; the specific coding system used for the ZOI was the Great Lakes – St. Lawrence Ecosite Factsheet.

English colloquial names and scientific binomials of plant species generally follow Newmaster *et al.* (1998). Specific emphasis was placed on searching for plant species of conservation concern and species at risk identified through the records review.

Plant species were considered rare if designated provincially as S1 (critically imperiled), S2 (imperiled), S3 (vulnerable) or SH (Possibly Extirpated - Historical). Species having a high coefficient of conservatism (9 or 10) as designated by Oldham *et al.* (1995) were also considered species of note.

3.1.3 Wetland Confirmation and Delineation

Previously unidentified wetlands within 120 m of the Project Location identified during the course of the site investigations were delineated during the vegetation community assessment and vascular plant surveys on June 18-22, 2012 and July 29-August 3, 2012. The wetland boundaries were mapped according to the Ontario Wetland Evaluation System (OWES), Northern Manual (MNR, 2002), through reconciling aerial photographs and observations made during the site investigations (including delineation with GPS units). In keeping with the OWES, Northern Manual, the outer boundaries of wetlands were established where 50% of the plant community consists of upland species.

3.1.4 Wildlife and Wildlife Habitat

Site investigations to determine the presence of candidate SWH were conducted by MKI from March 30-April 5 and April 25-May 3, 2012; and by Stantec Consulting Ltd. ("Stantec") on April 17-19, May 7-11, June 18-22 and July 29-August 3, 2012.

Site investigations focused on determining whether candidate SWH, as identified during the records review, have the potential to occur in or within 120 m of the Project Location. Criteria used to identify candidate SWH were derived from the SWHTG (MNR, 2000a) and the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012). Specific emphasis was placed on determining whether the critical habitat features, and defining criteria provided by the 'Draft SWH EcoRegion 5E Criterion Schedule' required to support SWH, were present in natural features in or within 120 m of the Project Location. Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) was used to determine which features should be considered Generalized Candidate SWH. Generalized Candidate SWH refers to features that are within 120 m of the Project Location but do not overlap with infrastructure which will have an impact on the habitats during operations. These habitats are carried forward to the Environmental Impact Study where they are treated as significant and general construction mitigation is applied.

3.1.4.1 Seasonal Concentration Areas of Animals

Seasonal Concentration Areas are areas where wildlife species occur in aggregations at certain times of the year, on an annual basis. Such areas are sometimes highly concentrated with members of a given species, or several species, within relatively small areas. In spring and autumn, migratory wildlife species will concentrate where they can rest and feed. Other wildlife species require habitats where they can survive winter. Seasonal concentration area habitats have been identified by using the habitat criteria found in the SWHTG (MNR, 2000a) and 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012). Site assessments were carried out for the following categories of seasonal concentration areas:

- Waterfowl stopover and staging areas (terrestrial);
- Waterfowl stopover and staging areas (aquatic);
- Shorebird migratory stopover areas;
- Raptor wintering areas;
- Bat hibernacula;
- Bat maternity colonies;
- Turtle wintering areas;
- Snake hibernacula;
- Colonially-nesting bird breeding habitat (bank and cliff);
- Colonially-nesting bird breeding habitat (tree/shrub); and

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

- Colonially-nesting bird breeding habitat (ground).

One additional applicable exception for EcoRegion 5E, Late-winter Moose Habitat, was examined in addition to those mentioned above for EcoDistrict 5E-13; this type of habitat is considered significant within the district.

The habitat criteria for each potential seasonal concentration area, and methods employed to identify them in and within 120 m of the Project Location, have been summarized in **Table 3.1**. Numeric ecosite codes referenced in this table can be converted into more descriptive FEC and wetland classification community names using the crosswalk tables in **Appendix C**.

Table 3.1: Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
Waterfowl Stopover and Staging Area (Terrestrial)	<ul style="list-style-type: none"> - Fields with sheet water during spring, or annual spring melt-water flooding in Meadow or Thicket ELC community ecosites: G060-062, G077-079, G093-095, G109-111. The area of the flooded field ecosite plus a 100-300 m radius dependent on local site conditions and adjacent land use is the candidate SWH. 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120m of the Project Location that would support waterfowl terrestrial stopover and staging areas. - ELC/FEC surveys, GIS analysis of the landscape and aerial surveys conducted prior to leaf-out were used to identify large wetlands or marshes with a diversity of vegetation communities interspersed with cultural meadows that flood each spring (terrestrial staging areas).
Waterfowl Stopover and Staging Area (Aquatic)	<ul style="list-style-type: none"> - Meadow Marsh, Floating Marsh, Open Shore Fen, Shrub Shore Fen, Shallow Marsh, and Open Water Marsh communities adjacent to open water, with an abundant food supply including aquatic invertebrates and vegetation, which are used by waterfowl during migration. - Migrating waterfowl usually prefer larger wetlands, especially those adjacent to large bodies of water, and relatively undisturbed shorelines with a diversity of vegetation communities (MNR 2000). - The Canadian Wildlife Service and MNR are typically aware of migration stopover sites, including locally significant habitat. - ELC community ecosites: G142-G152 - The candidate habitat feature includes the ELC ecosite plus a radius of 100 m. 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120 m of the Project Location that would support waterfowl aquatic stopover and staging areas. - ELC/FEC surveys, GIS analysis of the landscape and aerial surveys conducted prior to leaf-out were used to identify large wetlands or marshes with a diversity of vegetation communities interspersed with open water (aquatic staging areas). - Stantec conducted aerial surveys on April 17, 2012 that entailed flying low over all open water areas to evaluate whether or not adjacent wetland areas met criteria for candidate SWH, and to observe any waterfowl species using open water features throughout the Project Study Area.
Shorebird Migratory Stopover Area	<ul style="list-style-type: none"> - Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. - Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. - ELC community ecosites: G005-G006, 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120 m of the Project Location that would support shorebird migratory stopover areas. - ELC surveys, GIS analysis of the landscape and aerial surveys conducted prior to leaf-out were used to identify shorelines and beach areas which would support shorebird migratory stopover areas.

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.1: Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
	<p>G160-G162, G170-G172, G176-G178, G186-G188, G204-G214</p> <ul style="list-style-type: none"> - The candidate habitat feature includes the ELC ecosite plus a radius of 100 m. 	
Raptor Wintering Area	<ul style="list-style-type: none"> - Coniferous Forest, Mixed Forest or Deciduous Forest in combination with either Meadow, Sparse Shrub or Shrub ecosites that are >20 ha and provide roosting, foraging and resting habitats for wintering raptors. Upland habitat must represent at least 15 ha of the 20 ha minimum size. - ELC community ecosites: G011-G019, G023-G028, G033-G043, G048-G059, G064-G076, G081-G092, G097- G108, G113-G125 or FEC Ecosites ES11 – ES35 in addition to one of the following ELC community ecosites: G020-022, G029-032, G044-047, G060-063, G077-080, G093-096, G109-112 - Least disturbed sites, idle/fallow or lightly grazed field/meadow with adjacent woodlands. 	<ul style="list-style-type: none"> - ELC/FEC surveys, GIS analysis of the landscape and aerial surveys conducted prior to leaf-out were used to identify communities in or within 120 m of the Project Location which would support wintering raptors.
Bat Hibernacula	<ul style="list-style-type: none"> - Bat Hibernacula may be found in association with components of cliffs(ELC ecosites G158-G159), rock talus and rock barrens(ELC ecosite G164) - Hibernacula may be found in abandoned caves, horizontal mine shafts, abandoned underground foundations and karsts. - Buildings are not considered to be SWH. - The candidate SWH includes the feature plus a 1,000 m radius. 	<ul style="list-style-type: none"> - Wildlife habitat assessments included searches with in the Project Location and 120 m ZOI for habitat features that could support bat hibernacula including caves and abandoned mine workings
Bat Maternity Colonies	<ul style="list-style-type: none"> - Maternity colonies considered SWH are found in forested ecosites. - Any of the following Community Types: Deciduous Forest (G016-19, G040-42, G055-58, G070-75, G088-91, G103-107 and G118-124), Mixed Forest (G028, G043, G059, G092, G108, G125), that have>10/ha wildlife trees >25 cm diameter at breast height (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. - Female bats prefer wildlife trees (snags) in early stages of decay, class 1-3. 	<ul style="list-style-type: none"> - Criteria from Bat and Bat Habitats - Guidelines for Wind Power Projects (MNR, 2011b) were used to identify potential bat maternity roosts in the field. - Mixedwood and deciduous forest ELC community types in or within 120 m of the Project Location were considered one contiguous woodland feature. - Within the contiguous woodland, the density of snags/cavity trees was calculated as follows: A total of 30 fixed area 12.6 m radius plots (0.05 ha) were selected at random. The number of snags ≥25 cm dbh within each plot was recorded. The formula πr^2 was used to determine the number of snags per ha. - Twenty-four plots were completed by MKI from March 31-April 5, 2012. Six plots were completed by Stantec from June 15-June 28, 2012. - 29 informal (not uniformly 12.6 m radius) plots were completed by Stantec from June

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.1: Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
		<p>15-June 28, 2012, and 20 additional informal plots and transects were completed throughout the Project Study Area in August, 2012 .</p> <ul style="list-style-type: none"> - Justification for Alternate Methods: The Project Location and the surrounding landscape is radically different from the typical southern Ontario landscape where MNRs Bat and Bat Habitats Guidelines have been most often applied. Rather than a few scattered woodlots in a mosaic of agricultural lands with extensive man-made structures, the potential maternity roost habitat in the Project Study Area is found in a more or less continuously forested landscape that functions in many respects as one large homogenous woodland. - In response to the challenge of applying guidelines developed and applied mostly in an agricultural setting to a forested landscape, Stantec requested guidance from the MNR on methods. Discussions were held in June 2012 and it was recommended that Stantec complete 30 plots to determine the density of potential bat maternity roost trees, and if candidate SWH for Maternity roost was confirmed (i.e. 10 snags/ha), Stantec agreed to conduct exit surveys at 60 representative trees.
Turtle Wintering Areas	<ul style="list-style-type: none"> - Snapping and Midland Painted turtles utilize ELC community classes: Swamp (G128-G135), Marsh (G142-G145), Open Water (G150-G152), Shallow water (G148-G149), and Open Fen (G146-G147). - Northern Map turtles utilize open water areas such as deeper rivers or streams and lakes as over-wintering habitat. - For most turtles, wintering areas are in the same general area as their core habitat. - Water has to be deep enough not to freeze to the bottom, and have soft mud substrate. - Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen. - The ELC ecosite with the over-wintering turtles is the candidate SWH. 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120 m of the Project Location that would support turtle wintering areas.
Reptile Hibernaculum	<ul style="list-style-type: none"> - Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. - Wetlands such as conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120 m of the Project Location that would support snake hibernacula. - Habitat features that would provide an underground route or act as a potential hibernacula, including exposed rock crevices or inactive animal borrows, were

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.1: Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
	<p>ground cover can be important over-wintering habitat.</p> <ul style="list-style-type: none"> - The existence of rock piles or slopes, stone fences, and crumbling foundations may assist in identifying habitat. - For all snakes, habitat may be found in any forested ecosite in Central Ontario other than very wet ones. The following Community Types may be directly related to snake hibernacula: Talus, Rock Barren, Crevice, Cave, and Alvar. - The candidate SWH is the hibernaculum plus a 30 m radius. - The Project Study Area is well outside the known range of the Five-lined Skink. 	<p>recorded.</p>
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)	<ul style="list-style-type: none"> - Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following ELC Community Ecosites: Meadow, Thicket, Savannah, Bluff, or Cliff (G001-G004, G007-G008, G020-G021, G029-G031, G044-G046, G060-G062, G077-G079, G093-G095, G109-G111, G173-G175, G201-G203, G210-G212) - A colony identified as candidate SWH will include a 50 m radius habitat area from the peripheral nests. - Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, and soil or aggregate stockpiles. - Does not include a licensed/permitted mineral aggregate operation 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120 m of the Project Location that would support colonially-nesting bank and cliff bird breeding habitat. - Open habitats near bodies of water were scanned for large cavity trees and man-made structures suitable for, and with evidence of previous use by, nesting swallows. Hills with exposed substrate, including river banks, were also scanned for holes indicative of a Bank Swallow nesting colony.
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)	<ul style="list-style-type: none"> - Nests are typically in live or standing dead trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. - Most nests in trees are 11 to 15 m from ground, near the top of the tree. - May occur in any of the following Community Types: Mixed Swamp, Deciduous Swamp, Coniferous Treed Fen, and fresh-moist coniferous, mixed wood or deciduous forest. (ELC ecosites: G064-G076, G081-G092, G097-G108, G113-G125, G128-G136 or FEC ecosites: ES11.2, ES12.2, ES13.2, ES14.2, ES15.2, ES16.2, ES17.2, ES18.2, ES19.2, ES20.2, ES21.2, ES23.2, ES24.2, ES25.2, ES26.2, ES27.2, ES28.2, ES29.2, ES30.2, ES31, ES32, ES33, ES34, ES35) - The edge of the colony and a minimum 300 m area of habitat or extent of the Forest 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120 m of the Project Location that would support colonially-nesting tree and shrub bird breeding habitat. - Large areas of marsh or swamp habitat with an abundance of live or standing dead trees, in or within 120 m of the Project Location were searched for large stick nests to assess the presence of colonially-nesting bird species within suitable communities during aerial surveys undertaken prior to leaf-out, as well as ELC/FEC surveys.

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.1: Characteristics Used to Identify Candidate Seasonal Concentration Areas

Candidate Seasonal Concentration Area	Criteria	Methods
	Ecosite containing the colony or any island <15.0 ha with a colony, is the candidate SWH.	
Colonially-Nesting Bird Breeding Habitat (Ground)	<ul style="list-style-type: none"> - Any rocky island or peninsula within a lake or large river, close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh, Shallow Marsh, Meadow, Thicket, or Savannah. - Colonies of gulls and terns nest on islands or peninsulas associated with open water or in marshy areas - Brewers Blackbird colonies are found on the ground or in low bushes in close proximity to streams. - The edge of the colony and a minimum 120 m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0 ha with a colony is the candidate SWH. 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120 m of the Project Location that would support colonially-nesting ground bird breeding habitat.
Late Winter Moose Habitat	<ul style="list-style-type: none"> - Characterized by dense conifer cover with greater than 50% canopy closure and greater than 10 m in height, on gentle to moderately rugged sites with deep soils. Stand must be greater than 50 ha in area. - Areas identified as rating 3 or 4 are considered candidate SWH. - The area of the SWH is the area of the forest ecosites. 	<ul style="list-style-type: none"> - Vegetation community classifications were utilized to assess features in or within 120m of the Project Location that would support late winter habitat for Moose. - The presence of Moose and Moose sign within suitable ELC communities was assessed.

3.1.4.2 Rare Vegetation Communities or Specialized Habitats for Wildlife

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for their survival and cannot readily move to or find alternative habitats. Some wildlife species require large areas of suitable habitat for their long-term survival. Many wildlife species require substantial areas of suitable habitat for successful breeding. Their populations decline when habitat becomes fragmented and reduced in size. Specialized habitat for wildlife is a community or diversity-based category, therefore, the more wildlife species a habitat contains, the more significant the habitat becomes to the planning area. The largest and least fragmented habitats within a planning area will support the most significant populations of wildlife.

Rare Vegetation Communities and Candidate Specialized Wildlife Habitat have been identified by using the habitat criteria found in the SWHTG (MNR 2000) and 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR 2012). Site assessments were carried out for the following categories of rare vegetation communities and specialized habitats:

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

- Beach, beach ridge, bar and sand dunes;
- Shallow Atlantic coastal marsh;
- Cliffs and talus slopes;
- Rock barren;
- Sand barren;
- Alvar;
- Old growth forest;
- Bog;
- Tallgrass prairie;
- Savannah;
- Rare forest type – Red Spruce;
- Rare forest type – White Oak;
- Waterfowl nesting areas;
- Bald Eagle and Osprey nesting, foraging and perching habitat;
- Woodland raptor nesting habitat;
- Turtle and lizard nesting areas;
- Seeps and springs;
- Moose aquatic feeding habitat;
- Mineral licks;
- Denning sites for Mink, Otter, Marten, Fisher and Eastern Wolf;
- Amphibian breeding habitat (woodland);
- Amphibian breeding habitat (wetland); and
- Mast producing areas.

The habitat criteria for each potential rare vegetation community and candidate specialized wildlife habitat, and methods employed to identify them in and within 120 m of the Project Location, have been summarized in **Table 3.2**.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
Beach/Beach Ridge/Bar/Sand Dunes	<ul style="list-style-type: none"> - Any identified beach, beach ridge or sand dune found in Ecosites G005-G006, G166-G168, G182-G184, G213-G214 or FEC ES1 and ES2 - Vegetation may vary from patchy and barren to tree cover, but less than 60%. - Characterized by unstable sand. - Marram Grass (<i>Ammophila breviligulata</i>) and Beach Pea (<i>Lathyrus japonicus</i>) are known indicators of this SWH. 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC/FEC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of these rare vegetation communities.
Shallow Atlantic Coastal Marsh	<ul style="list-style-type: none"> - Shallow marsh occurs on shallow mineral (sand) or mineral organic (sandy peat) shoreline subject to low wave energy, on inland lakes and beaver ponds particularly those that experience fluctuating water levels from year to year (i.e. some years with exposed shorelines in summer/fall). - Any of the following ELC Ecosites: G143-G145 G148-G152 - Virginia Meadow-beauty (<i>Rhexia virginica</i>) is a known indicator of this SWH. Other associated species include <i>Rhynchospora capitellata</i>, <i>Xyris difformis</i>, <i>Panicum spretum</i>, <i>Triadenum virginicum</i>, <i>Polygonum careyi</i> and <i>Juncus militaris</i>. 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC/FEC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of shallow Atlantic coastal marshes.
Cliffs and Talus Slopes	<ul style="list-style-type: none"> - Any cliff or talus slope. - Vegetation can vary from patchy and barren to tree cover, but less than 60% - Cliffs and Talus slopes in Ecoregion 5E are primarily Precambrian rock and typically sparsely vegetated. - Found in any of the following ELC ecosites: G158-G159, G166-G168 G173G175, G182-G184 or G201-G203as well as FEC sites ES6 and ES7 - Characteristic flora for cliff and talus slopes includes lichens (such as Rock tripe sp.) and ferns (including <i>Polypodium virginianum</i>, <i>Cystopteris fragilis</i> and <i>Woodsia ilvensis</i>, <i>Cryptogramma stelleri</i>, <i>Woodsia alpina</i>, and <i>Saxifraga paniculata</i>). 	<ul style="list-style-type: none"> - ELC/FEC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of cliffs and talus slopes in or within 120 m of the Project Location. - Stantec field work was supplemented by field work from MKI Ltd., including a single observation of cliff habitat in ELC ecosite G158Tt.
Rock Barren	<ul style="list-style-type: none"> - Rock barrens are characterized by extensive areas of exposed granitic bedrock which is sparsely vegetated. - Vegetation can vary from patchy and barren to tree cover but less than 60%. - Any rock barren greater than 1 ha is candidate SWH. Occurs in ELC ecosites G163-G165, and G179-G181 or FEC ES8. 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of rock barrens.

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
	<ul style="list-style-type: none"> - Characteristic flora for rock barrens includes a number of indicator species of lichens, mosses, sparse grasslands, low shrubs and stunted open grown trees. 	
Sand Barrens	<ul style="list-style-type: none"> - Sand barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires or erosion. - They have little or no soil and the underlying rock protrudes through the surface. - Usually located within other types of natural habitat such as forest or savannah. - Vegetation can vary from patchy and barren to tree covered but less than 60%. - May occur in any of the following ELC Ecosite types: G007, and G215 or FEC ES10 - There is no minimum size for identifying a candidate SWH sand barren area - Characteristic plant species of sand barrens include: <i>Cladina</i> spp., <i>Carex houghtoniana</i>, <i>Carex merritt-fernaldii</i>, <i>Comptonia peregrina</i>, <i>Rubus flagellaris</i>, <i>Selaginella rupestris</i>, and <i>Viola labradorica</i>, <i>Polygonella articulata</i>, and <i>Stipa spartea</i>. 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of sand barrens.
Alvars	<ul style="list-style-type: none"> - Alvars are extremely rare habitats in EcoRegion 5E; they are small and highly localized just north of the Palaeozoic-Precambrian contact - An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. - The hydrology of alvars is complex, with alternating periods of inundation and drought. - Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. - Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or relict plant and animal species. - Vegetation cover varies from patchy to barren with a less than 60% tree cover. - Any of the following Central Ontario Forest Ecosites on very shallow soils: ES13.1, ES14.1, ES16.1, ES21.1, ES9 - An alvar greater than 0.5 ha in size is 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of alvars.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
	candidate SWH. 5E Alvar Plant Indicator species include: <i>Penstemon hirsutus</i> , <i>Panicum philadelphicum</i> , <i>Scutellaria parvula</i> , <i>Rhus aromatica</i> , <i>Monarda fistulosa</i> , <i>Senecio pauperculus</i>	
Old-growth Forest	<ul style="list-style-type: none"> - Old-growth forests tend to be relatively undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. - Heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris. - Stands 30 ha in size or with at least 10 ha interior habitat (assuming 100 m buffer to edge of forest) are candidate SWH. Include the following FEC ecosites: ES11, ES12, ES14, ES20, ES21, ES22, ES23, ES24, ES25, ES26, ES27, ES28, ES29, ES30 or ELC ecosites: G011-G15, G017-G018, G023, G027, G033, G036, G039-G042, G048, G051, G054-G058, G064, G066, G069, G071-G075, G081, G084, G087, G089-G091, G103, G105-G107, G113, G115, G118, G120-G124 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC/FEC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of old growth forests.
Bog	<ul style="list-style-type: none"> - Bogs are nutrient-poor, acid peatlands dominated by peat mosses (<i>Sphagnum</i> sp.), ericaceous shrubs and sedges (<i>Cyperaceae</i>). The water table is at or near the surface in spring and slightly lower the remainder of the year and is virtually isolated from mineral soil waters. - A bog of any size is candidate SWH. Found in the following ELC Ecosites: G126, and G137-G138 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of bogs.
Savannahs	<ul style="list-style-type: none"> - A Savannah is related to tallgrass prairie habitat that has tree cover between 25 – 60%. - The open areas between the trees are dominated by prairie species, while forest species are found beneath the tree canopy. - Any of the following Southern ELC Ecosites: TPS1, TPS2, TPW1, TPW2, or CUS2 - A savannah of any size is candidate SWH. Site must not be dominated by exotic or introduced species. 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of savannahs.
Tall-grass Prairies	<ul style="list-style-type: none"> - In EcoRegion 5E, there are few if any 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
	<p>tallgrass prairie remnants. Tallgrass plant species occur, often together, primarily along shorelines.</p> <ul style="list-style-type: none"> - A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has <25% tree cover. - Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite) or FEC ecosite ES10. - Tall grass prairie of any size is candidate SWH. Tall-grass prairie indicator species include <i>Andropogon gerardii</i> and <i>Spartina pectinata</i> 	<p>records review, there are no known rare vegetation communities in or within 120 m of the Project Location.</p> <ul style="list-style-type: none"> - ELC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of tall grass prairies.
Rare Forest Type – Red Spruce	<ul style="list-style-type: none"> - Stands containing Red Spruce trees are rare in EcoRegion 5E. - Red Spruce is a valued wildlife cover tree. - Red Spruce is a shade tolerant conifer that evolved within tolerant hardwood forests. - Red Spruce grows best in a cool, moist climate. It will grow in shallow, till soils (avg. of 46 cm) and may grow on sites unfavorable for other species such as organic soils over rock, steeper slopes, and wet bottomlands, although poorly drained sites will inhibit growth. - Any of the following ELC ecosites: G036, G051, G066, G084, G086, G100, G102, G116, G117 - Or FEC ecosites: ES 30.1 or ES 30.2 - Red Spruce forest of any size is candidate SWH. 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC/FEC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of Red Spruce forests.
Rare Forest Type – White Oak	<ul style="list-style-type: none"> - Stands containing White Oak trees are rare in EcoRegion 5E. - White Oak is a valued wildlife mast producing tree. The mast produced by the White Oak tree is often preferred over the more common red oak acorn. - Forest stands containing White Oak trees are uncommon in the Great Lakes St. Lawrence Forest. - Any of the following ELC ecosites : G017, G041, G057, G072, G090, G106, G121 - Or FEC ecosites: ES 14.1, ES14.2 - White Oak forest of any size is candidate SWH. 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare vegetation communities in or within 120 m of the Project Location. - ELC/FEC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of White Oak forests.
Other Rare Vegetation	<ul style="list-style-type: none"> - Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the 	<ul style="list-style-type: none"> - As discussed in Section 2.2.4.2 of the records review, there are no known rare

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
Communities	SWHTG. - Any ELC Ecosite that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH. - The MNR/NHIC will have up-to-date listings for rare vegetation communities.	vegetation communities in or within 120 m of the Project Location. - ELC/FEC and botanical inventories conducted by Stantec in the spring and summer 2012 were used to assess the presence of other rare vegetation communities.
Waterfowl Nesting Area	- All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: G129-G135, G142-G152 - Note: includes adjacency to Provincially Significant Wetlands - A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a cluster of 3 or more small (<0.5 ha) wetlands where waterfowl nesting is known to occur - Upland areas should be at least 120 m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. - Wood Ducks, Bufflehead, Common Goldeneye and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites.	- The results of ELC/FEC surveys and GIS analysis of the landscape were used to identify large upland areas of forest habitat that occurred adjacent to a large marsh, pond, swamp or swamp thicket communities or clusters of these vegetation communities in or within 120 m of the Project Location.
Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat	- Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. - Osprey nests are usually at the top of a tree. - Bald Eagle nests are large stick structures, typically in super canopy trees in a notch within the tree's canopy in mature woodlots. Nests are usually 50 to 200 m from shore; - Bald Eagle usually requires 250 ha of mature continuous deciduous or mixed forest for breeding, nesting, shelter, feeding and roosting; preferably with 30 to 50% canopy cover. - Bald Eagle requires tall, dead, or partially dead trees within 400 m of nest for perching. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). - Forest communities directly adjacent to riparian areas – rivers, lakes, ponds and wetlands. - The nest plus an 800 m radius is the candidate SWH.	- Searches for stick nests (active or not) as well as a general habitat assessment were conducted during vegetation and wildlife habitat assessment surveys in the spring and summer of 2012 and during an aerial survey before leaf-out in the spring of 2012.
Woodland Raptor Nesting Habitat	- All natural or conifer plantation woodland/forest stands.	- Searches for stick nests (active or not) were conducted during the April 17, 2012 aerial

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
	<ul style="list-style-type: none"> - Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers Hawk nest along forest edges sometimes on peninsulas or small off-shore islands. - In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. - May be found in all forested ELC Ecosites in Community Class: TR - May also be found in the forested swamp ELC Ecosites: G128-G133. - A radius of 100 – 400 m is applied around the nest, depending on the species, to delineate the candidate SWH. 	<p>survey undertaken prior to leaf-out in conjunction with preliminary ecological land classification and habitat assessments conducted from May 7-11, 2012. During these surveys all observed stick nests were recorded.</p>
Turtle Nesting Areas	<ul style="list-style-type: none"> - Turtle Nesting areas may be adjacent to ELC Ecosites: G138, G140-149 - Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. - For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. - Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. - A 30 m radius is applied around the area to delineate the candidate SWH. 	<ul style="list-style-type: none"> - Searches for turtle nesting habitat were conducted during the spring vegetation surveys in 2012, surveys focused on areas adjacent to all watercourses, lakes and wetlands in or within 120 m of the Project Location.
Seeps and Springs	<ul style="list-style-type: none"> - Seeps/Springs are areas of emergence of groundwater where the water table is present at the ground surface. Often they are found within headwater areas within forested habitats. - Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system could have seeps or springs. - Seeps and springs are important feeding and drinking areas especially in the winter and will typically support a variety of plant and animal species. - The area of the ELC forest ecosite containing the seeps/springs is the 	<ul style="list-style-type: none"> - Survey methods were consistent with REA guidelines for site investigation to identify seeps and springs. Searches for seeps and springs occurred during aerial surveys undertaken prior to leaf-out, vegetation surveys and general habitat assessments in the spring and summer of 2012. Seeps and springs were also identified by Stantec aquatics team members during field investigations completed between June 15 and August 10, 2012, in support of the Water Assessment / Water Bodies Report. - All watercourses identified during aquatic surveys were followed to their source(s) to observe whether or not they originated from

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
	<p>candidate SWH (MNR 2012).</p>	<p>a seep. Areas with rust-colored stains on the soil surface were noted, as this indicates iron hydroxide precipitating out of groundwater.</p> <ul style="list-style-type: none"> - Potential seeps were also identified through a review of aerial photographs and topographic maps of the ZOI. - Candidate seeps identified by MKI and MNR were reviewed by Stantec to determine if these met REA criteria for seeps and springs, namely a groundwater origin. - A YSI field dissolved oxygen meter was used to sample water in potential seeps or springs to confirm a groundwater origin - Criteria used to distinguish ground from surface water included: Water temperatures between 8 and 12 degrees when ambient temperature was substantially above or below that range indicated groundwater. Relatively low DO when compared with surrounding surface water features (usually below 2 mg/L) indicated groundwater; evidence of continued flow or seepage well after snow melt or precipitation events indicated groundwater; and iron staining or precipitates indicated groundwater. - Where the use of the YSI meter was impractical, groundwater-originating seeps were determined based on topography, vegetation and evidence of persistent seepage in late summer. - All woodlands in or within 120 m of the Project Location were searched. - Seeps in this landscape are generally small and often ephemeral. Please see Appendix H-4 for a detailed discussion. - At a 1:10 000 scale of mapping the minimum area for mapping is generally accepted as 0.25 ha (50 m x 50 m). Individual seeps were well below this size and have been mapped as points. Where linear concentrations of seepage areas were encountered, points were used to map the beginning and end of the seepage area
Moose Aquatic Feeding habitat	<ul style="list-style-type: none"> - Habitat may be found in all forested ecosystems adjacent to water. - MNR maps these locations on Crown land and rates the site on a scale of 0-4, with 4 being the best. Feeding sites classed 3 or 4 	<ul style="list-style-type: none"> - Methods for identification of MAFAs outlined in MNR's Selected Wildlife and Habitat Features: Inventory Manual were applied. - Searches for previously unidentified Moose aquatic feeding areas were conducted

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
	<p>are candidate significant wildlife habitat. Where Moose aquatic feeding area (MAFA) is in low supply, class 2 MAFA habitat could also be considered candidate SWH.</p> <ul style="list-style-type: none"> - Wetlands and isolated embayments in rivers or lakes which provide an abundance of submerged aquatic vegetation such as pondweeds, water milfoil and yellow water lily are preferred sites. Adjacent stands of lowland conifer or mixed woods will provide cover and shade. - The candidate SWH is the feature plus a 120 m radius in the surrounding forest. 	<p>during aerial surveys undertaken prior to leaf-out and during general habitat assessment and vegetation surveys in the spring and summer 2012.</p>
Mineral Licks	<ul style="list-style-type: none"> - Mineral licks may be found in all forested ecosites. - Mineral licks are areas of sodium-rich groundwater upwelling which are uncommon in the landscape. These areas rarely occur on granitic bedrock (MNR, 2000a), although where vertical fractures in granitic bedrock are present saline water from deep brine aquifers may discharge to surface (Frape <i>et al.</i>, 1984). - This habitat component is found in upwelling groundwater and the soil around these seepage areas. - The candidate SWH is the feature plus a 100 – 200 m radius. 	<ul style="list-style-type: none"> - Mineral licks are easily identified from air photos or aerial surveys as areas of light gray clay with evidence of heavy trampling by moose (MNR, 2000a; Frape <i>et al.</i>, 1984). - Aerial and ground searches for mineral licks occurred in the spring and summer of 2012 during general habitat assessment, waterbody assessment, and vegetation surveys. - Seepage areas identified per "Seeps and Springs", above, were inspected for evidence of trampling by Moose.
Denning sites for Mink, Otter, Marten, Fisher and Eastern Wolf	<ul style="list-style-type: none"> - Denning sites may be found in all forested ecosites. - Mink prefer shorelines dominated by coniferous or mixed forests with dens usually located underground. Mink will sometimes use old muskrat lodges. - Otters prefer undisturbed shorelines along water bodies that support productive fish populations with abundant shrubby vegetation and downed woody debris for denning. They often use old beaver lodges or log jams and crevices in rock piles. - Marten and fisher share the same general habitat, requiring large tracts of coniferous or mixed forests of mature or older age classes. Denning sites are often in cavities in large trees or under large downed woody debris. - The candidate SWH is the den plus a 120 m radius. 	<ul style="list-style-type: none"> - Extensive searches for denning sites are not recommended as they are very difficult to locate. However, protection of appropriate habitat should be considered during planning [Draft SWH EcoRegion 5E Criterion Schedule (MNR, 2012)]. - Searches for denning sites occurred in the spring of 2012 before leaf out and during general habitat assessment surveys in the summer of 2012.
Amphibian Breeding	<ul style="list-style-type: none"> - All forested ELC ecosites: The wetland 	<ul style="list-style-type: none"> - Natural vegetation communities with the

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
Habitat (Woodland)	<p>breeding ponds (including vernal pools) may be permanent, seasonal or ephemeral, large or small in size and could be located within or adjacent to the woodland.</p> <ul style="list-style-type: none"> - Presence of a wetland, lake or pond >500m² (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). - The wetland, lake or pond and surrounding woodland ecosite, is the candidate SWH.. - Breeding ponds within the woodland or the shortest distance from forest habitat are more significant because of reduced risk to migrating amphibians and more likely to be used. - Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat. 	<p>potential to support amphibian breeding habitat (woodland) were assessed by Stantec during vegetation assessment surveys. Each location with a habitat area of more than 500 m² of standing water or areas which showed evidence of holding water through the spring (based on topography and vegetation) were identified. Size of pools, presence and depth of standing water, surrounding vegetation community, emergent and submergent vegetation and canopy cover were recorded.</p> <ul style="list-style-type: none"> - Man-made features including extensive vernal pooling associated with logging roads and skidder trails were not considered as potential amphibian breeding habitats in accordance with direction from MNR staff (May 30, 2012). - Very small (less than 500 m²) areas of ephemeral woodland pooling were observed scattered throughout woodland ecosites. In keeping with guidance from the MNR these very small pools have not been mapped as individual candidate SWH.
Amphibian Breeding Habitat (Wetland)	<ul style="list-style-type: none"> - Found in ecosites G129-G135 and G142-G152 - Wetlands and pools (including vernal pools) >500m² (about 25 m diameter) isolated from woodland/forest habitat (>120 m) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats. Amphibians mostly breed in habitats that lack fish. - Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. - Bullfrogs require permanent water bodies with abundant emergent vegetation. - The ELC ecosite wetland area and the shoreline are the candidate SWH. 	<ul style="list-style-type: none"> - Natural vegetation communities with the potential to support amphibian breeding habitat (wetland) were assessed by Stantec during vegetation assessment surveys. - Man-made features including artificial ponds associated with logging roads and skidder trails were not considered as potential amphibian breeding habitats in accordance with direction from MNR staff (May 30, 2012).
Mast Producing Areas	<ul style="list-style-type: none"> - Found in ELC Ecosites: G015, G017, G019, G027-G028, G041-G043, G057, G059, G072, G090, G106, G108, G121 or FEC Ecosites: ES14, ES17.1, ES23, ES24, 	<ul style="list-style-type: none"> - Identification of mast producing areas occurred during spring and summer general habitat assessment and vegetation surveys in 2012.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.2: Characteristics Used to Identify Rare Vegetation Communities and Candidate Specialized Wildlife Habitat

Candidate Rare Vegetation Communities & Candidate Specialized Wildlife Habitat	Criteria	Methods
	<p>ES25, ES26</p> <ul style="list-style-type: none"> - Most important areas are mature forests >0.5 ha containing numerous large American beech and red oak trees that supply the energy-rich mast that wildlife prefer. - Other significant tree species include hickory, basswood, black cherry, ironwood, mountain ash, pin cherry, butternut and white oak. Significant shrub species include blueberries, wild black berry, serviceberry, raspberry, beaked hazel, choke cherry and hawthorn spp. - Sites providing long-term, relatively stable food supplies, forest openings or barrens >1 ha provide excellent sites for mast producing shrubs. - Sites such as clear-cuts or burns are a temporary source of food and are less significant. - The ELC ecosite is the candidate SWH. 	

3.1.4.3 Species of Conservation Concern

Habitats in or within 120 m of the Project Location were assessed for their suitability to support species of conservation concern that are known to occur, have the potential to occur, or have occurred historically within the vicinity of the Project Study Area (**Table 3**, Appendix B).

Assessments were carried out for the following categories of species of conservation concern:

- Marsh breeding bird habitat;
- Open country breedingb bird habitat
- Shrub/early successional breeding bird habitat; and
- Species of conservation concern and rare (S1-S3, SH) wildlife and plant species.

Site investigations were carried out through a combination of vegetation surveys for plant species of conservation concern, and ELC/FEC-based habitat assessments for both plant and wildlife species of conservation concern as described in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012). Additional survey information for specific categories is discussed in **Table 3.3**.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.3: Characteristics Used to Identify Candidate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Marsh Bird Breeding Habitat	<ul style="list-style-type: none"> - Nesting occurs in wetlands. - All wetland habitats are to be considered candidate habitat as long as there is shallow water with emergent aquatic vegetation present. - For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently it may be found in upland shrubs or forest at a considerable distance from water. - May include any of the ELC ecosites: G138-G152. - For Green Heron: Above Ecosites plus G129-G136. 	<ul style="list-style-type: none"> - Site investigations were conducted to assess the potential for this habitat using ELC to delineate previously unidentified wetland communities in or within 120 m of the Project Location.
Open Country Bird Breeding Habitat	<ul style="list-style-type: none"> - Grassland areas > 30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following ELC ecosites: G008-G009, G020-G021, G029-G031, G044-G046, G060-G062, G077-G079, G093-G095, G109-G111 - Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. - The indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. 	<ul style="list-style-type: none"> - Site investigations were conducted to assess the potential for grassland communities in or within 120 m of the Project Location to support area-sensitive bird species, through the delineation and verification of grassland communities by ELC. Grassland habitat not associated with agriculture (e.g. hayfields, cattle pastures) within 120 m of the Project Location, and generally within the Project Study Area, is very limited and does not exceed 30 ha in size.
Shrub/Early Successional Bird Breeding Habitat	<ul style="list-style-type: none"> - Oldfield areas succeeding to shrub and thicket habitats >30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following ELC ecosites: G009-G010, G021-G022, G031-G032, G046-G047, G062-G063, G079-G080, G095-G096, G111-G112, G134-G135. - Patches of shrub ecosites can be complexed into a larger habitat for some bird species. - Larger shrub thicket habitats (>30 ha) are most likely to support and sustain a diversity of these species. - Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or lightly grazed pasturelands. 	<ul style="list-style-type: none"> - Site investigations were conducted to assess the potential for this habitat type using ELC to delineate thicket and early successional type communities.
S1-S3, SH, Species of Conservation Concern	<ul style="list-style-type: none"> - All species of conservation concern or provincially rare plant and animal species element occurrences within a 1 or 10 km grid. - The area of the Habitat to the finest ELC 	<ul style="list-style-type: none"> - Site investigations were carried out through spring and summer botanical inventories and for plant species of conservation concern, ELC/FEC-based habitat assessments for both plant and wildlife species of

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.3: Characteristics Used to Identify Candidate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
	scale that adequately protects the habitat form and function is the SWH	conservation concern as described in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012). These species are listed in Table 3 , Appendix B.

3.1.4.4 Animal Movement Corridors

Habitats within 120 m of the Project Location were assessed for their suitability to support animal movement corridors that are known to occur or have the potential to occur within the vicinity of the Project Study Area. Habitats were assessed for the following animal movement corridors:

- Amphibian movement corridors;
- Cervid movement corridors; and
- Furbearer Movement corridors

Animal movement corridors have been identified by using the habitat criteria found in the SWHTG (MNR 2000) and 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR 2012). The habitat criteria for each potential animal movement corridor, and methods employed to identify them in and within 120 m of the Project Location, has been summarized in **Table 3.4**.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.4: Characteristics Used to Identify Candidate Habitat for Animal Movement Corridors

Candidate Animal Movement Corridor	Criteria	Methods
Amphibian Movement Corridor	<ul style="list-style-type: none"> - Movement corridors between breeding habitat and summer habitat - Corridors may be found in all ecosites associated with water - Determined based on identifying significant amphibian breeding habitat (wetland). 	<ul style="list-style-type: none"> - ELC/FEC surveys adjacent to potential amphibian breeding habitat (wetland). - Identified once Amphibian Breeding Habitat - Wetland is confirmed.
Cervid movement corridor	<ul style="list-style-type: none"> - Corridors may be found in all forested ecosites. - Typically follow riparian areas, woodlots, and areas of physical geography (ravines or ridges). - Corridors will be multi-functional i.e. these will function for any smaller mammal species as well. - Movement corridor must be determined when Moose Aquatic Feeding Area and Mineral Lick Habitat has been identified as significant. 	<ul style="list-style-type: none"> - ELC/FEC surveys adjacent to potential MAFAs and Mineral Licks. - Identified once MAFA or Mineral Lick is confirmed.
Furbearer movement corridors	<ul style="list-style-type: none"> - All Forested Ecosite Codes adjacent to or within shoreline habitats. - Mink and Otter den sites are typically found within a riparian area of a lake, river, stream or wetland. The den site will potentially have a movement corridor associated with it. - Movement corridors must be determined when habitat of Denning Sites for Mink, Otter, Marten Fisher and Eastern Wolf has been identified as significant. 	<ul style="list-style-type: none"> - ELC/FEC surveys adjacent to potential furbearer denning sites. - Identified once furbearer denning site is confirmed.

3.2 RESULTS

The Project Location, and areas within 120 m of it, were comprised primarily of natural vegetation including deciduous forest, coniferous forest, swamp, marsh and other wetland communities. Vegetation communities are described in **Section 3.2.1**.

Field notes for the site investigations conducted by Stantec and MKI are provided in **Appendix E** and **Appendix F**, respectively.

A summary of the corrections to the features identified through the records review, including new features or functions identified as a result of site investigations, is provided in **Table 5** (Appendix B) and discussed in the following sections. A summary of all natural features within 120 m of the Project Location, including descriptions of the features' attributes, compositions and functions, is provided in **Table 6** (Appendix B).

3.2.1 Vegetation Community and Vascular Plants Assessment

During site investigations, Stantec Biologists classified vegetation communities using the ELC (Lee *et al.*, 1998) and FEC (Chambers *et al.*, 1997) systems. The forested communities within

the Project Study Area and surrounding landscape represent several different vegetation types but one contiguous forested area. Where it is ecologically appropriate functions are assessed on the basis of ELC Ecosites, however for some ecological functions the most appropriate scale of analysis is the large continuous forested area.

Descriptions of the vegetation communities found in or within 120 m of the Project Location and a complete list of vascular plant species recorded are provided in Appendix C. Delineated ELC/FEC communities are shown on **Figures 3.0 to 3.9**.

3.2.2 Wetlands

Wetlands within the Project Study Area are typically Conifer Swamps, Thicket Swamps, Shallow Marsh and Meadow Marsh communities. Descriptions of these features can be found in **Table 6** (Appendix B). Wetland boundaries as delineated by Stantec are identified as SWET on **Figures 4.0 to 4.9** with ELC community descriptions found in **Appendix C**. In total, 67 wetlands were identified, including the seven wetland complexes previously evaluated, and including 48 wetlands not previously identified during records review. Of the 67 total wetlands, 63 were located within 120 m of the Project Location.

3.2.2.1 Provincially Significant Wetlands

Site investigations confirmed the presence of wetland communities associated with the Bullseye PSW complex within 120 m of the Project Location. Slight adjustments were made during the site investigations to the boundary of one wetland community in this complex within the ZOI, which was based on detailed field assessments (i.e. the southernmost tip of SWET4, as shown on **Figure 4.6**). MNR was engaged in the adjustment process, and approved the revised wetland boundary during a site visit with Stantec ecologists on October 4, 2012. No corrections are required to the records review (**Table 5**, Appendix B).

3.2.2.2 Non-provincially Significant Wetlands

Site investigations confirmed the presence of non-provincially significant wetland communities within 120 m of the Project Location. No adjustments to the wetland boundaries were made as a result of the site investigation. No corrections are required to the records review.

3.2.2.3 Additional/Unevaluated Wetlands

Forty-eight (48) additional wetlands, not previously identified by MNR or NRSI, were identified within 120 m of the Project Location. These wetlands consisted primarily of Organic Rich Conifer swamps (ELC/FEC code G129Tt) with scattered small meadow marshes and swamp thickets.

Potential wetland communities that were beyond 120 m of the Project Location and were not contiguous with the identified additional wetland features, as determined through air photo interpretation and site investigations, were not included as part of the wetland feature located within 120 m of the Project Location.

Corrections made to the records review for wetlands as a result of the site investigations are summarized in **Table 5** (Appendix B). An evaluation of significance is required for previously unidentified wetlands.

3.2.3 Wildlife and Wildlife Habitat

Results of the site investigations for wildlife habitat are summarized in the following sections. The results are considered within the context of criteria for SWH as outlined within the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) in order to determine whether natural communities within 120 m of the Project Location support candidate or confirmed SWH. Candidate SWHs identified in site investigations are described in the following sections, and illustrated on **Figures 5.0 to 5.9**.

Additional candidate SWH not identified during records review were identified during the field studies. Table 1 in Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a) sets out the candidate SWHs that are to be identified within 120 m of each project component. Only those candidate SWHs are shown on **Figures 5.0 to 5.9** and are discussed in the tables below.

For context, mapping of Generalized candidate SWH (habitat outside the distances set out in Table 1 in Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects', MNR, 2011a) is provided in **Appendix H-5**.

3.2.3.1 Seasonal Concentration Areas of Animals

Site investigation involved a thorough assessment of natural areas for seasonal concentration areas for wildlife habitat. Potential habitat for seasonal concentration areas was examined during the site investigation phase, and is discussed in **Table 3.5**. Seasonal concentration areas that did not fulfill the criteria in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) will not be carried forward to the evaluation of significance.

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.5: Summary of Site Investigation Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120m of Project Location	Rationale	Candidate Carried Forward to Summary and EOS (Y/N)
Waterfowl Stopover and Staging Area (Terrestrial)	No	- Cultural meadow communities within 120 m of the Project Location were classified as G045NH, and are not considered suitable for waterfowl stopover and staging areas. No evidence of annual spring flooding was observed in cultural communities, and as a result they were considered absent in or within 120 m of the Project Location.	No
Waterfowl Stopover and Staging Area (Aquatic)	Yes	- Wetlands with abundant aquatic invertebrates, a variety of aquatic plants, and areas of open water for staging are used by waterfowl during migration. During aerial surveys, ELC/FEC surveys and site investigations suitable habitat was identified within 120 m of the Project Location: meadow marsh and shallow marsh communities adjacent to open water. - No candidate SWH for waterfowl stopover and staging areas (aquatic) were identified either in the Project Location or within 120 m of turbines. Several small occurrences of ELC/FEC G142-152 were encountered, however these areas are small in comparison to the large staging opportunities provided along the Montreal River and in the open water portions of larger water bodies in the Study Area, including Bow Lake and Negick Lake. Portions of Bow Lake and Negick Lake within the ZOI included only one small occurrence of ELC/FEC ecosite G142N, which was not large enough to provide stopover or staging habitat.	No
Shorebird Migratory Stopover Area	No	- Relatively undisturbed shorelines along lakes, rivers, and wetlands, including beach areas, bars and un-vegetated shoreline habitat that produce abundant food (clams, insects, snails and worms) are used by shorebirds during migration (MNR, 2000a). No known shorebird migratory stopover areas are confirmed within the Project Study Area. Site investigations determined that large wetlands, lakes or river features with associated ELC ecosite shoreline communities as listed in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) were absent within 220 m (the feature includes the ELC ecosite and 100 m radius) of the Project Location.	No
Raptor Wintering Area	No	- Grasslands are predominantly small and under cultural influence within 120 m of the Project Location, including hydro corridors, small pockets associated with established roads and shrub thickets in disturbed clear cuts around meteorological tower locations. These sites are found in association with woodlands; however the absence of undisturbed grassland habitat of sufficient size (min 50 ha) indicates that raptor wintering areas are absent in and within 120 m of the Project Location.	No
Bat Hibernacula	No	- No caves, abandoned mine shafts, underground foundations, or karst formations were found in, or within 1120 m (the habitat feature includes a 1000 m radius around the entrance to the hibernaculum) of the Project Location.	No
Bat Maternity Colonies	Yes	- Woodlands in and within 120 m of the Project Location consist of a number of different ecosites; however, the forested area is considered one contiguous woodland feature which is	Yes (1)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.5: Summary of Site Investigation Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120m of Project Location	Rationale	Candidate Carried Forward to Summary and EOS (Y/N)
		<p>predominantly mature deciduous and mixed forest stands. Wildlife trees ≥ 25 cm dbh at a decay class from 1-3 were observed in abundance during Stantec's site investigations and ELC/FEC surveys. In total, 267 snags or trees suitable for supporting significant maternity colonies (i.e. those with particularly large slabs of loose bark or suitable cavities) were observed and recorded within 120 m of the Project Location (see Appendix H-2). For the 30 12.6 m radius (0.05 ha) plot surveys completed by MKI and Stantec, the observed density of snags which met candidate Bat Maternity Roost criteria was 26.7 snags/ha. Per MNR (2011a) "Bat and Bat Habitats: Guidelines for Wind Power Projects", a snag tree density of ≥ 10 snags per ha indicates that the site is a candidate for maternity colony roosts. As all mixedwood and deciduous forested ecosites are contiguous within the Project Location, the forested area will be assessed as one feature for candidate SWH for bat maternity colonies. Our field work confirmed that suitable cavity habitat trees with greater than 25 cm dbh and decay classes of 1-3 were common and widespread across the landscape. In early August, as part of the field season finalization, two full field days were spent travelling the Project Study Area observing the distribution of snag tree and other habitat features. The purpose of this work was to confirm that the Project Location was ecologically similar to the Project Study Area, and, that SWH present in the Project Location was also well represented throughout the Project Study Area.</p>	
Turtle Wintering Areas	Yes	<ul style="list-style-type: none"> - Results of the vegetation classification surveys identified the presence of several open aquatic areas within 120 m of the Project Location. These features consisted primarily of lakes and beaver flooded meadows with scattered meadow marshes and swamp thickets. A number of these features had mud substrates and were of a depth that would not freeze solid. - Seven candidate SWH for turtle wintering areas were identified during site investigations Six of these were located within 120 m of the Project Location (TWA-1 to 5 and TWA-7). TWA-1, 4 and 7 are within 120 m of an access road and are shown on Figures 5.0-5.9. These sites require an evaluation of significance. - TWA-2, 3 and 5 are within 120 m of collector line corridors, but not within 120 m of turbine or road project components. Per Table 1, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS. Mapping of these Generalized features is provided in Appendix H-5. 	Yes (3) and Generalized (3)

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.5: Summary of Site Investigation Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120m of Project Location	Rationale	Candidate Carried Forward to Summary and EOS (Y/N)
Reptile Hibernacula	Yes	<ul style="list-style-type: none"> - Twelve candidate SWH for snake hibernacula, such as abandoned animal burrows, broken and fissured rock, and rock crevices, were identified during site investigations. The SWH for these features is the hibernaculum plus a 30 m radius. Eleven of these were located in or within 120 m of the Project Location (SH-1 to 4 and SH-6 to 12). - Features SH-2, 4, 8, 9 and 11 overlap with project components or are within 120 m of turbine project components. These sites require an evaluation of significance and are shown on Figures 5.0-5.9. - SH-1, 3, 6, 7, 10 and 12 are within 120 m of collector line corridors, but not within 120 m of turbine or road project components. Per Table 1, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS. Mapping of these Generalized features is provided in Appendix H-5. 	Yes (5) and Generalized (6)
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)	No	<ul style="list-style-type: none"> - Results of the vegetation community surveys determined that there are no eroding banks, sandy hills, borrow pits, steep slopes or sand piles which are not aggregate licensed/permitted areas or man-made, present within 170 m (the feature includes a 50 m radius around the peripheral nests) of the Project Location. 	No
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)	No	<ul style="list-style-type: none"> - The Ontario Breeding Bird Atlas identified that the known range of nesting colonial birds overlaps with the Project Study Area, however no nests of any colonial species such as Herons were encountered within 420 m (the feature includes a 300 m radius around the colony) of the Project Location. Woodlands containing deciduous treed swamps and lakes with treed swamp and swamp thickets along its margins are present within 120 m of the Project Location; however, no evidence of colonially-nesting bird species was observed during site investigations. 	No
Colonially-Nesting Bird Breeding Habitat (Ground)	No	<ul style="list-style-type: none"> - There are no lakes or large rivers providing suitable shoreline habitat or containing rocky island or peninsula features in or within 370 m (the feature includes a 150 m radius around the colony) of the Project Location. Brewer's Blackbird is not known to occur within the Project Study Area (Cadman <i>et al.</i>, 2007). 	No
Late Winter Moose Habitat	No	<ul style="list-style-type: none"> - Some smaller ELC communities meet the criteria of dense conifer cover with greater than 50% canopy closure with tall trees >10 m; however there are no conifer stands >50 ha in total area in or within 120 m of the Project Location. 	No

3.2.3.2 Rare Vegetation Communities or Specialized Habitats for Wildlife

Site investigation results pertaining to rare vegetation communities and specialized habitats in and within 120 m of the Project Location are summarized in **Table 3.6**. Rare vegetation

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

community types or specialized habitats for wildlife that did not fulfill the criteria in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) will not be carried forward to the evaluation of significance.

Table 3.6: Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community / Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
Beach/ Beach Ridge/ Bar/ Sand Dunes	No	- Beach, beach ridge, bar and sand dunes (ELC Ecosites G005-G006, G166-G168, G182-G184, and G213-G214) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location.	No
Shallow Atlantic coastal marsh	No	- Shallow Atlantic coastal marsh (ELC Ecosites G143-G145 and G148-G152) was not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location.	No
Cliffs and Talus Slopes	Yes	- One treed cliff community (G158Tt, as shown on Figure 3.3) was identified by MKI within the 120 m ZOI as part of the Bow Lake Wind Farm Phase 1 Addendum. Based on notes provided by MKI, this cliff was approximately 150 m long with a varying height of 3-10 m. This treed cliff community does not overlap with the Project Location. The habitat feature is within 120 m of a Construction Compound, but not within 120 m of any Project-related roads. In accordance with Appendix D of the NHA Guide, this feature will be treated as Generalized candidate SWH. Mapping of Generalized features is provided in Appendix H-5.	Generalized (1)
Rock barren	No	- Rock barrens (ELC Ecosites G163-G165 and G179-G181) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location.	No
Sand Barrens	No	- Sand barrens (ELC Ecosites G007 and G215) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location.	No
Alvars	No	- Alvars (southern Ontario ELC codes: AL01, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2 or Central Ontario forest ecosites in very shallow soil: ES13.1, ES14.1, ES16.1, ES21.1, ES9) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location.	No

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Site Investigation

January 2013

Table 3.6: Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community / Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
Old-growth Forest	No	<ul style="list-style-type: none"> - ELC/FEC assessments and vegetation surveys in or within 120 m of the Project Location did not identify old-growth forests. - Old growth forests are categorized as mature forests with large trees that have not been disturbed and may occur in any of the following ELC Ecosites: G011-G15, G017-G018, G023, G027, G033, G036, G039-G042, G048, G051, G054-G058, G064, G066, G069, G071-G075, G081, G084, G087, G089-G091, G103, G105-G107, G113, G115, G118, G120-G124. As the Project Location has been historically logged, it has experienced recognizable disturbances resulting from forestry activities. As such it has not developed a multi-layered canopy with abundant snags and downed woody debris and mature dominant tree species >140 years old, as is characteristic of old growth forests. - All mature woodlands within 120 m of the Project Location had evidence of previous forestry disturbance. No candidate SWH (old-growth forests) was present in or within 120 m of the Project Location for old-growth forests. 	No
Bog	No	<ul style="list-style-type: none"> - Bogs (ELC Ecosites G126 and G137-G138) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location. 	No
Savannahs	No	<ul style="list-style-type: none"> - Savannahs (Southern Ontario ELC Ecosites: TPS1, TPS2, TPW1, TPW2 and CUS2CUS2) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location. 	No
Tall-grass Prairies	No	<ul style="list-style-type: none"> - Tall grass prairies (Southern Ontario ELC Ecosites: TP01 and TP02TP02) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location. 	No
Rare forest type – Red Spruce	No	<ul style="list-style-type: none"> - Red Spruce forests (ELC Ecosites G036, G051, G066, G084, G086, G100, G102, G116 and G117G117) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location. 	No
Rare forest type – White Oak	No	<ul style="list-style-type: none"> - White Oak forests (G017, G041, G057, G072, G090, G106 and G121G121) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location. 	No
Other Rare Vegetation Communities	No	<ul style="list-style-type: none"> - Rare vegetation communities (other rare vegetation communities) were not observed during the ELC/FEC assessments, or vegetation surveys in or within 120 m of the Project Location. 	No
Waterfowl Nesting Area	Yes	<ul style="list-style-type: none"> - Site investigations indicated that wetlands within 240 m (the feature includes a radius of 120 m around the wetland or wetland cluster) of the Project Location were comprised primarily of coniferous swamp, shallow marsh, meadow marsh and deciduous swamp communities. Forested upland areas adjacent to these features are large and contiguous. - Twelve candidate SWH for waterfowl nesting areas were 	Yes (12)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.6: Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community / Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
		identified in the Project Location or within 120 m of turbines and are shown as WNA 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 16 and 18 on Figures 5.0-5.9 . These sites require an evaluation of significance.	
Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat	No	- Habitat assessments of all woodlands and vegetated watercourses within 920 m (the feature includes the nest plus up to an 800 m radius depending on site lines) of the turbines did not detect any stick nests of a size and location to suggest use by Bald Eagle or Osprey. Rivers, lakes and ponds that could be used by Bald Eagle and Osprey were present within 120 m of the Project Location, but no Bald Eagle or Ospreys were observed using the associated habitats. Bald Eagles were observed perching and foraging at the dump site immediately east of Hwy. 17 (at the intersection of Hwy. 17 and Dump Road). The location where the birds were observed is situated is well beyond 920 m from any Project turbine.	No
Woodland Raptor Nesting Habitat	Yes	- ELC and habitat assessments of all woodlands and vegetated watercourses within 120 m of the Project Location detected two stick nests of potential woodland raptors; one of which was active at the time of observation. The locations are shown as WRNH-1 and WRNH-2 on Figures 5.0-5.9 . Although both nest sites were over 120 m away from the Project Location, the species using these nests was unknown. As such, a conservative application of a 400 m radius around the nests [as prescribed in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) for potential Red-shouldered Hawk and Northern Goshawk nests] was applied which intersected the Project Location. These features require an evaluation of significance. - During records review, one Red-tailed Hawk nest was identified by MNR. The nest was not present during site investigations (including the Apr. 17 helicopter survey) and no other stick nests or raptors were observed at this location. As such, this feature was not brought forward to the Evaluation of Significance.	Yes (2)
Turtle Nesting Areas	No	- ELC and habitat assessment surveys undertaken along and adjacent to water bodies within 250 m (the feature includes a radius of 30-100 m around the nest) of the Project Location did not locate any exposed sand or gravel areas that would provide suitable habitat to support turtle nesting. - No candidate SWH was present in or within 120 m of the Project Location for turtle nesting habitat.	No
Seeps and Springs	Yes	- ELC/FEC and woodland habitat assessment surveys, surveys by MKI, Tulloch, MNR, as well as surveys by Stantec aquatics team members, in support of the Water Assessment / Water Bodies Report, of all woodlands within 120 m of the Project Location identified seeps or springs throughout the contiguous woodland community (G058Tt). - Forty-eight potential seeps and springs were identified during site investigations or reported by MNR, of which 46 are within	Yes (1)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.6: Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community / Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
		<p>the contiguous ELC forest ecosite G058Tt. One additional seep (SEEP-11) is located in ELC forest ecosite G067Tt and is directly adjacent to ELC forest ecosite G058Tt. Another seep (SEEP-9) is located within ELC ecosite G142 (Mineral Meadow Marsh). Wetland ecosites are not considered to be candidate significant wildlife habitat for seeps and springs (MNR 2012).</p> <p>- In accordance with the Draft Ecoregion 5E Criterion Schedule (MNR 2012), the area of the ELC forest ecosite containing the seeps/springs is the candidate SWH. The contiguous woodland ecosite G058Tt and adjacent woodland ecosite G067Tt containing SEEP-11 will be carried forward to the evaluation of significance as one feature. Potential seeps are considered to be attributes supporting the candidate significant wildlife habitat feature, and are mapped as points on Figures 5.0-5.9.</p>	
- Moose aquatic Feeding Habitat	- Yes	<p>- ELC and habitat assessment surveys within 240 m (the feature includes the wetland plus 120 m radius in adjacent forest) of the Project Location identified wetlands and isolated embayments on lakes which included submerged aquatic vegetation located adjacent to conifer or mixed forest ecosites. The MNR has also provided mapping information with regards to 36 classified moose aquatic feeding habitats located within the Project Study Area, of which 7 were within 120 m of the Project Location. Site investigations were conducted by Stantec to confirm the location and quality of these 7 MAFAs.</p> <p>- Class 3 and 4 MAFAs are candidate significant wildlife habitat and, where MAFA habitat is in low supply, Class 2 MAFA habitat could also be considered candidate SWH (MNR 2012). However, as 36 MAFAs have been identified within the Project Study Area, MAFA habitat is not in low supply and Class 2 MAFA should not be considered candidate SWH.</p> <p>- No MAFAs of Class 3 or 4 were identified by MNR within 120 m of the Project Location.</p> <p>- Four MAFAs of Class 2 were identified by MNR within 120 m of the Project Location. Of these:</p> <p>- One (MAFA-B), a fen associated with SWET-4) was determined by Stantec not to be a MAFA during site investigations due to the absence of submerged and emergent vegetation.</p> <p>- One (MAFA-C) was determined by Stantec to be a Class 1, or low quality, MAFA.</p> <p>- Two (MAFA-D and F) were confirmed by Stantec as Class 2, or moderate quality, MAFAs.</p> <p>- Three MAFAs of Class 1 identified by MNR were confirmed by Stantec as low potential feeding areas (MAFA-A, E, and G).</p> <p>- One potential MAFA previously unidentified by MNR was identified by Stantec in and within 120 m of the Project Location subsequent to the site investigation phase. This feature is shown as MAFA-1 on Figures 5.0-5.9 and requires</p>	- Yes (1)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.6: Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community / Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
		<ul style="list-style-type: none"> - an evaluation of significance. - Corrections to the Records Review have been made with respect to MAFAs, as shown in Table 5 (Appendix B). - Field notes (Appendix E) include a detailed description of aquatic vegetation, size of area, adjacent vegetation, history of use and accessibility of each MAFA. 	
Mineral Licks	No	<ul style="list-style-type: none"> - ELC/FEC and habitat assessment surveys, including aerial surveys, undertaken in all woodlands and watercourses within 320 m (the feature includes a 100-200 m radius around the lick) of the Project Location did not locate any mineral licks. Mineral licks are readily apparent from aerial surveys as areas of light gray clay with evidence of heavy trampling by moose (MNR, 2000a; Frape <i>et al.</i>, 1984). No such areas were encountered during any of the surveys in the Project Location. - No candidate SWH was present in or within 120 m of the Project Location for mineral licks. 	No
Denning sites for Mink, Otter, Marten, Fisher and Eastern Wolf	Yes	<ul style="list-style-type: none"> - Habitat within the Project Location includes mixed and coniferous shorelines, providing habitat for Mink. - Habitat in the Project Location adjacent to water bodies includes undisturbed shorelines, with shrubby vegetation and downed woody debris which may provide suitable habitat for Otter, in the presence of productive fish populations. - The Project Study Area also includes tracts of mixed mature forests, of variable size which may provide habitat for Marten and Fisher; however the majority of mixed or coniferous areas (including one location identified by MNR during November 2011) did not contain unique characteristics of sufficient size that would indicate suitable habitat. - Habitat for Eastern Wolf includes contiguous heavily forested areas, with home ranges approximately 300 km². The Project Study Area likely contributes to the home range for wolves, and scat and tracks were observed during site investigations. However, no den sites were identified. - ELC and habitat assessment surveys undertaken within 220 m (the feature includes a 120 m radius around the den) of the Project Location did not locate any denning sites for Mink, Otter, Marten, Fisher or Eastern Wolf. 	No
Amphibian Breeding Habitat (Woodland)	Yes	<ul style="list-style-type: none"> - During site investigations in the spring of 2012 potential amphibian woodland breeding ponds within 320 m (feature includes a 200 m radius of adjacent forest around woodland pools) of the Project Location were assessed. All wetlands, areas of standing water, areas which showed evidence of holding water through the spring (based on topography and vegetation), and lakes or ponds with an area of more than 500 m² and lying within 120 m of woodlands were assessed. Size of pools, presence and depth of standing water, surrounding vegetation community, emergent and submergent vegetation and canopy cover were recorded. Seventeen candidate SWH for amphibian breeding habitat (Woodland) were identified and are shown as ABHW-1 to ABHW-17 on 	Yes (17)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.6: Summary of Site Investigation Results for Rare Vegetation Communities and Specialized Wildlife Habitat

Candidate Rare Vegetation Community / Specialized Wildlife Habitat	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EOS (Y/N)
		Figures 5.0-5.9. These features overlap with project components and require an evaluation of significance.	
Amphibian Breeding Habitat (Wetland)	No	<ul style="list-style-type: none"> - Site investigations conducted in the spring of 2012 were undertaken to identify potential amphibian wetland breeding habitats within 120 m of the Project Location. All wetlands and pools in ELC Ecosites G129-135 and G142-152 >500 m² and isolated from woodlands (>120 m) were assessed. - As wetlands and pools in or within 120 m of the Project Location are less than 120 m from woodland habitats, they are not isolated and do not meet the criteria for amphibian breeding habitat (wetland). See amphibian breeding habitat (woodland). 	No
Mast Producing Areas	No	<ul style="list-style-type: none"> - During site investigations, ELC/FEC and habitat assessment surveys within 120 m of the Project Location no forested areas >0.5 ha with a high component (>50%) of mast producing trees were identified. - Some sites in or within 120 m of the Project Location included a component of mast producing shrubs, however most were in disturbed areas, and are less than 1 ha in size. These sites are considered a temporary source of food and as a result are less significant. - No candidate SWH was present in or within 120 m of the Project Location for mast producing areas. 	No

3.2.3.3 Species of Conservation Concern

Site investigation results pertaining to habitats for species of conservation concern within 120 m of the Project Location are summarized in **Table 3.7**. Special Concern and Rare (S1-S3, SH) Wildlife Species includes 4 species of birds, 8 species of plants, and 22 species of insects, as identified during the records review and described in **Table 3** (Appendix B). Habitats for three bat species of conservation concern (i.e. Small-footed Bat, Eastern Pipistrelle/Tri-coloured Bat and Northern Long-eared Bat/Northern Myotis) are considered under Bat Hibernacula and Bat Maternity Colonies, and are addressed in **Table 3.5**. Habitat for Bald Eagle is considered under Specialized Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat, and is addressed in **Table 3.6**. Habitat for Yellow Rail is considered under Marsh Breeding Bird Habitat, rather than as habitat for an individual species of conservation concern, and is addressed in **Table 3.7** (below). Habitat for species of conservation concern that did not fulfill the criteria in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) will not be carried forward to the evaluation of significance.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.7: Summary of Site Investigation Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120m of Project Location	Rationale	Carried Forward to EOS (Y/N)
Marsh Bird Breeding Habitat	Yes	<ul style="list-style-type: none"> - Site investigations confirmed that marsh bird breeding habitat is present within 120 m of the Project Location. All wetlands with shallow water and emergent aquatic vegetation are to be considered as potential candidate SWH. - Twenty-four candidate SWH for marsh bird breeding habitat were identified during site investigations, of which 22 are within 120 m of the Project Location. Two features overlap with project components (MBBH- 8, and 9) and require an evaluation of significance. These candidate features are shown on Figures 5.0-5.9. - Twenty features are located within 120 m of non-turbine project components (MBBH-1-7, 10-15, 17-21, 23 and 24). - Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these twenty features are considered Generalized Candidate SWH and will be brought forward to the EIS. Generalized Candidate SWH are shown in Appendix H-5. 	Yes (2) and Generalized (20)
Open Country Bird Breeding Habitat	No	<ul style="list-style-type: none"> - Site investigations confirmed that grassland habitat exceeding 30 ha was absent in or within 120 m of the Project Location. As such, no candidate SWH for open country birds was present in or within 120 m of the Project Location. 	No
Shrub/Early Successional Bird Breeding Habitat	No	<ul style="list-style-type: none"> - Site investigations confirmed that shrub/early successional bird breeding habitat exceeding 30 ha was absent in or within 120 m of the Project Location. As such, no candidate SWH for shrub/early successional birds was present in or within 120 m of the Project Location. 	No
Canada Warbler	Yes	<ul style="list-style-type: none"> - The Canada Warbler is an interior forest species occupying dense, mixed coniferous or deciduous forests with closed canopy, especially wet bottomlands of cedar or alder; and shrubby undergrowth in cool moist mature woodlands with riparian habitats. The Canada Warbler usually requires at least 30 ha of interior forest habitat (MNR, 2000a). - Site investigations confirmed that preferred habitat for Canada Warbler is present in or within 120m of the Project Location in ELC Ecosites G129, G224, G067 and G070. All of these habitats are found in moist low lying and bottomland areas, with a coniferous canopy which includes cedar, and instances of deciduous species in the canopy, as well as providing a dense understory and shrub layer. - Forty-four candidate SWH for Canada Warbler were identified during site investigations. - Twenty-four candidate SWH overlap with project components or are within 120m of wind turbine components and require an evaluation of significance (CWH 1, 3, 6, 8, 9, 10, 11, 12, 15, 18, 20, 21, 22, 23, 24, 25, 28, 29, 30, 31, 35, 36, 39, and 40). These candidate features are shown on Figures 5.0-5.9. - Twenty sites (CWH-2, 4, 5, 13, 16, 17, 19, 26, 27, 32, 33, 34, 37, 38, 41, 42, 43 and 44) are within the 120 m ZOI but do not overlap with any project components and are not within 120m of wind turbine components. In consultation with MNR Sault Ste Marie District staff and using guidance from Table 1, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 	Yes (24) and Generalized (20)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.7: Summary of Site Investigation Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120m of Project Location	Rationale	Carried Forward to EOS (Y/N)
		2011a), these features will be considered Generalized Candidate SWH and will be brought forward to the EIS. Generalized Candidate SWH are shown in Appendix H-5 .	
Olive-sided Flycatcher	Yes	<ul style="list-style-type: none"> - The Olive-sided Flycatcher prefers semi-open, conifer forest, particularly spruce forests near ponds, lakes or rivers. Burns with dead trees for perching are also important components of their habitat (MNR, 2000a). Typically the Olive-sided Flycatcher breeds in the boreal forest, where it uses coniferous trees to support its cup-shaped nest (Cadman <i>et al.</i>, 2007). - Site investigations confirmed that preferred habitat for the Olive-sided Flycatcher is present in or within 120 m of the Project Location. All moist coniferous woodlands including ELC codes G129, G052, G067, G101, G050, G053 and G014 are considered candidate SWH. - Thirteen candidate SWH for Olive-sided Flycatcher were identified during site investigations of which twelve were located within 120 m of the Project Location. - Six sites were located in the Project Location (OFH-1, 4, 5, 6 and 13) or are within 120m of wind turbine components and require an evaluation of significance. These candidate features are shown on Figures 5.0-5.9. - Six sites (OFH-2, 3, 7, 8, 9 and 11)) are within the 120 m ZOI but do not overlap with any project components and are not within 120m of wind turbine components. In consultation with MNR Sault Ste Marie District staff and using guidance from Table 1, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a), these features will be considered Generalized Candidate SWH and will be brought forward to the EIS. Generalized Candidate SWH are shown in Appendix H-5. 	Yes (6) and Generalized (6)
Oval-leaved Bilberry	Yes	<ul style="list-style-type: none"> - Oval-leaved bilberry may be present in moist coniferous woods, transitional habitats adjacent to coniferous stands, cut-over coniferous woods, verges of road cuts, or mixed woods (Reznicek <i>et al.</i>, 2011, Flora of N.A. Editorial committee, 1993). Suitable habitat is located in ELC communities G070, G067, G224, and G129. Based on the records review and site investigations, habitat for oval-leaved bilberry is locally abundant within the Project Study Area. - Sixty-nine candidate SWH for oval-leaved bilberry were identified in or within 120 m of the Project Location. - Fifty-one features overlap with project components or are within 120 m of roadways and require an evaluation of significance. These features are shown as OBH on Figures 5.0-5.9. - Eighteen features do not overlap with any project components and are not within 120 m of road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS. Generalized Candidate SWH are shown in Appendix H-5. 	Yes (51) and Generalized (18)
Woodland Pine Drops	Yes	<ul style="list-style-type: none"> - Woodland pine drops are nearly always in habitats with conifers (especially pines but also hemlock, spruce, fir, white- 	Yes (25) and Generalized

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.7: Summary of Site Investigation Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120m of Project Location	Rationale	Carried Forward to EOS (Y/N)
		<p>cedar), in dry-mesic (usually sandy or rocky) soil, often with common juniper and sometimes aspen or birch (Reznicek <i>et al.</i>, 2011, Flora of N.A. Editorial committee, 1993).</p> <ul style="list-style-type: none"> - Thirty-three candidate SWH for woodland pine drops were identified during site investigations and are shown as WPH-1 to WPH-33 on Figures 5.0-5.9. One site (WPH-29) is located outside of the ZOI. - Twenty-five sites were located in the Project Location and require an evaluation of significance. - Seven sites (WPH 11, 12, 15, 17, 18, 26 and 27) were located within 120 of the Project Location, but not within 120 m of road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS. Generalized Candidate SWH are shown in Appendix H-5. 	(7)
Boreal Bedstraw	Yes	<ul style="list-style-type: none"> - Boreal bedstraw is known to inhabit coniferous and deciduous woods (Reznicek <i>et al.</i>, 2011, Flora of N.A. Editorial committee, 1993). Based on information provided by MNR, this species utilizes microhabitats such as seeps and springs, and perhaps other wet areas such as infiltration sites. - Ninety-six candidate SWH for boreal bedstraw were identified in or within 120 m of the Project Location. - Sixty-nine features overlap with project components or are within 120 m of roadways and require an evaluation of significance. These features are shown as BBH on Figures 5.0-5.9. - Twenty-seven features do not overlap with any project components and are not within 120 m of road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS. Generalized Candidate SWH are shown in Appendix H-5. 	Yes (69) and Generalized (27)
Wooly Beach Heath	Yes	<ul style="list-style-type: none"> - Wooly beach heath may occur on sandy or silty beaches, on sand plains, or in sandy jack pine woods and clearings (Reznicek <i>et al.</i>, 2011, Flora of N.A. Editorial committee, 1993). - Four candidate SWH for wooly beach heath were identified in or within 120 m of the Project Location and are shown as WBHH-1 to WBHH-4 on Figures 5.0-5.9. Two of these sites (WBHH-1 and 4) are within the Project Location and require an evaluation of significance. WBHH-2 and 4 are within 120 m of the Project Location, but not within 120 m of road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these feature are considered Generalized Candidate SWH and will be brought forward to the EIS. 	Yes (2) and Generalized (2)
Braun's Holly Fern	Yes	<ul style="list-style-type: none"> - Braun's holly fern may occur in moist deciduous or mixed conifer-hardwood forests on slopes and in ravines, and especially frequent in rocky woods; some historical records from conifer plantations (Reznicek <i>et al.</i>, 2011, Flora of N.A. 	Yes (34) and Generalized (9)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.7: Summary of Site Investigation Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120m of Project Location	Rationale	Carried Forward to EOS (Y/N)
		<p>Editorial committee, 1993).</p> <ul style="list-style-type: none"> - Forty-three candidate SWH for Braun's holly fern were identified in or within 120 m of the Project Location. - Thirty-four features overlap with project components or are within 120 m of roadways and require an evaluation of significance. These features are shown as BHFH on Figures 5.0-5.9. - Nine features do not overlap with any project components and are not within 120 m of road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS. Generalized Candidate SWH are shown in Appendix H-5. 	
Mountain Fir-moss	Yes	<ul style="list-style-type: none"> - Mountain fir-moss may occur on damp, acidic, igneous rocks in alpine zone or exposed cliffs and talus slopes elsewhere, and along coast of Lake Superior (Reznicek <i>et al.</i>, 2011, Flora of N.A. Editorial committee, 1993). - Eleven candidate SWH for mountain fir-moss were identified during site investigations and are shown as MFH-1 to MFH-11 on Figures 5.0-5.9. Three of these features (MFH-7, 8 and 9) are outside of the ZOI. Seven sites (MFH-1 to 6, and 11) are in the Project location and require an evaluation of significance. One site is located within 120 m of a collector line corridor, but not within 120 m of road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) this feature is considered Generalized Candidate SWH and will be brought forward to the EIS. 	Yes (7) and Generalized (1)
Blue Wild Rye	Yes	<ul style="list-style-type: none"> - Blue wild rye may occur on sites with moist to dry soil in meadows, thickets, and open woods (Reznicek <i>et al.</i>, 2011, Flora of N.A. Editorial committee, 1993). - Nine candidate SWH for blue wild rye were identified during site investigations and are shown as BWRH-1 to BWRH-9 on Figures 5.0-5.9. Eight of these were located in or within 120 m of the Project Location (BWRH-1 to 3, and 5-9). These sites require an evaluation of significance. 	Yes (8)
Quill Spike-rush	Yes	<ul style="list-style-type: none"> - Quill spike-rush habitat includes moist, sandy bare depressions in Jack pine stands. (Voss <i>et al.</i>, 2012). - Twenty-four candidate SWH for quill spike-rush were identified during site investigations and are shown as QSH-1 to QSH-24 on Figures 5.0-5.9. Twenty-two of these were located in or within 120 m of the Project Location (QSH-1-6, 8-15, and 17-24). Twelve of these sites (QSH-3 to 8, 17, 18, 19, 20, 21 and 24) are within 120 m of the Project Location, but not within 120 m of road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS. The remaining ten sites require an evaluation of significance. 	Yes (10) and Generalized (12)
Uhler's Sundragon	Yes	<ul style="list-style-type: none"> - Uhler's Sundragon is provincially rare but locally common throughout much of Northern Ontario where suitable habitat is present. Habitat includes clear, slow-moving forest streams, 	Generalized

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.7: Summary of Site Investigation Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120m of Project Location	Rationale	Carried Forward to EOS (Y/N)
		beaver ponds and lakes with low acidity (Jones <i>et al.</i> , 2008; Dunkle, 2000). - Site investigations confirmed that suitable habitat for Uhler's Sundragon is present within 120 m of the Project Location in lakes and wetlands, but not within 120 m of turbine or road project components. Per Table 16, Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a) these features are considered Generalized Candidate SWH and will be brought forward to the EIS.	
Monarch	Yes	- This species prefers abandoned farmland and roadsides, but is also found in city gardens and parks. The larval host plant is milkweed. Typical summer habitat consists of >10ha of mostly grassland or fallow land with a combination of field and forest habitat present. Habitat should not be disturbed, and it should contain an abundance of preferred nectar plants. - Based on site investigations, there are no areas of open field habitat to support Monarch. Monarchs incidentally observed in the Project Study Area are considered to be transient and simply using the general area. No specific critical habitats are present in or within 120 m of the Project Location (e.g. significant amounts of milkweed or stopover areas). As such, no candidate SWH for Monarch was present in or within 120 m of the Project Location.	No

3.2.3.4 Animal Movement Corridors

As indicated in the SWHTG (MNR, 2000a), it is seldom possible to observe wildlife species using corridors. A review of aerial photography indicates that woodland vegetation communities are contiguous with no large tracts of fragmented habitat which, if present, would indicate a need for movement corridors. Site investigation results pertaining to animal movement corridors within 120 m of the Project Location are summarized in **Table 3.8**. Animal movement corridors that did not fulfill the criteria in the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012) will not be carried forward to the evaluation of significance.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.8: Summary of Site Investigation Results for Habitat for Animal Movement Corridors

Candidate Animal Movement Corridor	Present in or within 120m of Project Location	Rationale	Carried forward to EOS (Y/N)
Amphibian Movement Corridor	No	<ul style="list-style-type: none"> - Amphibian movement corridors must be considered when Amphibian breeding habitat is confirmed as SWH from Amphibian Breeding Habitat – Wetland. All amphibian breeding habitat present in or within 120 m of the Project Location is located inside a large contiguous woodland, such that overwintering habitat surrounds breeding ponds and no travel corridors are required. - As a result, no candidate SWH was present in or within 120 m of the Project Location for amphibian movement corridors. 	No
Cervid Movement Corridor	Yes	<ul style="list-style-type: none"> - Cervid movement corridors must be considered if Moose aquatic feeding areas or mineral lick habitat are confirmed as SWH. Moose may consistently utilize the same trails to access feeding areas/mineral licks. Typically these trails would come from a thermal resting habitat or another MAFA, also they may be based on the topography of the area providing a corridor to access habitat. - Corridors should be at least 200 m wide with gaps <20 m and if following riparian area with at least 15 m of vegetation on both sides of waterway. Shorter corridors are more significant than longer corridors. - One candidate Moose aquatic feeding area (i.e. MAFA-1) was identified in and within 120 m of the Project Location. If MAFA-1 is confirmed as SWH, the main trail would be followed and the corridor delineated. If this leads out of the MAFA habitat, then an animal movement corridor should be proposed to encompass this main trail area. 	Yes
Furbearer Movement Corridors	No	<ul style="list-style-type: none"> - As discussed in Table 3.2, ELC and habitat assessment surveys undertaken within 120 m of the project did not locate any denning sites for Mink, Otter, Marten, Fisher or Eastern Wolf. - As a result, no candidate SWH was identified in or within 120 m of the Project Location for furbearer movement corridors. - However, understanding that denning sites can be difficult to locate it is understood that such sites may occur in or within 120 m of the Project Location. If these sites do occur, the dens and the associated foraging habitats required by the furbearers are located inside a large contiguous woodland such that foraging habitat surrounds denning habitat and travel is through the entire forested landscape rather than through specific and concentrated corridors. 	No

3.2.4 Provincial Parks and Conservation Reserves

Site investigations confirmed that an addition to LSPP (P292) is located within 120 m of the Project Location. The boundary of P292 is located west of Highway 17, and across the highway from the entrance to Dump Road (which is to be upgraded as part of the Project). Although the Project Location is located outside of the Park boundary, one previously unidentified wetland (SWET-40, as shown on **Figure 4.1**) and associated candidate SWH for species of

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

conservation concern (as shown on **Figure 5.1**) are located within the Park and within 120 m of the proposed road upgrade. Site investigations for these features are discussed in **Section 3.2.2.3** (Additional/Unevaluated Wetlands) and the respective sections of **Table 3.7** (candidate SWH), and will be brought forward to the EOS and EIS as appropriate.

3.3 SITE INVESTIGATION RESULTS SUMMARY

Table 3.9 provides a summary of the natural features that will be carried forward to the evaluation of significance.

Table 3.9: Natural Features Carried Forward to Evaluation of Significance

Feature ID (see Fig. 4.1-4.9)	Feature Type	Identified in Records Review	Carried Forward to Evaluation of Significance	Features to be Evaluated
Wetlands				
SWET	Wetlands	No	Yes	Forty-four features: SWET-1, 2, 3, 9, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 25, 26, 28, 29, 30, 31, 33, 35, 36, 38, 39, 40, 41, 44, 45, 46, 48, 50, 51, 56, 57, 60, 62, 63, 64, 65, 66, 67 and 68.
Wildlife Habitat – Seasonal Concentration Areas of Animals				
BMRC	Bat Maternity Roost Colonies	No	Yes	One feature: Entire forested ecosite (G058Tt).
TWA	Turtle Wintering Areas	No	Yes	Three features: TWA-1, 4 and 7.
SH	Reptile (Snake) Hibernacula	No	Yes	Five features: SH-2, 4, 8, 9, and 11.
Wildlife Habitat – Rare Vegetation Communities or Specialized Habitat for Wildlife				
WNA	Waterfowl Nesting Areas	No	Yes	Twelve features: WNA-2, 3, 4, 5, 7 – 11, 13, 16, and 18.
WRNH	Woodland Raptor Nesting Habitat	Yes (WRNH-3)	Yes	Two features: WRNH-1 and 2.
SEEP	Seeps and Springs	No	Yes	One feature: Entire forested ecosite (G058Tt + G067Tt)
MAFA	Moose Aquatic Feeding Habitat	Yes	Yes	One feature: MAFA-1.
ABHW	Amphibian Breeding Habitat (Woodland)	No	Yes	Seventeen features: ABHW-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.9: Natural Features Carried Forward to Evaluation of Significance

Feature ID (see Fig. 4.1-4.9)	Feature Type	Identified in Records Review	Carried Forward to Evaluation of Significance	Features to be Evaluated
Wildlife Habitat – Habitat for Species of Conservation Concern				
MBBH	Marsh Bird Breeding Habitat	No	Yes	Two features: MBBH-8 and 9.
CWH	Canada Warbler	Yes	Yes	24 features: CWH-1, 3, 6, 8, 9, 10, 11, 12, 15, 18, 20, 21, 22, 23, 24, 25, 28, 29, 30, 31, 35, 36, 39, and 40.
OFH	Olive-sided Flycatcher	Yes	Yes	Six features: OFH-1, 4 to 6, 12 and 13.
OBH	Oval-leaved bilberry	Yes	Yes	51 features: OBH-1, 2, 3, 11, 13, 16, 19, 20, 23, 25, 31, 34, 39, 40, 45, 49, 50-57, 59, 61, 63, 65-73, 75, 78-83, 85-88, 94-96, and 98
WPH	Woodland Pine Drop	Yes	Yes	Twenty-five features: WPH-1 to 10, 13, 14, 16, 19 to 25, 27, 28, 30 to 33.
BBH	Boreal Bedstraw	Yes	Yes	Sixty-nine features: BBH-1-9, 11, 13, 14, 18, 22-29, 32-34, 38, 40-43, 47, 51, 52, 54-56, 59-61, 63, 64, 66-71, 73-76, 78-81, 84, 86, 87-92, 94, 96, 97, 98 and 99
WBHH	Woolly Beach Heath	Yes	Yes	Two features: WBHH-1 and 3.
BHFH	Braun's Holly Fern	Yes	Yes	Thirty-four features: BHFH-1-5, 7, 9, 10, 13-21, 25-30, 32-36, 38-40 and 42-44.
MFH	Mountain Fir-moss	Yes	Yes	Seven features: MFH-1 to 6 and 11.
BWRH	Blue Wild Rye	Yes	Yes	Eight features: BWRH-1, 2, 3, 5, 6, 7, 8 and 9.
QSH	Quill Spike-rush	Yes	Yes	Ten features: QSH-1, 2, 9-15, and 22.
Wildlife Habitat – Animal Movement Corridors				
	Cervid Movement Corridor	No	Yes	One feature: area surrounding MAFA-1 if MAFA-1 is significant.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Site Investigation

January 2013

Table 3.10 summarizes the features that are considered Generalized Candidate Significant Wildlife Habitat. Generalized Candidate SWH refers to features that are within 120 m of the Project Location but do not overlap with infrastructure which will have an impact on the habitats during operations, as identified in Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a). Therefore these habitats will be carried forward to the Environmental Impact Study where they will be treated as significant and general construction mitigation will be applied. Generalized Candidate SWH are shown on **Figures H-5.1-H-5.9** and listed in **Table H-5.1** in **Appendix H-5**.

Table 3.10: Generalized Candidate Significant Wildlife Habitat

Feature Type	Feature ID (See Fig. 5.0-5.9)	Identified in Records Review
Turtle Wintering Areas	- TWA-2, 3 and 5	No
Snake Hibernacula	- SH-1, 3, 6, 7, 11 and 12	No
Marsh Breeding Bird Habitat	- MBBH-1 to 7, 10 to 15, 17-21, 23 and 24	No
Cliff Community	- G158Tt	Yes
Uhler's Sundragon	- N/A (Incidental Observations)	No
Canada Warbler	- CWH-2, 4, 5, 7, 13, 14, 16, 17, 19, 26, 27, 32, 33, 34, 37, 38, 41, 42, 43 and 44	No
Olive-sided Flycatcher	- OFH-2, 3, 7, 8, 9, and 11	No
Oval-leaf Bilberry	- OBH-26, 29, 37, 58, 60, 62, 64, 74, 76, 77, 84, 89-93, 97 and 99	No
Woodland Pine Drops	- WPH 11, 12, 15, 17, 18, 26 and 27	No
Boreal Bedstraw	- BBH-10, 12, 15, 17, 19, 20, 21, 30, 31, 35, 36, 37, 39, 45, 49, 50, 58, 62, 65, 72, 82, 83, 85, 93, 95, and 100	No
Wooly Beach Heath	- WBHH-2	No
Braun's Holly Fern	- BHFH-6, 8, 11, 12, 22, 23, 24, 37 and 41	No
Mountain Fir-moss	- MFH-10	No
Quill Spike-rush	- QSH-3, 4 to 8, 17 to 21 and 24	No

Natural features identified in the records review were confirmed through the site investigation program. Corrections made to the records review are provided in **Table 5** (Appendix B).

4.0 Evaluation of Significance

Natural heritage information collected from the records review, the site investigation and consultations was analyzed to determine the significance and sensitivity of existing natural heritage features and their ecological functions. For all natural heritage features existing in or within 120 m of the Project Location, a determination was made of whether the natural heritage feature is provincially significant, significant, not provincially significant or not significant.

Natural heritage features present in and within 120 m of the Project Location requiring an Evaluation of Significance are identified in **Table 3.9**.

4.1 METHODS

A review of LIO mapping and the NHIC database indicated the presence of previously unevaluated wetland features within the Project Study Area. Evaluations of these wetland communities were conducted by NRSI in 2010, according to the Ontario Wetland Evaluation System (OWES), Northern Manual (MNR, 2002). Evaluation records were submitted to the MNR Sault Ste. Marie District in November 2010, revised based on MNR comments, and re-submitted in March 2012.

Wildlife habitats were considered to be significant if MNR has identified them as such, or when evaluated as significant using procedures established by MNR. In some circumstances, an evaluation of significance may not have been completed due to the timing of feature identification and field work outside of the appropriate survey window for the candidate significant wildlife habitat, or where surveys were insufficient to determine significance. Per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), when determining the significance of identified candidate significant wildlife habitat, an applicant may "treat the habitat as significant and commit to undertake a study of habitat use prior to construction within 120 m of the habitat" (MNR 2011a). Where habitat has been treated as significant, a commitment to undertake the habitat use study and a description of study methods are included in the Environmental Impact Study (**Section 5.0** of this report). Furthermore, where a natural feature is defined by many smaller attributes within the larger feature, the feature may be treated as significant provided that the attributes of the feature are evaluated using criteria and procedures established by MNR (2011a).

Sources used in the evaluation of significance for the natural heritage features in or within 120 m of the Project Location included:

- Ontario Wetland Evaluation System Northern Manual (MNR, 2002);
- Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011a);
- Significant Wildlife Habitat Technical Guide (MNR, 2000a);
- Significant Wildlife Habitat Decision Support System (MNR, 2000b)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

- Draft Significant Wildlife Habitat EcoRegion 5E Criterion Schedule (MNR, 2012); and
- Selected Wildlife and Habitat Features: Inventory Manual (MNR, 2000c).

Provincial designations for special concern species were obtained from the most recent Committee on the Status of Species at Risk in Ontario (COSSARO) assessments. Federally, designations for endangered, threatened and special concern species were obtained from the most recent Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessments and the schedules of the Species at Risk Act (SARA) were used to determine species protection.

Within the context of O. Reg 359/09, endangered and threatened species are addressed as part of the 'Approval and Permitting Requirements Document for Renewable Energy Projects' (APRD) (MNR, 2009) requirements and are therefore not included as part of this NHA. Information required with regard to endangered and threatened species is being submitted to MNR under separate cover as part of the Bow Lake Farm APRD Report. Where this information indicates that approvals or permits are required, these will be addressed separately through the applicable statute and its permitting process.

Candidate significant natural heritage features are shown on **Figures 5.0 to 5.9**. Specific methods used in the evaluation of significance for each type of natural feature are detailed in the following sections.

4.2 WETLANDS

For the purposes of this evaluation, wetlands previously evaluated by NRSI and subsequently confirmed by MNR as provincially significant or non-provincially significant are considered to meet the requirements for a determination of significance. Unless field investigations provided evidence to contradict the existing MNR assessment of significance the designation as assigned by MNR is used. As discussed in **Section 3.2.2.1**, slight adjustments were made during the site investigations to the boundary of one wetland community associated with the Bullseye PSW complex within the ZOI. This boundary revision was conducted using both orthophoto imagery interpretation and field validation using a sub-meter GPS, and was approved by MNR through on site confirmation. Wetland boundaries as delineated by NRSI (and confirmed by MNR) were reviewed during site investigations by an OWES trained evaluator, including four (4) wetlands associated with the Bullseye PSW complex (SWET-4, 27, 52 and 53) and fifteen (15) wetlands associated with non-provincially significant wetland complexes (SWET-5, 6, 7, 8, 10, 23, 24, 32, 34, 37, 43, 54, 55, 58 and 59).

During site investigations additional wetland communities were identified in and within 120 m of the Project Location. Data were collected through desktop procedures (e.g. aerial photograph interpretation) to supplement on-site field investigations. The Wetland Characteristics and Ecological Functions Assessment (WECFA) for Renewable Energy Projects approach provided in Appendix C of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011a) was used to assess previously unevaluated wetlands where the Project Location is

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

within 120 m of the wetland, but not within the wetland itself. Although this procedure does not evaluate the significance of these wetlands with the same level of rigor as the OWES, it provides a procedure by which the significance of these wetlands can be assumed (i.e. they are treated as provincially significant) and their ecological functions assessed based on the criteria established within the OWES manual. As described in **Section 3.2.2.3**, 44 unevaluated wetlands were located within 120 m of the Project Location, and required an evaluation of significance.

4.3 WILDLIFE AND WILDLIFE HABITAT

4.3.1 Seasonal Concentration Areas of Animals

The criteria and methods used to evaluate the significance of candidate significant wildlife habitat for seasonal concentration areas of animals in or within 120 m of the Project Location are presented in **Table 4.1**. Survey dates, times and conditions are provided in **Table 4** (Appendix B).

Table 4.1: Criteria and Methods Used to Evaluate Seasonal Concentration Areas of Animals

Candidate Seasonal Concentration Area	Criteria	Methods
Bat maternity colonies	<ul style="list-style-type: none"> - Based on discussions with MNR, if one or more bats are observed exiting a cavity of a candidate bat maternity roost tree, the entire woodland or the forest ELC ecosite is considered SWH for maternity colony roost. 	<ul style="list-style-type: none"> - Per MNR guidance, candidate roost trees were monitored for evidence of maternity colonies through exit surveys. Evaluation methods followed "Bat and Bat Habitats: Guidelines for Wind Power Projects" (MNR, 2011b). - Candidate roost trees were monitored during the month of June. - The best examples of candidate bat maternity roost trees were selected for exit surveys, therefore not all candidate roost trees were located within the 30 12.6 m (0.05 ha) radius plots surveyed during site investigation. Approximately half the exit surveys were conducted at trees identified as candidates during opportunistic field searches not specifically related to bats. In order to achieve better areal coverage of the Project Location and the surrounding landscape, approximately half of the exit surveys were conducted in randomly selected areas (the main criteria for site selection being safely accessible areas for the night time work, and a reasonable distribution of samples across the Project Location and landscape). Surveyors were directed to survey the best candidate roost trees in the vicinity of the location randomly selected. In all cases each crew was able to find excellent candidate maternity roost trees to survey without extensive searching.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.1: Criteria and Methods Used to Evaluate Seasonal Concentration Areas of Animals

Candidate Seasonal Concentration Area	Criteria	Methods
		<ul style="list-style-type: none"> - During exit surveys, observers chose a viewing station with a clear aspect of the cavity opening or crevice. - The cavity opening or crevice was monitored from 30 minutes before dusk until 60 minutes after dusk for evidence of bats exiting. At some sites, night vision cameras were used in conjunction with a broad band acoustic monitor to observe cavities, with the camera footage being reviewed by bat observers the following day. - Each candidate roost tree was monitored once. - Stantec conducted 70 exit surveys at candidate maternity roosts from June 15-28, 2012. A broad-band acoustic bat detector was used in conjunction with 55 of 7070 exit surveys. Infrared video cameras were used in conjunction with 20 exit surveys.
Turtle wintering areas	<ul style="list-style-type: none"> - Presence of 5 over-wintering Midland Painted turtles - Presence of 1 or more Northern map turtle or snapping turtle overwintering within a wetland is significant. 	<ul style="list-style-type: none"> - Detailed habitat use surveys within the appropriate survey window for turtle wintering areas were not conducted, and will be required per Appendix D of the NHA Guide. - Surveys for congregations (basking areas) of turtles should be conducted on warm sunny days in spring, beginning late April or early May. Weather should be assessed prior to any surveying to make sure conditions are appropriate. MNR typically requires that 3 visits are conducted during this period to evaluate turtle wintering areas. See habitat use study methodology in the Environmental Impact Study, Section 5.0 of this report, for detail.
Reptile hibernacula	<ul style="list-style-type: none"> - Presence of snake hibernacula used by a minimum of five individuals of one species or two species of listed snake species (Eastern Gartersnake, Northern Watersnake, Northern Red-bellied Snake, Brownsnake, Smooth Green Snake, Ring-necked Snake) - Habitat is considered significant if either Milksnake or Eastern Ribbonsnake is present. 	<ul style="list-style-type: none"> - Stantec observed for emerging / congregations of snakes concurrent with amphibian egg mass surveys conducted from May 7-11, 2012. - Detailed habitat use surveys within the appropriate survey window for reptile hibernacula were not conducted, and will be required per Appendix D of the NHA Guide. - Surveys should be conducted during peak daylight hours (10:00-15:00 h) on sunny warm days in spring for congregations of snakes near candidate hibernacula. Surveys should be conducted from late April-late May, although weather should be assessed prior to any surveying to make

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.1: Criteria and Methods Used to Evaluate Seasonal Concentration Areas of Animals

Candidate Seasonal Concentration Area	Criteria	Methods
		sure conditions are appropriate. MNR typically requires that 3 visits are conducted during this period to evaluate snake hibernacula. See habitat use study methodology in the Environmental Impact Study, Section 5.0 of this report, for detail.

4.3.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

The criteria and methods used to evaluate the significance of candidate significant wildlife habitat for rare vegetation communities or specialized habitat for wildlife in or within 120 m of the Project Location are presented in **Table 4.2**. Survey dates, times and conditions are provided in **Table 4** (Appendix B).

Table 4.2: Criteria and Methods Used to Evaluate Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Community or Specialized Habitat for Wildlife	Criteria	Methods
Waterfowl Nesting Areas	<ul style="list-style-type: none"> - Presence of 3 or more nesting pairs for listed species (i.e. American Black Duck, Northern Pintail, Northern Shoveler, Gadwall, Blue-winged Teal, Green-winged Teal, Wood Duck, Hooded Merganser, Common Merganser, Red-breasted Merganser, Mallard, Canada Goose, American Widgeon, Bufflehead and Common Goldeneye) excluding Mallards, or; - Presence of 10 or more nesting pairs for listed species including Mallards. - Any active nesting site of an American Black Duck is considered significant. 	<ul style="list-style-type: none"> - Nesting surveys were completed during the spring breeding season (April - June). Evaluation methods followed 'Bird and Bird Habitats: Guidelines for Wind Power Projects' (MNR 2011c) as described below. - As outlined by Stantec in the Bow Lake Phase 2 Field Work Plan for evaluating the significance of candidate waterfowl nesting areas, Stantec conducted breeding bird surveys, which included waterfowl, from June 5-11, June 26-29 and July 10-13, 2012. - In addition to the breeding bird work early indications of waterfowl nesting were looked for during the aerial survey April 17 and reconnaissance surveys May 7-10. - Breeding bird surveys included standardized area searches using a fixed width transect placed within each habitat type and in all areas of the Project Location, as well as ten minute point counts placed within 120 m of each turbine location. - All breeding bird surveys were conducted between dawn and four hours after sunrise, during the month of June and early July. - All point count and transect locations were visited twice in the nesting season by experienced avian biologists. Additional detail on survey methods are described in

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.2: Criteria and Methods Used to Evaluate Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Community or Specialized Habitat for Wildlife	Criteria	Methods
		Table 4 (Appendix B). Information on survey locations can be found in Appendix H-1 .
Woodland Raptor Nesting Habitat	<ul style="list-style-type: none"> - Presence of 1 or more active nests from species list (Red-tailed Hawk, Great Horned Owl, Broad-winged Hawk, Sharp-shinned Hawk, Merlin, Barred Owl, Red-shouldered Hawk, Coopers Hawk and Northern Goshawk) is considered significant. - SWH includes a 400 m radius around the nests of Red-Shouldered Hawk and Northern Goshawk (or 28 ha of suitable habitat); 200 m radius around the nests of Barred Owl; 100 m radius around the nests of Broad-winged hawk, Coopers hawk, Great Horned Owl and Red-tailed Hawk and a 50 m radius around the nests of Merlin and Sharp-shinned Hawk. 	<ul style="list-style-type: none"> - Field investigations were conducted from late April/early May through to early July. - MKI conducted surveys of two stick nest locations (WRNH-1 and WRNH-2) on April 1 and May 3, 2012, respectively, noting evidence of nest construction or nesting activity. - Additional detail on survey methods are described in Table 4 (Appendix B). Information on survey locations can be found in Appendix H-1.
Seeps and Springs	<ul style="list-style-type: none"> - Presence of a site with 2 or more seeps/springs. - Per the Draft Ecoregion 5E Criterion Schedule (MNR 2012), the area of the ELC forest ecosite containing the seeps/springs is the SWH 	<ul style="list-style-type: none"> - Searches for seeps and springs were conducted as described in Table 3.2 of this report. - As outlined in the 'Draft SWH Ecoregion 5E Criterion Schedule' (MNR, 2012), ELC ecosite polygons with two or more seepage areas are considered SWH. Individual seeps are mapped as points on Figures 5.0 to 5.9, indicating the location of site-specific attributes supporting the SWH designation. - At a 1:10 000 scale of mapping, the minimum area for mapping is generally accepted as 0.25 ha (50 m x 50 m). Individual seeps were well below this size and have been mapped as points. Where linear concentrations of seepage areas were encountered, points were used to map the beginning and end of the seepage area.
Moose Aquatic Feeding Habitat	<ul style="list-style-type: none"> - Any candidate site with observed or demonstrated moose use is significant. - The area of the habitat includes the wetland area and adjacent forest stands (120 m) of a mixed or conifer forest, particularly those that provide thermal cover and/or travel corridors to other features that are considered significant. 	<ul style="list-style-type: none"> - One candidate Moose aquatic feeding habitat was identified by Stantec in August outside of the optimal survey period (June to July). - A detailed habitat use survey within the appropriate survey window for moose aquatic feeding habitat will be completed per the requirements of Appendix D of the NHA Guide. See habitat use study methodology in the Environmental Impact Study, Section 5.0 of this report, for detail. - Field notes (Appendix E) include a detailed description of aquatic vegetation, size of area, adjacent vegetation, history of use

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.2: Criteria and Methods Used to Evaluate Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Community or Specialized Habitat for Wildlife	Criteria	Methods
		and accessibility.
Amphibian Breeding Habitat (Woodland)	<ul style="list-style-type: none"> - Presence of breeding population of 1 or more of the listed salamander species (i.e. Eastern Newt, Blue-spotted Salamander, Spotted Salamander, Four-toed Salamander or Northern Two-lined Salamander) or 2 or more of the listed frog/toad species (i.e. Spring Peeper, Wood Frog or American toad) with at least 100 individuals (adults, juveniles, eggs/larval masses). - The habitat is the woodland (ELC polygons) and wetland (ELC polygons) combined. The amount of area protected is dependent on slope, riparian vegetation, high water mark and height of trees and ground/surface water condition. 	<ul style="list-style-type: none"> - A number of observational studies were conducted to determine the presence of breeding amphibians in and within 120 m of the Project Location. - Evaluation methods for calling amphibians followed the 'Marsh Monitoring Protocol' (BSC 2003), and were conducted by MKI from May 1-2, 2012, further amphibian call counts were also conducted by Stantec on May 7-11 and June 16-21 and 24, 25 and 27, 2012. All amphibian call count surveys began after sunset and surveys recorded all calling activity for a period of three minutes. - A call count of 3 or more was considered to represent a minimum of 100 individuals. - Salamander trapping and egg mass searches were conducted by MKI from April 26-May 2, 2012. Stantec conducted amphibian egg mass surveys from May 7-11, 2012. Salamander trapping and egg mass survey methodologies employed were consistent with MNR protocols. Each survey location was visited between 4-5 times, with traps set up each night and checked the following morning.

4.3.3 Habitat for Species of Conservation Concern

The criteria and methods used to evaluate the significance of candidate significant wildlife habitat for species of conservation concern for wildlife in or within 120 m of the Project Location are presented in **Table 4.3**.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.3: Criteria and Methods Used to Evaluate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
Marsh Bird Breeding Habitat	<ul style="list-style-type: none"> - Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren; or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species (American Bittern, Sora, Red-necked Grebe, Pie-billed Grebe, Redhead, Ring-necked Duck, Lesser Scaup, Ruddy Duck, Common Moorhen, American Coot, Wilson's Phalarope, Common Loon, Sandhill Crane, Green Heron, Sedge Wren, Marsh Wren, Trumpeter Swan) - Presence of 1 or more breeding pair of Trumpeter Swan, Black Tern, Green Heron or Yellow Rail in any wetland is significant. - The area of the ELC ecosite is the SWH. 	<ul style="list-style-type: none"> - Evaluation methods followed "Bird and Bird Habitats: Guidelines for Wind Power Projects" (MNR, 2011c). - Stantec conducted breeding bird surveys, which included marsh birds, from June 5-11, June 26-29 and July 10-13, 2012. - Breeding bird surveys included standardized area searches using a fixed width transect, placed within each habitat type, including wetlands, and located in all areas in and within 120 m of the Project Location. Ten minute point counts also occurred across the study area and within 120 m of all proposed turbine locations. - All breeding bird surveys were conducted between dawn and four hours after sunrise, during the month of June and early July. - All point count and transect locations were visited twice by experienced avian biologists. Details of survey locations can be found in Appendix H-1.
Special Concern and Rare Wildlife Species-Birds	<ul style="list-style-type: none"> - Presence of Canada Warbler or Olive-sided Flycatcher 	<ul style="list-style-type: none"> - Evaluation methods followed 'Bird and Bird Habitats: Guidelines for Wind Power Projects' (MNR, 2011c). - Stantec conducted breeding bird surveys, which included habitats for Canada Warbler and Olive-sided Flycatcher, from June 5-11, June 26-29 and July 10-13, 2012 when birds were singing and defending their territories. - Breeding bird surveys included standardized area searches using a fixed width transect, placed within each habitat type, including wetlands, and located in all areas in and within 120 m of the Project Location. Ten minute point counts occurred throughout the study area within 120 m of all proposed turbine locations. - All breeding bird surveys were conducted between dawn and four hours after sunrise, during the month of June and early July. - All point count and transect locations were visited twice by experienced avian biologists. Details of survey locations can be found in Appendix H-1. - Habitat for bird species of special concern was delineated at the ecosite level. However, where species were observed outside of preferred habitat, these are shown as points on Figures 6.1-6.9.
Special Concern and Rare Plant Species	<ul style="list-style-type: none"> - Presence of Oval-leaved Bilberry, Woodland Pine Drop, Boreal Bedstraw, 	<ul style="list-style-type: none"> - Conducted field inventory for all plants considered special concern or rare species

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.3: Criteria and Methods Used to Evaluate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
	<p>Woolly Beach Heath, Braun's Holly Fern, Mountain Fir-moss, Blue Wild Rye or Quill Spike-rush.</p> <p>- Habitat form and function to be assessed to determine area of significant habitat that protects the rare or special concern species identified.</p>	<p>during the time of year the species was present or easily identifiable.</p> <p>- Botanical inventories were concurrent with ELC/FEC surveys conducted by Stantec from June 18-22 and July 29-Aug. 3, 2012. Boreal Bedstraw, Braun's Holly Fern and Oval-leaved Bilberry were observed at various locations throughout the Project Study Area but, consistently, the Sugar Maple – Yellow Birch (G058Tt) community provided suitable habitat for these species. This community type was extensive and occupied the majority of the Project Study Area. Its classification was completed at the finest spatial scale of ELC, which provides site and stand level data. This level of classification, however, provides a poor depiction of the available habitat where species occurrences were documented. Ideally, microhabitat mapping within the larger ELC community type would improve the readers understanding of candidate habitat versus habitat that is actually utilized by the species in question. Therefore, a microsite mapping solution that focused on congregated occurrences was developed (as described below).</p> <p>- The challenges associated with this are the extent of the Project Study Area and the absence of standardized protocol for delineating habitat boundaries of specific rare plants. Within this landscape, for example, there were frequent observations of small moist pockets within the larger sugar maple – yellow birch community, some no more than 4 m² in size, but large enough to support occurrences of Oval-leaved Bilberry. The solution was to develop microhabitat mapping that focuses on congregated occurrences, which have been collectively identified and mapped by Stantec, Tulloch, NRSI, MKI, and the MNR over multiple years.</p> <p>- Microhabitat mapping was completed by the Stantec Vegetation Ecologist responsible for ELC/FEC mapping of the Project Study Area, who was the technical lead for vegetation field studies on site. Microhabitat delineations were completed using ArcGIS software with 2008 orthographic imagery. Because the specific habitat of the rare species can't be readily distinguished by</p>

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.3: Criteria and Methods Used to Evaluate Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Criteria	Methods
		review of orthographic imager, natural features were used to assist with delineations. These consisted of topographic contours, watercourses, ELC units, wetland units, seep mapping, flow accumulation mapping (based on Digital Elevation Modeling), and all UTM points of rare plants. No microhabitat delineations were drawn outside of the 120 m ZOI, nor were any delineations completed for seemingly suitable habitat that did not have documented occurrences of the species. These potential habitats are instead illustrated Figures 5.1 to 5.9 and described in Appendix H-3 .

4.4 RESULTS

The following sections summarize the results of the evaluation of significance for natural features within 120 m of the Project Location. The locations of individual features relative to the Project Location are shown in **Figures 6.0 to 6.9**.

4.4.1 Wetlands

Nineteen (19) previously evaluated wetlands were identified within 120 m of the Project Location, including four (4) of seven (7) wetlands which make up the Bullseye PSW complex (SWET-4, 27, 52 and 53). The Bullseye Wetland Complex PSW is composed of three wetland types; swamp, marsh and fen and is located in the northeast portion of the Project Study Area. This PSW complex was determined to be significant largely because of the presence of provincially rare plant species (i.e. oval-leaved bilberry and boreal bedstraw) and a bird species (i.e. Rusty Blackbird) tracked by NHIC. Fifteen (15) wetlands associated with non-provincially significant wetland complexes (SWET-5, 6, 7, 8, 10, 23, 24, 32, 34, 37, 43, 54, 55, 58 and 59) were also identified within 120 m of the Project Location.

Forty-eight (48) unevaluated wetland communities were identified within 120 m of the Project Location by Stantec during site investigations. These communities were evaluated using the Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects described in **Section 4.2**. All wetlands assessed under this protocol are being treated as provincially significant for the purposes of the NHA and project siting. **Table 7** (Appendix B) provides the assessments of these wetland communities.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

No project components are proposed in, on, or over a wetland. All wetlands located within 120 m of the Project Location will be included in the EIS. The collector line in the vicinity of SWET-48 will follow the approved FMP road and will not be in the wetland.

4.4.2 Wildlife and Wildlife Habitat**4.4.2.1 Seasonal Concentration Areas**

Evaluations of significance for candidate SWH for seasonal concentration areas in and within 120 m of the Project Location are presented in **Table 4.4**.

Table 4.4: Summary of Evaluation of Significance Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
Bat maternity colonies			
Best candidate roost trees throughout the Project Location	Yes	<ul style="list-style-type: none"> No bats were observed exiting cavities of candidate bat maternity roost trees during 70 exit surveys conducted by Stantec from June 15 to June 28, 2012. Thus, the mixedwood and deciduous forest ecosites that include the ZOI do not satisfy the criteria for significance as directed by MNR's bat expert and the Sault Ste Marie district office (and as described in Table 4.1). However, field work did confirm the presence of bat species during the maternity roosting season in the Project Study Area. From June 15th to June 28th (67 detector nights), broad-band acoustic bat detectors were used to collect over 5900 ultrasonic data samples from candidate bat maternity roosting trees and other sites within the Project Study Area. From these samples, 1191 bat calls were identified. Seven of eight bat species known to be present in the region were recorded in the study area, including at candidate bat maternity roost trees. The species most frequently recorded were Little Brown Bat and Northern Long-eared Bat, with 495 calls and 168 calls respectively. Five other species (Red Bat, Eastern Pipistrelle, Big Brown Bat, Silver-haired Bat and Hoary Bat) were recorded infrequently over the sampling period, with from 4 to 21 calls for each species. Within the 1191 total bat calls recorded, 459 calls could not be identified to species, due to very short call segment length or a low-quality sample. For these, the call was identified to guild, or simply as a high or low frequency call. Eastern Small-footed Bat calls are very difficult to distinguish from other myotic bat species, thus while the species could be present within the Study Area, its presence could not be confirmed by acoustic surveys. Given these results, it is reasonable to assume that the identified bat species were roosting in appropriate trees across the extensively forested Study Area and not reliant on habitat in or within 120 m of the Project Location. 	No
Turtle wintering areas			
TWA-1, 4 and 7	Yes	<ul style="list-style-type: none"> The Project Location is not sited within significant wildlife habitat for turtle wintering areas. Features TWA-1, 4 and 7 were within 120 m of an access road upgrade, but were identified during 	Yes

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.4: Summary of Evaluation of Significance Results for Seasonal Concentration Areas

Candidate Seasonal Concentration Areas	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
		ELC/FEC surveys conducted outside of the basking survey window. As per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), these features will be treated as significant wildlife habitat, and studies will be undertaken to determine the actual use of the habitat (ELC ecosite) prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report.	
Snake hibernacula			
SH-2, 4, 8, 9 and 11	Yes	- Features SH-2, 4, 8 9 and 11 were within 120 m of a turbine area or an access road upgrade, but were identified during ELC/FEC surveys conducted outside of the emergence survey window. As per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), these features will be treated as significant wildlife habitat, and studies will be undertaken to determine the actual use of the habitat (candidate hibernaculum and 30 m radius) prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report.	Yes

4.4.2.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Evaluations of significance for candidate SWH for rare vegetation communities or specialized habitat for wildlife in and within 120 m of the Project Location are presented in **Table 4.5**.

Table 4.5: Summary of Evaluation of Significance Results for Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Communities or Specialized Habitat for Wildlife	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
Rare vegetation communities			
Waterfowl nesting areas			
Twelve features: WNA-2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 16, and 18	Yes	- Per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), these features will be treated as significant wildlife habitat, and studies will be undertaken to determine the actual use of the habitat (ELC ecosite) prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report.	Yes (12)
Woodland raptor nesting habitat			
WRNH-1	Yes	- The Project Location is not sited within significant wildlife habitat for woodland raptor nesting habitat. No raptors were observed at	No

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Evaluation of Significance

January 2013

Table 4.5: Summary of Evaluation of Significance Results for Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Communities or Specialized Habitat for Wildlife	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
		the nest site, and no evidence of nesting activity or recently-placed nest materials was noted by MKI during the nest survey. As such, WRNH-1 does not meet the criteria for significance.	
WRNH-2	Yes	- An adult Red-tailed Hawk was observed sitting on WRNH-2 during nest surveys conducted by MKI. The bird flew off and made alarm calls. New nesting material was evident on the nest. As such, WRNH-2 is confirmed as a Red-tailed Hawk nest, and the habitat radius around WRNH-2 is 100 m [as per the 'Draft SWH EcoRegion 5E Criterion Schedule' (MNR, 2012)]. With a 100 m radius, feature WRNH-2 is located within 120 m of the Project Location, however this feature does not overlap with any project components. Following guidance from Table 1, Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), Specialized Raptor Nesting Habitat need not be identified or evaluated within the Project Location unless the feature directly overlaps with project components. This feature (WRNH-2) will be treated as Generalized Candidate Significant Wildlife Habitat and general construction mitigation measures will be applied as described in the EIS.	Yes (Generalized)
Seeps and Springs			
SEEP Entire forested ecosite (G058Tt + G067Tt)	Yes	- Of 48 potential seeps identified during site investigation, 24 seeps of groundwater origin were confirmed within the contiguous forest ecosite (G058Tt and G067Tt) and within 120 m of the Project Location. In accordance with the 'Draft Ecoregion 5E Criterion Schedule' (MNR 2012), the presence of two or more seeps within a site confirms significant wildlife habitat, therefore the contiguous woodland ecosite will be carried forward to the environmental impact study. As individual seeps are considered to be attributes supporting the significant wildlife habitat, the EIS will address the protection of individual seeps where these overlap with project components, taking into account the slope, vegetation, height of trees and groundwater condition of the attribute. Individual seeps are mapped as points on Figures 6.0-6.9 .	Yes
Moose Aquatic feeding habitat			
MAFA-1	Yes	- An overhead collector line is sited adjacent to the forest ELCELC ecosite associated with MAFA-1, and a turbine is sited within 120 m of the feature. As this feature was identified outside of the appropriate timing window for determining significance, per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a) this feature will be treated as significant wildlife habitat and studies will be undertaken to determine the actual use of the habitat prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report.	Yes
Amphibian breeding habitat (woodland)			
Seventeen features:	Yes	- Eastern Newt and Spotted Salamander were recorded by	Yes (17)

BOW LAKE WIND FARM

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

Evaluation of Significance

January 2013

Table 4.5: Summary of Evaluation of Significance Results for Rare Vegetation Communities or Specialized Habitat for Wildlife

Candidate Rare Vegetation Communities or Specialized Habitat for Wildlife	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
ABHW-1 to 17		<p>Stantec during egg mass surveys, and adult Blue-spotted Salamander was recorded during salamander trapping surveys. Spring Peeper, Wood Frog and American Toad were also recorded during egg mass surveys and call counts.</p> <ul style="list-style-type: none"> Surveys at six candidate ABHW (1, 2, 3, 6, 8 and 10) recorded salamander egg masses or frog and toad calls in sufficient abundance to confirm significance. Surveys at the remaining 11 candidate ABHW were insufficient to determine habitat significance. As per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), these features will be treated as significant wildlife habitat, and studies will be undertaken to determine the actual use of the habitat (ELC ecosite) prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report. 	

4.4.2.3 Habitat for Species of Conservation Concern

Evaluations of significance for candidate SWH for species of conservation concern in and within 120 m of the Project Location are presented in **Table 4.6**.

Table 4.6: Summary of Evaluation of Significance Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
Marsh Bird Breeding Habitat			
Two features: MBBH-8 and 9	No	<ul style="list-style-type: none"> Marsh bird surveys at two candidate features were insufficient to determine habitat significance. As per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), these features will be treated as significant wildlife habitat, and studies will be undertaken to determine the actual use of the habitat (ELC ecosite) prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report. 	Yes (2)
Canada Warbler			
24 features: CWH-1, 3, 6, 8, 9, 10, 11, 12, 15, 18, 20, 21, 22, 23, 24, 25, 28, 29, 30, 31, 35, 36, 39, and 40	Yes	<ul style="list-style-type: none"> Canada Warbler was recorded in three of the twenty-four candidate SWH polygons during the breeding bird surveys (CWH-11, 18, and 30) and is considered to be breeding in these polygons. Canada Warbler was not observed during breeding bird surveys in candidate habitats 24, 28 and 31. These features are not 	Yes (21)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.6: Summary of Evaluation of Significance Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
		<p>significant and will not be carried forward to the EIS.</p> <ul style="list-style-type: none"> Breeding bird surveys in the remaining 18 candidate Canada Warbler habitats were insufficient to determine habitat significance. As per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), these features will be treated as significant wildlife habitat, and studies will be undertaken to determine the actual use of the habitat (ELC ecosite) prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report. 	
Olive-sided Flycatcher			
Six features: OFH-1, 4, 5, 6, 12 and 13	No	<ul style="list-style-type: none"> Olive-sided Flycatcher was not observed in candidate SWH polygon OFH-12 during the breeding bird surveys. This candidate habitat is not significant and will not be carried forward to the EIS. Surveys at the remaining five candidate features were insufficient to determine habitat significance. As per Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), these features will be treated as significant wildlife habitat, and studies will be undertaken to determine the actual use of the habitat (ELC ecosite) prior to any construction activities occurring within 120 m of the habitat. Specific surveys to determine habitat use will be identified as a commitment in the Environmental Impact Study Report. 	Yes (5)
Oval-leaved Bilberry			
51 features: OBH-1, 2, 3, 11, 13, 16, 19, 20, 23, 25, 31, 34, 39, 40, 45, 49, 50-57, 59, 61, 63, 65-73, 75, 78-83, 85-88, 94-96, and 98	Yes	<ul style="list-style-type: none"> Oval-leaved Bilberry was recorded in suitable habitat in 34 features: OBH-51-57, 59, 61, 63, 65-73, 75, 78-83, 85-88, 94-96, and 98. These features will be brought forward to the EIS. 	Yes (34)
Woodland Pine Drop			
Twenty-five features: WPH-1 to 10, 13, 14, 16, 19 to 25, 27, 28, 30 to 33.	No	<ul style="list-style-type: none"> Woodland Pine Drop was not recorded during botanical inventories, and is not considered to be present in the Project Location or the ZOI. 	No
Boreal Bedstraw			
Sixty-nine features: BBH-1-9, 11, 13, 14, 18, 22-29, 32-34, 38, 40-43, 47, 51, 52, 54-56, 59-61, 63, 64, 66-71, 73-76, 78-81, 84, 86, 87-92, 94, 96, 97, 98 and 99	Yes	<ul style="list-style-type: none"> Boreal Bedstraw was recorded in suitable habitat in 29 features: BBH-63, 64, 66-71, 73-76, 78-81, 84, 86, 87-92, 94, and 96-99. These features will be brought forward to the EIS. 	Yes (29)

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.6: Summary of Evaluation of Significance Results for Habitat for Species of Conservation Concern

Candidate Habitat for Species of Conservation Concern	Present in or within 120 m of Project Location	Rationale	Carried Forward to Summary and EIS (Y/N)
Woolly Beach Heath			
Two features: WBHH-1 and 3.	No	- Woolly Beach Heath was not recorded during botanical inventories, and is not considered to be present in the Project Location or the ZOI.	No
Braun's holly fern			
Thirty-four features: BHFH-1-5, 7, 9, 10, 13-21, 25-30, 32-36, 38-40 and 42-44.	Yes	- Braun's Holly Fern was recorded in suitable habitat in four features: BHFH-40, 42, 43 and 44. These features will be brought forward to the EIS.	Yes (4)
Mountain Fir-moss			
Seven features: MFH-1 to 6 and 11.	No	- Mountain Fir-moss was not recorded during botanical inventories, and is not considered to be present in the Project Location or the ZOI.	No
Blue Wild Rye			
Eight features: BWRH-1, 2, 3, 5, 6, 7, 8 and 9.	No	- Blue Wild Rye was not recorded during botanical inventories, and is not considered to be present in the Project Location or the ZOI.	No
Quill Spike-rush			
Ten features: QSH-1, 2, 9-15, and 22.	No	- Quill Spike-rush was not recorded during botanical inventories, and is not considered to be present in the Project Location or the ZOI.	No

4.5 SUMMARY

This Natural Heritage Assessment was undertaken to identify natural features found in or within 120 m of the Project Location and evaluate their significance. This report has been prepared in accordance with O. Reg. 359/09 and the MNR's 'Approval and Permitting Requirements Document for Renewable Energy Projects' (September 2009).

Based on an evaluation of significance, significant natural features identified within 120 m of the Project Location are presented in **Table 4.7**.

Table 4.7: Significant Natural Features Carried Forward to Environmental Impact Study

Feature Type	Feature ID	Carried Forward to EIS from EOS (Yes/No)
Wetlands		
Previously identified wetlands - PSW	- SWET-4, 27, 52 and 53.	Yes
Previously unidentified wetlands	- SWET-1, 2, 3, 9, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 25, 26, 28, 29, 30, 31, 33, 35, 36, 38, 39, 40, 41, 44, 45, 46, 48, 50, 51, 56, 57, 60, 62, 63, 64, 65, 66, 67 and 68.	Yes

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

Table 4.7: Significant Natural Features Carried Forward to Environmental Impact Study

Feature Type	Feature ID	Carried Forward to EIS from EOS (Yes/No)
Wildlife Habitat – Rare Vegetation Communities or Specialized Habitat for Wildlife		
Amphibian breeding habitat (woodland)	- ABHW-1, 2, 3, 6, 8, and 10	Yes
Seeps	- One feature: Entire forested ecosite (G058Tt + G067Tt)	Yes
Wildlife Habitat – Habitat for Species of Special Concern		
Canada Warbler	- CWH-11, 18 and 30	Yes
Oval-leaved bilberry	- OBH- 51-57, 59, 61, 63, 65-73, 75, 78-83, 85-88, 94-96, and 98.	Yes
Boreal bedstraw	- BBH- 63, 64, 66-71, 73-76, 78-81, 84, 86, 87-92, 94, and 96-99	Yes
Braun's holly fern	- BHFH-40, 42, 43 and 44	Yes

Where the evaluation of significance for natural features was insufficient to determine significance, these features will be treated as significant and habitat use studies prior to construction will be committed to in the EIS. These features are presented in **Table 4.8**.

Table 4.8: Natural Features Treated as Significant and Carried Forward to Environmental Impact Study, with Commitment to Undertake Study of Habitat Use

Feature Type	Feature ID	Carried Forward to EIS from EOS (Yes/No)
Wildlife Habitat – Seasonal Concentration Areas		
Turtle Wintering Areas	- TWA-1, 4 and 7.	Yes
Snake Hibernacula	- SH-2, 4, 8, 9 and 11.	Yes
Wildlife Habitat – Rare Vegetation Communities or Specialized Habitat for Wildlife		
Waterfowl Nesting Areas	- WNA-2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 16, and 18..	Yes
Moose Aquatic Feeding Habitat	- MAFA-1	Yes
Amphibian Breeding Habitat (woodland)	- ABHW-4, 5, 7, 9, 11-17	Yes
Wildlife Habitat – Habitat for Species of Special Concern		
Marsh Breeding Bird Habitat	- MBBH-8 and 9	Yes
Canada Warbler	- CWH-1, 3, 6, 8, 9, 10, 12, 15, 20, 21, 22, 23, 25, 29, 35, 36, 39 and 40	Yes
Olive-sided Flycatcher	- OFH-1, 4, 5, 6, and 13.	Yes

The locations of all significant features/attributes are presented in **Figures 6.0 to 6.9**.

An Environmental Impact Study Report will be prepared to identify and assess any negative environmental effects and develop mitigation measures to avoid adverse effects on these features

Table 4.9 summarizes the features that are considered Generalized Candidate Significant Wildlife Habitat. Generalized Candidate SWH refers to features that are within 120 m of the Project Location but do not overlap with infrastructure which will have an impact on the habitats

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Evaluation of Significance

January 2013

during operations, as identified in Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a). These habitats will be carried forward to the Environmental Impact Study where they will be treated as significant and general construction mitigation will be applied.

Generalized Candidate SWH are shown on **Figures H-5.1-H-5.9** and listed in **Table H-5.1** in **Appendix H-5**.

Table 4.9: Generalized Candidate Significant Wildlife Habitat

Feature Type	Feature ID (See Fig. 5.0-5.9)	Identified in Records Review
Turtle Wintering Areas	- TWA-2, 3 and 5	No
Snake Hibernacula	- SH-1, 3, 6, 7, 11 and 12	No
Woodland Raptor Nesting Habitat	- WRNH-2	Yes
Marsh Breeding Bird Habitat	- MBBH-1 to 7, 10 to 15, 17-21, 23 and 24	No
Cliff Community	- G158Tt	Yes
Uhler's Sundragon	- N/A (Incidental Observations)	No
Canada Warbler	- CWH-2, 4, 5, 7, 13, 14, 16, 17, 19, 26, 27, 32, 33, 34, 37, 38, 41, 42, 43 and 44	No
Olive-sided Flycatcher	- OFH-2, 3, 7, 8, 9, and 11	No
Oval-leaf Bilberry	- OBH-26, 29, 37, 58, 60, 62, 64, 74, 76, 77, 84, 89-93, 97 and 99	No
Woodland Pine Drops	- WPH 11, 12, 15, 17, 18, 26 and 27	No
Boreal Bedstraw	- BBH-10, 12, 15, 17, 19, 20, 21, 30, 31, 35, 36, 37, 39, 45, 49, 50, 58, 62, 65, 72, 82, 83, 85, 93, 95, and 100	No
Wooly Beach Heath	- WBHH-2	No
Braun's Holly Fern	- BHFH-6, 8, 11, 12, 22, 23, 24, 37 and 41	
Mountain Fir-moss	- MFH-10	No
Quill Spike-rush	- QSH-3, 4 to 8, 17 to 21 and 24	No

5.0 Environmental Impact Study

The primary mitigation measure employed to reduce impacts to natural features and functions was avoidance. Micro-siting decisions were made during the development of the Project layout with the objective to minimize impacts to natural features, wildlife and wildlife habitat. The Project is sited in predominately forested lands and some natural habitat removal will be required for construction of the Project. Modifications were made to locate Project components as far away as practicable from features and attributes identified as significant through the records review, site investigation and evaluation of significance.

Parts of the Project Location are located within significant wildlife habitat but not in provincially significant wetlands. Parts of the 120 m ZOI are located within significant wildlife habitat and provincially significant wetlands. As noted in **Section 4.3**, significant natural features that occur in or within 120 m of the Project Location are identified in **Table 4.7**.

Where the Project Location intrudes into significant features detailed site specific mitigation is proposed and net impacts are stated in keeping with the NHA Guide (MNR, 2011a).

For significant wildlife habitat outside the Project Location, but within 120 m, Appendix D of the NHA guide has been used to determine which habitat types require site specific discussion and mitigation. Habitat types within 120 m of the Project components, which do not have an “x” in Appendix D of the NHA Guide have been treated as Generalized Candidate SWH and are addressed through generalized mitigation measures and best management practices.

An Environmental Impact Study (“EIS”) is required to assess potential negative environmental effects and identify mitigation measures designed to prevent or minimize those potential negative effects to a level of insignificance.

As per O. Reg. 359/09 Project components are, with an exception, not permitted in a provincially significant southern wetland¹. The exception is that projects may be sited within 120 m of a provincially significant southern wetland and in, or within 120 m of, significant wildlife habitat if an EIS is prepared that identifies and addresses any negative environmental effects on the feature and identifies mitigation measures.

Given the diversity of natural heritage features, some of the features qualify as significant under multiple designations. For example, provincially significant wetlands often exhibit criteria for significant wildlife habitat. Where a feature is considered significant for multiple natural heritage designations, the impacts and mitigation as they relate to each function are discussed within the analysis of potential impacts to the feature in **Section 5.2**.

¹ Although the wetland evaluations conducted by NRSI in 2010 correctly employed the Ontario Wetland Evaluation System Northern Manual (MNR, 2002), provincially significant wetlands in EcoRegion 5E are treated as “Southern Ontario Wetlands” under the NHA Guide (MNR, 2011a).

5.1 PROJECT FOOTPRINT

The proposed Project Location is located predominantly on Provincial Crown Land within the unorganized Townships of Smilsky and Peever, in the District of Algoma. The Project is located approximately 80 km north of Sault Ste. Marie and roughly 6 km east of Montreal River Harbour. Detailed descriptions of the key construction and installation activities, including Project components, are provided in the 'Bow Lake Wind Farm Construction Plan Report' (Stantec, 2012). The Project Location is shown on **Figure 6.0**.

Within the Project Location a "constructible area" has been defined that includes the Project components as well as additional land around the Project components that allows for movement and workspace for construction purposes. The 120 m ZOI was applied to the entire Project Location including all the constructible area, and the assessment of potential effects included the constructible area as part of the Project Location. All construction activities including construction of temporary components will occur within the constructible area but the entire constructible area may not be used at any specific construction site. As part of the best management approach, the constructible areas will be reduced in size as much as possible in areas where natural features, which are not deemed significant, occur, and construction will be limited to the smaller area. Spatial requirements, as they pertain to the primary Project components, are summarized as follows.

The Project consists of 36 wind turbine generators. The selected model of wind turbine for the Project is the General Electric ("GE") 1.6-100. Specifications of the wind turbine are:

- Hub height above grade: 96.0 m
- Blade length: 48.7 m
- Rotor diameter: 100.0 m
- Tip height: 146.0 m

Turbine foundations will be constructed of poured concrete and reinforcing steel rebar with an estimated 19 – 20 m diameter and to a depth of approximately 4 – 6 m. The foundations are anticipated to be octagonal in shape; however final foundation designs will be determined based on site-specific geotechnical conditions as determined during geotechnical investigations undertaken in the fall of 2012. The wind turbine pedestal is approximately 5 m in diameter and is anchored to the concrete foundation using large diameter anchor bolts. Once poured, the foundation and pedestal are backfilled to grade and compacted with select fill and subsoil from the original excavation. A pad-mount transformer, located at the base of each wind turbine, is required to increase the voltage of the electricity generated in the nacelle of each wind turbine to the collection system line voltage. Each pad-mount transformer will be mounted on a precast concrete pad adjacent to the wind turbine tower.

Wind turbine staging areas will be established around each wind turbine location. The staging area will be used for temporary storage of components as well as provide the necessary work

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

areas to support foundation installation, component assembly, crane assembly, and wind turbine erection and commissioning activities. The staging areas will occupy the lands within approximately 70 m radius of the wind turbine location. Based upon the specific conditions at each wind turbine location, the total area cleared for the staging area may be reduced.

Crane pads will be constructed at the same time as the access roads and will be adjacent to turbine locations (within the constructible area and staging area around each turbine). Crane pads are anticipated to be approximately 20 x 30 m in size; however final crane pad design will be based upon the specific requirements of the cranes utilized for turbine assembly and erection purposes.

Access to the Project will be via three types of roads;

1. Existing roads including Dump Road, Hogg's Dam Road, MacKay Road, Rebecca's Road, Mile 67 Road and Trim Lake Road are not part of the Project Location except where site specific road upgrades are required to allow for safe transport of Project construction vehicles and equipment. Sections of the Dump Road, Hogg's Dam Road and MacKay Road will require upgrades, as shown on **Figures 6.1 to 6.4** and are included in the Project Location. All road upgrades proposed along sections of Rebecca's Road, Mile 67 Road, and Trim Lake Road are included in the Forest Management Plan ("FMP") Amendment, and as such are not considered part of the Project Location.
2. Approved FMP roads will be constructed to facilitate future management of the forest resources in the Project Study Area. To minimize disturbance, these roads will also be used to facilitate construction of the Project but they are not included as part of the Project Location. As discussed below, collector lines will follow these roads where possible and the collector lines are part of the Project, and thus are included in the Project Location.
3. Project Specific access roads will be built in a few limited situations where the FMP roads are not suitable for turbine site access. Collector lines will follow these roads where feasible.

Project specific access roads will have a travelled surface width of 8 – 12 m. Road corridors of 60 m width are being assessed to allow for micro-siting of access road locations within the corridors based on site-specific conditions. Where required due to design considerations and/or natural features, road corridors have been reduced in specific locations. Typically a 35 m cleared width is required to construct the access roads, associated ditches and embankments, and adjacent collector lines. Where required due to design considerations or natural features, cleared areas will be reduced to a minimum of 20 m. In some locations where constraints permit, additional cleared width may be required. In all instances the actual cleared area within the road corridor will be 60 m or less and will be limited to the minimum width required for safe and efficient construction of the Project.

Collector line corridors of 60 m width are being assessed to allow for micro-siting of collector lines within the corridors. Where required due to design considerations and/or natural features, collector line corridors have been reduced in certain locations. Where collector lines are located

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

adjacent to a permanent access road, both the collector line and the access road will be located within a 35 m cleared width located inside the assessed 60 m wide corridor.

When a collector line segment is not located adjacent or within an access road, a 20 m cleared width is required. Construction of collector lines that are not located adjacent to a permanent access road will require the construction of a temporary construction trail to support collector line installation during the construction period. The temporary construction trail will be approximately 6 m wide and designed for temporary construction use only. Temporary trail construction will be limited to grading along the trail route and will not require the installation of a permanent road base.

Electrical components of the Project include a transformer substation located on MacKay Road and a collector system. The transformer station will be located on a prepared area of approximately 95 x 155 m located within the Construction Compound. From each turbine pad-mount transformer, a combination of 34.5 kV underground and overhead collector lines carry the electricity to the transformer station. Collector lines will generally follow the access roads, and/or FMP roads, where practical to reduce the required construction area and minimize potential effects. Underground collector lines will be installed either immediately to one side of roads, just off the graveled surface, or within the road itself (to a depth of approximately 1 m). Overhead lines, used where burying cables is impractical or technically not preferred, and where no approved FMP roads or proposed access roads exist, will be constructed on monopole structures.

Underground collector lines constructed along FMP roads will have no additional environmental effects beyond the effects associated with construction and use of the approved FMP roads. Where overhead collector lines are built on poles, the net effect will be an increase to the width of the corridor cleared for the road and the line. The width of the extra clearing will vary depending on the geometry of the road – for the purposes of impact assessment and analysis, the extra width has been assumed to be 10 m. For completeness, the locations of all collector lines, regardless of where FMP roads exist have been assessed in this EIS.

The Operations and Maintenance building will be constructed on the site of the Construction Compound adjacent to the transformer station. The building will permanently house offices, a workshop, parts and vehicle storage, a septic system, water well, storage yard, and other ancillary facilities. Two welfare buildings will be constructed within the Construction Compounds identified in the central and southern portions of the Project: one welfare building will be located at the intersection of Mile 67 Road and the road leading to Turbine 6; the second building will be located east of Trim Lake Road, on the main access road to wind turbines 32-39.

Temporary Construction Compounds include a Construction Compound surrounding the site of the transformer station, as well as Construction Compounds associated with the location of Project welfare buildings. Water taking will be required during construction for mixing concrete for foundation construction and dust control along access roads. Three water extraction points have been identified at locations where there are surface water sources with sufficient capacity

to provide water requirements without affecting waterbody flows or levels. Water withdrawal will be made by suction pump into appropriately sized water trucks for delivery to concrete batch plants and/or dust control purposes.

To support concrete batch plants, one quarry site and two aggregate pits have been approved under the *Aggregate Resources Act*. They are not, however, part of the Project Location, or the REA application and are not shown on the NHA/EIS figures.

The Project Location (including constructible area), and the associated 120 m ZOI, in relation to significant natural features are shown on **Figures 6.0 to 6.9**.

5.2 EIS OVERVIEW

The following sections provide a detailed description of the potential negative environmental effects of the Project, identify appropriate mitigation measures and describe how the environmental effects monitoring plan and construction plan will prevent, minimize or mitigate any potential negative environmental effects [O. Reg. 359/09, s. 38(2)(a)]. Potential impacts to species (e.g. disturbance and mortality) are discussed in the Environmental Effects Monitoring Plan. Distances between Project components and the outer boundary of significant natural features are provided in **Table 6** (Appendix B).

The SWHTG (MNR, 2000), the NHA Guide (MNR, 2011a), 'Draft Ecoregion Criteria' (MNR, 2012) and the SWHTG Decision Support System (MNR, 2000), in addition to other relevant scientific literature and extensive working experience, were used to assist in the evaluation of impacts and mitigation measures.

5.3 GENERAL MITIGATION MEASURES

The following best management practices and other measures intended to prevent, minimize or mitigate potential adverse effects on adjacent significant natural features will be implemented, where required during the construction and operational phases of the Project. Provided these practices and measures are properly implemented, the Project will not cause significant negative environmental effects.

5.3.1 Vegetation Removal

Vegetation removal necessary for construction and operation of the Project will predominantly occur in forested areas. Where vegetation removal is proposed the following general mitigation measures will be employed:

- Prior to construction, the limits of vegetation clearing will be clearly staked in the field. The Construction Supervisor will ensure that no construction activity or site disturbance occurs beyond the staked limits. Regular monitoring of the limits of clearing will be undertaken to ensure that disturbance is confined to the designated work area. Should monitoring reveal

that clearing or site disturbance occurred beyond defined limits, mitigation action will be taken that could include rehabilitation of the disturbed area at the direction of a qualified ecologist.

- To the extent practical, tree and/or brush clearing will be completed outside the core nesting season for migratory birds (May 9 to August 8) as per the core breeding periods in Ontario for birds protected under the *Migratory Birds Convention Act* in Bird Conservation Region 12 (Environment Canada, 2012). Should clearing be required during the breeding bird season, prior to any clearing, Environment Canada will be contacted. Surveys will be undertaken by a qualified biologist to identify the presence/absence of nesting birds. If a nest is located, a designated buffer will be marked off within which no construction activity will be permitted while the nest is active. The radius of the buffer width will range from 5 – 60 m depending on the species. Buffer widths are based on species' sensitivity and on buffer width recommendations that have been reviewed and approved by Environment Canada.
- To the extent practical, removal of habitat trees (snag trees) will be completed outside the core maternity roosting season for bats. The core breeding periods for birds (May 9 to August 8) adequately covers the maternity roosting period for bats. If habitat tree removal clearing is required during the maternity roosting period, prior to removal, a qualified biologist will review the trees to make a determination in consultation with MNR.
- To the extent practical, tree and/or brush clearing within 200 m of the amphibian breeding areas as mapped on **Figures 6.1 to 6.9** will be completed outside the amphibian breeding season (April 15 – June 30). If clearing during the breeding season is required within 200 m of the amphibian breeding areas, a mitigation plan designed to minimize the areas to be cleared, and a detailed sediment and erosion control plan which takes into consideration the habitat features and function of the amphibian breeding habitat, will be prepared in consultation with the MNR.
- Prior to the start of construction activity, the topsoil/seedbank (where present) will be stripped and preserved; material will be reapplied in suitable rehabilitation areas post-construction.
- All disturbed areas of the construction site will be re-vegetated with native species as soon as conditions allow.
- Excavated soil will be re-used on site. Soil conditions at temporary laydown areas and other disturbed sites will be restored, and depending on surrounding habitat, natural regeneration and/or seeding will be relied on to restore native vegetation cover. Once the laydown areas are no longer required, vegetation will be surveyed to assess disturbance and the potential for natural regeneration. If required, areas will be reseeded with species native to Ecodistrict 5E-13 or the local area, and in consultation with MNR.

5.3.2 Sediment and Erosion Control Measures

In order to minimize erosion potential and the introduction of sediment into the natural features during road construction, site grading, collector line installation, and other construction activities,

erosion and sediment (“E&S”) control measures will be implemented prior to the initiation of any construction.

Due to the hilly topography of the Project Study Area, erosion susceptibility is relatively high. Steep and elongated slopes would accelerate runoff during a storm event. In addition, the Project Study Area is underlain by bedrock which is covered by a shallow layer of soil. As such, the risk of erosion and resulting sedimentation within down-gradient natural features is also present. E&S controls will be installed prior to and during construction to minimize potential sedimentation impacts.

Natural features (i.e. wetlands, water bodies, woodlands) adjacent to constructible areas could be affected by sediment transferred during runoff events. As such, all natural heritage features identified within 30 m of any proposed construction area may be at higher risk of potential impacts from sedimentation.

E&S control measures will be installed prior to construction to minimize potential sedimentation impacts within natural heritage features, as appropriate. The following measures/guidelines will be implemented, as required, prior to and during construction of the Project components:

- An ample supply of sediment control materials, which may include erosion control blankets, silt curtains, mud mats (access roads), check dams (rock or straw bales), wooden stakes, and sediment bags (dewatering) will be kept on-site in sufficient quantities during construction to allow timely installation if required;
- Silt barriers (e.g. fencing) will be erected along wetland and woodland community edges and in the vicinity of water bodies located within 30 m of construction areas (including staging areas and laydown areas), as appropriate to minimize potential sediment transport to the natural features. In areas of steep topography, silt barriers will be installed along watercourses and wetlands at distances greater than 30 m, if deemed appropriate by the Construction Supervisor. These barriers will be monitored twice per week and after any significant rainfall event by the Construction Supervisor to ensure they are functioning as intended. All E&S control measures will be properly maintained during and following construction until disturbed soils in the construction area have adequately re-stabilized with vegetation;
- Where the installation of an equalizing culvert is proposed, appropriate erosion control measures (i.e. rip rap, straw bales, seeding) will be installed at the ends of each culvert to prevent erosion; and
- Where culverts are proposed within 30 m of an identified natural feature, enhanced sediment and erosion control measures (i.e. straw bales, double rows of sediment fencing, check dams) will be installed as added protection to filter runoff and further minimize potential sedimentation within the down-gradient features (wetlands, woodlands and water bodies). This added protection is proposed to reduce environmental risk.

Specific E&S control measures will be selected, located and sized by an engineer during the detailed design stage to ensure protection of adjacent natural features. All E&S controls will be installed prior to construction, regularly monitored by the Construction Supervisor, and will be maintained to ensure they are functioning as intended during and following construction. In accordance with MNR suggestions, monitoring will be conducted twice per week and after significant rain events.

5.3.3 Dewatering

Site-specific geotechnical investigations, to be completed prior to detailed design and any construction activities, will provide further details related to geologic conditions. Dewatering requirements will be re-assessed as part of the geotechnical investigations.

If groundwater is encountered during excavations, good construction practices will be used, such as minimizing the length of time that the excavation is open and visually monitoring seepage into the excavation. Should pumping be required to dewater excavated areas, discharge water will be directed into sediment control bags or spread across the constructible area in a diffuse manner to reduce the potential for erosion and sediment transfer. Discharge piping will be free of leaks and will be properly anchored to prevent bouncing and snaking during surging. The rate of discharge will be monitored to ensure no erosion, scouring, sediment transport or flooding occurs. The rate of dewatering will be controlled to prevent adverse effects to adjacent natural features and encourage re-infiltration of extracted groundwater.

In order to mitigate and reduce the potential for any impacts to natural heritage features during dewatering activities, the following measures will be implemented, as required and necessary:

- The area to be used for discharging will be clearly marked with flagging and/or snow-fencing prior to work commencing;
- During site preparation, silt fencing will be installed to retain sediments on site so they do not runoff into any natural feature. All sediment control structures will be regularly inspected by the Construction Supervisor, and repaired/maintained as necessary;
- All water pumped during dewatering activities will be directed away from significant natural features and not directed into wetlands or water bodies;
- The use of sediments bags (or filter rings) will be used as appropriate to filter out suspended sediment prior to discharge. Any sediment bags or filter rings will be regularly monitored by the Construction Supervisor during pumping to ensure their efficacy, with any clogging or failures to be rectified immediately; and
- After dewatering work is no longer required, any remaining disturbed soils will be restored as soon as feasible, and depending on surrounding habitat, natural regeneration and/or seeding will be relied on to restore native vegetation cover. If seeding or replanting is required, all material will consist of native species indigenous to EcoDistrict 5E-13.

Further dewatering recommendations will be reviewed upon the completion of the detailed engineering design. Additional detail is provided in the Bow Lake Wind Farm Construction Plan Report.

5.4 NATURAL AREAS MANAGEMENT STRATEGY

The total amount of natural vegetation to be removed for the life of the Project (construction and operation phases) is approximately 17 ha. The areas where vegetation removal and site disturbance will occur on a temporary basis (e.g. construction laydown areas), which will be re-vegetated either by natural regeneration, planting or seeding, is estimated to be 181 ha.

Given the overlap of the delineation of natural features found within the Project Location, habitat to be removed is often classified under more than one natural feature type (e.g. wetlands and woodlands contribute to significant wildlife habitat for waterfowl nesting areas and aquatic feeding areas).

In order to mitigate for habitat lost temporarily for construction of the Project as well as habitat loss resulting from the installation of long-term infrastructure (i.e. turbines and access roads), a Natural Areas Management Strategy will be developed for lands within the Project Location and 120 m ZOI. The strategy will be designed to preserve, restore and enhance the natural heritage functions of the habitats currently found within the Project Location and ZOI, and will include consideration of all natural areas. Restoration and enhancement efforts will include efforts to promote native biodiversity throughout the Project Study Area, and may include restoration of woodland and/or wetland communities, including habitats for plant species of conservation concern, as appropriate. Using this approach, mitigation for all terrestrial heritage features and functions will be coordinated to create and/or maintain healthy, self-sustaining ecosystems.

The Natural Areas Management Strategy will include the following aspects:

- A Replanting and Restoration Plan will be developed for the Project. This plan will ensure that all disturbed areas of the construction site will be restored as soon as conditions allow. Temporary construction areas will be treated with preserved topsoil/seedbanks and allowed to regenerate. A cover crop will be applied, if required and as determined by a qualified professional, to prevent establishment of undesirable non-native species while the native seedbank germinates. Areas will be seeded with suitable native seed from local sources to the extent possible, and as approved by MNR.
- A Vegetation Monitoring Plan will be developed for the Project to monitor the success of the Replanting and Restoration Plan. The monitoring program will track the success of revegetation efforts and provide adaptive management contingencies where targets are not met. The program will continue for a full growing season post restoration, or until no additional effort is required to achieve management objectives.
- The Plans will be developed in consultation with MNR.

- Management efforts may be coordinated with other interest groups willing to partner that have specific knowledge of habitat management and the local natural heritage of the area.
- Records of the restoration work will be kept so that results can be communicated to MNR or other interested groups.

5.5 WETLANDS

Table 8 (Appendix B) is a summary of the mitigation measures to be applied to wetlands within the Project Location or with 120 m of the Project Location. The following discussion highlights, and where necessary, expands on key issues from **Table 8**.

No project components are located inside the Bullseye PSW complex.

The corridor for the collector line running between Turbines 18 and 19 is adjacent to a short portion of the boundary of the Bullseye PSW complex (see **Figure 6.6** and **Figure 7.13**). The road in this location is an FMP road and is not part of the REA application. In this location, the collector line will be placed in the road bed well outside the wetland boundary, if possible. If soil conditions make this unworkable the collector line corridor will be narrowed to the minimum width possible approximately 10m and located on the south side of the FMP road away from the wetland. During construction, best management practices will be employed to control erosion and sediment. Once the buried collector line is installed and becomes operational, and the adjacent disturbed areas are restored, it will have no effect on the wetland form or function.

The 60 m wide access road corridors and collector line corridors used for the site investigation and evaluation of significance analyses overlap with non-PSW wetlands in several locations (for example SWET-35 and SWET-36 on **Figure 6.9**; see **Table 8** (Appendix B) for a complete list). In these locations the corridors will be reduced to the minimum width possible to avoid direct disturbance to the wetlands. **Figures 7.1** to **7.27** show each example where corridor widths have been restricted to avoid significant features.

Underground collector lines will be installed either immediately to one side of access roads, just off the graveled surface, or within the road itself (to a depth of approximately 1 m). Overhead lines, to be used only where burying cables is impractical or technically not preferred, will be constructed on monopole structures. All efforts will be made to utilize underground collector lines in the vicinity of wetlands to minimize the corridor width.

Best management practices will be employed to control erosion and sediment transport during construction. Roadside ditches and culverts will be constructed to minimize disturbance or alterations to existing surface water flow patterns in the vicinity of the wetlands.

Overall Project mitigation measures for wetlands are summarized in **Table 8** (Appendix B).

Net Effects

Sixty-three (63) wetlands are located within 120 m of the Project Location. No portion of the Project Location is located within a PSW.

Implementation of the mitigation measures presented in this EIS will ensure that direct impacts are minimized and that indirect disturbance effects from construction and operational activities are properly managed. There will be no direct disturbance associated with installation of collector line poles in limited locations. Collector line poles may be installed adjacent to the wetlands, but no poles will be in the wetland itself. It is anticipated there will be no significant net loss of wetland area and no wetlands functions will be impaired.

5.6 SIGNIFICANT WILDLIFE HABITAT

5.6.1 Turtle Wintering Areas

The primary mitigation strategy applied to this feature was avoidance. The Project Location is not sited within significant wildlife habitat for turtle wintering areas ("TWA"s). Features TWA-1 (**Figure 6.4**), TWA-4 (**Figure 6.9**), and TWA-7 (**Figure 6.9**) are within 120 m of access road upgrades. Potential impacts and mitigation measures are provided in **Table 8** (Appendix B). At their closest point, the access road upgrades are located 103 m from TWA-1, 46 m from TWA-4 and 51 m from TWA-7. No habitat loss or fragmentation to turtle wintering areas would result from the construction of the access road upgrades. Given sediment and erosion control measures to be installed along the edge of the work area associated with the road upgrades, and the relatively large setback distances ranging from 46 to 103 m, construction activities will have low potential for impact. In addition, the construction period will be short term.

In accordance with Appendix D of the Natural Heritage Assessment Guide (MNR, 2011a), due to the location of proposed access road upgrades within 120 m of candidate TWAs, the proponent must commit to undertaking studies to determine the actual use of the habitat by turtles prior to any construction activities occurring within 120 m of the habitat. Habitat use surveys will be conducted in the spring of 2013 to determine the use of TWA-1, 4 and 7. Over-wintering areas will be searched for congregations (basking area) of turtles on warm, sunny days during the spring (April-May). Each feature will be surveyed a minimum of 3 times: once early in the season (e.g. mid- to late-April); once in mid-season (e.g. early- to mid-May), and once later in the season (e.g. mid- to late-May). For each survey, the surveyor will walk the boundary of the wetland where turtles are likely to be basking. Data, including species and numbers of individuals, will be recorded on Reptile Hibernacula Observation Forms. Additional information that will be recorded on the appropriate data forms include:

- Weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation should be recorded);
- Date and time of day;
- GPS coordinates of the point location; and

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

- Name of the observer doing field work.

Results of the habitat use surveys will be provided to MNR. Turtle species expected to be observed include the Midland Painted Turtle. Pending completion of these studies, site specific mitigation is being proposed for candidate SWH for turtle wintering areas. Roads in the vicinity of the TWAs will be fenced to exclude turtles. Speed limits of 30 km will be enforced along the length of the road adjacent to the TWAs and project staff will be trained in the safe and appropriate handling of turtles that may enter the road ROW. If the habitat use studies in 2013 conclude that the wintering areas do not constitute SWH, the site specific mitigation measures proposed will not be required and best management practices will be substituted.

Net Effects

The Project Location (access road upgrade) is located within 120 m of TWA-1, TWA-4, and TWA-7. The setbacks and mitigation measures presented in **Table 8** (Appendix B) will ensure that there will be no loss of turtle wintering habitat or disruption of turtle wintering area function.

5.6.2 Snake Hibernacula

The primary mitigation strategy applied to candidate snake hibernacula ("SH") was avoidance. In accordance with Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a), candidate snake hibernacula are being treated as significant. Habitat use surveys will be conducted in the spring of 2013 to determine the use of SH-2 (**Figure 6.4**), SH-4 (**Figure 6.5**), SH-8 (**Figure 6.6**), SH-9 (**Figure 6.6**) and SH-11 (**Figure 6.5**). Hibernacula emergence/exit surveys will be conducted between the hours of 10:00 am and 3:00 pm on sunny warm days in spring (April/May) at the location of the candidate hibernacula. Each feature will be surveyed a minimum of 3 times: once early in the season (e.g. mid- to late-April); once in mid-season (e.g. early- to mid-May), and once later in the season (e.g. mid- to late-May). For each survey, the surveyor will observe for 20 minutes, recording all snake species and number of individuals observed entering or exiting the candidate hibernacula. The search pattern at each hibernaculum will include surveying all potential basking and sheltering habitat within the location (i.e. an area including a 30 m radius around the hibernaculum). The search route will be tracked using a GPS unit so the search pattern can be easily repeated. Data will be recorded on Reptile Hibernacula Observation Forms. Additional information that will be recorded on the appropriate data forms include:

- Weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation);
- Date and time of day;
- GPS coordinates of the point location; and
- Name of the observer doing field work.

Results of the habitat use surveys will be provided to MNR. Given the size and characteristics of the forest communities containing SH-2, 4, 8, 9 and 11, and the historic ranges of snake species

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

in the Project Study Area, it is anticipated that the habitats could potentially support one of the indicator snake species identified in the Draft Significant Wildlife Habitat EcoRegion 5E Criterion Schedule (MNR, 2012), namely Eastern Gartersnake.

Pending completion of these studies, site specific mitigation is being proposed for candidate SWH for snake hibernacula. If the habitat use studies in 2013 fail to confirm the hibernacula as SWH, the site specific mitigation measures proposed will not be required and best management practices will be substituted.

The Project Location is sited within assumed SWH for snake hibernacula ("SH"). Feature SH-8 is within the turbine blade sweep area of Turbine 19 (see **Figure 8.0**), and Feature SH-9 is in the collector line corridor adjacent to Turbine 21 (see **Figure 9.0**), and within 120 m of the Turbine blade sweep and access road corridor. Feature SH-2 is within 120 m of Turbine 10 (**Figure 6.4**), and Feature SH-4 is within 120 m of Turbine 5 (**Figure 6.5**). Feature SH-11 is within the collector line corridor between Turbine 5 and Turbine 6 (**Figure 6.5**).

Site specific mitigation for Feature SH-8 is based on recommendations in the SWHTG DSS and includes the following:

- Limited tree clearing and no grubbing and stripping of the entire 30 m radius around the hibernaculum entrance so that natural vegetation is maintained as much as possible; given the topography of the site, the snake hibernaculum is downslope from the Turbine base so that minimal disturbance is feasible;
- Properly toed-in silt fencing around the perimeter of the entire working area and extended along the access road as shown on **Figure 8.0** to exclude snakes from the construction area and from the road near the hibernaculum; and
- Signage instructing drivers to be aware of snakes on the road.

Given the low traffic volumes and slow speeds associated with the steep road gradients, road mortality is not expected to be a significant issue. The silt fencing will discourage snakes travelling to and from the hibernaculum from entering construction areas. The majority of the area surrounding Feature SH-8 will remain undisturbed and there will be adequate travel routes to and from the site without the snakes having to enter the construction area.

Post construction traffic is expected to be very low volume and low speed so that the road does not pose an ongoing threat once the silt fencing has been removed.

Site specific mitigation for Features SH-9 and SH-11 includes:

- No tree clearing outside the turbine working area to minimize woodland habitat disturbance near the feature;
- Properly toed-in silt fencing around the perimeter of the entire working area to exclude snakes from the construction area;

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

- Reducing the width of the collector line corridor and placing the collector line at the far southern edge of the corridor approximately 26 m away from the edge of the SWH, for Feature SH-9, and at the far eastern edge of the corridor approximately 40 m from the edge of the SWH for Feature SH-11; and
- Signage instructing drivers to be aware of snakes on the road in the vicinity of Turbine 21, for Feature SH-9, and Turbines 5 and 6 for Feature SH-11.

There will be no direct impact to Features SH-9 or SH-11, and indirect impacts will be minimized through avoidance of vegetation clearing in close proximity to the site.

Feature SH-2 is within 120 m of Turbine 10 (**Figure 6.4**), and Feature SH-4 is within 120 m of Turbine 5 (**Figure 6.5**). Mitigation measures at these Turbines include silt fencing around the turbine working area to exclude snakes. All other potential hibernacula are more than 120 m away from turbines and roads and are treated as generalized habitat. Potential impacts and mitigation measures are provided in **Table 8** (Appendix B).

The mitigation measures outlined above will ensure that there is no disruption of the site-specific habitat conditions surrounding the snake hibernacula, and will minimize snake disturbance and mortality. The habitat function will be protected through attenuation of disturbance effects from operational activities. There will be no loss of snake hibernacula or functions.

5.6.3 Waterfowl Nesting Areas

There are twelve (12) features either in the Project Location or within 120 m of a Turbine that are considered significant waterfowl nesting areas ("WNA"s). This includes WNA-2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 16, and 18.. Potential impacts and mitigation measures are provided in **Table 8** (Appendix B).

The primary mitigation strategy applied to this feature was avoidance. As per the requirements of Appendix D of the Natural Heritage Assessment Guide (MNR, 2011a), due to the location of Project infrastructure within the forested upland portion of the SWH (i.e. uplands within 120 m of core wetland), the proponent must commit to undertaking studies to determine the actual use of the habitat by waterfowl prior to any construction activities occurring within 120 m of the habitat.

Habitat use studies will be conducted according to 'Bird and Bird Habitats: Guidelines for Wind Power Projects' (MNR, 2011c) and will include nesting studies to be completed in the spring, during the breeding season (April-June). Specifically, nesting studies will consist of modified area searches in -WNA-2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 16, and 18.. Nesting studies will take place by walking along wetland perimeters or through wetlands in order to observe waterfowl that may be out of sight due to dense vegetation. Surveys will be conducted twice to account for early nesting (e.g. Mallards and Wood Ducks in early- to mid-April) and late nesting (e.g. Blue-winged Teal and Ring-necked Ducks in late-May to mid-June) as will include species that breed throughout the season. All waterfowl species seen and heard will be recorded. Additional information that will be recorded on the appropriate data forms include:

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

- Weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation should be recorded);
- Date and time of day;
- GPS coordinates of the start and end location; and
- Name of the observer doing field work.

Results of the habitat use surveys will be provided to MNR. Data gathered from these surveys, if waterfowl nesting areas are deemed significant, will be brought forward and utilized as baseline results during post-construction monitoring in habitats within 120 m of a wind turbine. Waterfowl species anticipated to be observed from the Draft Significant Wildlife Habitat Ecoregion 5E Criterion Schedule include: American Black Duck, Northern Pintail, Northern Shoveler, Gadwall, Blue-winged Teal, Green-winged Teal, Wood Duck, Hooded Merganser, Common Merganser, Red-breasted Merganser, Mallard, Canada Goose, American Widgeon, Bufflehead and Common Goldeneye.

Turbine/laydown areas and a construction compound are inside the forested uplands portion of the SWH (i.e. the 120 m area surrounding the core wetlands) of WNA-4 (**Figure 6.4**) and WNA-16 (**Figure 6.4**). Turbine locations are within 120 m of the outside edge of the SWH at WNA-9 (**Figure 6.5**) and WNA-18 (**Figure 6.6**).

Vegetation clearing will be required to accommodate the construction and laydown areas. Construction areas vary by turbine but are generally in the range of 4000 m² - 10,000 m². The total area of SWH at the WNAs directly affected ranges from approximately 5 ha to approximately 17 ha, with much of that made up of the surrounding upland area. The removal of a portion of the forest within 120 m of a core wetland in a landscape where each core wetland is surrounded by thousands of hectares of forest is negligible. There will be no clearing inside WNAs that are outside the turbine blade swept areas, but within 120 m of the turbine.

Access roads corridors and/or collector line corridors are also inside the SWH (i.e. 120 m upland habitat buffer around core wetlands that are part of the SWH) for WNA-5 (**Figure 6.3**), WNA-4 and 16 (**Figure 6.4**), WNA-11 and 18 (**Figure 6.6**), and WNA-3 (**Figure 6.9**). A collector line corridor is within 120 m of the outside edge of the SWH at WNA-9 (**Figure 6.5**).

Corridor widths, forest clearing and general disturbance will be minimized in these areas. Road locations (i.e. WNA-3 and 5) are in areas where existing roads and trails will simply be upgraded. In the other locations, the corridors are along approved FMP roads, such that any additional clearing to allow Project development will be minimal. Collector line corridors outside any existing or approved FMP roads are limited to WNA-16 and WNA 11. These collector lines will be on single poles and the corridor will be limited to 20 m in width. In total approximately 42,000 m² (4.2 ha) of habitat will be cleared for these corridors. The total area of WNA SWH in the Project Location is more than 200 ha. The loss of approximately 4.2 ha, out of more than 200 ha of potential habitat is an acceptable impact, especially in a landscape where upland

habitat surrounding waterfowl nesting areas is not a limiting factor to the productivity of the habitats, as discussed below.

It is also important to note that the SWH includes a 120 m radius around the core wetlands habitat. This radius is a tool to be used as a guideline to ensure adequate habitat is protected. It is a useful tool in a landscape where upland habitat may be relatively scarce and may constitute a limiting factor for waterfowl breeding success. The 120 m tool does not necessarily reflect actual habitat usage, and the entire 120 m radius is not critical or a limiting factor. In habitats where upland habitat is extensive, suitable nesting sites are the most likely limiting factor. Cavity nesting sites are well distributed across this landscape.

The small areas of forest removed for Turbine lay down areas and collector line corridors, while within the 120 m distance, are often situated up significant slopes and ecologically are not well connected to the wetland breeding and foraging areas. The waterfowl in the breeding areas do not restrict their use to a uniform 120 m radius around the pond, but will use the upland habitat that best suits their requirements and is most readily accessible. The hilltops where the turbines are located are least likely to be of significant value to the waterfowl and the more gently sloping upland habitats, even if they are more than 120 m away from the pond, are likely to be of greater significance. From that perspective, the turbine impacts are restricted to small areas of the least significant upland habitat and there is a large reservoir of suitable habitat inside and beyond the 120 m radius.

Net Effects

The Project Location (collector line corridor) overlaps with upland habitat outside the core wetland features for several WNAs. Potential impacts will be mitigated as discussed in WNA section of **Table 8** (Appendix B). Several turbine laydown areas, and some access road and collector line corridors are within the upland forest habitats adjacent to core wetlands, and as a result are technically within the SWH. However the SWH features are all part of a large contiguous woodland. Upland habitat is not a limiting factor in this landscape and the removal of small areas of forest habitat to accommodate turbine laydown areas and collector lines will not have a negative effect on the viability of upland habitat adjacent to these core wetlands. Potential direct effects to nesting waterfowl species (including potential mortality and disturbance effects) will be addressed through the Environmental Effects Monitoring Plan.

5.6.4 Moose Aquatic Feeding Habitat

As per the requirements of Appendix D of the 'Natural Heritage Assessment Guide for Renewable Energy Projects' (MNR, 2011a), due to the location of proposed turbines within 120 m of a potential moose aquatic Feeding Area MAFA-1, the proponent must commit to undertaking studies to determine the actual use of the habitat prior to any construction activities occurring within 120 m of MAFA-1. Please see **Figures 6.4, 6.5 and 6.6** for the extent of MAFA-1.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

A habitat use survey will be conducted to determine the use MAFA-1, using criteria provided in the SWHTG, Table Q-2. Habitat use surveys will consist of area searches during the month of June around the MAFA, denoting any Moose observations, bedding/resting areas, tracks and trails. Habitat surveys will determine the level of use, what areas of the MAFA are being used, access points, shelter areas and areas of aquatic vegetation. Specific criteria that will be collected include: abundance of preferred aquatic food plants, quality of adjacent forest habitat, degree of disturbance of the site, access to foraging areas, and history of consistent use. Data will be recorded on Moose Aquatic Feeding Areas forms and mapped accordingly. Additional information that will be recorded on the data form includes:

- Weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation);
- Date and time of day;
- GPS coordinates of the point location; and
- Name of the observer doing field work.

Results of the habitat use survey will be provided to MNR. MAFA-1 is located inside a large contiguous woodland, such that forested habitat surrounds feeding areas and no travel corridors are required (i.e. the entire forested area serves as suitable travel habitat). As a result, cervid movement corridors will not be considered as part of the habitat use survey.

If the study confirms the MAFA as significant wildlife habitat mitigation will be required.

The collector line corridor from Turbine 13 to Turbine 18 runs through the forested portion of MAFA-1 (**Figures 6.4 and 6.6**). Potential impacts and mitigation measures are provided in **Table 8** (Appendix B), and are discussed briefly below.

All components of the Project are sited well outside of the wetland core associated with MAFA-1. No loss of aquatic habitat is anticipated from the Project. The boundary of this core area is consistent with the wetland mapped as SWET-2, and the collector line corridor is 40 m north of the boundary of SWET-2 core habitat. This distance will result in a buffer to the core wetland of between 40 m (if the collector line is located at the extreme south edge of the corridor) and 100 m (if the collector line is located at the extreme north edge of the corridor).

The collector line corridor is within the 120 m forest buffer that surrounds the core wetland habitat of MAFA-1. The collector line will be built along an approved FMP road and, terrain permitting, will be located in the road bed to eliminate any additional forest clearing. If the terrain makes underground lines impractical, the collector line corridor will be restricted to a maximum of 10 m wide and located on the north side of the FMP road. Either way, there will be no substantial clearing of trees near the wetland core of MAFA-1 as a result of the Project. No microhabitat changes in the core wetland will occur as a result of wind turbines and ancillary infrastructure.

Avoidance is the main strategy used to minimize impacts to MAFA-1, particularly to the wetland core. Mitigation recommendations are generally consistent with those recommended for wetlands (see **Table 8**, Appendix B).

Net Effects

A collector line corridor will traverse approximately 150 m of the forest portion of the MAFA. If possible the collector line will be located in the road bed of the approved FMP road and there will be no additional tree clearing in conjunction with the collector line. In the worst case scenario there could be approximately 0.30 ha (3000 m²) of additional clearing in the forested habitat component. The forested habitat component of MAFA-1 is large and is surrounded by additional forested lands. The potential worst case impact of 0.30 ha is negligible. The collector line corridor will have no impact on moose travel whether it is above or below ground. There will be no loss of wetland area and no impact on the function as an aquatic feeding area.

5.6.5 Seeps and Springs

In accordance with the Ecoregional criteria for Ecoregion 5E, any forest Ecosite with two (2) or more seeps is to be considered a SWH feature. By that measure, the entire forest landscape surrounding and including the Project Location is one large SWH feature due to numerous seeps and springs.

Impact assessment and mitigation at the scale of the entire Ecosite polygons will by necessity be highly generalized. However, based on discussions with MNR district staff it has been decided that for the purposes of the EIS, the seeps and springs inside Ecosites should be delineated at a higher level of detail and impact assessment and mitigation focused on individual seeps as attributes that support the broad landscape SWH feature.

Groundwater seepage is a common phenomenon in the rolling Canadian Shield landscape of the Project Study Area. Shallow groundwater is stored in the thin layer of glacial till over impermeable granitic bedrock, which becomes rapidly saturated during rainfall events (Devito *et al.*, 1996; Buttle *et al.*, 2004). Analyses of regional groundwater flow in the Canadian Shield have demonstrated that groundwater movement is highly correlated with the complex surface topography (Sykes *et al.*, 2009), and that the water table mimics the surface topography (Farvolden *et al.*, 1987). Since groundwater movement is greatest when the hydraulic gradient is large, such as where the water table is steeply sloped (Smerden and Redding, 2007), over rolling terrain groundwater recharge and groundwater discharge can occur in close geographic proximity (Sykes *et al.*, 2009).

In the Project Study Area, seeps are most frequently manifested as seepage from shallow groundwater where the sloping, impermeable bedrock meets thin, permeable surface deposits (Farvolden *et al.*, 1987). The infiltration areas that support these seeps are generally diffuse and widespread across the glacial till, but there are small localized bedrock depressions where infiltration may be concentrated. These seepage areas and the small concentrated infiltration areas that contribute to them are often characterized by shallow organic soils and facultative

plant species such as Velvet-leaved Blueberry, American Fly Honeysuckle, Jewelweed, and Interrupted Fern. Individually these seeps and infiltration areas provide limited wildlife habitat function, especially in a landscape such as the Project Study Area with abundant surface water expressions. Collectively, these areas of the landscape contribute to the hydrologic balance of the landscape units.

Another form of seepage, albeit not groundwater-originating, occurs where rainwater permeates the thin soil layer and runs laterally on top of the bedrock, before discharging where bedrock meets the surface layer, in topographically-converging areas, or at the toe-slope of a hill (Walter *et al.*, 2000). This process of lateral movement is called interflow, and is typically observable during wet periods (e.g. spring) relative to dry periods during summer and early fall (Walter *et al.*, 2000). Interflow differs from groundwater seepage, which contributes base flow to surface water features, and overland flow, which is the flow of water across the ground surface (USEPA 2010). Because interflow is not available to wildlife during dry periods or when the soil is frozen, it does not provide reliable habitat for seep-dependent wildlife.

As discussed in **Appendix H-4**, and noted above, there are numerous areas within 120 m of the Project Location which may be wet in the spring and for short periods after high volume precipitation events. Such areas do not meet the definition for seeps and springs in the 'Technical Guide for Renewable Energy Approvals' (MOE, 2011), namely "a site of emergence of ground water where the water table is present at the ground surface, including a spring". These areas are better classified as shallow "interflow" features which do not have the seasonal longevity or altered water chemistry that deeper groundwater derived seeps and springs typically exhibit. However, these areas are still important components of the landscape ecology and are worthy of identification and management.

Figures 6.1 through **6.9** show individual areas of springs/seeps and interflow observed in the Study Area by various observers. **Figures 7.1** to **7.27** show areas where the Project Location has been modified to avoid potential seeps and springs. As noted above, not all areas indicated on these figures meet the definition for seeps and springs in the 'Technical Guide for Renewable Energy Approvals' (MOE, 2011).

The second component of seep and spring habitat that needs to be considered is the groundwater infiltration function that supports individual seeps and springs. Infiltration areas are often generalized over broad areas of the landscape with suitable soil and slope conditions, but in this landscape infiltration areas also include localized site specific depressions and bedrock controlled crevices that can be recognized in the field.

In the Project Study Area landscape, infiltration areas tend to be concentrated on the tops and gently sloping shoulders of the bedrock knolls, while seepage and interflow tends to be concentrated on the mid- to lower-slope positions, where gradient increases and the thickness of glacial drift is reduced. Due to the widespread and diffuse nature of infiltration areas, they are not mapped as attributes on **Figures 6.1** to **6.9**. However, the infiltration function has been considered in the impact analysis and mitigation measures recommended below.

Individual areas of seepage/interflow, and localized areas of recharge that support the seepage/interflow, tend to be extremely small in this landscape, often less than 10 x 10 m. At a scale of 1:10,000 attributes of these dimensions will appear as points. In addition seepage and interflow in wetlands is common and diffuse. Given that wetlands are addressed as a separate natural heritage feature, seepage/interflow in wetlands has not been mapped.

Appendix H-4 includes additional discussion of the landscape distribution of recharge, interflow and seepage functions and serves as context for the discussion below.

Potential impacts and mitigation measures for seep and spring habitat are provided in **Table 8** (Appendix B). The following discussion highlights some key site specific examples.

Seep 11 (**Figure 6.3**) is alongside an area where the Hogg Dam Road will be upgraded. The seep is on the downslope side of the road (toward the Montreal River) and there is a culvert in this location. The standard road design and mitigation measures recommended in **Table 8** (Appendix B), including proper culvert sizing, permeable road bed and sediment and erosion controls, will ensure that there is no negative impact on the seep itself or on the associated functions and water flows upslope and downslope.

Seep 43 (**Figure 6.4**) could not be confirmed in the field by Stantec during the summer of 2012. The general area of the location of Seep 43 was searched but GPS coordinates were not available to field staff at the time of their visits. This potential seep is located in a large relatively flat portion of the landscape with deeper soils. Given its landscape position, it is most likely an area of ephemeral interflow or it is a wet depression associated with an infiltration function that supports extensive and substantial areas of seepage to the north (generally indicated as Seeps 19 – 30 on **Figure 6.4**). Additional seepage/interflow conditions have been observed to be associated with the watercourse to the east just outside the Project Location.

Seep 43 is surrounded by, but not overlapping with, a proposed construction compound. A 45 m diameter circle has been set aside around the coordinates of Seep 43. This area will be fenced off prior to construction and no fill will be placed in the restricted area.

The construction compound proposed for the area surrounding Seep 43 will be underlain by permeable soils. It is unlikely that material will need to be imported, but if any material is imported, it will be restricted to coarse and free draining material to allow for continued infiltration and support of seepage to the north. Standard mitigation measures outlined in **Table 8** (Appendix B) will maintain the quality and quantity of water infiltrating in this area and mitigate any potential effects on Seep 43 in particular and the extensive seepage habitats to the north and west.

Substantial infiltration and interflow/seepage was observed along the easterly slopes of the ridge where Turbines 1, 2 and 3 are located (**Figures 6.4** and **6.5**). Turbines, access roads and collector line corridors have been carefully sited in this area to minimize alterations to the existing flow patterns. Best management practices during both FMP road and Project Access

Road construction will include adequate ditch and culvert design to minimize alterations in the movement of water across this landscape.

No confirmed areas of seepage as defined under the 'Technical Guide for Renewable Energy Approvals' (MOE, 2011) were identified in the ZOI surrounding Turbines 32 to 35 (**Figure 6.9**). During the detailed siting work for these Turbines areas of infiltration and interflow were observed. Turbine locations and access road/collector line corridors were located to avoid the best examples of infiltration and interflow areas to minimize impacts on these landscape functions.

Net Effects

The entire Project Location is located inside SWH for seeps and springs. However, the Project Location has been modified on a site specific basis to ensure that none of the project components overlap with a confirmed area of seepage. The Standard mitigation measures specified in this EIS will ensure that the infiltration and seepage/interflow dynamics currently operating in the landscape continue to function. As a result there will be no negative effect on seep habitat functions in the Project Location or the surrounding landscape.

5.6.6 Amphibian Breeding Habitat (Woodland and Wetland)

In accordance with the Ecoregional criteria for Ecoregion 5E, any forest Ecosite that supports breeding habitat for two (2) or more species of frogs or one (1) species of salamander is to be considered to be a SWH feature. By that measure the entire forest landscape surrounding and including the Project Location is one large SWH feature, due to widespread breeding habitats for spring peeper and American toad, as well as other amphibian species.

The Ecoregional criteria distinguish wetland amphibian breeding habitat from woodland amphibian breeding habitat. "Woodland" habitat includes "*wetlands lakes or ponds within or adjacent to a woodland*". "Wetland" habitat is distinguished as "*wetlands and pools ... isolated from woodland/forest habitat*". No such isolated habitats exist in the Project Location. Every wetland, lake pond or pool is directly connected to woodland habitat. The Ecoregional criteria also include a different, but overlapping, list of species for each habitat type. To reflect the integrated ecology of the Project Study Area landscape these two habitat types have been considered together and the presence, requirements and sensitivities of both species list are reflected in the impact analysis and mitigation measures.

Impact assessment and mitigation at the scale of the entire Ecosite polygons will by necessity be highly generalized. However, based on discussions with MNR district staff it has been decided that for the purposes of the EIS, the larger breeding areas (attributes with more than 500 m² area) inside ecosites and separate wetland ecosites that support amphibian breeding and are surrounded by forested lands, should be delineated and impact assessment and mitigation should be focused on these areas as key attributes that support the broad landscape SWH feature. To further focus the impact assessment a 200 m habitat zone around each breeding area has also been identified. These attributes and areas have been shown on

Figures 6.1 to 6.9. Potential impacts and mitigation measures are provided in **Table 8** (Appendix B). General comments are also provided below.

Turbines/laydown areas, access roads and associated constructible areas are found in and within 120 m of amphibian woodland breeding habitat. Significant wildlife habitat for amphibian breeding (woodland) has been confirmed for ABHW-1, 2, 3, 6, 8 and 10. As per the requirements of Appendix D of the Natural Heritage Assessment Guide (MNR, 2011a), the proponent must also commit to undertaking studies to determine the actual use of the breeding habitat by amphibians in ABHW-4, 5, 7, 9, 11, 12, 13, 14, 15, 16 and 17 prior to any construction activities occurring within 120 m of the habitat, due to the location of these features relative to Project components.

Presence for amphibians (salamanders, frogs and toads) will be executed in two different stages: Salamander egg mass surveys, and call count surveys for breeding frogs and toads.

Egg mass surveys are time sensitive, and will be conducted in spring, prior to leaf-out for all ponds suitable for salamander egg mass habitat. Egg mass surveys will consist of perimeter surveys, supported by dip-netting and minnow-trapping of adults. The timing window will vary depending on spring temperatures, and will occur in mid- to late-April.

Based on the protocols set out in the Marsh Monitoring Program (BSC, 2003), three separate call surveys will be completed for breeding amphibians (frogs and toads) in woodland ponds. Surveys are temperature dependant. The first survey window will fall between May 1 and May 15, or when the night-time temperatures are consistently above 5°C. The second survey window will fall between June 1 and June 15, or when the night-time temperatures are consistently above 10°C. The third survey window will fall between July 1 and July 15, or when the night-time temperatures are consistently above 17°C. Surveys are time sensitive, and will be conducted half an hour after sunset, with appropriate temperature conditions (as noted above). Surveys during the second and third windows will be repeated at the stations established during the first survey. For each survey, the surveyor will observe for 3 minutes at each station, recording the different amphibian species heard and observed, and the approximated level of calling heard by each individual(s). Additional information will be recorded on the appropriate data forms, which include:

- Weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation);
- Date and time of day;
- GPS coordinates of the point location; and
- Name of the observer doing field work.

Results of the habitat use surveys will be provided to MNR. Given the size and characteristics of the forest communities containing ABHW-4, 5, 7, 9, 11, 12, 13, 14, 15, 16 and 17 and the historic ranges of amphibian species in the Project Study Area, it is anticipated that the habitats

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

could potentially support several of the indicator amphibian species identified in the Draft Significant Wildlife Habitat Ecoregion 5E Criterion Schedule (MNR, 2012), namely Eastern Newt, Blue-spotted Salamander, Spotted Salamander, Four-toed Salamander, Northern Two-lined Salamander, Spring Peeper, Wood Frog and American Toad.

Some woodland habitat loss will result from the construction of Project components located in forested areas. No impacts will occur in the wetland breeding areas. Site specific mitigation measures are discussed below, and shown on **Figures 7.1 to 7.27**. These measures will ensure there is no meaningful fragmentation of the woodland amphibian breeding habitat as a result of the Project.

During construction and decommissioning of the turbines, the access roads will experience some traffic, which will vary in intensity as the construction phase progresses. Amphibians are at an increased risk from vehicle collisions in spring, particularly on cool rainy nights as they move towards warmer road surface. Given the temporary (i.e. one breeding season or less) nature of the increased traffic activity, the restriction of construction and decommissioning activities primarily to daytime hours and the design of access roads (unpaved, gravel roads) the risk of increased mortality during construction and decommissioning is considered low. Some limited mortality is possible; however, the potential long-term effects to amphibian populations from this mortality and from barrier effects will be minimal.

During operation of the Project, access roads will experience very little traffic on a daily basis and both mortality and barrier effects are expected to be negligible. Amphibians are most susceptible in spring, particularly cool spring nights. Maintenance vehicle traffic will primarily be restricted to daytime hours.

Disturbance to local amphibian populations due to increased activity during construction and decommissioning would be temporary. Disturbance during operation of the turbines will also be minimal and temporary due to the periodic nature of maintenance and the fact that local populations will likely adapt to the new structures.

None of the core breeding habitats as shown on **Figures 6.1 to 6.9** are directly impacted by project components. The 200 m of forested habitat identified around each breeding habitat is affected by several different types of project components. For example the forested upland portion of ABHW-1 (**Figure 6.9**) is traversed by approximately 1 km of road upgrades. Some forest habitat will be lost but the total amount removed is small in comparison to the total area of forest surrounding this breeding habitat. A well developed and well travelled road already exists in this location so the net effects from the road upgrades will be minor.

ABHW-5 (**Figure 6.9**) is crossed by an overhead collector line. The collector line corridor will be limited to 20 m width through this habitat and will not affect the core breeding habitat. Less than 1 ha (approximately 8000 m² – 400 m long by 20 m wide) of forest will be removed from an attribute that has approximately 20 ha of upland forest habitat within 200 m and much more

upland forest just outside the 200 m radius. The corridor will be monopoles and will not create any barrier to amphibian movement through the landscape.

Three (3) turbines and associated collector lines will affect the upland forest habitat portion of ABWH-15 (**Figure 6.6** and **6.7**). Collector line corridors will follow Approved FMP roads through this habitat and wherever possible the collector line will be underground in the road bed. Where overhead lines are required by the terrain, the associated corridor will be kept as narrow as possible, generally less than 10 m wide. This relatively minor clearing of upland forest around breeding habitats that are surrounded by high quality upland forest in all directions will not have a significant effect on amphibian breeding.

ABHW-6 (**Figure 6.9**) is based on amphibian breeding in SWET-16 and SWET-17. The access road to Turbine 39 may interfere with amphibian movement between these ponds and surrounding woodland habitat, particularly movement of salamanders. To mitigate this potential effect two salamander passages will be constructed under the access road as shown on **Figure 7.24**. The exact location of each passage will be determined based on site grading in consultation with the MNR.

Each passage will consist of 450 mm corrugated steel pipe (CSP) culverts. The culverts will be buried such that the bottom 150 mm is below the surrounding grade and the upper 300 mm is within the road bed. The bottom third of the culvert will be filled with native soil material. Silt fence “wing walls” will extend 10 m in each direction from both ends of the culvert. The silt fence will be securely keyed into the surrounding ground and will serve to guide salamanders toward the culvert opening. The purpose of these structures will be to ensure that salamanders can move between SWET-16, SWET-17 and the surrounding upland forest habitats.

Salamander passages will be inspected twice per year, once in early October before significant snowfall and once in the early spring, as soon as snow melt has proceeded sufficiently to expose the culvert openings. Inspection will include;

- Are the silt fence “wings walls” intact, properly keyed in, and functioning to guide amphibians toward the culverts; and
- Are the culverts accessible and passable by amphibians – i.e. approximately one third buried two thirds above surrounding grade with natural soils bottom and free of any barriers or blockages.

Repairs and maintenance will be completed as necessary based on the inspections.

Net Effects

Direct impacts on core breeding habitats will be avoided. Indirect impacts to upland forest habitat will be minimized to the point where effects will be negligible in a well forested landscape.

Considering the temporary nature of construction effects, the distance between the features and the Project components, and the periodic nature of maintenance activities, it is likely that resident amphibians will adapt to the Project quickly. Consequently, no negative effects are anticipated to amphibian breeding habitats.

5.6.7 Habitat for Bird Species of Conservation Concern – Canada Warbler and Olive-sided Flycatcher

Canada Warbler was recorded in CWH-11, 18 and 30, which represent SWH for the species. Olive-sided Flycatcher was not recorded within candidate habitat in the ZOI, therefore no SWH has been verified for this species. As per the requirements of Appendix D of the 'Natural Heritage Assessment Guide' (MNR, 2011a), due to the location of access roads, collector lines and associated constructible areas in habitats treated as SWH for Canada Warbler (CWH-1, 3, 6, 8, 9, 10, 12, 15, 20, 21, 22, 23, 25, 29, 35, 36, 39 and 40) and Olive-sided Flycatcher (OFH-1, 4, 5, 6 and 13) the proponent must commit to undertaking studies to determine the actual use of the habitat by these two species prior to any construction activities occurring within 120 m of the habitat. Habitat use studies will be conducted according to 'Bird and Bird Habitats: Guidelines for Wind Power Projects' (MNR, 2011c).

Point count stations in each habitat will be established and surveyed during the habitat use surveys. An adequate number of stations (i.e., a minimum of one station per 3 ha of habitat, depending on habitat shape) will be located in each of CWH-1, 3, 6, 8, 9, 10, 12, 15, 20, 21, 22, 23, 25, 29, 35, 36, 39 and 40 and OFH-1, 4, 5, 6 and 13. Each of the surveys will include a ten-minute point count at each location, conducted during the peak of the breeding season (mid-May to early July). Each station will be surveyed a minimum of 3 times: once early in the season; once in mid-season; and, once later in the season with at least 10 days between surveys at a particular station. Point counts must be performed in the early morning, between dawn (one half hour before sunrise) and about 4 hours after sunrise. Where appropriate, sound meters will be used to record singing birds. Surveys in late June and early July should usually be completed within 3 hours of sunrise. Surveys will be performed when the wind speed is 3 or less on the Beaufort scale and when there is no precipitation unless it is a light drizzle. Additional information that will be recorded on the appropriate data forms include:

- Weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation should be recorded);
- Date and time of day;
- GPS coordinates of the point location; and
- Name of the observer doing field work.

Results of the habitat use surveys will be provided to MNR. From data gathered from these surveys, if Canada Warbler and/or Olive-sided Flycatcher breeding evidence is confirmed and habitat is confirmed as significant, data will be brought forward and utilized as baseline results during post-construction monitoring in habitats within 120 m of turbines.

Potential impacts and mitigation measures are provided in **Table 8** (Appendix B). Potential Project effects are discussed below.

During construction there is the potential for the direct loss of active nests if construction activities occur in the breeding season. The implementation of measures such as avoiding activities that could disturb or destroy nests during key periods or protecting active nests with buffer zones will mitigate the risks to active nests.

During operation, direct mortality of birds may occur from collisions with turbines. Various studies throughout North America have documented bird collisions at wind facilities and investigated the underlying mechanisms. In general, resident breeding birds tend to have lower collision rates than non-residents, at least partly because they become familiar with the turbines and avoid them (Kingsley and Whittam, 2007).

Collision risk is partly a function of the rate of exposure of birds to the turbine blade sweep and types of behaviour that occurs within this range. Species that engage in behaviours such as aerial displays or actively hunt within the blade sweep are considered to be at higher risk. Canada Warbler and Olive-sided Flycatcher are not expected to engage in high risk behaviours during breeding season; life cycle activities for these species (mating, foraging and rearing of young) typically occur at heights that are below the blade sweep zone.

The mortality rates observed to date at operational facilities in Ontario are considered low, with no evidence of large scale fatality events or significant population impacts (Friesen, 2011). Monitoring results to date from operational facilities indicate that wind turbines are not a major concern with respect to the sustainability of migratory bird populations in Ontario (Friesen, 2011; MNR, 2011c) and are a small contributor to overall bird mortality when compared to other anthropogenic structures (Arnett *et al.*, 2007; Kingsley and Whittam, 2007; National Academy of Sciences, 2007; Kerlinger *et al.*, 2011).

Indirect impacts during construction and operation could include disturbance or disruption to breeding birds. Disturbance from construction activity, such as increased traffic, noise, or dust, may result in avoidance of habitats by birds. These effects are greatest if disturbance occurs during critical life stages such as courtship or nesting (NWCC, 2002).

Destruction, fragmentation, and disturbance of habitat as a result of wind energy projects were identified as larger threats to breeding birds than direct mortality (Kingsley and Whittam, 2007). Edge effects may increase predation, parasitism and may affect bird habitat use, reproductive success and site fidelity.

The total vegetation removal required will remove only a small proportion of the forested habitat evaluated as significant for the purposes of this Project that occurred within the landscape. Overall cover of forested habitat will be maintained within the landscape, with >99% of this habitat type retained. As habitat in this landscape is not a limiting factor for either Canada

Warbler or Olive-sided Flycatcher, the removal of a small percentage of forest within the greater landscape is not anticipated to have a negative effect on local populations.

Noise levels during operations might also result in disturbance effects to breeding birds. Habib *et al.* (2007) found that noise from compressor stations (which produce sound at 75 to 90 dB(A) at the source) reduced pairing success of Ovenbirds (a forest songbird) by 15%. Levels of noise that may be experienced by forest breeding birds (including Canada Warbler and Olive-sided Flycatcher) from operation of the wind turbines is influenced by a number of factors such as distance from receptor, direction of the receptor (i.e. up or down wind) or weather effects (wind speed and direction). For example, noise from wind turbines is more likely to have the least effect on wildlife at high wind speeds, as the sound from the turbines can be masked by the sound of the wind. Reijnen *et al.* (1996) suggest that noise levels below 47 dB(A) will not have significant effects on breeding birds. Barber *et al.* (2010) suggest that physiological responses to noise exposure in animals may begin to appear at exposure levels of 55 – 60 dB(A). Studies also indicate that birds adjust their songs to compensate for environmental background noises (Brumm, 2004; Barber *et al.*, 2010) and that many species of wildlife easily habituate to regular noise (Penna *et al.*, 2005).

Studies specific to the wind industry indicate that avian productivity of breeding birds does not appear to be negatively affected at many wind facilities (Kingsley and Whittam, 2007). However, most studies to date that document avoidance, disturbance or displacement effects have focused mainly on grassland or open country birds. Studies of bird densities in grassland habitats have documented localized avoidance behavior in some species (Leddy *et al.*, 1999; Johnson *et al.*, 2000; Erickson *et al.*, 2004). Avoidance behavior was documented from 50 m to 180 m from turbine bases. Other studies have shown no avoidance of wind turbines (Shaffer and Johnson, 2008; James, 2008) while others show species nesting in higher abundances near turbines (de Lucas *et al.*, 2004). To date, a review of existing research at operating facilities suggests that wind facilities have little impact on the nesting of birds (Strickland *et al.*, 2011).

Potential disturbance effects to forest breeding birds, and specifically Canada Warbler and Olive-sided Flycatcher, will be minimized through the implementation of the following mitigation measures:

- Avoiding construction and decommissioning activities during sensitive periods (i.e. the breeding season).
- Mitigation measures for vegetation removal will be implemented as outlined in **Section 5.3.1**.
- Refer to the Environmental Effects Monitoring Plan in the Design and Operations Report, which provides details of the mortality and disturbance effects monitoring program methods, identifies performance objectives to assess the effectiveness of the proposed mitigation measures and describes a response and contingency plan that will be implemented if performance objectives cannot be met.

Several of the preferred breeding habitats for Canada Warbler as shown on **Figures 6.1 to 6.9** are directly impacted by either access road corridors or collector line corridors. For example, CWH-39 (**Figure 6.4**) is traversed by an overhead collector line and a portion of the construction compound/transformer station. The collector line corridor will be limited to a 20 m width through this habitat and will result in the removal of a portion of the preferred breeding habitat. A portion of the habitat will be removed to accommodate the construction compound/transformer station, although the total area cleared for this development will be reduced to minimize the amount of habitat lost. Clearing activities will be undertaken outside of the breeding season and will not affect nesting birds. Breeding habitat on either side of the corridor will be maintained, and will remain connected to the broader forested landscape on either side of the corridor. The collector line will be on monopoles and will not create any barrier to bird movement through the landscape. As the 20 m corridor is not sufficiently wide to constitute a “break” in forest cover, the interior function of the forested habitat, and therefore its ability to support breeding habitat for Canada Warbler, will not be affected by the collector line corridor.

CWH-18 (**Figure 6.9**) is crossed by approximately 50 m of an access road and an associated collector line. Wherever possible the collector line will be underground in the road bed. Similarly, collector lines associated with an FMP road will affect CWH-29 (**Figure 6.6**). Collector line corridors will follow Approved FMP roads through this habitat and wherever possible the collector line will be underground in the road bed. In both situations, where overhead lines are required by the terrain the associated corridor will be kept as narrow as possible. Some forest habitat will be lost but the total amount removed is small in comparison to the total area of forest surrounding these preferred breeding habitats. This relatively minor clearing of forest around preferred breeding habitats that are surrounded by high quality upland forest in all directions will not have a significant effect on Canada Warbler breeding.

Net Effects

Given the low potential for effects and the proven effectiveness of the proposed mitigation, no significant effects are predicted for forest breeding birds, including species of conservation concern Canada Warbler and Olive-sided Flycatcher. Post-construction monitoring will be conducted to verify effects predictions and additional operational mitigation (e.g. feathering blades) will be implemented if unanticipated significant effects occur.

Direct impacts on preferred breeding habitats will be minimized, and indirect impacts to breeding habitat and adjacent forested areas will be minimized to the point where effects will be negligible in a extensively forested landscape.

5.6.8 Habitat for Bird Species of Conservation Concern – Marsh Breeding Birds

All components of the Project are sited outside of wetland features. No loss of habitat or alteration of groundwater or surface water flow is anticipated from the Project. Potential effects to wetland habitats, proposed mitigation and net effects are described in **Section 5.5**.

BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

Environmental Impact Study

January 2013

As per the requirements of Appendix D of the Natural Heritage Assessment Guide (MNR, 2011a), due to the location of turbines/laydown areas, access roads, collector lines and associated constructible areas within 120 m of habitats treated as SWH for marsh breeding birds (MBBH-8 and 9), the proponent must commit to undertaking studies to determine the actual use of the habitat by marsh breeding birds prior to any construction activities occurring within 120 m of the habitat.

Habitat use studies will be conducted according to 'Bird and Bird Habitats: Guidelines for Wind Power Projects' (MNR, 2011c) and will include breeding surveys in May/June when marsh bird species are actively nesting in wetland habitats. Specifically, nesting studies will consist of point counts at stations established in MBBH-8 and 9. An adequate number of stations (i.e., a minimum of one station per 3 ha of habitat, depending on habitat shape). Point counts will be performed in the early morning, between dawn (one half hour before sunrise) and about 4 hours after sunrise. Each station will be surveyed a minimum of 3 times, conducted early in the season, mid-season and later in the season, with at least 10 days between surveys at a particular station. Point counts should be performed when there is as little wind as possible (i.e. wind speeds should be 3 or less on the Beaufort scale) and should begin as early as possible in the morning (but not earlier than one half-hour before local sunrise), when the wind is generally calm so that windy conditions that may arise later in the morning can be avoided. Point counts should not be conducted if it is raining unless precipitation is not more than a light drizzle.

At each station, the surveyor will observe for ten minutes, recording all species seen or heard (including marsh birds), along with an estimate of the number of individuals of each species and the highest level of breeding evidence observed for each observation. Surveyors will estimate the distance to each bird using a scale of 0–50 m, 50–100 m and further than 100 m. Birds that move during the survey will be recorded in the closest distance category that they entered during the survey. Data that will be reported are the number of birds of each species detected in each distance band. Birds that fly over without stopping should be recorded separately as "fly-overs". Additional information that will be recorded on the appropriate data forms include:

- Weather conditions (temperature, wind speed (on a Beaufort scale), % cloud cover, and presence of any precipitation should be recorded).
- Date and time of day.
- GPS coordinates of the point location.
- Name of the observer doing field work.

Results of the habitat use surveys will be provided to MNR. From data gathered from these surveys, if marsh bird breeding habitats are confirmed as significant, data will be brought forward and utilized as baseline results during post-construction monitoring in habitats within 120 m of a wind turbine. Species anticipated to be observed from the Draft Significant Wildlife Habitat Ecoregion 5E Criterion Schedule include: American Bittern, Sora, Red-necked Grebe, Pie-billed Grebe, Redhead, Ring-necked Duck, Lesser Scaup, Ruddy Duck, Common Moorhen,

American Coot, Wilson's Phalarope, Common Loon, Sandhill Crane, Green Heron, Sedge Wren, Marsh Wren, Trumpeter Swan, Yellow Rail and Black Tern.

Net Effects

Access roads are typically responsible for the largest amount of disturbed footprint during construction (Arnett *et al.*, 2007) however the proposed layout for the Project has avoided wetland features. Given the low potential for effects and the proven effectiveness of the proposed mitigation, no significant effects are predicted for marsh breeding birds or their habitats. Post-construction monitoring will be conducted to verify effects predictions and additional operational mitigation (e.g. feathering blades) will be implemented if unanticipated significant effects occur.

5.6.9 Habitat for Plant Species of Conservation Concern – Oval-leaved Bilberry, Boreal Bedstraw and Braun's Holly-fern

Portions of the Project Location are sited in SWH for plant species of conservation concern, including Oval-leaved bilberry, Boreal bedstraw and Braun's holly-fern. Habitats supporting these plants are also within 120 m of new access roads, access road upgrades and the collector lines. Potential impacts and mitigation measures are provided in **Table 8** (Appendix B). Habitat for plant species of conservation concern have been grouped according to potential Project effects (i.e. by Project components) and are discussed below for a few key examples.

The main mitigation proposed for significant wildlife habitat for plant species of conservation concern is avoidance of the majority of the known attributes that support the SWH designation (i.e. the known occurrences of the plants and the most likely habitat areas for the species of concern). **Figures 6.1 to 6.9** include the locations of known occurrences of the plants and, where technically feasible, micro-habitat delineations. The methods and results of the microhabitat analyses are presented in **Appendix H-4**.

Braun's Holly Fern habitat is concentrated along steeper rocky slopes that are largely outside any direct impact from the Project components. In a few locations (see **Figure 6.4** for example) collector lines cross known habitat areas. These collector lines will either be alongside FMP road allowances or on overhead poles with a minimal access trails. The collector lines alongside FMP roads will not have any additional negative effect on the habitat beyond that caused by the approved FMP roads. Where collector lines require their own corridor, the habitat areas will be crossed at a perpendicular and the location of the construction trails within the proposed corridor will be positioned to avoid or minimize disturbance to known populations. Additionally, the width of the corridor will be reduced where feasible in an effort to minimize disturbance to suitable habitat.

Oval-Leaved Bilberry habitat is abundant and widespread throughout the Project Location and within the broader Project Study Area. Several occurrences of Oval-Leaved Bilberry are found on collector line corridors (see for example **Figure 6.5** collector line corridor between Turbines

13 and 18); collector lines will follow the FMP road in this location and underground collector lines will be installed by trenching in the road right of way. Overhead lines will be required in several areas where burying cables is impractical or technically not preferred. For example the collector line south of Negick Lake on **Figure 6.7**, will be an overhead line constructed on monopole structures. This section of collector line is close to several known occurrences of Oval-Leaved Bilberry. Clearing of the right-of way for the overhead line will change microsite conditions, particularly by increasing the amount of direct sunlight received by these plants.

In these populated areas of the collector line, the location of the construction trails within the proposed corridor will be positioned to avoid or minimize disturbance to known populations. Additionally, the width of the corridor will be reduced where feasible in an effort to minimize disturbance to suitable habitat. Based on field observations by Stantec and MKI during site investigations and EOSs, Oval-leaved Bilberry is locally abundant throughout the ZOI. **Figure 6.7** indicates six (6) occurrences of Oval-leaved Bilberry within collector line corridors and an additional 16 well outside any area of impact.

Figure 6.9 indicates that Turbine 39 will be erected in an area of Oval-leaved Bilberry habitat. The laydown area for this turbine has been restricted to the smallest possible area to minimize the habitat disturbance. The detailed site plan for the Turbine 39 location also reveals that much of the Oval-leaved Bilberry habitat in this location is below a sharp drop off, which will assist in isolating it from any effects of the limited clearing. **Figure 6.9** also depicts other numerous Oval-leaved Bilberry habitat areas that are outside any influence of the Project.

Boreal Bedstraw was often observed within suitable habitat, particularly in the northeast section of the Project Study Area. **Figures 6.6** and **6.7** show numerous occurrences of the plant species and associated habitat. Most of the locations were avoided and occur outside any area of direct impact from the Project. Areas that will be impacted by the project are situated in collector line corridors. Impacts of the collector line corridors will be minimized by keeping the construction corridors as narrow as possible, by site specific alterations to the collector line alignments within the wider corridors, and by selecting pole locations for overhead collector lines that avoid the wetter microsites preferred by Boreal Bedstraw.

Where underground collector lines are used, appropriate culverts will be installed to ensure minimal alteration to surface flows that support the habitats for rare plants. Specific examples are shown on **Figures 7.16** and **7.18**.

Net Effects

Direct impacts on the habitat for species of conservation concern are small relative to the total habitat in the Project Study Area, and can be minimized by careful siting of collector lines inside the planned corridors.

Indirect effects can be controlled through the use of standard mitigation measures as discussed above. Specific mitigation measures proposed can be found in **Table 8** (Appendix B). The total vegetation removal required will remove a small proportion of the habitat for plant species of

conservation concern evaluated as significant for the purposes of this Project that occurred within the landscape. More than 99% of the current woodland cover, including cover for plant species of conservation concern, will be maintained within the landscape. The implementation of the Natural Areas Management Strategy, as described in **Section 5.4**, will enhance and preserve the natural heritage qualities of the habitats currently found within the Project Location and ZOI.

5.6.10 Generalized Wildlife Habitat

In addition to the series of wildlife habitats identified in **Section 3.2.3**, a number of wildlife habitat types have also been identified that may be present within 120 m of the Project Location, but are located within 120 m of project components that are not expected to have an impact on these habitats. In accordance with the Natural Heritage Assessment Guide (MNR, 2011a), potential impacts to these habitats are typically associated with the temporary disturbance of construction activity and can be grouped together as generalized impacts and mitigation measures.

Wildlife habitats that require generalized consideration were identified in **Section 3.2.3**.

A comprehensive list of general construction mitigation measures that will be implemented during the construction and decommissioning phases of the Project is presented in **Table 9** (Appendix B).

5.7 POST-CONSTRUCTION MONITORING

In order to demonstrate how any negative environmental effects identified in the Environmental Impact Study will be mitigated, post-construction monitoring is required as part of the REA Application. This information is provided in the Environmental Effects Monitoring Plan (EEMP), as well as the Design and Operations Report. In addition to the mitigation measures identified through the EIS, the Environmental Effects Monitoring Plan must include post-construction monitoring for birds and bats. A summary of the EEMP is included in this NHA/EIS, please see **Table 10** (Appendix B).

5.8 SUMMARY OF IMPACTS AND MITIGATION

The general impacts, suggested mitigation measures and application to minimize and mitigate the potential negative impacts to significant natural heritage features associated with the planning, design and construction of the proposed Project are summarized in **Table 8** (Appendix B).

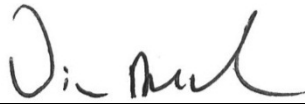
Once the recommended protective, mitigation and monitoring measures are applied, the construction, operation and decommissioning of the Project is expected to have no significant net negative effects on the natural heritage features in or within 120 m of the Project Location or on their associated ecological functions.

6.0 Closure

This document entitled Natural Heritage Assessment and Environmental Impact Study was prepared by Stantec Consulting Ltd. for the account of Nodin Kitagan Limited Partnership and Nodin Kitagan 2 Limited Partnership. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

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BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

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BOW LAKE WIND FARM**NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY**

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January 2013

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