



**NORTHLAND
POWER**

Empire Solar Project

Natural Heritage Evaluation of Significance Report

October 18, 2012



Northland Power Inc.
on behalf of
Northland Power Solar
Empire L.P.
Toronto, Ontario

Natural Heritage
Evaluation of Significance Report

Empire Solar Project

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Rev. 1

October 18, 2012

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Project Report

October 18, 2012

**Northland Power Inc.
Empire Solar Project**

Natural Heritage Evaluation of Significance

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1. Introduction

1.1 Project Description

Northland Power Solar Empire L.P. (hereinafter referred to as “Northland”) is proposing to develop a Class 3 10-megawatt (MW) ground mounted solar photovoltaic (Solar PV) facility in the Town of Cochrane. This Project, known as the Empire Solar Project, is hereafter referred to as “Empire” or the “Project.”

The Project location is comprised of two primary components. The first part of the Project is the location of the solar panels, including access roads, inverters, transformers, fencing, etc, and is hereafter referred to as the “solar panel Project location”. The solar panel Project location approximately 122 hectares (ha) in size and located on Lots 17 and 18, Concession 7 of the Town of Cochrane. The solar panel Project location is situated on Glackmeyer Concession Road 7 (shown in Figure 1.1).

The second part of the Project is the approximately 20 km transmission line from the solar panel Project location to the connection point west of the Project location near Hunta, ON, as well as associated transition structure and switching station. This portion of the project is referred to as the transmission line Project location, with locations shown in Figures 1.2 and 1.3.

1.2 Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, made under the *Environmental Protection Act* identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. Ground-mounted solar facilities with a name plate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and require a REA in accordance with Section 4 of O. Reg. 359/09.

Section 24(1) of O. Reg. 359/09 requires proponents of Class 3 solar projects to undertake a natural heritage assessment consisting of a records review report, site investigation report and an evaluation of significance report for each natural feature identified during the records review and site investigation.

Natural Features are defined in Section 1(1) of O. Reg. 359/09 to be all or part of

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

In respect of woodlands and valleylands, Section 1(1) of O. Reg. 359/09 requires that these features be located south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under Section 3 of the *Planning Act*. This figure shows that the proposed Project location is located on the Canadian Shield, and therefore valleylands and woodlands as defined by O. Reg. 359/09 cannot be located on the Project location.

1.2.1 Records Review Report

Section 25 of the REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage records review to identify “whether the project is

- (a) in a natural feature
- (b) within 50 m of an area of natural and scientific interest (earth science)
- (c) within 120 m of a natural feature that is not an area of natural or scientific interest (earth science).” (O. Reg. 359/09, s. 25, Table).

Subsection 2 of Section 30 of the REA Regulation requires the proponent to prepare a report “setting out a summary of the records searched and the results of the analysis” (O. Reg. 359/09). The Natural Heritage Records Review Report (Hatch Ltd., 2012a) was prepared to meet these requirements.

1.2.2 Site Investigation Report

Section 26 of the REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage site investigation for the purpose of determining

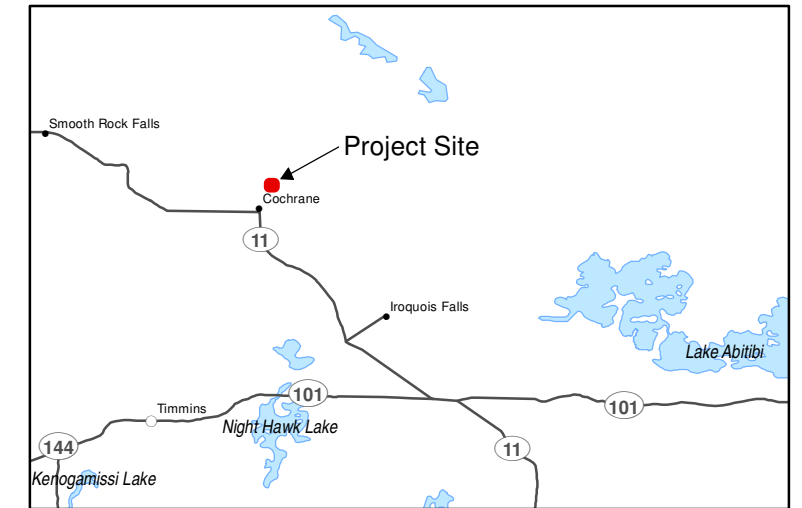
- whether the results of the analysis summarized in the (natural heritage records review) report prepared under Subsection 25(3) are correct or require correction, and identifying any required corrections
- whether any additional natural features exist, other than those that were identified in the (natural heritage records review) report prepared under Subsection 30(2)
- the boundaries, located within 120 m of the Project location, of any natural feature that was identified in the records review or the site investigation
- the distance from the Project location to the boundaries determined under clause (c).

The Natural Heritage Site Investigation Report (Hatch Ltd., 2012b) was prepared to meet these requirements.

1.2.3 Evaluation of Significance Report

Section 27 of the REA Regulation requires proponents of Class 3 solar projects to undertake an evaluation of significance (EOS) for natural heritage features identified during the records review and site investigation and prepare a report that sets out

- a determination of whether the natural feature is
 - ◆ provincially significant
 - ◆ significant



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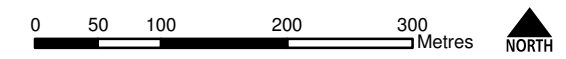
- Building
- Road
- Watercourse
- ▭ Parcel
- ▭ Waterbody
- ▨ Provincially Significant Wetland

Project Components

- ▭ Project Location
- ▭ 120 m from Project Location

Notes:

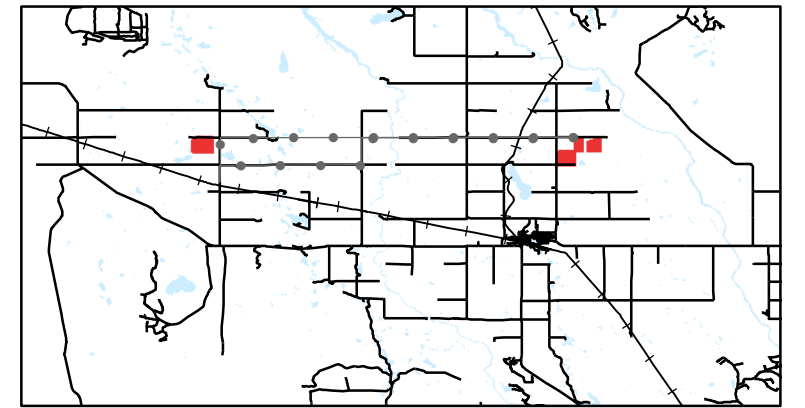
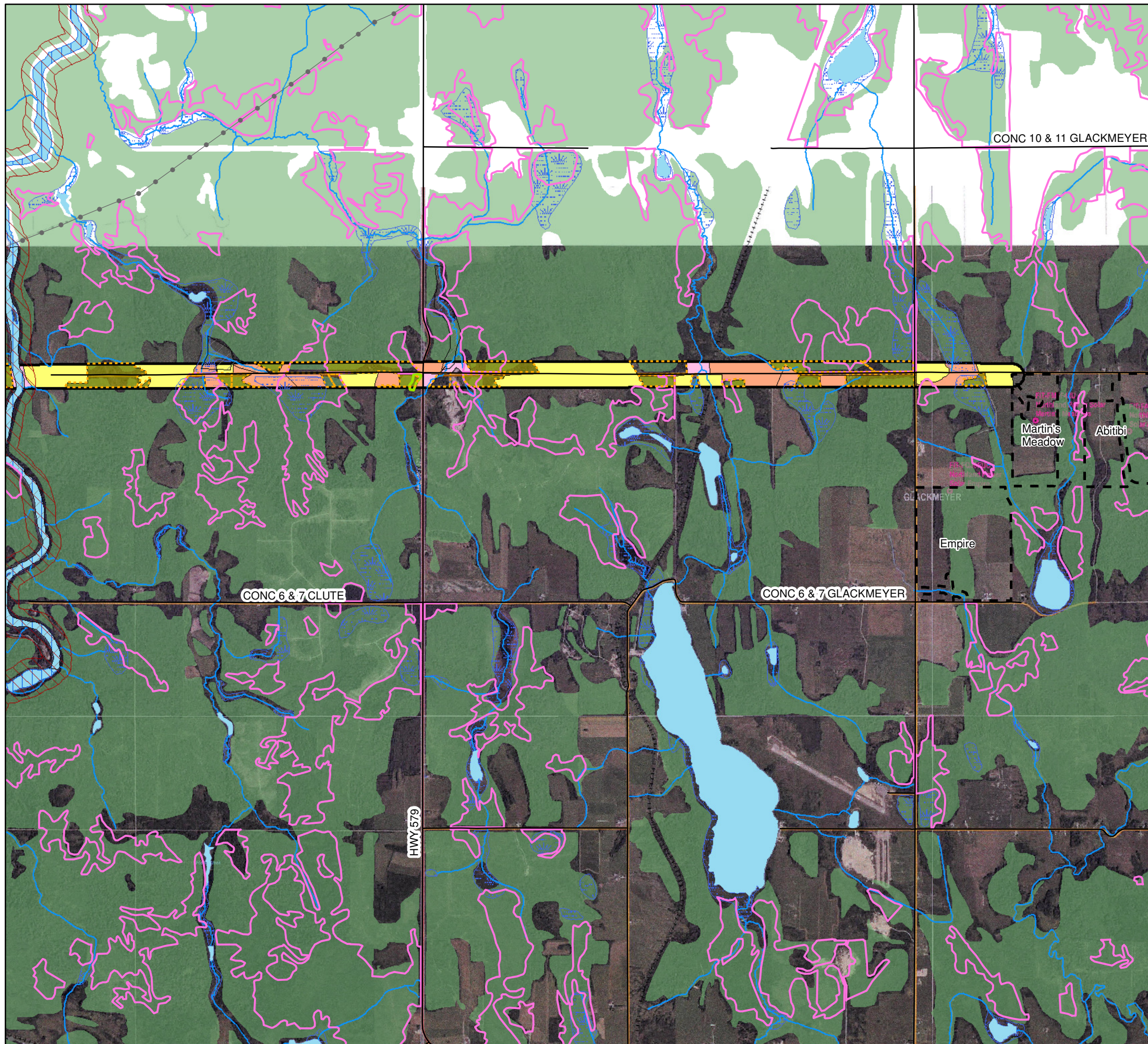
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2. Spatial referencing UTM NAD 83.
3. Satellite imagery obtained from Google Earth Pro, captured 2003.
4. Wetland information provided by NRSI (2011).



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Figure 1.1
 Northland Power Inc.
Empire Solar Project
Solar Panel Project Location and Evaluation of Significance

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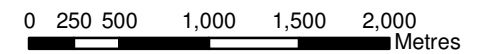
- Road
- Utility Line
- Watercourse
- Area Sensitive Grassland Habitat / Short-eared Owl Habitat
- Area Sensitive Shrubland Habitat / *Carex Wiegandii* Habitat
- Area Sensitive Woodland / Canada Warbler / Olive-sided Flycatcher / *Vaccinium ovalifolium* Habitat
- Bald Eagle Habitat
- *Carex haydenii* Habitat
- *Carex loliacea* Habitat
- Common Nighthawk Habitat
- Old Growth or Mature Forest / Northern Long-eared Bat and Specialized Raptor Nesting Habitat
- Mink, Otter, Marten, and Fisher Denning Site
- Moose Aquatic Feeding Area
- Moose Late Winter Habitat / Winter Deer Yard
- *Scirpus heterochaetus* Habitat
- Seeps and Springs / *Carex tetanica* Habitat
- Red-necked Grebe Habitat
- Waterbody
- Waterfowl Stopover and Staging Area
- Waterfowl Nesting Habitat
- Wetland Area
- Wetlands Supporting Amphibian Breeding Ponds

Project Infrastructure

- Connection Point
- Northland Power Project Location
- 120 m from Distribution Line
- Switchyard
- Transition Structure

Notes:

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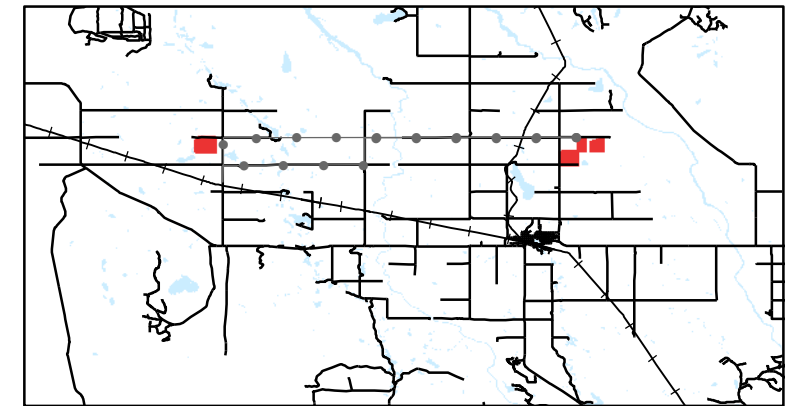
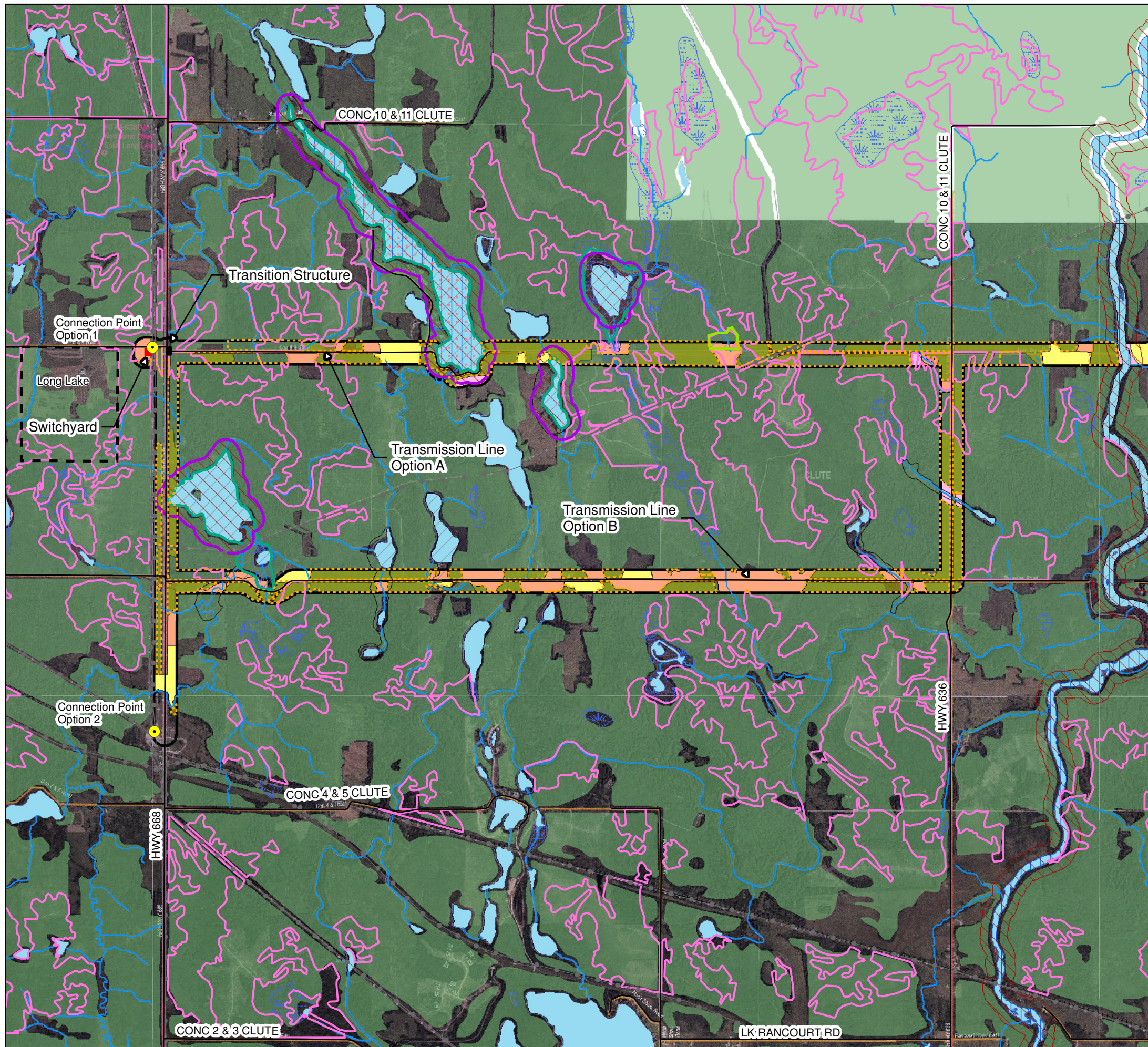


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Figure 1.2
 Northland Power Inc.
**Transmission Line Project Location
 (Eastern Half) - Generalized Candidate
 Significant Natural Heritage Features**

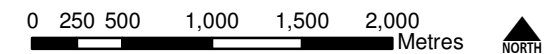
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Legend

- Road
 - Utility Line
 - Watercourse
 - Area Sensitive Grassland Habitat / Short-eared Owl Habitat
 - Area Sensitive Shrubland Habitat / *Carex Wiegandii* Habitat
 - Area Sensitive Woodland / Canada Warbler / Olive-sided Flycatcher / *Vaccinium ovalifolium* Habitat
 - Bald Eagle Habitat
 - *Carex haydenii* Habitat
 - *Carex loliacea* Habitat
 - Common Nighthawk Habitat
 - Old Growth or Mature Forest / Northern Long-eared Bat and Specialized Raptor Nesting Habitat
 - Mink, Otter, Marten, and Fisher Denning Site
 - Moose Aquatic Feeding Area
 - Moose Late Winter Habitat / Winter Deer Yard
 - *Scirpus heterochaetus* Habitat
 - Seeps and Springs / *Carex tetanica* Habitat
 - Red-necked Grebe Habitat
 - Waterbody
 - Waterfowl Stopover and Staging Area
 - Waterfowl Nesting Habitat
 - Wetland Area
 - Wetlands Supporting Amphibian Breeding Ponds
- Project Infrastructure**
- Connection Point
 - Northland Power Project Location
 - 120 m from Distribution Line
 - Switchyard
 - Transition Structure

Notes:
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 2. Spatial referencing UTM NAD 83.
 3. Satellite Imagery from Ministry of Natural Resources.



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Figure 1.3
 Northland Power Inc.
**Transmission Line Project Location
 (Western Half) - Generalized Candidate
 Significant Natural Heritage Features**

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- ◆ not significant
- ◆ not provincially significant
- a summary of the evaluation criteria or procedures used to make the determinations
- the name and qualifications of any person who applied to evaluation criteria or procedures. This EOS Report for the natural features identified within 120 m of the Project has been prepared to meet these requirements.

1.3 Input to Evaluation of Significance from Consultation Activities

As required by Section 27 of O. Reg. 359/09, the evaluation of significance must consider information obtained through consultation with the public, aboriginal communities and municipalities and local authorities. Results of these consultation activities in relation to the evaluation of significance are discussed below.

1.3.1 Public Consultation

A public meeting has been held in association with this Project; notices for the meeting were published in the local newspaper. In addition, landowners within 120 m of the Project location were mailed notices of the proposed Project and meeting dates.

To date, no information relating to natural features relevant to the evaluation of significance has been obtained through these consultation activities.

1.3.2 Aboriginal Consultation

Aboriginal communities identified by the Ministry of the Environment as communities to be consulted through the Renewable Energy Approval process have been mailed letters requesting information relating to the Project, along with meeting notices and copies of the Project Description Report.

To date, no information relating to natural features relevant to the evaluation of significance has been obtained through these consultation activities.

1.3.3 Municipal/Local Authority Consultation

Meetings have been held with staff of the Town of Cochrane and Hunta Local Roads Board. In addition, the Town and Roads Board has received notices of the public meetings and copies of the Project Description Report.

To date, no information relating to natural features relevant to the evaluation of significance has been obtained through these consultation activities.

1.4 Evaluation of Significance Report Format

Section 1 of this EOS has identified the legislative requirements for an EOS under the REA Regulation and identified the reasons why an EOS is required for the Project. Section 2 provides a summary of the results of the records review and site investigation. Section 3 provides the EOS for wildlife habitat, and Section 4 provides the EOS for the wetland. Section 5 identifies the conclusions of the EOS, and the references are provided in Section 6.

2. Summary of Results of Records Review and Site Investigation

As stated above, natural features requiring an evaluation of significance are identified through the records review (Hatch Ltd., 2011a) and site investigation (Hatch Ltd., 2011b) required under Sections 25 and 26 of the REA Regulation, respectively. These studies have already been completed, and the results are summarized in Table 2.1. This Report provides the evaluations for the features identified in Table 2.1.

Table 2.1 Natural Features on and within 120 m of the Project Location

Natural Feature	Project Location	Adjacent Lands (within 120 m)
Solar Panel Project Location		
ANSI – Earth Science	No	No
ANSI – Life Science	No	No
Wetland	Yes	Yes
Wildlife Habitat	Yes	Yes
Transmission line Project Location		
ANSI – Earth Science	No	No
ANSI – Life Science	No	No
Wetland	No	Yes
Wildlife Habitat	No	Yes

3. Wildlife Habitat

Several types of candidate significant wildlife habitats were identified during the site investigation:

- Solar Panel Project Location
 - ◆ Habitat for area-sensitive species
 - ◆ Wetlands supporting amphibian breeding habitat
 - ◆ Habitat for species of conservation concern, including
 - Common Nighthawk Habitat
 - Olive-sided Flycatcher Habitat
 - *Vaccinium ovalifolium* habitat
 - *Carex wiegandii* habitat
 - *Carex haydenii* habitat
 - *Scirpus heterochaetus* habitat
- Transmission line Project Location
 - ◆ Generalized Characterized Candidate Significant Wildlife Habitat
 - Seasonal Concentration Areas
 - Winter deer yards/moose late winter habitat

- o Waterfowl stopover and staging areas
- o Waterfowl nesting sites
- Specialized Wildlife Habitats
 - o Area-sensitive woodland/shrubland/grassland habitats
 - o Moose aquatic feeding areas
 - o Old growth or mature forest stands
 - o Woodlands supporting amphibian breeding habitat
 - o Wetlands supporting amphibian breeding habitat
 - o Mink, otter, marten and fisher denning sites
 - o Specialized raptor nesting habitat
 - o Seeps and springs
- Habitat for Species of Conservation Concern
 - o Northern Long-eared Bat
 - o Red-necked Grebe
 - o Short-eared Owl
 - o Common Nighthawk
 - o Canada Warbler
 - o Bald Eagle
 - o Olive-Sided Flycatcher
 - o *Vaccinium ovalifolium*
 - o *Scirpus heterochaetus*
 - o *Carex wiegandii*
 - o *Carex tetanica*
 - o *Carex loliacea*
 - o *Carex haydenii*
- Animal Movement Corridors associated with several waterbodies within 120 m of the Project location.

3.1 Evaluation Criteria and Guidelines for Wildlife Habitat, and Determination of Significance

The criteria processes outlined in the Ministry of Natural Resources (MNR) Natural Heritage Assessment Guide (NHAG) (MNR, 2011) and Significant Wildlife Habitat Technical Guide (SWHTG)

(MNR, 2000) are used to evaluate the significance of wildlife habitat. The specific criteria used in the evaluation from these sources are discussed by habitat type below.

3.1.1 Solar Panel Project Location

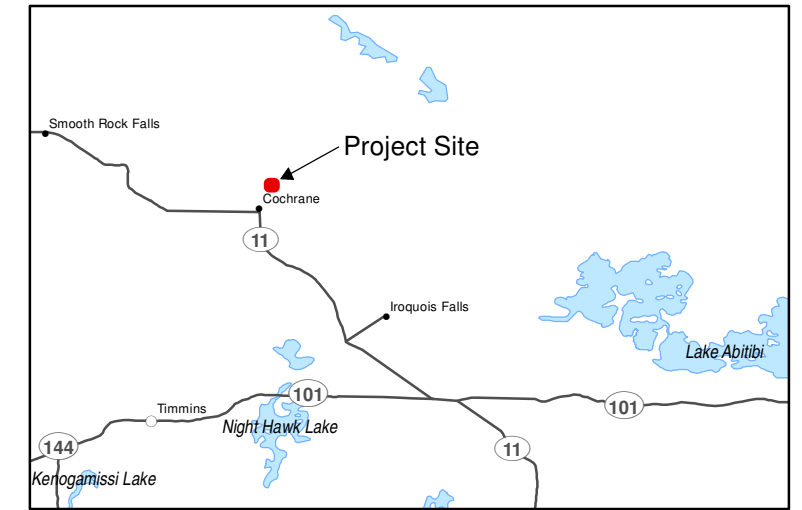
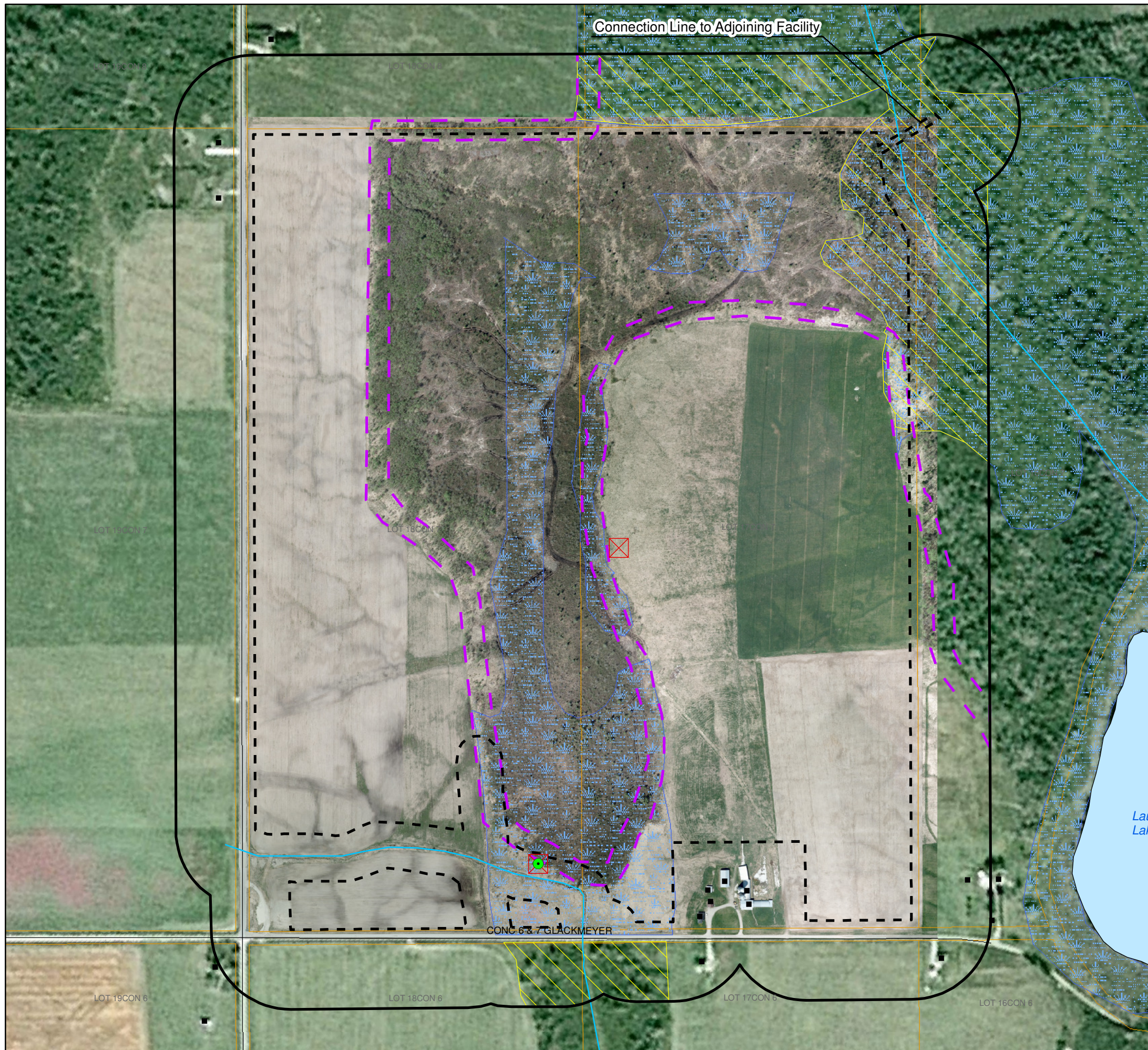
3.1.1.1 Specialized Wildlife Habitat

Criteria for evaluation of specialized habitat for wildlife are identified within Table Q-2 of Appendix Q of the SWTHG. The criteria that were considered during the evaluation of these features are discussed in respect of the individual features below.

3.1.1.1.1 Wetlands Supporting Amphibian Breeding Habitat

Wetlands supporting amphibian breeding habitat were identified within the wetland communities around the creek within 120 m west of the Project location. In order to evaluate the significance of wetlands supporting amphibian breeding habitat, amphibian calling surveys were completed at a point within the wetland community on two separate occasions. Surveys were completed in accordance with the protocols outlined in the Marsh Monitoring Program, which consists of 180 deg, 3-minute point counts, completed either after sunset or after 2200 hours. Survey locations are shown in Figure 3.1. Details of the surveys are provided below:

- Site Investigation 1
 - ◆ Date, Times and Duration of Site Investigation
 - Date: May 18, 2011
 - Start Time: 2245
 - End Time: 2345
 - Duration: 1 hour
 - ◆ Weather Conditions During Site Investigation
 - Temperature: 6°C
 - Cloud Cover: Clear sky
 - ◆ Name and Qualifications of Person Conducting Site Investigation
 - This site investigation was completed by Levi Snook and Shelley Potter.
 - Levi Snook is an Environmental Scientist with experience conducting environmental assessments on proposed hydroelectric, wind, and solar energy sites. He has diplomas in environmental science from Sir Sandford Fleming College and a degree in biology from Trent University. He has expertise in terrestrial assessments in support of Natural Heritage studies that include conducting Ecological Land Classifications, as well as wildlife inventories, including amphibian and reptile surveys.



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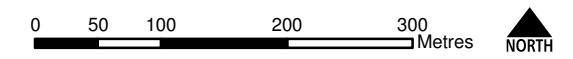
- Amphibian Point Count Location
- Building
- ⊠ Common Nighthawk Survey Location
- Road
- Watercourse
- ▭ Parcel
- ▨ Area-sensitive Shrubland Area Search Location
- ▨ Olive-sided Flycatcher Area Search Location
- ▭ Waterbody
- ▨ Wetland

Project Components

- ▭ Project Location
- ▭ 120 m from Project Location

Notes:

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3. Satellite imagery obtained from Google Earth Pro, captured 2003.
4. Wetland information provided by NRSI (2011).



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Figure 3.1
 Northland Power Inc.
Empire Solar Project
Solar Panel Project Location
and Evaluation of Significance
Survey Locations



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- Shelley Potter is an environmental professional with a marine and freshwater biology honors graduate from the University of Guelph. Previous work and internships have provided experience in the fields of environmental science, sustainable development, water conservation and analysis, fresh water biology, marine mammal biology, Ichthyology and Oceanography. Shelley recently completed an internship with the University of Queensland working with Dr. Mike Noad at the Humpback Whale Acoustic Research Collaboration. Marine Mammal Observing experience, acoustic recording experience and ability to geographically track migration patterns of humpback whales using a theodolite and Cyclops computer program was acquired. Shelley has also recently participated in terrestrial and aquatic field surveys for various renewable energy projects in Ontario.
- Site Investigation 2
 - ◆ Date, Times and Duration of Site Investigation
 - Date: June 21, 2011
 - Start Time: 2130
 - End Time: 2200
 - Duration: 0.5 hours
 - ◆ Weather Conditions During Site Investigation
 - Temperature: 15 °C
 - Beaufort Wind: 2 to 4
 - Cloud Cover: 15%
 - ◆ Name and Qualifications of Person Conducting Site Investigation
 - Names and qualifications of NRSI staff conducting the site investigations are provided in Appendix B.

During the first site investigation, an American Toad, and a full chorus of Spring Peepers were recorded during the site investigations, while no amphibians were recorded during the second site investigation.

The results of these site investigations were then used to assess the criteria for significant wetlands supporting amphibian breeding habitat:

- Provision of significant wildlife habitat – There are no other significant wildlife habitats associated with this feature, and therefore this criteria is not met.
- Degree of permanence – It is expected that water is found within the marshland seasonally, therefore this criteria is not met.

- Species diversity of pond – Two species of frog (Spring Peeper and American Toad) were recorded during amphibian surveys. Therefore, species diversity of the ponds is considered to be poor.
- Presence of rare species – No rare species were identified during the baseline surveys.
- Size and number of ponds – The wetland community is relatively small and therefore this criteria is not met.
- Diversity of submergent and emergent vegetation – A diversity of submergent and emergent vegetation was not recorded from the wetland community.
- Presence of shrubs, logs at edge of pond – Both tall and low shrubs were recorded on or adjacent to the wetland community, therefore this criteria is met.
- Adjacent forest habitat – There are no portions of the wetland community adjacent to forest communities, therefore this criteria is not met.
- Water quality – Water quality is unknown.
- Level of disturbance – Active agricultural operations occur on either side of the wetland community, therefore this criteria is not met.

Therefore, as the only criteria that was met was presence of shrubs and logs at the edge of the pond, this feature is determined to not be a significant wetland supporting amphibian breeding habitat.

3.1.1.1.2 Habitat for Area-Sensitive Shrubland Species

Area-sensitive shrubland birds were assessed through a random area search of suitable habitats during the breeding season. The search area is shown in Figure 3.1. Details of this survey are provided below (note: duration includes area searches of all habitat types).

- Date, Times and Duration of Site Investigation
 - ◆ Date: June 21, 2011
 - ◆ Start Time: 0530
 - ◆ End Time: 0700
 - ◆ Duration: 1.5 hours
- Weather Conditions During Site Investigation
 - ◆ Temperature: 13°C
 - ◆ Beaufort Wind: 2
 - ◆ Cloud Cover: 70%
- Name and Qualifications of Person Conducting Site Investigation
 - ◆ Names and qualifications of NRSI staff conducting the site investigations are provided in Appendix A.

Of the birds detected, none are considered to be area-sensitive shrubland species. Therefore, this habitat is not considered to be significant habitat for area-sensitive species, and further comparison to the criteria is not required.

3.1.1.2 *Habitat for Species of Conservation Concern*

3.1.1.2.1 Olive-sided Flycatcher

Area searches of suitable habitats on the Project location, conducted concurrently with those surveys previously described in Section 3.1.1.2.2, did not result in any observations of Olive-sided Flycatcher. As a result, it is determined that they are not present on or within 120 m of the Project location.

3.1.1.2.2 Common Nighthawk

Evening bird surveys were completed in conjunction with the second site investigation for wetlands supporting amphibian breeding habitat (see Section 3.1.1.1.1 for details of timing and weather conditions). Survey locations are shown in Figure 3.1. No Common Nighthawk were recorded during the surveys on or within 120 m of the Project location.

3.1.1.2.3 *Carex Haydenii*

This species was not detected during vegetation surveys of suitable habitats on and within 120 m of the Project location. Details of vegetation surveys have been previously identified in the Natural Heritage Site Investigations Report (Hatch, 2012b).

3.1.1.2.4 *Carex Wiegandii*

This species was not detected during vegetation surveys of suitable habitats on and within 120 m of the Project location. Details of vegetation surveys have been previously identified in the Natural Heritage Site Investigations Report (Hatch, 2012b).

3.1.1.2.5 *Scirpus Heterochaetus*

This species was not detected during vegetation surveys of suitable habitats on and within 120 m of the Project location. Details of vegetation surveys have been previously identified in the Natural Heritage Site Investigations Report (Hatch, 2012b).

3.1.1.2.6 *Vaccinium Ovalifolium*

This species was not detected during vegetation surveys of suitable habitats on and within 120 m of the Project location. Details of vegetation surveys have been previously identified in the Natural Heritage Site Investigations Report (Hatch, 2012b).

3.1.2 **Transmission line Project Location**

In accordance with Appendix D of the NHAG, all wildlife habitat identified within 120 m of the transmission line Project location during the site investigations are considered to be “Generalized Candidate Significant Wildlife Habitat”. As such the features listed below will be carried forward to the Environmental Impact Study.

- Seasonal Concentration Areas
 - ◆ Winter deer yards/moose late winter habitat
 - ◆ Waterfowl stopover and staging areas
 - ◆ Waterfowl nesting sites
- Specialized Wildlife Habitats
 - ◆ Area-sensitive woodland/shrubland/grassland habitats
 - ◆ Moose aquatic feeding areas
 - ◆ Old growth or mature forest stands
 - ◆ Woodlands supporting amphibian breeding habitat
 - ◆ Wetlands supporting amphibian breeding habitat
 - ◆ Mink, otter, marten and fisher denning sites
 - ◆ Specialized raptor nesting habitat
 - ◆ Seeps and springs
- Habitat for Species of Conservation Concern
 - ◆ Northern Long-eared Bat
 - ◆ Red-necked Grebe
 - ◆ Short-eared Owl
 - ◆ Common Nighthawk
 - ◆ Canada Warbler
 - ◆ Bald Eagle
 - ◆ Olive-Sided Flycatcher
 - ◆ *Vaccinium ovalifolium*
 - ◆ *Scirpus heterochaetus*
 - ◆ *Carex wiegandii*
 - ◆ *Carex tetanica*
 - ◆ *Carex loliacea*
 - ◆ *Carex haydenii*
- Animal Movement Corridors associated with several waterbodies within 120 m of the Project location

3.2 Date of Beginning and Completion of Evaluation

The evaluation of wildlife habitat commenced with records review in May 2010 and is finalized with the completion of this Report in March 2012. Site investigations were completed in association with this evaluation on August 24, 2010, and May 18, June 23, and June 24, 2011.

3.3 Overall Conclusion

Based on the evaluation above, the following significant wildlife habitat features were identified:

- Transmission line Project location
 - ◆ Generalized Characterized Candidate Significant Wildlife Habitat
 - Seasonal Concentration Areas
 - Winter deer yards/moose late winter habitat
 - Waterfowl stopover and staging areas
 - Waterfowl nesting sites
 - Specialized Wildlife Habitats
 - Area-sensitive woodland/shrubland/grassland habitats
 - Moose aquatic feeding areas
 - Old growth or mature forest stands
 - Woodlands supporting amphibian breeding habitat
 - Wetlands supporting amphibian breeding habitat
 - Mink, otter, marten and fisher denning sites
 - Specialized raptor nesting habitat
 - Seeps and springs
 - Habitat for Species of Conservation Concern
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 - Red-necked Grebe
 - Short-eared Owl
 - Common Nighthawk
 - Canada Warbler
 - Bald Eagle
 - Olive-Sided Flycatcher
 - *Vaccinium ovalifolium*
 - *Scirpus heterochaetus*

- o *Carex wiegandii*
- o *Carex tetanica*
- o *Carex loliacea*
- o *Carex haydenii*
- Animal Movement Corridors associated with several waterbodies within 120 m of the Project location.

3.4 Name and Qualifications of Evaluator

Evaluations of wildlife habitat were completed by Sean K. Male of Hatch.

Sean K. Male, M.Sc. is a Terrestrial Ecologist specializing in assessments of terrestrial habitat, flora and fauna. Sean received his Bachelors of Science (Honours) in Biology from Queen's University, where he completed his Honour's thesis under Dr. Raleigh J. Robertson, studying the impacts of nestbox density in Tree Swallows (*Tachycineta bicolor*) on nest-building behaviour. He then completed a Master's of Science degree in the Watershed Ecosystem Graduate Program at Trent University under Dr. Erica Nol. Sean's thesis focussed on examining the impacts of a Canadian diamond mine on a population of breeding passerines. For his thesis, Sean spent two summers in the Canadian arctic studying populations of Lapland Longspurs (*Calcarius lapponicus*) around the Ekati Diamond Mine, located 300 km northeast of Yellowknife. While at Trent, Sean participated in the Northern Saw-whet Owl (*Aegolius acadicus*) Migration Banding Project at the Oliver Centre. Following his time at Trent, Sean participated in the Landscape Monitoring Program, participating in a study of the impacts of woodlot size on breeding birds.

Sean joined Hatch as a Terrestrial Ecologist in 2006. Since joining Hatch, Sean has participated in several environmental assessments, REAs and other regulatory approvals for hydro, wind and solar power developments as the terrestrial biologist specializing in field investigations identifying flora and fauna species, including species of significance. He has developed and implemented baseline monitoring and impact assessment programs for both terrestrial wildlife and plant communities, including detailed bird and bat studies for several wind power developments, including the proposed 100-MW Coldwell wind power development near Marathon, Ontario, a proposed 20-MW facility near Port Dover, Ontario, and a proposed 110-MW wind facility in southwestern Ontario. Sean has also conducted terrestrial and wetland vegetation surveys for several proposed hydropower projects totalling over 40 MW in southern and northern Ontario and has participated in fisheries surveys for several of these projects.

4. Wetlands

4.1 Solar Panel Project Location

The evaluation of the wetland communities was completed separately and can be found in Appendix A. The conclusion of the wetland evaluation was that these communities were provincially significant.

4.2 Transmission line Project Location

There are no wetlands identified on the Transmission line Project Location, however there are a number of wetlands identified within 120 m of this Project location. These wetlands have been identified to be associated with 10 wetland complexes.

Two of these wetland complexes has been previously assessed as a provincially significant wetland (see Section 4.1 and Hatch, 2012c). In accordance with Appendix C of the Natural Heritage Assessment Guide, the eight remaining wetland complexes are assumed to be provincially significant wetlands. The characteristics of these eight wetland communities that must be documented requirements of Appendix C are identified in Table 4.1.

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Table 4.1 Wetland Characteristics and Ecological Functions of Wetlands within 120 m of the Transmission line Project Location

Ecological Function	Wetland Catch Basin 2	Wetland Catch Basin 3	Wetland Catch Basin 4	Wetland Catch Basin 5	Wetland Catch Basin 6	Wetland Catch Basin 7	Wetland Catch Basin 8
Drainage Basin Size (ha)	2015	1432	807		1061	1496	1424
Actual Wetland Size (ha) (within 120 m of transmission line)	47.67	29.47	34.57	1.6	30.1	33.1	22.23
Wetland Type	Within 120 m – Marsh Swamp/thicket swamp communities also present within catch basin	Within 120 m – Swamp Marsh/thicket swamp communities also present within catch basin	Within 120 m – Swamp Marsh/thicket swamp communities also present within catch basin	Within 120 m – Marsh Swamp/thicket swamp communities also present within catch basin	Within 120 m – Swamp Marsh/thicket swamp communities also present within catch basin	Within 120 m – Swamp Marsh/thicket swamp communities also present within catch basin	Within 120 m – Marsh Swamp/thicket swamp communities also present within catch basin
Site Type	Palustrine/Riverine	Palustrine/Riverine	Palustrine/Riverine	Palustrine/Riverine	Palustrine/Riverine	Palustrine/Riverine	Palustrine/Riverine/Lacustrine
Vegetation Communities (within 120 m of transmission line)	gcM; cS; tsS	cS; gcM	cS; tsS	gcM	cS; tsS; gcM	cS; tsS; gcM	gcM; tsS; cS
Proximity to other wetlands	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km
Interspersion	Medium to High	Medium to High	Medium to High	Medium to High	Medium to High	Medium to High	Medium to High
Open Water Types	Type 3: Open water occupies 5-25% of the wetland area, occurring in ponds of various sizes; vegetation occurs in dense patches or diffuse open stands.	Type 1: Open water occupies < 5% of the wetland area.	Type 2: Open water occupies 5-25% of the wetland area, occurring in a central area	Type 2: Open water occupies 5-25% of the wetland area, occurring in a central area	Type 3: Open water occupies 5-25% of the wetland area, occurring in ponds of various sizes; vegetation occurs in dense patches or diffuse open stands	Type 3: Open water occupies 5-25% of the wetland area, occurring in ponds of various sizes; vegetation occurs in dense patches or diffuse open stands	Type 5: Open water occupies 26-75% of the wetland area, occurring in a pattern where small ponds and “embayments” are common
Flood Attenuation (total)	None of the wetland communities located within 120 m of the Project location are considered to be isolated communities, however isolated wetland communities may be found elsewhere within the catchment basin, more than 120 m from the Project location. Wetland vegetation communities along watercourses within 120 m of the Project would provide stormwater retention, and therefore flood attenuation benefits.	None of the wetland communities located within 120 m of the Project location are considered to be isolated communities, however isolated wetland communities may be found elsewhere within the catchment basin, more than 120 m from the Project location. Wetland vegetation communities along watercourses within 120 m of the Project would provide stormwater retention, and therefore flood attenuation benefits.	None of the wetland communities located within 120 m of the Project location are considered to be isolated communities, however isolated wetland communities may be found elsewhere within the catchment basin, more than 120 m from the Project location. Wetland vegetation communities along watercourses within 120 m of the Project would provide stormwater retention, and therefore flood attenuation benefits.	None of the wetland communities located within 120 m of the Project location are considered to be isolated communities, however isolated wetland communities may be found elsewhere within the catchment basin, more than 120 m from the Project location. Wetland vegetation communities along watercourses within 120 m of the Project would provide stormwater retention, and therefore flood attenuation benefits.	None of the wetland communities located within 120 m of the Project location are considered to be isolated communities, however isolated wetland communities may be found elsewhere within the catchment basin, more than 120 m from the Project location. Wetland vegetation communities along watercourses within 120 m of the Project would provide stormwater retention, and therefore flood attenuation benefits.	None of the wetland communities located within 120 m of the Project location are considered to be isolated communities, however isolated wetland communities may be found elsewhere within the catchment basin, more than 120 m from the Project location. Wetland vegetation communities along watercourses within 120 m of the Project would provide stormwater retention, and therefore flood attenuation benefits.	None of the wetland communities located within 120 m of the Project location are considered to be isolated communities, however isolated wetland communities may be found elsewhere within the catchment basin, more than 120 m from the Project location. Wetland vegetation communities along watercourses within 120 m of the Project would provide stormwater retention, and therefore flood attenuation benefits.

Ecological Function	Wetland Catch Basin 2	Wetland Catch Basin 3	Wetland Catch Basin 4	Wetland Catch Basin 5	Wetland Catch Basin 6	Wetland Catch Basin 7	Wetland Catch Basin 8
Water Quality Improvement (total)	Given the presence of: <ul style="list-style-type: none"> • tertiary roadways and corridors within the catchment basin • agricultural and forestry activities within the upland areas the wetland communities are determined to provide moderate water quality improvement functions	Given the presence of: <ul style="list-style-type: none"> • a secondary roadway within the catchment basin • tertiary roadways and corridors within the catchment basin • agricultural and forestry activities within the upland areas • a small pit within the catchment basin the wetland communities are determined to provide moderate water quality improvement functions	Given the presence of: <ul style="list-style-type: none"> • tertiary roadways and corridors within the catchment basin • agricultural and forestry activities within the upland areas the wetland communities are determined to provide low water quality improvement functions	Given the presence of: <ul style="list-style-type: none"> • tertiary roadways and corridors within the catchment basin • agricultural and forestry activities within the upland areas the wetland communities are determined to provide low water quality improvement functions	Given the presence of: <ul style="list-style-type: none"> • a major hydro corridor from the Long Sault hydroelectric station within the catchment basin • tertiary roadways and corridors within the catchment basin • agricultural and forestry activities within the upland areas the wetland communities are determined to provide moderate to high water quality improvement functions	Given the presence of: <ul style="list-style-type: none"> • a major hydro corridor from the Long Sault hydroelectric station within the catchment basin • tertiary roadways and corridors within the catchment basin • forestry activities within the upland areas the wetland communities are determined to provide moderate to high water quality improvement functions	Given the presence of: <ul style="list-style-type: none"> • a major hydro corridor from the Long Sault hydroelectric station within the catchment basin • tertiary roadways and corridors within the catchment basin • agricultural and forestry activities within the upland areas the wetland communities are determined to provide moderate to high water quality improvement functions
Shoreline Erosion Control	Thicket shrub and meadow marsh communities associated with the palustrine/riverine wetland communities within (and beyond) 120 m of the Project location provide high shoreline erosion control functions	Thicket shrub and meadow marsh communities associated with the palustrine/riverine wetland communities within (and beyond) 120 m of the Project location provide high shoreline erosion control functions	Thicket shrub and meadow marsh communities associated with the palustrine/riverine wetland communities within (and beyond) 120 m of the Project location provide high shoreline erosion control functions	Thicket shrub and meadow marsh communities associated with the palustrine/riverine wetland communities within (and beyond) 120 m of the Project location provide high shoreline erosion control functions	Thicket shrub and meadow marsh communities associated with the palustrine/riverine wetland communities within (and beyond) 120 m of the Project location provide high shoreline erosion control functions	Thicket shrub and meadow marsh communities associated with the palustrine/riverine wetland communities within (and beyond) 120 m of the Project location provide high shoreline erosion control functions	Thicket shrub and meadow marsh communities associated with the palustrine/riverine and lacustrine wetland communities found within the catchment basin provide high shoreline erosion control functions
Groundwater Recharge (Total)	Wetlands within 120 m of the Project location are primarily palustrine/riverine, and therefore provide limited to medium potential for groundwater recharge, primarily during annual flooding events, such as spring freshet.	Wetlands within 120 m of the Project location are primarily palustrine/riverine, and therefore provide limited to medium potential for groundwater recharge, primarily during annual flooding events, such as spring freshet.	Wetlands within 120 m of the Project location are primarily palustrine/riverine, and therefore provide limited to medium potential for groundwater recharge, primarily during annual flooding events, such as spring freshet.	Wetlands within 120 m of the Project location are primarily palustrine/riverine, and therefore provide limited to medium potential for groundwater recharge, primarily during annual flooding events, such as spring freshet.	Wetlands within 120 m of the Project location are primarily palustrine/riverine, and therefore provide limited to medium potential for groundwater recharge, primarily during annual flooding events, such as spring freshet.	Wetlands within 120 m of the Project location are primarily palustrine/riverine, and therefore provide limited to medium potential for groundwater recharge, primarily during annual flooding events, such as spring freshet.	Wetlands within 120 m of the Project location are primarily palustrine/riverine, and therefore provide limited to medium potential for groundwater recharge, primarily during annual flooding events, such as spring freshet. The lacustrine wetland communities around the south shore of Lower Deception Lake would provide no groundwater recharge potential.
Species Rarity (Total)	No rare species noted during 2011 surveys within the wetland. <ul style="list-style-type: none"> • Breeding Habitat for Endangered or Threatened Species = none 	No rare species noted during 2011 surveys within the wetland. <ul style="list-style-type: none"> • Breeding Habitat for Endangered or Threatened Species = none 	No rare species noted during 2011 surveys within the wetland. <ul style="list-style-type: none"> • Breeding Habitat for Endangered or Threatened Species = none 	No rare species noted during 2011 surveys within the wetland. <ul style="list-style-type: none"> • Breeding Habitat for Endangered or Threatened Species = none 	No rare species noted during 2011 surveys within the wetland. <ul style="list-style-type: none"> • Breeding Habitat for Endangered or Threatened Species = none 	No rare species noted during 2011 surveys within the wetland. <ul style="list-style-type: none"> • Breeding Habitat for Endangered or Threatened Species = none 	No rare species noted during 2011 surveys within the wetland. <ul style="list-style-type: none"> • Breeding Habitat for Endangered or Threatened Species = none

Ecological Function	Wetland Catch Basin 2	Wetland Catch Basin 3	Wetland Catch Basin 4	Wetland Catch Basin 5	Wetland Catch Basin 6	Wetland Catch Basin 7	Wetland Catch Basin 8
	<ul style="list-style-type: none"> Traditional Migration or Feeding Areas for an Endangered or Threatened Species = none Provincially Significant Plant and Animal Species = none Regionally Significant Species = none Locally Significant Species = none Species of Special Status = none 	<ul style="list-style-type: none"> Traditional Migration or Feeding Areas for an Endangered or Threatened Species = none Provincially Significant Plant and Animal Species = none Regionally Significant Species = none Locally Significant Species = none Species of Special Status = none 	<ul style="list-style-type: none"> Traditional Migration or Feeding Areas for an Endangered or Threatened Species = none Provincially Significant Plant and Animal Species = none Regionally Significant Species = none Locally Significant Species = none Species of Special Status = none 	<ul style="list-style-type: none"> Traditional Migration or Feeding Areas for an Endangered or Threatened Species = none Provincially Significant Plant and Animal Species = none Regionally Significant Species = none Locally Significant Species = none Species of Special Status = none 	<ul style="list-style-type: none"> Traditional Migration or Feeding Areas for an Endangered or Threatened Species = none Provincially Significant Plant and Animal Species = none Regionally Significant Species = none Locally Significant Species = none Species of Special Status = none 	<ul style="list-style-type: none"> Traditional Migration or Feeding Areas for an Endangered or Threatened Species = none Provincially Significant Plant and Animal Species = none Regionally Significant Species = none Locally Significant Species = none Species of Special Status = none 	<ul style="list-style-type: none"> Traditional Migration or Feeding Areas for an Endangered or Threatened Species = none Provincially Significant Plant and Animal Species = none Regionally Significant Species = none Locally Significant Species = none Species of Special Status = none
Significant Features and Habitats (Total)	<ul style="list-style-type: none"> Colonial Waterbirds = none Winter Cover for Wildlife = none Waterfowl Staging and/or Molting Area = none Waterfowl Breeding = none 	<ul style="list-style-type: none"> Colonial Waterbirds = none Winter Cover for Wildlife = none Waterfowl Staging and/or Molting Area = none Waterfowl Breeding = none 	<ul style="list-style-type: none"> Colonial Waterbirds = none Winter Cover for Wildlife = none Waterfowl Staging and/or Molting Area = none Waterfowl Breeding = none 	<ul style="list-style-type: none"> Colonial Waterbirds = none Winter Cover for Wildlife = none Waterfowl Staging and/or Molting Area = none Waterfowl Breeding = none 	<ul style="list-style-type: none"> Colonial Waterbirds = none Winter Cover for Wildlife = none Waterfowl Staging and/or Molting Area = none Waterfowl Breeding = none 	<ul style="list-style-type: none"> Colonial Waterbirds = none Winter Cover for Wildlife = none Waterfowl Staging and/or Molting Area = none Waterfowl Breeding = none 	<ul style="list-style-type: none"> Colonial Waterbirds = none Winter Cover for Wildlife = none Waterfowl Staging and/or Molting Area = none Waterfowl Breeding = none
Fish Habitat (Total)	<p>No specific fish community or habitat assessment work has been conducted.</p> <p>The watercourses and associated riparian wetlands within the community are deemed to provide spawning, nursery and residence habitat for the fish community, as well as some migration/movement function as fish travel to and from various habitat areas.</p>	<p>No specific fish community or habitat assessment work has been conducted.</p> <p>The watercourses and associated riparian wetlands within the community are deemed to provide spawning, nursery and residence habitat for the fish community, as well as some migration/movement function as fish travel to and from various habitat areas.</p>	<p>No specific fish community or habitat assessment work has been conducted.</p> <p>The watercourses and associated riparian wetlands within the community are deemed to provide spawning, nursery and residence habitat for the fish community, as well as some migration/movement function as fish travel to and from various habitat areas.</p>	<p>No specific fish community or habitat assessment work has been conducted.</p> <p>The watercourses and associated riparian wetlands within the community are deemed to provide spawning, nursery and residence habitat for the fish community, as well as some migration/movement function as fish travel to and from various habitat areas.</p>	<p>No specific fish community or habitat assessment work has been conducted.</p> <p>The watercourses and associated riparian wetlands within the community are deemed to provide spawning, nursery and residence habitat for the fish community, as well as some migration/movement function as fish travel to and from various habitat areas.</p>	<p>No specific fish community or habitat assessment work has been conducted.</p> <p>The watercourses and associated riparian wetlands within the community are deemed to provide spawning, nursery and residence habitat for the fish community, as well as some migration/movement function as fish travel to and from various habitat areas.</p>	<p>No specific fish community or habitat assessment work has been conducted.</p> <p>The watercourses and associated riparian wetlands within the community are deemed to provide spawning, nursery and residence habitat for the fish community, as well as some migration/movement function as fish travel to and from various habitat areas.</p>

5. Conclusions

Results of the EOS are summarized in Table 5.1. Based on the EOS outlined above, there are significant natural features present on and within 120 m of the Project location. The locations of these features are shown in Figures 1.1 to 1.3.

An environmental impact study conducted according to the requirements of Section 38(2) of O. Reg. 359/09 will be required in order to construct the Project within 120 m of these significant natural features.

Table 5.1 Significant Natural Features on and within 120 m of the Project Location

Natural Feature	Project Location	Adjacent Lands (within 120 m)	
<i>Solar Panel Project Location</i>			
SIGNIFICANT	Wildlife Habitat	No	No
	Wetland	Yes	Yes
PROVINCIALY SIGNIFICANT	Earth Science ANSI	No	No
	Life Science ANSI	No	No
<i>Transmission line Project Location</i>			
SIGNIFICANT	Wildlife Habitat	No	Yes (generalized candidate significant wildlife habitat)
PROVINCIALY SIGNIFICANT	Wetland	No	Yes (2 evaluated, 8 assumed provincially significant)
	Earth Science ANSI	No	No
	Life Science ANSI	No	No

6. References

Hatch Ltd. 2012a. Empire Solar Project – Natural Heritage Records Review Report. Prepared for Northland Power Inc. on behalf of Northland Power Solar Empire L.P.

Hatch Ltd. 2012b. Empire Solar Project – Natural Heritage Site Investigations Report. Prepared for Northland Power Inc. on behalf of Northland Power Solar Empire L.P.

Hatch Ltd. 2012c. Long Lake Solar Project – Natural Heritage Site Investigations Report. Prepared for Northland Power Inc. on behalf of Northland Power Solar Long Lake L.P.

Ministry of Natural Resources (MNR). 2011. Natural Heritage Assessment Guide for Renewable Energy Projects. Toronto: Queen's Printer for Ontario. 248 pp.

MNR. 2000. Significant Wildlife Habitat Technical Guide. 151p.

Appendix A
Natural Resource Solutions Inc. (NRSI)
Wetland Evaluation



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

1247D

February 21, 2012

Mr. Sean Male
Hatch Energy
4342 Queen Street, Suite 500
Niagara Falls, ON L2E 7J7

Dear Mr. Male,

**RE: Empire Solar Project
Summary of Wetland & Upland Vegetation Mapping,
Breeding Bird and Amphibian Call Surveys**

Summary of Surveys

On behalf of Natural Resource Solutions Inc., I am pleased to provide the following which documents the work completed at the above noted solar project being proposed by Northland Power.

The objectives of this assignment were to complete vegetation mapping, amphibian surveys, breeding bird, and evening bird surveys.

Appendix I includes a list of study team members and their roles.

Vegetation

On site vegetation mapping occurred on June 22, 2011 (0830 - 1300hrs, weather 8°C, sunny, 65% cloud cover, wind – Beaufort scale 3). The standard Ontario Wetland Evaluation System (OWES) (OMNR 1993) was used by a Certified Wetland Evaluator to map and describe on-site wetlands, as well as wetlands within 120m of the project site.

Upland vegetation on the subject property and within 120m was described using the Forest Ecosystem Classification system (Taylor et al. 2000). Since this system focuses on woodland habitats, the standard Ecological Land Classification (ELC) System for Southern Ontario (Lee et al. 1998; Lee 2008) was used to classify meadow, thicket and other habitats not covered by the FEC.

In addition, a catchment basin boundary was identified that included the on-site wetlands. All wetlands in the catchment basin were also mapped and described using OWES June 21 to June 24, 2011. In this case, land access and the extent of the lands required that the mapping be completed using aerial photography supplemented with field checks of wetland polygons at strategic locations (primarily roadside).

Please see Appendix II for a list of polygon labels.

The wetlands within the catchment basin were evaluated using the standard OWES system for northern Ontario. A copy of the completed evaluation, including mapping, is included in Appendix III.

Amphibian Call Monitoring

On site amphibian surveys were completed on June 21, 2011 (2130 – 2200hrs, weather 15°C, 15% cloud cover, wind – Beaufort scale 2 to 4). The standard Marsh Monitoring Protocol (Bird Studies Canada 2009) was used in which 3 minute point counts were conducted at predetermined stations.

No amphibians were heard at any station.

The field data forms are included in Appendix IV.

Breeding Bird Surveys

On site breeding bird surveys were completed on 21 June, 2011 (0530 – 0700hrs, weather 13°C, 70% cloud cover, wind – Beaufort scale 2) using the standard Ontario Breeding Bird methodology (Cadman et al. 2007).

The following species were observed during that period:

Species Observed	Observed	Possible	Probable	Confirmed
American Crow (<i>Corvus brachyrhynchos</i>)	X			
American Goldfinch (<i>Carduelis tristis</i>)		S		
American Redstart (<i>Setophaga ruticilla</i>)		S		
American Robin (<i>Turdus migratorius</i>)			P	
Black-and-white Warbler (<i>Mniotilta varia</i>)		S		
Black-capped Chickadee (<i>Poecile atricapillus</i>)		S		
Chestnut-sided Warbler (<i>Dendroica pensylvanica</i>)		S		
Common Loon (<i>Gavia immer</i>)		S		
Common Yellowthroat (<i>Geothlypis trichas</i>)		S		
Eastern Phoebe (<i>Sayornis phoebe</i>)		S		
Gray Catbird (<i>Dumetella carolinensis</i>)		S		
Least Flycatcher (<i>Empidonax minimus</i>)		S		
Red-eyed Vireo (<i>Vireo olivaceus</i>)		S		
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)			P	
Sandhill Crane (<i>Grus canadensis</i>)			P	
Savannah Sparrow (<i>Passerculus sandwichensis</i>)		S		
Scarlet Tanager (<i>Piranga olivacea</i>)		S		
Song Sparrow (<i>Melospiza melodia</i>)		S		
Veery (<i>Catharus fuscenscs</i>)		S		
White-throated Sparrow (<i>Zonotrichia albicollis</i>)		S		

Observed

X Species observed in its breeding season with no evidence of breeding

Possible

H Species observed in its breeding season in suitable nesting habitat

S Singing male present or breeding calls heard in breeding season in suitable nesting habitat

Probable

P Pair observed in their breeding season in suitable nesting habitat

T Permanent territory presumed through registration of territorial song on at least 2 days, one week or more apart at the same place

D Courtship or display between a male and female or 2 males including courtship feeding and copulation

V Visiting probable nest site

A Agitated behaviour or anxiety calls of an adult

B Brood patch on adult female or cloacal protuberance on adult male

N Nest building or excavation of nest site

Confirmed

DD Distraction display or injury feigning

NU Used nest or egg shell found (occupied/laid this season)

FY Recently fledged young or downy young

AE Adults leaving or entering nest site in circumstances indicating occupied nest

FS Adult carrying faecal sac

CF Adult carrying food for young

NE Nest containing eggs

NY Nest with young seen or heard

Evening Bird Surveys

Surveys for birds that are primarily active in the evening were conducted at the project site. The surveys were completed on June 21, 2011 (2130 - 2200hrs, weather 15°C, 15% cloud cover, wind – Beaufort scale 2 to 4). No evening birds were heard on site.

Other species observed during evening bird surveys included:

White-tailed Deer (*Odocoileus virginianus*)

References

- Bird Studies Canada. 2009. Marsh Monitoring Program Participant's Handbook for Surveying Amphibians. 2009 Edition. Published by Bird Studies Canada in Cooperation with Environment Canada and the U.S. Environmental Protection Agency. February 2009.
- Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier. 2007. Atlas of the Breeding Birds of Ontario. Available online at: <http://www.birdsontario.org/atlas/index.jsp>
- Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.
- Lee, H. 2008. Southern Ontario Ecological Land Classification - Vegetation Type List. Ontario Ministry of Natural Resources: London, Ontario.
- Ontario Ministry of Natural Resources. 1993. Ontario Wetland Evaluation System. Northern Manual. Revised 1994 & 2002)
- Ontario Ministry of Natural Resources. 2011. Northeast Nightjar Survey Techniques (Draft). Sudbury District MNR
- Taylor, K.C. et al. 2000. A Field Guide to Forest Ecosystems of Northeastern Ontario. 2nd Edition. NEST Field Guide FG-001.

**Appendix I
Team Members**

Team Member	Qualification	Role
David Stephenson	Certified Wetland Evaluator Certified ELC Certified OWES Certified Arborist	Project Management, Reporting
Jessica Grealey	Terrestrial and Wetland Biologist Certified ELC	Site Assessment
Tara Brenton	Terrestrial and Wetland Biologist Certified ELC Certified OWES Certified Arborist	Site Assessment
Charlotte Moore	Terrestrial Biologist	Site Assessment
Megan Pope	Terrestrial Biologist	Site Assessment, Data Analysis, Reporting
Gerry Schaus	GIS Technician	Mapping

Appendix II

Within Project Site and 120m boundary

OWES CLASSIFICATIONS

- tsS_{7,18}: [OWES: Tall Shrub Swamp]
*ts: speckled alder (*Alnus incana* spp. *rugosa*), red osier dogwood (*Cornus stolonifera*)
gc: pale touch-me-not (*Impatiens palidia*), spinulose wood fern (*Dryopteris carthusiana*), fragrant bedstraw (*Galium triflorum*)
m: moss sp.
- tsS₄₃₋₄₆: [OWES: Tall Shrub Swamp]
*ts: speckled alder (*Alnus incana* spp. *rugosa*), bebb's willow (*Salix bebbiana*)
ls: red osier dogwood (*Cornus stolonifera*), red raspberry (*Rubus idaeus* ssp. *idaeus*)
gc: lady fern (*Athyrium filix-femina* var. *angustum*), tall meadowrue (*Thalictrum pubescens*), New England aster (*Symphotrichum novae-angliae*), rough goldenrod (*Solidago rugosa* ssp. *rugosa*), Common hairgrass (*Deschampia flexuosa*)
ne: reed canary grass (*Phalaris arundinacea*)
- tsS₄₈: [OWES: Tall Shrub Swamp]
ds: speckled alder (*Alnus incana* spp. *rugosa*)
*ts: speckled alder (*Alnus incana* spp. *rugosa*), Bebb's willow (*Salix bebbiana*), shining willow (*Salix lucida*), alder-leaved buckthorn (*Rhamnus alnifolia*)
gc: wild mint (*Mentha arvensis* ssp. *borealis*), New England aster (*Symphotrichum novae-angliae*), Yellow Water-crowfoot (*Ranunculus flabellaris*)
ne: Awl-fruited Sedge (*Carex stipata*), fox sedge (*Carex vulpinoidea*), reed canary grass (*Phalaris arundinacea*), tall oat grass (*Arrhenatherum elatius*)
- neM₄₂: [OWES: Narrow-leaved Emergents Marsh]
ls: bebb's willow (*Salix bebbiana*), speckled alder (*Alnus incana* spp. *rugosa*), red raspberry (*Rubus idaeus* ssp. *idaeus*)
gc: new England aster (*Symphotrichum novae-angliae*), rough goldenrod (*Solidago rugosa* ssp. *rugosa*), wild mint (*Mentha arvensis* ssp. *borealis*)
*ne: reed canary grass (*Phalaris arundinacea*), fox sedge (*Carex vulpinoidea*), Small-fruited Bulrush (*Scirpus microcarpus*)

reM₁₄:

[OWES: Robust Emergents Marsh]
ds: speckled alder (*Alnus incana* spp. *rugosa*)
*re: common cattail (*Typha latifolia*)
ff: greater duckweed (*Spirodela polyrhiza*)

FEC CLASSIFICATIONS

ES6m: [FEC: Trembling Aspen-Black Spruce-Balsam Fir-Medium Soil]
Mixedwood stands on fresh to moderately moist, medium loamy to silty soils. Medium number of shrubs, herb rich).

ES7m: [FEC: Trembling Aspen-White Birch-Medium Soil]
Hardwood mixedwood stands on fresh to moist, medium loamy to silty soils. Medium number of shrubs and herbs, with abundant tall shrubs).

ES10: [FEC: Trembling Aspen-Black Spruce-Balsam Poplar-Moist Soil]
Hardwood mixedwood stands on moist, sandy to clayey (all mineral soil types) soils. Medium number of shrubs, herb rich, speckled alder common).

ELC CLASSIFICATIONS

MEG: [ELC: Graminoid Meadow]

MEGM3-8: [ELC: Reed Canary Grass Graminoid Meadow Type]

THDM2-8: [ELC: Raspberry Deciduous Shrub Thicket Type]

Outside of Project Site and 120m boundary

OWES CLASSIFICATIONS

cS_{1,2,13,27,32,33,34,37}:
[OWES: Coniferous Swamp]

hS₈:
[OWES: Deciduous Swamp]

tsS_{3-5,10-12,16,17,19-24,38,39,81}:
[OWES: Tall Shrub Swamp]

neM_{15,28,40,41,83}:
[OWES: Narrow-leaved Emergents Marsh]

reM₂₉:
[OWES: Robust Emergents Marsh]

FEC CLASSIFICATIONS

ES1r: [FEC: White Spruce-White Birch-Very Shallow Soil-Species Rich]
Mixedwood dominated by white spruce and white birch on dry to fresh, very shallow soils (0-30cm) over bedrock. Medium number of shrubs, herb poor).

ES6m: [FEC: Trembling Aspen-Black Spruce-Balsam Fir-Medium Soil]
Mixedwood stands on fresh to moderately moist, medium loamy to silty soils. Medium number of shrubs, herb rich).

ELC CLASSIFICATIONS

THDM2-8: [ELC: Raspberry Deciduous Shrub Thicket Type]

WODM5-1: [ELC: Moist Poplar Deciduous Woodland Type]

MEMM3: [ELC: Fresh Mixed Meadow Ecosite]

Abitibi-Martin's Meadow-Empire Wetland Complex

Wetland Evaluation Edition

2012

February 22, 2012

Comments

Attached Documents include:

Map of Interspersion

Map of Long Lake Wetland Complex Catchment Basin

Vascular Plant List

Fauna list

Additional Information

Official Name:	Abitibi-Martin's Meadow-Empire Wetland Complex		
Evaluation Edition:	2012	Class:	Wetland ID.:
Wetland Significance	Year/Month Last Evaluated	February 22, 2012	
Provincially Significat	Year/Month Last Updated		
Special Planning Considerations:		Scores	
		Biological:	132
		Social:	107
		Hydrological:	205
		Special Features:	159
		Overall:	603
Submitted by:	Natural Resources Solutions Inc.		
Date:	February 22, 2012		

WETLAND DATA AND SCORING RECORD

- i) **WETLAND NAME:** Abitibi-Martin's Meadow-Empire Wetland Complex
- ii) **MNR ADMINISTRATIVE REGION:** Cochrane **DISTRICT:** Cochrane
AREA OFFICE (if different from District): _____
- iii) **CONSERVATION AUTHORITY JURISDICTION:**
 (If not within a designated CA, check here: X)
- iv) **COUNTY OR REGIONAL MUNICIPALITY:** Cochrane
- v) **TOWNSHIP:** Cochrane
- vi) **LOTS & CONCESSIONS:** Glackmeyer Conc. 11 Lot 17, Conc. 10 Lots 12-19,
 (attach separate sheet if necessary) Conc. 9 Lots 12-19, Conc. 8 Lots 12-18,
Conc. 7 Lots 13-18, Conc. 6 Lots 16-17, Conc. 5 Lots 15-18
- vii) **MAP AND AIR PHOTO REFERENCES**
- a) Latitude: _____ Longitude: _____
- b) UTM grid reference: Zone: 17 U Block: _____
 Grid:E 501243 N 5442382
- c) National Topographic Series:
 map name(s) _____
 map number(s) _____ edition _____
 scale 1:22,000
- d) Aerial photographs: Date photo taken: Spring 2005 Scale: Google Earth Imagery
 Flight & plate numbers: _____

 (attach separate sheet if necessary)
- e) Ontario Base Map numbers & scale _____

 (attach separate sheets if necessary)

1.0 BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY

1.1.1 GROWING DEGREE-DAYS/SOILS

GROWING DEGREE DAYS

(check one)

- 1) _____ <1600
- 2) _____ 1600-2000
- 3) X _____ 2000-2400
- 4) _____ 2400-2800
- 5) _____ 2800-3000
- 6) _____ >3000

SOILS

Estimated Fractional Area

0.300	clay/loam
_____	silt/marl
_____	limestone
_____	sand
0.200	humic/mesic
0.500	fibric
_____	granite

SCORING:

Growing Degree-Days	Clay-Loam	Silt-Marl	Lime-stone	Sand	Humic-Mesic	Fibric	Granite
<1600	12	11	9	7	7	6	4
1600-2000	15	13	11	9	8	7	5
2000-2400	18	15	13	11	9	8	7
2400-2800	22	18	15	13	11	9	7
2800-3000	26	21	18	15	13	10	8
>3000	30	25	20	18	15	12	9

(maximum score 30; if wetland contains more than one soil type, evaluate based on the fractional area)

Steps required for evaluation: _____ (maximum score 30 points)

1. Select GDD line in evaluation table applicable to your wetland;
2. Determine fractional area of the wetland for each soil type;
3. Multiply fractional area of each soil type by score;
4. Sum individual soil type scores (round to nearest whole number).

In wetland complexes the evaluator should aim at determining the percentage of area occupied by the categories for the complex as a whole.

Score		
18	clay/loam	5.40
_____	silt/marl	0.00
_____	limestone	0.00
_____	sand	0.00
9	humic/mesic	1.80
8	fibric	4.00
_____	granite	0.00

Final Score Growing Degree-Days/Soils (maximum 30 points)

11

1.1.2 WETLAND TYPE (Fractional Area = area of wetland type/total wetland area)

	Fractional Area		Score
Bog		x 3	0.00
Fen		x 6	0.00
Swamp	0.87	x 8	6.96
Marsh	0.13	x 15	1.95

Wetland type score (maximum 15 points) 9

1.1.3 SITE TYPE (Fractional Area = area of site type/total wetland area)

	Fractional Area		Score
Isolated		x 1 =	0.000
Palustrine (permanent or intermittent flow)	0.830	x 2 =	1.660
Riverine	0.150	x 4 =	0.600
Riverine (at rivermouth)		x 5 =	0.000
Lacustrine (at rivermouth)		x 5 =	0.000
Lacustrine (on enclosed bay, with barrier beach)		x 3 =	0.000
Lacustrine (exposed to lake)	0.020	x 2 =	0.040
		Sub Total:	2.300

Site Type Score (maximum 5 points) 2

1.2 BIODIVERSITY

1.2.1 NUMBER OF WETLAND TYPES

(Check only one)	Score
1) <input type="checkbox"/>	one 9 points
2) <input checked="" type="checkbox"/>	two 13
3) <input type="checkbox"/>	three 20
4) <input type="checkbox"/>	four 30

Number of Wetland Types Score (maximum 30 points) 13

1.2.2 VEGETATION COMMUNITIES

Attach a separate sheet listing community (map) codes, vegetation forms and dominant species. Use the form on the following page to record percent area by dominant vegetation form. This information will be used in other parts of the evaluation.

Communities should be grouped by number of forms. For example, 2 form communities might appear as follows:

2 forms

<u>Code</u>	<u>Forms</u>	<u>Dominant Species</u>
M6	re, ff	re, <i>Typha latifolia</i> ; ff, <i>Lemna minor</i> , <i>Wolffia</i>
S1	ts, gc	ts, <i>Salix discolor</i> ; gc, <i>Impatiens capensis</i> , <i>Thelypteris palustris</i>

Note that the dominant species for each form are separated by a semicolon. The dominant species (maximum of 2) within a form are separated by commas.

Scoring:

Total # of communities with 1-3 forms = 40	Total # of communities with 4 -5 forms = 23	Total # of communities with 6 or more forms = 1
1 = 1.5 points	1 = 2 points	1 = 3 points
2 = 2.5	2 = 3.5	2 = 5
3 = 3.5	3 = 5	3 = 7
4 = 4.5	4 = 6.5	4 = 9
5 = 5	5 = 7.5	5 = 10.5
6 = 5.5	6 = 8.5	6 = 12
7 = 6	7 = 9.5	7 = 13.5
8 = 6.5	8 = 10.5	8 = 15
9 = 7	9 = 11.5	9 = 16.5
10 = 7.5	10 = 12.5	10 = 18
11 = 8	11 = 13	11 = 19
+ .5 each additional community = <u>5.0</u>	+ .5 each additional community = <u>5.0</u>	+ 1 each additional community = <u>3.0</u>
e.g., a wetland with 3 one form communities and 8 six form communities would score:	4 two form communities	12 four form communities and

6+13.5+15=34.5=35 points

Vegetation Communities Score (maximum 45 points) 13

1.2.3 DIVERSITY OF SURROUNDING HABITAT

(Check all appropriate items(1))

<input type="checkbox"/>	recent burn (< 5 yr)
<input type="checkbox"/>	abandoned agricultural land
<input type="checkbox"/>	utility corridor
<input checked="" type="checkbox"/>	deciduous forest
<input type="checkbox"/>	recent cutover or clearcut (<5 yr)
<input checked="" type="checkbox"/>	coniferous forest
<input checked="" type="checkbox"/>	mixed forest (at least 25% conifer and 75% deciduous or vice versa)
<input checked="" type="checkbox"/>	crops
<input type="checkbox"/>	abandoned pits and quarries
<input checked="" type="checkbox"/>	pasture
<input type="checkbox"/>	ravine
<input checked="" type="checkbox"/>	fence rows
<input checked="" type="checkbox"/>	open lake or deep river
<input checked="" type="checkbox"/>	creek flood plain
<input type="checkbox"/>	rock outcrop

Diversity of Surrounding Habitat Score (1 for each, maximum 7 points)**7****1.2.4 PROXIMITY TO OTHER WETLANDS**

(Check first appropriate category only)

Scoring

1)	<input checked="" type="checkbox"/>	Hydrologically connected by surface water to other wetlands (different dominant wetland type) or open lake or river within 1.5 km	8 points
2)	<input type="checkbox"/>	Hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5 km	8
3)	<input type="checkbox"/>	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or open lake or river from 1.5 to 4 km away (Second Marsh Wetland)	5
4)	<input type="checkbox"/>	Hydrologically connected by surface water to other wetlands (same dominant wetland type) from 0.5 to 1.5 km away	5
5)	<input type="checkbox"/>	Within 0.75 km of other wetlands (different dominant wetland type) or open lake or river, but not hydrologically connected by surface water	5
6)	<input type="checkbox"/>	Within 1 km of other wetlands, but not hydrologically connected by surface water	2
7)	<input type="checkbox"/>	No wetland within 1 km	0

Proximity to other Wetlands Score (Choose one only, maximum 8 points)**8**

1.2.5 INTERSPERSION

Number of Intersections (Check one)		Score
1)	26 or less	3
2)	27 to 40	6
3)	41 to 60	9
4)	61 to 80	12
5)	81 to 100	15
6)	101 to 125	18
7)	126 to 150	21
8)	151 to 175	24
9)	176 to 200	27
10)	>200	30

Interspersion Score (Choose one only maximum 30 points)

24

1.2.6 OPEN WATER TYPES

Permanently flooded: (Check one)		Score
1)	<input checked="" type="checkbox"/> type 1	8
2)	<input type="checkbox"/> type 2	8
3)	<input type="checkbox"/> type 3	14
4)	<input type="checkbox"/> type 4	20
5)	<input type="checkbox"/> type 5	30
6)	<input type="checkbox"/> type 6	8
7)	<input type="checkbox"/> type 7	14
8)	<input type="checkbox"/> type 8	3
9)	<input type="checkbox"/> no open water	0

Open Water Type Score (Choose one only maximum 30 points)

8

1.3 SIZE696.52

hectares

73

Subtotal for Biodiversity

Size Score (Biological Component) (maximum 50 points)**37**

Evaluation Table Size Score (Biological component)

Wetland size (ha)	Total Score for Biodiversity Subcomponent									
	<37	37-47	48-60	61-72	73-84	85-96	97-108	109-120	121-132	>132
<20 ha	1	5	7	8	9	17	25	34	43	50
20-40	5	7	8	9	10	19	28	37	46	50
41-60	6	8	9	10	11	21	31	40	49	50
61-80	7	9	10	11	13	23	34	43	50	50
81-100	8	10	11	13	15	25	37	46	50	50
101-120	9	11	13	15	18	28	40	49	50	50
121-140	10	13	15	17	21	31	43	50	50	50
141-160	11	15	17	19	23	34	46	50	50	50
161-180	13	17	19	21	25	37	49	50	50	50
181-200	15	19	21	23	28	40	50	50	50	50
201-400	17	21	23	25	31	43	50	50	50	50
401-600	19	23	25	28	34	46	50	50	50	50
601-800	21	25	28	31	37	49	50	50	50	50
801-1000	23	28	31	34	40	50	50	50	50	50
1001-1200	25	31	34	37	43	50	50	50	50	50
1201-1400	28	34	37	40	46	50	50	50	50	50
1401-1600	31	37	40	43	49	50	50	50	50	50
1601-1800	34	40	43	46	50	50	50	50	50	50
1801-2000	37	43	47	49	50	50	50	50	50	50
>2000	40	46	50	50	50	50	50	50	50	50

2.0 SOCIAL COMPONENT**2.1 ECONOMICALLY VALUABLE PRODUCTS****2.1.1 WOOD PRODUCTS**

Area of wetland forested (ha), i.e. dominant form is h or c. Note that this is not wetland size. (Check one only)

		Score
1)	<input type="checkbox"/> <5 ha	0
2)	<input type="checkbox"/> 5 -25 ha	4
3)	<input type="checkbox"/> 26 -50 ha	6
4)	<input type="checkbox"/> 51- 100 ha	8
5)	<input type="checkbox"/> 101 -200 ha	11
6)	<input checked="" type="checkbox"/> >200 ha	14

Source of information: NRSI mapping

Wood Products Score (Score one only, maximum 14 points)

14

2.1.2 Lowbush Cranberry

(Check one)

Present

1)

Score (Choose one)

2 points

Absent

2)

0

0

Source of information: _____

Lowbush Cranberry Score (maximum 2 points)

0

2.1.3 Wild Rice

(Check one)

Present (at least 0.5 ha)

1)

X

Score (Choose one)

10 points

Absent

2)

0

Source of information: Cochrane MNR office

Wild Rice Score (maximum 10 points)

10

2.1.4 COMMERCIAL FISH (BAIT FISH AND/OR COARSE FISH)

(Check one)

Present

1)

X

Score (Choose one)

12 points

Absent

2)

0

Source of information:

NRSI

Commercial Fish Score (maximum 12 points)

12

2.1.5 FURBEARERS

(Consult Appendix 9)

Name of furbearer

Source of information

1)	beaver	3
2)	red fox	3
3)	red squirrel	3
4)	marten	3
5)		

field work
field work
field work
Cochrane MNR office

Scoring: 3 points for each species. maximum 12

Furbearer Score (maximum 12 points)

12

2.2 RECREATIONAL ACTIVITIES

Type of Wetland-Associated Use						
Intensity of Use	Hunting		Nature Enjoyment/ Ecosystem Study		Fishing	
High	40 points		40 points		40 points	
Moderate	20		20		20	
Low	8	X	8		8	X
Not possible/NotKnown	0		0	X	0	
Totals		8		0		8

(score one level for each of the three wetland uses; scores are cumulative; maximum score 80 points)

Sources of information:

Hunting: Cochrane MNR office

Nature: Cochrane MNR office

Fishing: Cochrane MNR office

Recreational Activities Score (maximum 80 points)

16

2.3 LANDSCAPE AESTHETICS**2.3.1 DISTINCTNESS**

(Check one)		Score (Choose one)
Clearly distinct	1) <input type="checkbox"/>	3 points
Indistinct	2) <input checked="" type="checkbox"/>	0

Landscape Distinctness Score (maximum 3 points)**0****2.3.2 ABSENCE OF HUMAN DISTURBANCE**

(Check one)		Score (Choose one)
Human disturbances absent or nearly so	1) <input type="checkbox"/>	7 points
One or several localized disturbances	2) <input checked="" type="checkbox"/>	4
Moderate disturbance; localized water pollution	3) <input type="checkbox"/>	2
Wetland intact but impairment of ecosystem quality intense in some areas	4) <input type="checkbox"/>	1
Extreme ecological degradation, or water pollution severe and widespread	5) <input type="checkbox"/>	0

Source of information: air photos, field work**Absence of Human Disturbance Score (maximum 7 points)****4****2.4 EDUCATION AND PUBLIC AWARENESS****2.4.1 EDUCATIONAL USES**

(Check one)		Score (Choose one)
Frequent	1) <input type="checkbox"/>	20 points
Infrequent	2) <input type="checkbox"/>	12
No visits	3) <input checked="" type="checkbox"/>	0

Source of information: Cochrane MNR office**Educational Uses Score (maximum 20 points)****0****2.4.2 FACILITIES AND PROGRAMS**

(check one)		Score (Choose one)
Staffed interpretation centre	1) <input type="checkbox"/>	8 points
No interpretation centre or staff but a system of self-guiding trails or brochures available	2) <input type="checkbox"/>	4
Facilities such as maintained paths (e.g., woodchips) boardwalks, boat launches or observation towers but no brochures or other interpretation	3) <input type="checkbox"/>	2
No facilities or programs	4) <input checked="" type="checkbox"/>	0

Source of information: Cochrane MNR office**Facilities and Programs Score (maximum 8 points)****0**

2.4.3 RESEARCH AND STUDIES

(check appropriate spaces)

Long term research has been done	<input type="checkbox"/>	Score	12 points
Research papers published in refereed scientific journal or as a thesis	<input type="checkbox"/>		10
One or more (non-research) reports have been written on some aspect of the wetland 's flora fauna hydrology etc.	<input type="checkbox"/>		5
No research or reports	<input checked="" type="checkbox"/>		0

Attach list of known reports by above categories

Research and Studies Score (Score is cumulative, maximum 12 points) 0

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT

Circle the highest applicable score

Distance of wetland from settlement	1) population > 10,000		2) population 2,500 -10,000		3) population <2,500 or cottage community	
	40 points	<input type="checkbox"/>	26	<input type="checkbox"/>	16	<input type="checkbox"/>
1) Within or adjoining settlement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) 0.5 to 10 km from settlement	26	<input type="checkbox"/>	16	<input checked="" type="checkbox"/>	10	<input type="checkbox"/>
3) 10 to 60 km from settlement	12	<input type="checkbox"/>	8	<input type="checkbox"/>	4	<input type="checkbox"/>
4) >60 km from settlement	5	<input type="checkbox"/>	2	<input type="checkbox"/>	0	<input type="checkbox"/>
5) >100 km from settlement	0	<input type="checkbox"/>	0	<input type="checkbox"/>	0	<input type="checkbox"/>
	0		16		0	

Name of settlement: Town of Cochrane

Proximity to Human Settlement Score (maximum 40 points) 16

2.6 OWNERSHIP (FA= fraction Area) Score

FA of wetland in public or private ownership held under contract or in trust for wetland protection	<input type="checkbox"/>	x	10	=	<input type="checkbox"/>
FA of wetland area in public ownership,not as above	<input type="checkbox"/>	x	8	=	<input type="checkbox"/>
FA of wetland area in private ownership,not as above	<input type="checkbox"/>	x	4	=	<input type="checkbox"/>
	1.00				4.00

Source of information: Cochrane MNR office

Ownership Score (maximum 10 points) 4

2.7 SIZE**696.52** hectares**80** Subtotal for Social

Evaluation Table for Size Score (Social Component)

Wetland Size (ha)	Total for Size Dependent Score									
	<31	31-45	46-60	61-75	76-90	91-105	106-109	121-135	136-150	>150
<2 ha	1	2	4	8	10	12	14	14	14	15
2 - 4ha	1	2	4	8	12	13	14	14	15	16
5 - 8ha	2	2	5	9	13	14	15	15	16	16
9 - 12ha	3	3	6	10	14	15	15	16	17	17
13-17	3	4	7	10	14	15	16	16	17	17
18-28	4	5	8	11	15	16	16	17	17	18
29-37	5	7	10	13	16	17	18	18	19	19
38-49	5	7	10	13	16	17	18	18	19	20
50-62	5	8	11	14	17	17	18	19	20	20
63-81	5	8	11	15	17	18	19	20	20	20
82-105	6	9	11	15	18	18	19	20	20	20
106-137	6	9	12	16	18	19	20	20	20	20
138-178	6	9	13	16	18	19	20	20	20	20
179-233	6	9	13	16	18	20	20	20	20	20
234-302	7	9	13	16	18	20	20	20	20	20
303-393	7	9	14	17	18	20	20	20	20	20
394-511	7	10	14	17	18	20	20	20	20	20
512-665	7	10	14	17	18	20	20	20	20	20
666-863	7	10	14	17	19	20	20	20	20	20
864-1123	8	12	15	17	19	20	20	20	20	20
1124-1460	8	12	15	17	19	20	20	20	20	20
1461-1898	8	13	15	18	19	20	20	20	20	20
1899-2467	8	14	16	18	20	20	20	20	20	20
>2467	8	14	16	18	20	20	20	20	20	20

Total Size Score (Social Component)**19**

2.8 ABORIGINAL AND CULTURAL HERITAGE VALUES

Either or both Aboriginal or Cultural Values may be scored. However, the maximum score permitted for 2.8 is 30 points. Attach documentation.

2.8.1 ABORIGINAL VALUES

Full documentation of sources must be attached to the data record.

1) Significant		=	30 points
2) Not Significant		=	0
3) Unknown	X	=	0
Total:	0		

2.8.2 CULTURAL HERITAGE

1) Significant		=	30 points
2) Not Significant		=	0
3) Unknown	X	=	0
Total:	0		

Aboriginal Values/Cultural Heritage Score (maximum 30 points)

0

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION

If the wetland is a complex including isolated wetlands, apportion the 100 points according to area. For example if 10 ha of a 100 ha complex is isolated, the isolated portion receives the maximum proportional score of 10. The remainder of the wetland is then evaluated out of 90.

Step 1: If wetland is entirely Isolated, go directly to Step 5.

If wetland is lacustrine and the ratio of wetland area: lake area is <0.1, or wetland is riverine on the St. Mary's River, go to Step 5

All other wetlands, go through steps 2, 3, 4 and 5.

Step 2: Determination of Upstream Detention Factor (DF)

(a)	Wetland area (ha)	<u>696.52</u>
(b)	Total area (ha) of <u>upstream</u> detention areas (include the wetland itself)	<u>710.96</u>
(c)	Ratio of (a):(b)	<u>0.98</u>
(d)	Upstream detention factor: (c) x 2 = (maximum allowable factor = 1)	<u>1.96</u> <u>1.00</u>

Step 3: Determination of Peak Flow Attenuation Factor (AF)

(a)	Wetland area (ha)	<u>696.52</u>
(b)	Size of catchment basin (ha) <u>upstream</u> of wetland (include wetland itself in catchment area)	<u>2198.44</u>
(c)	Ratio of (a):(b)	<u>0.32</u>
(d)	Wetland attenuation factor: (c) x 10 = (maximum allowable factor = 1)	<u>3.2</u> <u>1.00</u>

Step 4: Determination of Wetland Surface Form Factor (FF)

From the list below, select the surface form which best describes the wetland.

Flooded with little or no aquatic vegetation	Factor <u>0</u>
Flooded but with submergent, emergent or floating vegetation	<u>0.2</u>
Flat (lawn) vegetation (typical of fens)	<u>0.5</u>
Hummock-depression microtopography	<u>X</u> 0.7
Patterned (e.g., string bog, ribbed fen)	<u>1</u>
Surface Form Factor (FF)	<u>0.7</u>

(Maximum allowable factor = 1)

Step 5:

- 1. Wetland is entirely Isolated 100 points
- 2. Wetland is lacustrine and the ratio of wetland area: lake area is <0.1 0 points
- 3. Wetland is riverine along the St. Mary's River 0 points
- 4. For all other wetlands*, calculate as follows:
 - a) Upstream Detention Factor (DF) (Step 2) 1.00
 - b) Wetland Attenuation Factor (AF) (Step 3) 1.00
 - c) Surface Form Factor (FF) (Step 4) 0.70

$[(DF + AF + FF)/3] \times 100^*$ 90

*Unless wetland is a complex including isolated portions -- see above

Total Flood Attenuation Score (maximum 100 points) 90

3.2 GROUND WATER RECHARGE

3.2.1 SITE TYPE

- (a) Wetland > 50% lacustrine (by area) or located on the St. Mary's River Score = 0
- (b) Wetland not as above. Calculate final score as follows:
(FA= area of site type/total area of wetland)

0.83	FA of isolated or palustrine wetland	x 20 =	16.60
0.15	FA of riverine wetland	x 5 =	0.75
0.02	FA of lacustrine wetland (wetland <50% lacustrine)	x 0 =	0.00

Site Type Score: (maximum 20 points) 17

3.2.2 SOILS

EVALUATION:

Dominant Wetland Type	Sand, loam, gravel, till		Clay or bedrock
Lacustrine or on St. Mary's River	0		0
Isolated	10		5
Palustrine	7	X	4
Riverine (not on St. Mary's River)	5		2
Totals		7	0

Hydrological Soil Class Score (maximum 10 points) 7

3.3 DOWNSTREAM WATER QUALITY IMPROVEMENT**3.3.1 WATERSHED IMPROVEMENT FACTOR**

Calculation of Watershed Improvement Score is based upon the fractional area (FA) of each site type within the wetland. FA = area of site type/total area of the wetland.

<u>Site Type</u>	<u>Improvement Factor (IF)</u>				
Isolated	FA	0	x	0.5 =	0.00
Riverine	FA	0.15	x	1 =	0.15
Palustrine with no inflow	FA	0	x	0.7 =	0.00
Palustrine with inflows	FA	0.83	x	1 =	0.83
Lacustrine on lake shoreline	FA	0.02	x	0.2 =	0.004
Lacustrine at lake inflow or outflow	FA	0	x	1 =	0.00
Watershed Improvement Score (IF x 30) (maximum = 30)					29.52

3.3.2 ADJACENT AND WATERSHED LAND USE**EVALUATION****Step 1: Determination of Maximum Initial Score**

Wetland on the Great Lakes or St. Mary's River (Go to Step 5a)

All other wetlands (Go through steps 2, 3, 4 and 5b)

Step 2: Determination of Broad Upslope Land Use (BLU)

Assess broad upslope land uses within the previous 5 years, agriculture, or other activities which alter the natural vegetation cover in an extensive manner.

Choose one	Score
>50% of catchment basin	20
20-50% of catchment basin	14
<20% of catchment basin	X 4
Score for BLU	
4	

Step 3: Determination of Linear Upslope Land Uses (LUU)

Assess linear upslope uses (LUU) e.g., roads, railways, hydro corridors, pipelines, etc., crossing the upslope catchment within 200m of the wetland boundary.

Choose the highest only	Score
Major corridor*	15
Secondary corridor	11
Tertiary corridor	X 6
Temporary or abandoned	3
None	0
Score for LUU	
6	

Major, secondary and tertiary roads are those that are indicated as such on the provincial highways maps. Major hydro corridors are trunk lines coming directly from a generating station. Major pipelines are trans-continental lines. Secondary corridors are regional distribution lines (i.e. multi-cable hydro corridors not emanating directly from a generating station or regional gas distribution lines). Tertiary corridors are single hydro lines or local gas distribution lines (i.e. to domestic users).

Step 4: Determination of Point-source Land Use (PS)

Assess point source (PS) land uses producing industrial effluents such as heavy industry, pulp and paper plants, major aggregate operations (but not small pits use for local road construction), etc. Score as 'present' only if a point source land use is located less than 1km upstream from the wetland.

		Score
Present		15
Not present	X	0
Score for PS		0

Step 5: Calculation of total score for Adjacent and Watershed Land Use

- a) Wetland on the Great Lakes or St. Mary's River
 b) All other wetlands, calculate as follows:

Final Score BLU+LUU+PS **10**

3.3.3 VEGETATION FORM

Choose the category that best describes the vegetation of the wetland

		Score
Trees, shrubs or herbs (h, c, ts, ls, gc)	X	8 points
Emergents, submergents (ne, re, be, f, ff, su)		10
Little or no vegetation (u)		0

Dominant Vegetation Form Score (maximum 10 points) **8**

3.4 CARBON SINK

Choose the category that best describes the wetland

- | | | |
|--|---|-----------|
| 1) Wetland a bog or fen with >50% organic soils | | 15 points |
| 2) Wetland has organic soils occupying 10 to 50% of the area (i.e. mainly mineral or undesignated soils, any wetland type) | | 6 |
| 3) Marshes and swamps with >50% organic soil | X | 9 |
| 4) Wetland with less than 10% of soils organic | | 0 |

Carbon Sink Score (maximum 15 points) **9**

3.5 SHORELINE EROSION CONTROL

From the wetland vegetation map determine the dominant vegetation type within the erosion zone for lacustrine and riverine site type areas only. Score according to the factors listed below.

Step 1:

Score

	Wetland entirely isolated or palustrine	0
X	Any part of the Wetland riverine or lacustrine (proceed to Step 2)	

Step 2:

Choose the one characteristic that best describes the shoreline vegetation (see text for a definition of shoreline)

Score

1)		Trees and shrubs	15
2)	X	Emergent vegetation	8
3)		Submergent vegetation	6
4)		Other shoreline vegetation	3
5)		No vegetation	0

Shoreline Erosion Control Score (maximum 15 points)

8

3.6 GROUNDWATER DISCHARGE

(Circle the characteristics that best describe the wetland being evaluated and then sum the scores)

Category	Catchment Interaction				
Wetland type	Bog = 0		Swamp/Marsh = 2	2	Fen = 5
Basin topography	Flat/Rolling = 5	5	Hilly = 2		Major relief break = 5
Wetland area: Upslope catchment area	Large (>50%) = 0		Moderate (6-50%) = 2	2	Small (<5%) = 5
Lagg Development	None found = 0	0	Minor = 2		Extensive = 5
Seeps at wetland edge	None found = 0	0	1-3 seeps = 5		4 or more seeps = 10
Iron precipitates evident at edge	None = 0	0	1-3 deposits = 2		4 or more deposits = 5
Surface marl deposits	None = 0	0	1-3 deposits = 2		>3 = 5
Wetland pH	Low < 4.2 = 0		Moderate 4.2-5.7 = 5		High >5.7 = 10
Catchment soil coverage	Patchy = 0		Thin (<20cm) = 2		Thick = 5
Catchment soil permeability	Low = 0		Moderate = 2	2	High = 5
Totals		5		6	15

(Scores are cumulative maximum score 30 points)

Groundwater Discharge Score (maximum 30 points)

26

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY

4.1.1 WETLANDS

Hills Site Region and Site District (5E only): _____

Wetland type (check one or more)

- _____ Bog
- _____ Fen
- X Swamp
- X Marsh

Evaluation Table for Scoring Rarity of Wetland Type.

Unit Number	Site Region & District	Marsh	Swamp	Fen	Bog
2E	James Bay	20	20	0	20
2W	Big Trout Lake	20	20	0	10
3E	Lake Abitibi	20	20	10	0
3W	Lake Nipigon	20	20	10	0
3S	Lake St. Joseph	20	20	10	0
4E	Lake Temagami	20	20	10	0
4W	Pigeon River	20	10	20	0
4S	Wabigoon Lake	20	10	20	0
5E-1	Thessalon	10	0	30	20
5E-2	Gore Bay	20	0	20	20
5E-3	La Cloche	20	0	30	20
5E-4	Sudbury	10	0	30	10
5E-5	North Bay	10	0	20	0
5E-6	Tomiko	10	0	20	0
5E-7	Parry Sound	20	0	30	20
5E-8	Huntsville	20	0	30	20
5E-9	Algonquin Park	10	0	30	0
5E-10	Brent	20	0	30	0
5E-11	Bancroft	0	10	30	10
5E-12	Renfrew	0	0	30	10
5E-13	Batchewana	10	0	10	30
5-S	Lake of the Woods	10	10	20	10

X

Rarity of Wetland Type Score (maximum 70 points)

40

4.1.2.3 PROVINCIALY SIGNIFICANT ANIMAL SPECIES

Name of species	Source of information
1) _____	_____
2) _____	_____
3) _____	_____
4) _____	_____
5) _____	_____
6) _____	_____
7) _____	_____
8) _____	_____
9) _____	_____
10) _____	_____
11) _____	_____
12) _____	_____
13) _____	_____
14) _____	_____
15) _____	_____

Attach separate list if necessary; Attach documentation

Scoring:

Number of provincially significant animal species in the wetland:

1 species = 50 points	14 species = 154
2 species = 80	15 species = 156
3 species = 95	16 species = 158
4 species = 105	17 species = 160
5 species = 115	18 species = 162
6 species = 125	19 species = 164
7 species = 130	20 species = 166
8 species = 135	21 species = 168
9 species = 140	22 species = 170
10 species = 143	23 species = 172
11 species = 146	24 species = 174
12 species = 149	25 species = 176
13 species = 152	

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

(no maximum score)

Provincially Significant Animal Species Score (no maximum)

0

4.1.2.4 PROVINCIALY SIGNIFICANT PLANT SPECIES

(Scientific names must be recorded)

	Common Name	Scientific Name	Source of information
1)	_____	_____	_____
2)	_____	_____	_____
3)	_____	_____	_____
4)	_____	_____	_____
5)	_____	_____	_____
6)	_____	_____	_____
7)	_____	_____	_____
8)	_____	_____	_____
9)	_____	_____	_____
10)	_____	_____	_____
11)	_____	_____	_____
12)	_____	_____	_____
13)	_____	_____	_____
14)	_____	_____	_____
15)	_____	_____	_____

Attach separate list if necessary; Attach documentation

Scoring:

Number of provincially significant plant species in the wetland:

1 species	= 50 points	14 species	= 154
2 species	= 80	15 species	= 156
3 species	= 95	16 species	= 158
4 species	= 105	17 species	= 160
5 species	= 115	18 species	= 162
6 species	= 125	19 species	= 164
7 species	= 130	20 species	= 166
8 species	= 135	21 species	= 168
9 species	= 140	22 species	= 170
10 species	= 143	23 species	= 172
11 species	= 146	24 species	= 174
12 species	= 149	25 species	= 176
13 species	= 152		

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Plant Species Score (no maximum)

0

4.1.2.5 REGIONALLY SIGNIFICANT SPECIES (SITE REGION)

Scientific names must be recorded for plant species. **Lists of significant species must be approved by MNR.**

SIGNIFICANT IN SITE REGION:

	Common Name	Scientific Name	Source of information
1)	eastern phoebe	Sayornis phoebe	NRSI field work
2)	gray catbird	Dumetella carolinensis	NRSI field work
3)	northern cardinal	Cardinalis cardinalis	NRSI field work
4)	sandhill crane	Grus canadensis	NRSI field work
5)	scarlet tanager	Piranga olivacea	NRSI field work
6)			
7)			
8)			
9)			
10)			
11)			
12)			
13)			
14)			
15)			

Attach separate list if necessary. Attach documentation.

** Score only if there is an approved list

Scoring:

No. of species significant in Site Region

1 species	=	20	6 species	=	55
2 species	=	30	7 species	=	58
3 species	=	40	8 species	=	61
4 species	=	45	9 species	=	64
5 species	=	50	10 species	=	67

Add one point for every species past 10 (no maximum score).

Significant Species (Site Region) Score (no maximum)

50

4.2.1.6 LOCALLY SIGNIFICANT SPECIES (SITE DISTRICT)

Scientific names must be recorded for plant species. **Lists of significant species must be approved by MNR.**

	Common Name	Scientific Name	Source of information
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____
8	_____	_____	_____
9	_____	_____	_____
10	_____	_____	_____
11	_____	_____	_____
12	_____	_____	_____
13	_____	_____	_____
14	_____	_____	_____
15	_____	_____	_____
16	_____	_____	_____
17	_____	_____	_____
18	_____	_____	_____

Attach separate list if necessary. Attach documentation.

Scoring:

No. of species significant in Site District

1 species	=	10	6 species	=	41
2 species	=	17	7 species	=	43
3 species	=	24	8 species	=	45
4 species	=	31	9 species	=	47
5 species	=	38	10 species	=	49

For each significant species over 10 in the wetland, add 1 point.

Locally Significant Species (Site District) Score (no maximum)

0

4.1.2.7 SPECIES OF SPECIAL STATUS

Black Duck

Suitable breeding habitat present and within assessment range (Figure 17)

Assessment Category	Check one	Score
40-80 Indicated Pairs/100 km sq	<input type="checkbox"/>	25 points
20-40 Indicated Pairs/100 km sq	<input type="checkbox"/>	20
10-20 Indicated Pairs/100 km sq	<input checked="" type="checkbox"/>	15
5-10 Indicated Pairs/100 km sq	<input type="checkbox"/>	10
1-5 Indicated Pairs/100 km sq	<input type="checkbox"/>	5
Habitat not suitable	<input type="checkbox"/>	0
Out of assessment range	<input type="checkbox"/>	0

Black Duck Score (maximum 25 points)

15

4.2 SIGNIFICANT FEATURES AND/OR FISH & WILDLIFE HABITAT

4.2.1 NESTING OF COLONIAL WATERBIRDS

Status	Name of species	Source of Information	Score
Currently nesting			50 points
Known to have nested within past 5 years			25
Active feeding area (great blue heron excluded)			15
None known			0
	X		

Attach documentation (nest locations etc., if known)

Colonial Waterbirds Score (maximum 50 points)

0

4.2.2. WINTER COVER FOR WILDLIFE

(Check only highest level of significance)	Score (one only)
1) <input type="checkbox"/> Provincially significant	100
2) <input type="checkbox"/> Significant in Site Region	50
3) <input type="checkbox"/> Significant in Site District	25
3) <input type="checkbox"/> Locally significant	10
4) <input type="checkbox"/> Little or poor winter cover present	0

Source of information: _____

Winter Cover for Wildlife Score (maximum 100 points)

0

4.2.3 WATERFOWL STAGING AND/OR MOULTING

(Check only highest level of significance for both staging and moulting; score is cumulative across columns, maximum score 150)

	Staging	Score (one only)	Moulting	Score (one only)
1) Nationally significant	<input type="checkbox"/>	150	<input type="checkbox"/>	150
2) Provincially significant	<input type="checkbox"/>	100	<input type="checkbox"/>	100
3) Regionally significant	<input type="checkbox"/>	50	<input type="checkbox"/>	50
4) Known to occur	<input type="checkbox"/>	10	<input type="checkbox"/>	10
5) Not possible	<input type="checkbox"/>	0	<input type="checkbox"/>	0
6) Not known	<input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/>	0
Total:			0	

Source of information:

Waterfowl Moulting and Staging Score (maximum 150 points)

0

4.2.4 WATERFOWL BREEDING

	(Check only highest level of significance)	Score
1) Provincially significant	<input type="checkbox"/>	100
2) Regionally significant	<input type="checkbox"/>	50
3) Habitat suitable	<input checked="" type="checkbox"/>	10
4) Habitat not suitable	<input type="checkbox"/>	0

Source of information:

field work

Waterfowl Breeding Score (maximum 100 points)

10

4.2.5 MIGRATOR PASSERINE, SHOREBIRD OR RAPTOR STOPOVER AREA

	(check highest applicable category)	Score
1) Provincially significant	<input type="checkbox"/>	100
2) Significant in Site Region	<input type="checkbox"/>	50
3) Significant in Site District	<input type="checkbox"/>	10
4) Not significant	<input checked="" type="checkbox"/>	0

Source of information:

Passerine, Shorebird or Raptor Stopover Score (maximum 100 points)

0

4.2.6 UNGULATE HABITAT**EVALUATION**

Score (1) + (2) + one of (3) to (6)

		Score
(1)	<input checked="" type="checkbox"/> Ungulate summer cover	15 points
(2)	<input checked="" type="checkbox"/> Mineral licks	50
(3)	<input type="checkbox"/> Moose aquatic feeding area Class 1	0
(4)	<input checked="" type="checkbox"/> Moose aquatic feeding area Class 2	10
(5)	<input type="checkbox"/> Moose aquatic feeding area Class 3	20
(6)	<input type="checkbox"/> Moose aquatic feeding area Class 4	35

(Score is cumulative for a maximum possible score of 100)

Ungulate Habitat Score (maximum 100 points)**25****4.2.6 FISH HABITAT****4.2.6. Spawning and Nursery Habitat****Table 5. Area Factors for Low Marsh, High Marsh, and Swamp Communities.**

No. of ha of Fish Habitat	Area Factor
< 0.5 ha	0.1
0.5- 4.9	0.2
5.0- 9.9	0.4
10.0- 14.9	0.6
15.0 -19.9	0.8
20.0+ ha	1.0

Step 1: Fish habitat is not present within the wetland (Score = 0) Fish habitat is present within the wetland (Go to Step 2)**Step 2:**

Choose only one option

1) Significance of the spawning and nursery habitat within the wetland is known (Go to Step 3)2) Significance of the spawning and nursery habitat within the wetland is not known (Go through Steps 4, 5, 6 and 7)

Step 3: Select the highest appropriate category below attach documentation:

- 1) Significant in Site Region 100 points
- 2) Significant in Site District 50
- 3) Locally Significant Habitat (5.0+ ha) 25
- 4) Locally Significant Habitat (<5.0 ha) 15

Score for Spawning and Nursery Habitat (maximum score 100 points)

0

Step 4: Proceed to Steps 4 to 7 only if Step 3 was not answered.

(**Low Marsh:** marsh area from the existing water line out to the outer boundary of the wetland)

Low marsh not present (Continue to Step 5)

Low marsh present (Score as follows)

Scoring for Presence of Key Vegetation Groups

Scoring is based on the one most clearly dominant plant species of the dominant form in each Low Marsh vegetation community. Check the appropriate Vegetation Group (see Appendix 16) for each Low Marsh community. Sum the areas of the communities assigned to each Vegetation Group and multiply by the appropriate size factor from Table 5.

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (see Table 5)	Score	Final Score (area factor x score)
1	Tallgrass				6 pts	0.0
2	Shortgrass-Sedge				11	0.0
3	Cattail-Bulrush-Burreed				5	0.0
4	Arrowhead-Pickerelweed				5	0.0
5	Duckweed				2	0.0
6	Smartweed-Waterwillow				6	0.0
7	Waterlily-Lotus				11	0.0
8	Waterweed-Watercress				9	0.0
9	Ribbongrass				10	0.0
10	Coontail-Naiad-Watermilfoil				13	0.0
11	Narrowleaf Pondweed				5	0.0
12	Broadleaf Pondweed				8	0.0
Total Score (maximum 75 points)						0.0

Step 5: (**High Marsh:** area from the water line to the inland boundary of marsh wetland type. This is essentially what is commonly referred to as a wet meadow, in that there is insufficient standing water to provide fisheries habitat except during flood or high water conditions.)

High marsh not present (Continue to Step 6)

High marsh present (Score as follows)

Scoring for Presence of Key Vegetation Groups

Scoring is based on the one most clearly dominant plant species of the dominant form in each High Marsh vegetation community. Check the appropriate Vegetation Group for each High Marsh community. Sum the areas of the communities assigned to each Vegetation Group and multiply by the appropriate size factor from Table 5.

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (see Table 5)	Score	Final Score (area factor x score)
1	Tallgrass				6 pts	0.0
2	Shortgrass-Sedge	X	10.84	0.6	11	6.6
3	Cattail-Bulrush-Burreed				5	0.0
4	Arrowhead-Pickerelweed				5	0.0
Total Score (maximum 25 points)						6.6

Step 6: (**Swamp:** Swamp communities containing fish habitat, either seasonally or permanently. Determine the total area of seasonally flooded swamps and permanently flooded swamps containing fish habitat.)

Swamp containing fish habitat not present (Continue to Step 7)

Swamp containing fish habitat present (Score as follows)

Swamp containing fish Habitat	Present (check)	Total area (ha)	Area Factor (see Table 5)	Score	TOTAL SCORE (factor x score)
Seasonally flooded				10	0.0
Permanently flooded				10	0.0
SCORE (maximum 20 points)					0.0

Step 7: Calculation of final score

Score for Spawning and Nursery Habitat (Low Marsh) (maximum 75)	=	<u>0.0</u>
Score for Spawning and Nursery Habitat (High Marsh) (maximum 25)	=	<u>6.6</u>
Score for Swamp Containing Fish Habitat (maximum 20)	=	<u>0.0</u>

Sum (maximum score 100 points) = 6.6

4.2.6.2 Migration and Staging Habitat**Step 1:**

- 1) Staging or Migration Habitat is not present in the wetland (Score = 0)
- 2) Staging or Migration Habitat is present in the wetland significance of the habitat is known (Go to Step 2)
- 3) Staging or Migration Habitat is present in the wetland significance of the habitat is not known (Go to Step 3)

NOTE: Only one of Step 2 or Step 3 is to be scored.

Step 2: Select the highest appropriate category below, attach documentation:

	Score
1) <input type="checkbox"/> Significant in Site Region	25 points
2) <input type="checkbox"/> Significant in Site District	15
3) <input type="checkbox"/> Locally Significant	10
4) <input type="checkbox"/> Fish staging and/or migration habitat present, but not as above	5

Score for Fish Migration and Staging Habitat (maximum score 25 points) 0

Step 3: Select the highest appropriate category below based on presence of the designated site type (does not have to be dominant). Note name of river for 2) and 3).

	Score
1) <input checked="" type="checkbox"/> Wetland is riverine at rivermouth or lacustrine at rivermouth	25 points
2) <input type="checkbox"/> Wetland is riverine, within 0.75 km of rivermouth	15
3) <input type="checkbox"/> Wetland is lacustrine, within 0.75 km of rivermouth	10
4) <input type="checkbox"/> Fish staging and/or migration habitat present, but not as above	5

Score for Staging and Migration Habitat (maximum score 25 points) 25

4.3 ECOSYSTEM AGE

(Fractional Area = area of wetland type/total area of wetland)

	Fractional Area			Scoring
Bog		x	25 =	0.0
Fen, treed to open on deep soils floating mats or marl		x	20 =	0.0
Fen, on limestone rock		x	5 =	0.0
Swamp	0.87	x	3 =	2.6
Marsh	0.13	x	0 =	0.0
		Sub Total:		2.6
Ecosystem Age Score (maximum 25 points)				2.6

4.4 GREAT LAKES COASTAL WETLANDS**Score for coastal (see text for definition) wetlands only**

Choose one only

wetland < 10 ha	=	0 points
wetland 10- 50 ha	=	25
wetland 51 -100 ha	=	50
wetland > 100 ha	=	75

Great Lakes Coastal Wetlands Score (maximum 75 points)**0**

5.0 EXTRA INFORMATION

5.1 PURPLE LOOSESTRIFE

X Absent/Not seen

 Present

(a) One location in wetland
Two to many locations

Abundance code

(b) (1 < 20 plants
(2 20-99 plants
(3 100-999 plants
(4 >1000 plants

5.2 SEASONALLY FLOODED AREAS

Indicate length of seasonal flooding

Check one or more

Ephemeral (less than 2 weeks)
Temporal (2 weeks to 1 month)
Seasonal (1 to 3 months) X
Semi-permanent (>3 months)
No seasonal flooding

5.3 SPECIES OF SPECIAL SIGNIFICANCE

5.3.1 Osprey

Present and nesting (attach map showing nest site)
Known to have nested in last 5 yr
Feeding area for osprey X
Not as above

5.3.2 Common Loon

Nesting in wetland (attach map showing nest site)
Feeding at edge of wetland
Observed or heard on lake or
river adjoining the wetland X
Not as above

INVESTIGATORS

AFFILIATION

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Natural Resource Solutions Inc.

Tara Brenton

Natural Resource Solutions Inc.

DATES WETLAND VISITED

June 21 and 22, 2011

DATE THIS EVALUATION COMPLETED:

February 22, 2012

ESTIMATED TIME DEVOTED TO COMPLETING THE FIELD SURVEY IN "PERSON HOURS"

50 hours

WEATHER CONDITIONS

- i) at time of field work June 21 morning: 13°C, 70-90% cloud cover, wind – Beaufort scale 0-2
 June 21 evening: 15°C, 5-15% cloud cover, wind – Beaufort scale 2-4
 June 22: 10-24°C, 10-100% cloud cover, wind – Beaufort scale 2-4

- ii) summer conditions in general spring: wet, cool; summer: hot, dry

OTHER POTENTIALLY USEFUL INFORMATION:

Surveys completed by Natural Resource Solutions Inc.:
 vegetation, breeding birds, nocturnal birds, anuran call surveys

CHECKLIST OF PLANT AND ANIMAL SPECIES RECORDED IN THE WETLAND:

Attach a list of all flora and fauna observed in the wetland.

*Indicate if voucher specimens or photos have been obtained, where located, etc.

WETLAND EVALUATION SCORING RECORD

WETLAND NAME

Abitibi-Martin's Meadow-Empire Wetland Complex

1.0 BIOLOGICAL COMPONENT1.1 PRODUCTIVITY

1.1.1 Growing Degree-Days/Soils	11
1.1.2 Wetland Type	9
1.1.3 Site Type	2

Total for Productivity **22**1.2 BIODIVERSITY

1.2.1 Number of Wetland Types	13
1.2.2 Vegetation Communities (maximum 45)	13
1.2.3 Diversity of Surrounding Habitat (maximum 7)	7
1.2.4 Proximity to Other Wetlands	8
1.2.5 Interspersion	24
1.2.6 Open Water Type	8

Total for Biodiversity **73**Sub Total for Biodiversity **73**1.3 SIZE (Biological Component) **37****TOTAL FOR BIOLOGICAL COMPONENT (not to exceed 250)** **132**

2.0 SOCIAL COMPONENT

2.1 ECONOMICALLY VALUABLE PRODUCTS

2.1.1 Wood Products	14
2.1.2 Lowbush Cranberry	0
2.1.3 Wild Rice	10
2.1.4 Commercial Fish	12
2.1.6 Furbearers	12

Total for Economically Valuable Products **48**

2.2 RECREATIONAL ACTIVITIES (maximum 80) **16**

2.3 LANDSCAPE AESTHETICS

2.3.1 Distinctness	0
2.3.2 Absence of Human Disturbance	4

Total for Landscape Aesthetics **4**

2.4 EDUCATION AND PUBLIC AWARENESS

2.4.1 Educational Uses	0
2.4.2 Facilities and Programs	0
2.4.3 Research and Studies (maximum 12)	0

Total for Education and Public Awareness **0**

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT **16**2.6 OWNERSHIP **4**

Subtotal for Social Component **80**

2.7 SIZE (Social Component) **19**2.8 ABORIGINAL AND CULTURAL VALUES (maximum 30) **0**

TOTAL FOR SOCIAL COMPONENT (not to exceed 250) **107**

3.0 HYDROLOGICAL COMPONENT

3.1 <u>FLOOD ATTENUATION</u>		90
3.2 <u>GROUNDWATER RECHARGE</u>		
3.2.1 Site Type	17	
3.2.2 Soils	7	
	Total for Groundwater Recharge	24
3.3 <u>WATER QUALITY IMPROVEMENT</u>		
3.3.1 Watershed Improvement Factor	30	
3.3.2 Adjacent and Watershed Land Use	10	
3.3.3 Vegetation Form	8	
	Total for Water Quality Improvement	48
3.4 <u>CARBON SINK</u>		9
3.5 <u>SHORELINE EROSION CONTROL</u>		8
3.6 <u>GROUNDWATER DISCHARGE</u>		26
	<u>TOTAL FOR HYDROLOGICAL COMPONENT (not to exceed 250)</u>	205

4.0 SPECIAL FEATURES4.1 RARITY

4.1.1 Wetlands		40
4.1.2 Species		
4.1.2.1 Endangered or Threatened Species Breeding	0	
4.1.2.2 Traditional Use by Endangered or Threatened Species	0	
4.1.2.3 Provincially Significant Animals	0	
4.1.2.4 Provincially Significant Plants	0	
4.1.2.5 Regionally Significant Species	50	
4.1.2.6 Locally Significant Species	0	
4.1.2.7 Species of Special Status	0	
Total for Species Rarity		50

4.2 SIGNIFICANT FEATURES OR HABITAT

4.2.1 Colonial Waterbirds	0	
4.2.2 Winter Cover for Wildlife	0	
4.2.3 Waterfowl Staging and Moulting	0	
4.2.4 Waterfowl Breeding	10	
4.2.5 Migratory Passerine, Shorebird or Raptor Stopover	0	
4.2.6 Ungulate Habitat	25	
4.2.7 Fish Habitat	32	
Total for Significant Features and Habitat		67

4.3 ECOSYSTEM AGE 34.4 GREAT LAKES COASTAL WETLANDS 0

TOTAL FOR SPECIAL FEATURES (maximum 250) 159

SUMMARY OF EVALUATION RESULT

Wetland	Abitibi-Martin's Meadow-Empire Wetland Complex
TOTAL FOR 1.0 BIOLOGICAL COMPONENT	132
TOTAL FOR 2.0 SOCIAL COMPONENT	107
TOTAL FOR 3.0 HYDROLOGICAL COMPONENT	205
TOTAL FOR 4.0 SPECIAL FEATURES COMPONENT	159
	<u>WETLAND TOTAL</u>
	603

INVESTIGATORS

David Stephenson
Charlotte Moore
Jessica Grealey
Katharina Walton
Megan Pope
Tara Brenton

AFFILIATION

Natural Resource Solutions Inc.

DATE

February 22, 2012

Species Observed		Vegetation survey	Amphibian survey	Breeding bird survey	Nocturnal bird survey
Amphibians					
Mink frog	<i>Rana septentrionalis</i>	X			
Spring peeper	<i>Pseudacris crucifer crucifer</i>		X		
Wood frog	<i>Rana sylvatica</i>	(Reported by Hatch)			
Birds					
Alder flycatcher	<i>Empidonax alnorum</i>	X		X	
American crow	<i>Corvus brachyrhynchos</i>	X		X	
American goldfinch	<i>Carduelis tristis</i>	X		X	
American kestrel	<i>Falco sparverius</i>	X			
American redstart	<i>Setophaga ruticilla</i>			X	
American robin	<i>Turdus migratorius</i>	X	X	X	X
Black and white warbler	<i>Mniotilta varia</i>	X		X	
Black-capped chickadee	<i>Poecile atricapillus</i>	X		X	
Black-throated green warbler	<i>Dendroica virens</i>	X		X	
Black-throated blue warbler	<i>Denrioca caerulenscens</i>	X		X	
Blue jay	<i>Cyanocitta cristata</i>			X	
Chestnut-sided warbler	<i>Dendrioca pensylvanica</i>			X	
Common loon	<i>Gavia immer</i>	X		X	
Common yellowthroat	<i>Geothlypis trichas</i>	X		X	
Eastern phoebe	<i>Sayornis phoebe</i>	X		X	
Gray catbird	<i>Dumetella carolinensis</i>			X	
Hermit thrush	<i>Catharus guttatus</i>		X	X	X
Mourning warbler	<i>Oporornis philadelphia</i>			X	
Northern cardinal	<i>Cardinalis cardinalis</i>			X	
Nothern harrier	<i>Circus cyaneus</i>	X			
Ovenbird	<i>Seiurus aurocapillus</i>			X	
Red-eyed vireo	<i>Vireo olivaceus</i>	X		X	
Red-winged blackbird	<i>Agelaius phoeniceus</i>	X		X	
Ring-billed gull	<i>Larus delawarensis</i>	X			
Sandhill crane	<i>Grus canadensis</i>	X	X	X	X
Savannah sparrow	<i>Passerculus sandwichensis</i>			X	
Scarlet tanager	<i>Piranga olivacea</i>			X	
Sharp-shinned hawk	<i>Accipiter striatus</i>	X			
Song sparrow	<i>Melospiza melodia</i>			X	
Tennessee warbler	<i>Vermivora peregrina</i>			X	
Tree swallow	<i>Tachycineta bicolor</i>	X			
Veery	<i>Catharus fuscescens</i>	X	X	X	X
White-breasted nuthatch	<i>Sitta carolinensis</i>	X			
White-throated sparrow	<i>Zonotrichia albicollis</i>	X	X	X	X
Yellow rumped warbler	<i>Dendroica coronata</i>			X	
Yellow warbler	<i>Dendroica petechia</i>	X		X	

Species Observed		Vegetation survey	Amphibian survey	Breeding bird survey	Nocturnal bird survey
Butterflies					
Canadian tiger swallowtail	<i>Papilio canadensis</i>	X			
Common ringlet	<i>Coenonympha tullia</i>	X			
Juvenal's duskywing	<i>Erynnis juvenalis</i>	X			
Northern crescent	<i>Phyciodes pascoensis</i>	X			
White admiral	<i>Limenitis arthemis arthemis</i>	X			
Wild indigo duskywing	<i>Erynnis Baptisiae</i>	X			
Dragonflies and Damers					
Ebony jewelwing	<i>Calopteryx maculata</i>	X			
Mammals					
Beaver	<i>Castor canadensis</i>	X			
Groundhog	<i>Marmota monax</i>	X			
Moose	<i>Alces alces</i>	X		X	
Red fox	<i>Vulpes vulpes</i>			X	X
Red squirrel	<i>Tamiasciurus hudsonicus</i>	X			
White-tailed deer	<i>Odocoileus virginianus</i>	X		X	
Vegetation					
Alder-leaved buckthorn	<i>Rhamnus alnifolia</i>	X			
Aquatic sedge	<i>Carex aquatilis</i>	X			
Awl-fruited sedge	<i>Carex stipata</i>	X			
Balsam fir	<i>Abies balsamea</i>	X			
Balsam poplar	<i>Populus balsamifera ssp. balsamifera</i>	X			
Bebb's willow	<i>Salix bebbiana</i>	X			
Bird's-foot trefoil	<i>Lotus corniculatus</i>	X			
Black spruce	<i>Picea mariana</i>	X			
Black willow	<i>Salix nigra</i>	X			
Blue bells	<i>Campanula rotundifolia</i>	X			
Blue flag iris	<i>Iris versicolor</i>	X			
Bluebead-lily	<i>Clintonia borealis</i>	X			
Bottlebrush sedge	<i>Carex hystericina</i>	X			
Bracken fern	<i>Pteridium aquilinum var. latiusculum</i>	X			
Bristly black currant	<i>Ribes lacustre</i>	X			
Bull thistle	<i>Cirsium vulgare</i>	X			
Bunchberry	<i>Cornus canadensis</i>	X			
Bush honeysuckle	<i>Diervilla lonicera</i>	X			
Canada blue-joint	<i>Calamagrostis canadensis</i>	X			
Canada mayflower	<i>Maianthemum canadense</i>	X			
Canada soapberry	<i>Shepherdia canadensis</i>	X			
Choke cherry	<i>Prunus virginiana ssp. virginiana</i>	X			
Club moss sp.	<i>Lycopodiaceae sp.</i>	X			
Common cattail	<i>Typha latifolia</i>	X			
Common dandelion	<i>Taraxacum officinale</i>	X			
Common hairgrass	<i>Deschampsia flexuosa</i>	X			
Cow parsnip	<i>Heracleum maximum</i>	X			
Cow vetch	<i>Vicia cracca</i>	X			
Curly dock	<i>Rumex crispus</i>	X			

Species Observed		Vegetation survey	Amphibian survey	Breeding bird survey	Nocturnal bird survey
Dark-green bulrush	<i>Scirpus atrovirens</i>	X			
Dwarf raspberry	<i>Rubus pubescens</i>	X			
Early meadowrue	<i>Thalictrum dioicum</i>	X			
European mountain-ash	<i>Sorbus aucuparia</i>	X			
Field horsetail	<i>Equisetum arvense</i>	X			
Fireweed	<i>Chamerion angustifolium</i> spp. <i>angustifolium</i>	X			
Fowl meadow grass	<i>Glyceria striata</i>	X			
Fox sedge	<i>Carex vulpinoidea</i>	X			
Fragrant bedstraw	<i>Galium triflorum</i>	X			
Grasses	<i>Poa</i> spp.	X			
Greater duckweed	<i>Spirodela polyrhiza</i>	X			
Hairy Solomon's seal	<i>Polygonatum biflorum</i>	X			
High bush cranberry	<i>Viburnum trilobum</i>	X			
Kentucky bluegrass	<i>Poa saltuensis</i> ssp. <i>languida</i>	X			
Labrador-tea	<i>Ledum groenlandicum</i>	X			
Lady fern	<i>Athyrium filix-femina</i>	X			
Lettuce sp.	<i>Lactuca</i> sp.	X			
Long-leaved aster	<i>Symphotrichum robynsonianum</i>	X			
Low bush blueberry	<i>Vaccinium angustifolium</i>	X			
Marsh cinquefoil	<i>Comarum palustre</i>	X			
Marsh St. John's-wort	<i>Triadenum virginicum</i>	X			
Marsh-marigold	<i>Caltha palustris</i>	X			
Moss sp.		X			
New England aster	<i>Symphotrichum novae-angliae</i>	X			
Nodding trillium	<i>Trillium cernuum</i>	X			
Northern beech fern	<i>Phegopteris connectilis</i>	X			
Ostrich fern	<i>Matteuccia struthiopteris</i> var. <i>pennsylvanica</i>	X			
Pale jewelweed	<i>Impatiens pallida</i>	X			
Prickly rose	<i>Rosa acicularis</i> ssp. <i>sayi</i>	X			
Red currant	<i>Ribes rubrum</i>	X			
Red maple	<i>Acer rubrum</i>	X			
Red raspberry	<i>Rubus idaeus</i> ssp. <i>idaeus</i>	X			
Red-berried elder	<i>Sambucus racemosa</i> ssp. <i>pubens</i>	X			
Red-osier dogwood	<i>Cornus stolonifera</i>	X			
Reed canary grass	<i>Phalaris arundinacea</i>	X			
Rough-leaved goldenrod	<i>Solidago patula</i>	X			
Sarsaparilla	<i>Aralia elata</i>	X			
Sedge sp.	<i>Carex</i> sp.	X			
Serviceberry	<i>Amelanchier humilis</i>	X			
Showy mountain ash	<i>Sorbus decora</i>	X			
Small-fruited Bulrush	<i>Scirpus microcarpus</i>	X			
Smooth scouring-rush	<i>Equisetum laevigatum</i>	X			
Speckled alder	<i>Alnus incana</i> spp. <i>rugosa</i>	X			
Spinulose wood fern	<i>Dryopteris carthusiana</i>	X			
Spotted touch-me-not	<i>Impatiens capensis</i>	X			
Star-flower	<i>Trientalis borealis</i> ssp. <i>borealis</i>	X			
Stinging nettle	<i>Urtica dioica</i>	X			
Swamp fly honeysuckle	<i>Lonicera oblongifolia</i>	X			
Tall buttercup	<i>Ranunculus acris</i>	X			













Species Observed		Vegetation survey	Amphibian survey	Breeding bird survey	Nocturnal bird survey
Tall meadow-rue	<i>Thalictrum pubescens</i>	X			
Tamarack	<i>Larix laricina</i>	X			
Trembling aspen	<i>Populus tremuloides</i>	X			
Tufted loosestrife	<i>Lysimachia thyrsiflora</i>	X			
Tufted vetch	<i>Vicia cracca</i>	X			
White birch	<i>Betula papyrifera</i>	X			
White spruce	<i>Picea glauca</i>	X			
Wild carrot	<i>Daucus carota</i>	X			
Wild mint	<i>Mentha arvensis ssp. borealis</i>	X			
Wild strawberry	<i>Fragaria virginiana</i>	X			
Willow species	<i>Salix species</i>	X			
Wood horsetail	<i>Equisetum sylvaticum</i>	X			
Woodland strawberry	<i>Fragaria vesca ssp. americana</i>	X			
Yellow lady's slipper	<i>Cypridedium calceolus</i>	X			

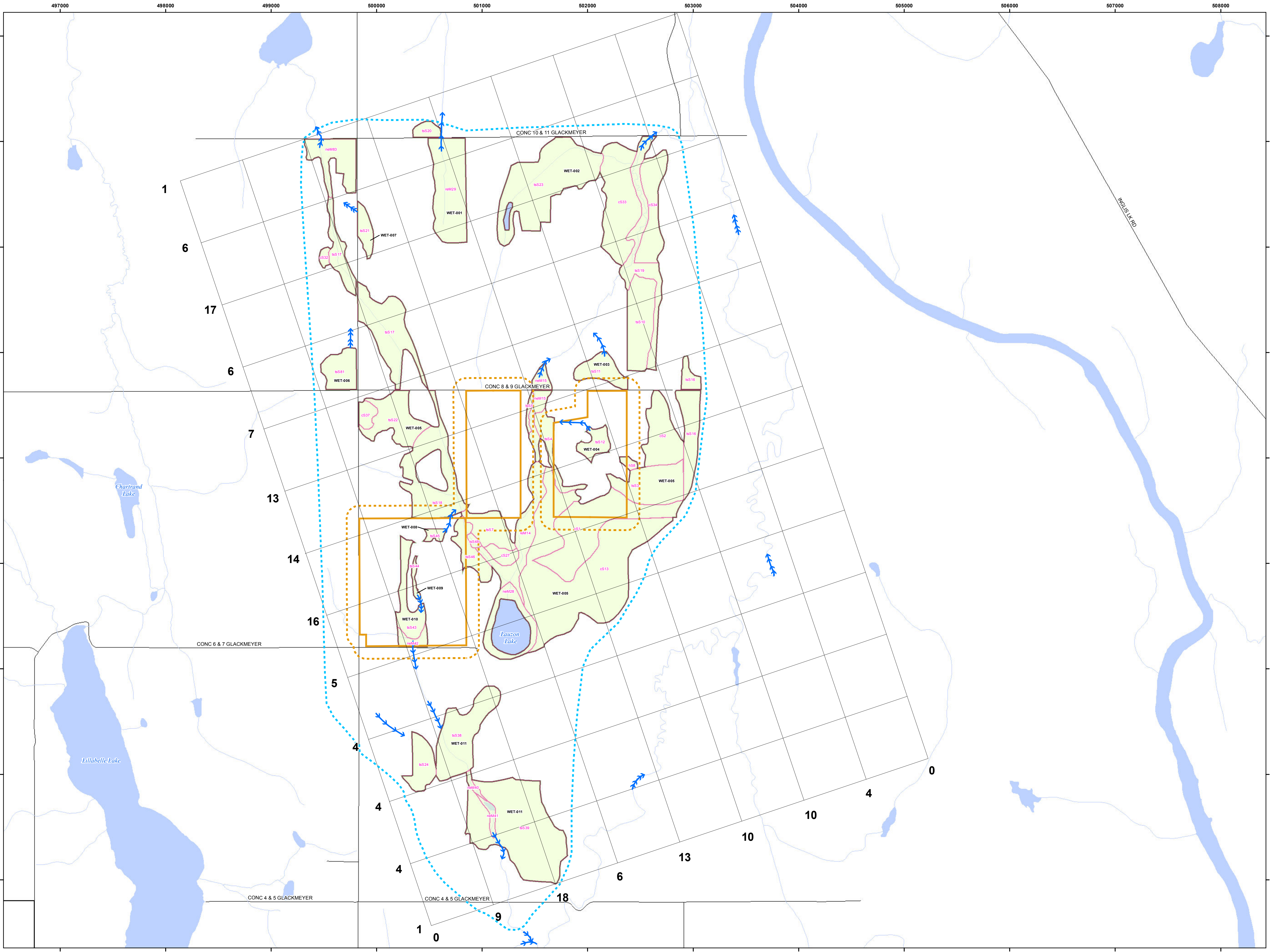
Figure 1

Northland Cochrane Area Solar Projects

Interspersion Map / Catchment Boundary

Legend

-  Project Site
-  Project Site 120m Buffer
-  Catchment
-  Wetland
-  Ecological Land Classification
-  Interspersion Grid
-  Highway
-  Primary Road
-  Secondary Road
-  Watercourse (Permanent)
-  Watercourse (Intermittent)
-  Waterbody
-  Watercourse Flow Direction



Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Source: Data provided by MNR© Copyright: Queen's Printer Ontario

Project: 1247B	NAD83 - UTM Zone 17
Date: February-22-12	Scale: 1:17,000 (22x34")

0 250 500 750 1,000 Metres



Amphibian Data Form

Project: Cochrane

Project No. 1247

UTM:

Observer: <u>TMR, NP</u>	Station Name: <u>Empire Stn 1</u> Visit #: <u>NRS 1 #1</u>	Date: <u>June 21/11</u> Start time: <u>2131</u>		
Wind speed: <u>2</u>	% Cloud cover: <u>15</u>	Air Temp: <u>15°C</u>	Water Temp: <u>N/A</u>	Water pH: <u>N/A</u>
Precipitation Description: <u>None</u>				
Remarks: <u>Sedge meadow that is associated w/ small stream. No standing water in stream @ time of visit direction <u>40°</u></u>				



CALL LEVEL CODES		Beaufort Wind Scale		
1	Calls can be counted; not simultaneous	0 Calm	0-2	Smoke rises vertically
2	Some simultaneous calls, distinguishable	1 Light air	3-5	Smoke drifts, but wind vanes do not
3	Calls not distinguishable individually overlapping	2 Slight breeze	6-11	Wind felt on face, leaves rustle
Enter as: Call code (# of individuals) e.g. 1 (2)		3 Gentle breeze	12-19	Leaves & small twigs in constant motion; light flags extended
		4 Mod. breeze	20-30	Wind raises dust and loose paper; small branches move
		5 Fresh breeze	31-39	Small trees in leaf begin to sway
		6 Strong breeze	40-50	Large branches in motion; inconvenience felt when walking against wind

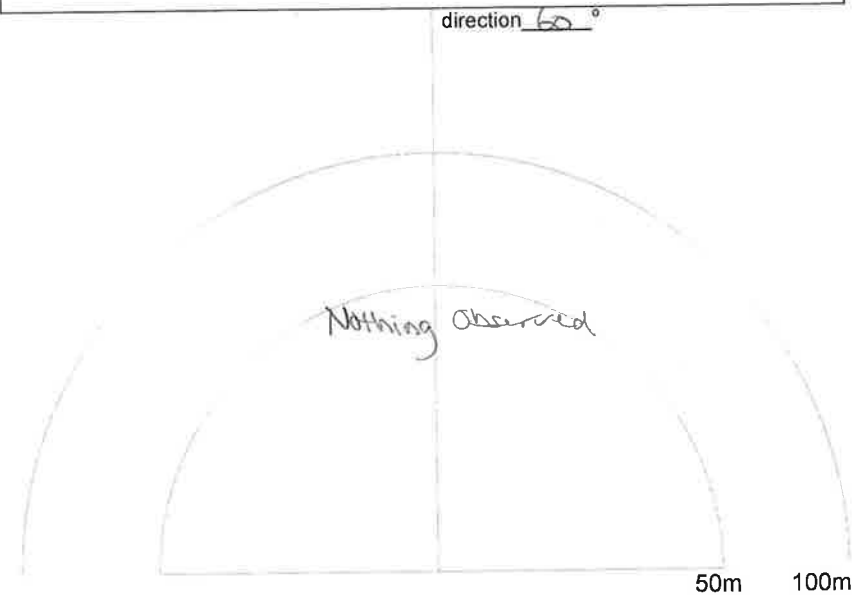


Amphibian Data Form

Project: Cochrane Project No. 1247

UTM:

Observer: <u>TMB, MP</u>	Station Name: <u>Empire Stn 2</u> Visit #: <u>N</u>	Date: <u>June 21 / 11</u> Start time: <u>22:16</u>
Wind speed: <u>4</u>	% Cloud cover: <u>20%</u>	Air Temp: <u>15°</u>
Precipitation Description: <u>None</u>		Water Temp: <u>N/A</u> Water pH: <u>N/A</u>
Remarks:		



CALL LEVEL CODES		Beaufort Wind Scale	
1	Calls can be counted; not simultaneous	0 Calm	0-2 Smoke rises vertically
2	Some simultaneous calls; distinguishable	1 Light air	3-5 Smoke drifts, but wind vanes do not
3	Calls not distinguishable individually overlapping	2 Slight breeze	6-11 Wind felt on face, leaves rustle
Enter as: Call code (# of individuals) e.g. 1 (2)		3 Gentle breeze	12-19 Leaves & small twigs in constant motion; light flags extended
		4 Mod. breeze	20-30 Wind raises dust and loose paper; small branches move
		5 Fresh breeze	31-39 Small trees in leaf begin to sway
		6 Strong breeze	40-50 Large branches in motion; inconvenience felt when walking against wind



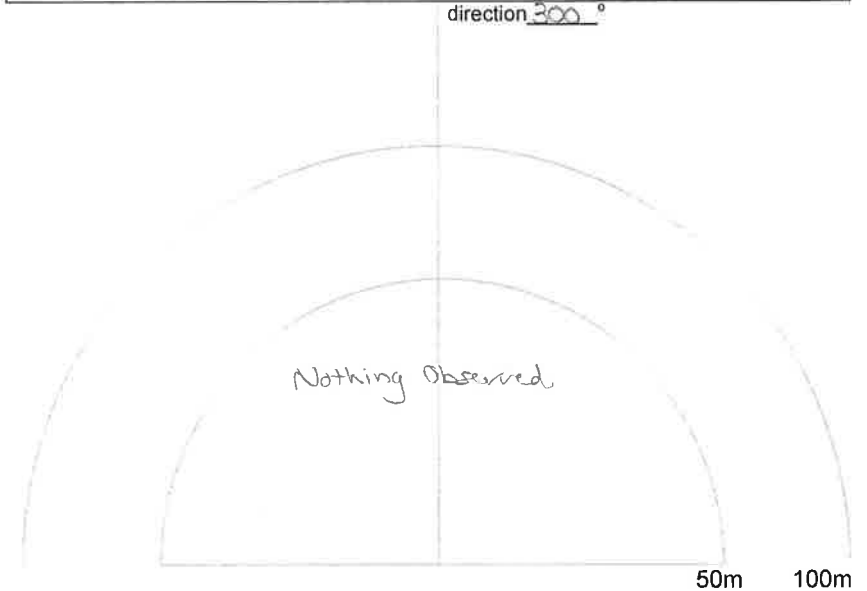
Amphibian Data Form

Project: Cochrane

Project No. 1247

UTM:

Observer: <u>TMB, MP</u>	Station Name: <u>Empire Stn 3</u> Visit #: <u>NRS1 Visit #1</u>	Date: <u>June 21 / 11</u> Start time: <u>2207</u>		
Wind speed: <u>3</u>	% Cloud cover: <u>5%</u>	Air Temp: <u>15°C</u>	Water Temp: <u>N/A</u>	Water pH: <u>N/A</u>
Precipitation Description: <u>None</u>				
Remarks: <u>reed canopy grass meadow marsh No standing water</u> <u>direction <u>300</u>°</u>				



CALL LEVEL CODES		Beaufort Wind Scale		
1	Calls can be counted; not simultaneous	0 Calm	0-2	Smoke rises vertically
2	Some simultaneous calls; distinguishable	1 Light air	3-5	Smoke drifts, but wind vanes do not
3	Calls not distinguishable individually overlapping	2 Slight breeze	6-11	Wind felt on face, leaves rustle
Enter as: Call code (# of individuals) e.g. 1 (2)		3 Gentle breeze	12-19	Leaves & small twigs in constant motion; light flags extended
		4 Mod. breeze	20-30	Wind raises dust and loose paper; small branches move
		5 Fresh breeze	31-39	Small trees in leaf begin to sway
		6 Strong breeze	40-50	Large branches in motion; inconvenience felt when walking against wind

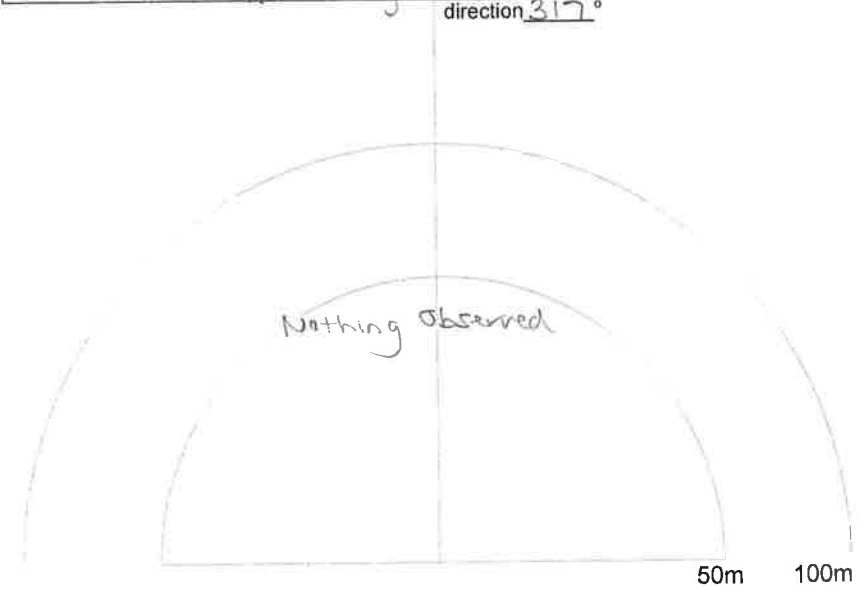


Amphibian Data Form

Project: Cochrane Project No. 1247

UTM:

Observer: <u>TMB, MP</u>	Station Name: <u>Empire Str 4</u> Visit #: <u>NRSI Visit #1</u>	Date: <u>June 21/11</u> Start time: <u>2154</u>
Wind speed: <u>3</u>	% Cloud cover: <u>5%</u>	Air Temp: <u>15°C</u>
Precipitation Description: <u>None</u>		Water Temp: <u>N/A</u> pH: <u>N/A</u>
Remarks: <u>Sedge meadow that runs adjacent to Ag field and alder thicket. No standing water.</u> <u>direction 317°</u>		



CALL LEVEL CODES		Beaufort Wind Scale		
1	Calls can be counted; not simultaneous	0 Calm	0-2	Smoke rises vertically
2	Some simultaneous calls; distinguishable	1 Light air	3-5	Smoke drifts, but wind vanes do not
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Enter as: Call code (# of individuals) e.g. 1 (2)		3 Gentle breeze	12-19	Leaves & small twigs in constant motion; light flags extended
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