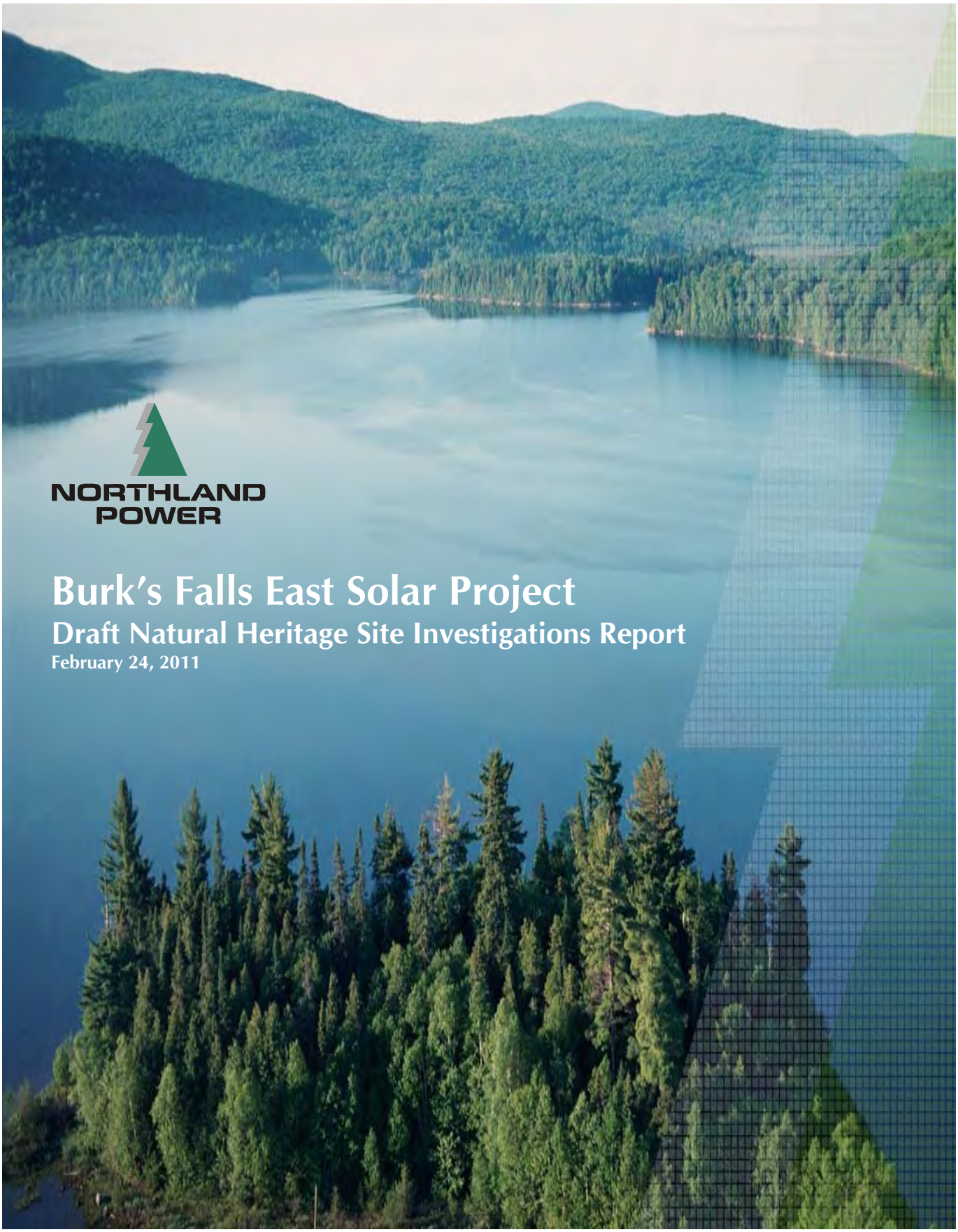

NORTHLAND POWER

Burk's Falls East Solar Project

Draft Natural Heritage Site Investigations Report

February 24, 2011

Northland Power Inc.
on behalf of
Northland Power Solar
Burk's Falls East
Toronto, Ontario

DRAFT Natural Heritage Site Investigation Report

Burk's Falls East Solar Project

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February 24, 2011

Project Report

February 24, 2011

Northland Power Inc.
Burk's Falls East Solar Project

DRAFT Natural Heritage Site Investigations Report

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1. Introduction

1.1 Project Description

Northland Power Solar Burk's Falls East L.P. (hereinafter referred to as "Northland") is proposing to develop a 10-megawatt (MW) solar photovoltaic project titled Burk's Falls East Solar Project (hereinafter referred to as the "Project"). The Project will be located on approximately 40 hectares (ha) of land, located on Chetwynd Road in the single tier Municipality of Armour Township (Figure 1.1).

1.2 Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the "REA Regulation") made under the *Environmental Protection Act* identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. Per Section 4 of the REA Regulation, 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.

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

a) 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

b) whether any additional natural features exist, other than those that were identified in the Natural Heritage Records Review report prepared under subsection 25 (3)

c) 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

d) the distance from the project location to the boundaries determined under clause (c).

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

a) an area of natural and scientific interest (ANSI) (earth science)

b) an ANSI (life science)

c) a coastal wetland

d) a northern wetland

e) a southern wetland

f) a valleyland

g) a wildlife habitat, or

h) a woodland.

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 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.

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

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

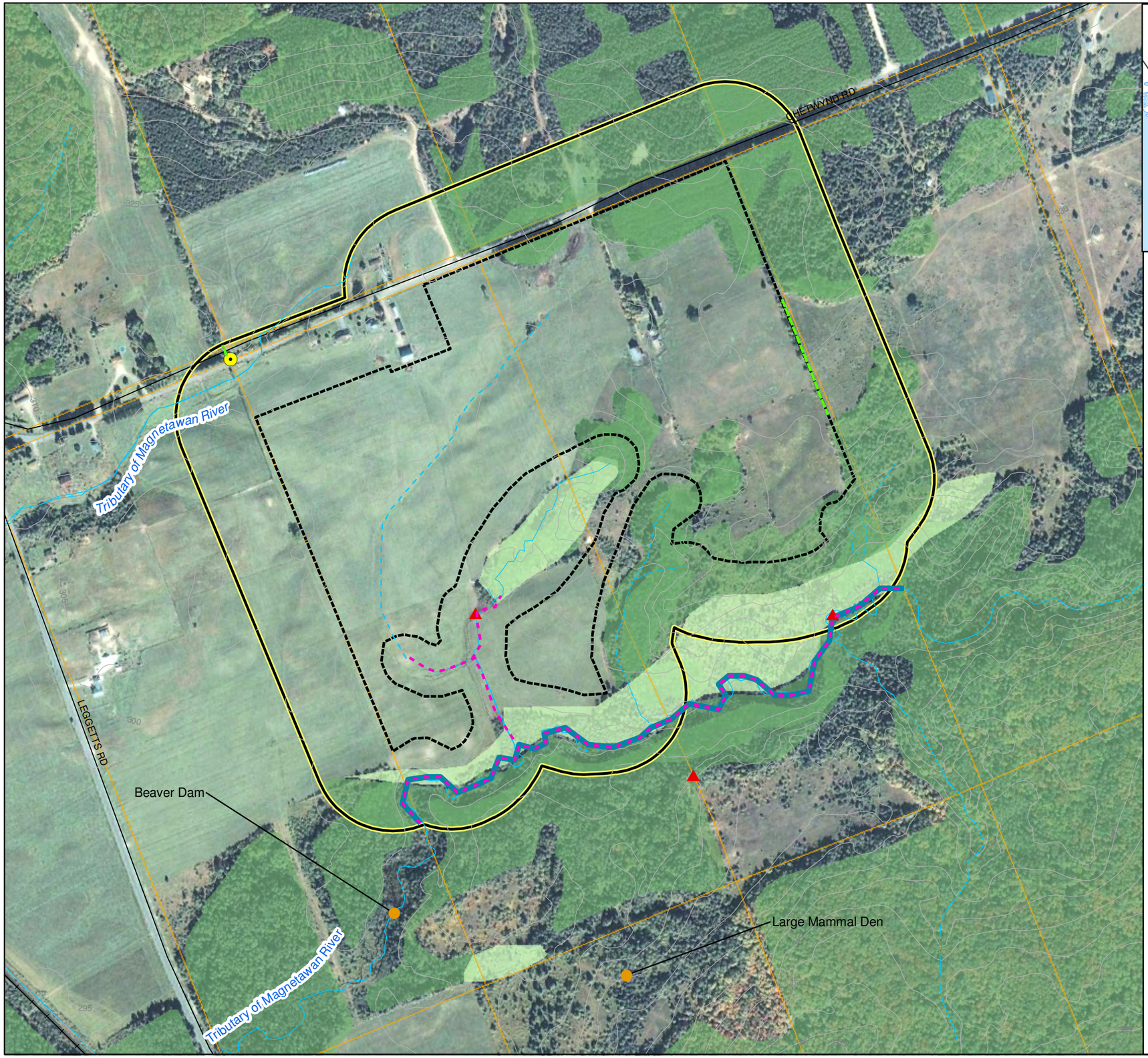
This Natural Heritage Site Investigation Report has been prepared to meet these requirements.

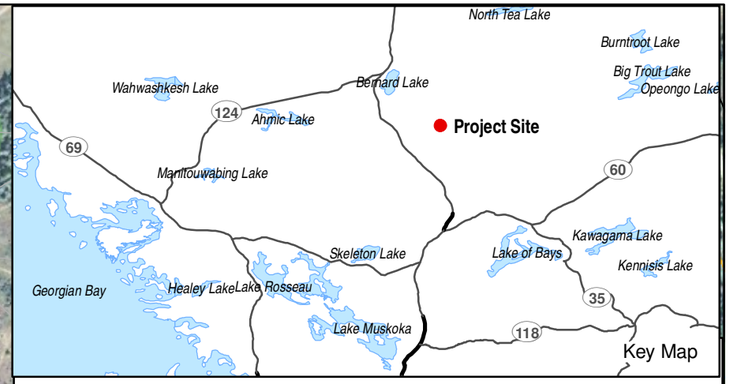
2. Summary of Results of Natural Heritage Records Review

Table 2.1 summarizes the results of the Natural Heritage Records Review Report (Hatch Ltd., 2010a).

Table 2.1 Summary of Records Review Determinations

Determination to be Made	Yes/No	Description
Is the Project in a natural feature?	Yes	A deer wintering area, a type of wildlife habitat, is present on the Project location.
Is the Project within 50 m of an ANSI (earth science)?	No	The nearest earth science ANSI is located several kilometres from the Project location.
Is the Project within 120 m of a natural feature that is not an ANSI (earth science)?	Yes	Wetlands and deer wintering area, a type of wildlife habitat, are present on and within 120 m of the Project location.





Legend

- Seepage Areas
- Roads
- Rail
- Topographic Contour (5m interval)
- Parcels
- Grassed Waterway
- Watercourse
- Hedgerow / Animal Movement Corridor
- Animal Movement Corridor / Snapping Turtle / Northern Map Turtle Habitat
- Provincially Significant Wetland (Assumed)
- Wooded Area / Animal Movement Corridor
- Milksnake Habitat
- Northern Ribbonsnake Habitat

Project Components

- Connection Point with Existing Distribution Line
- Project Location
- 120 m from Project Location

NORTH

0 50 100 200 Meters

1:6,000

Notes:
1. OBM and NRVIS data downloaded from LIO, with permission.
2. Spatial referencing UTM NAD 83.
3. Satellite imagery from Google Earth Pro.

Figure 1.1
Northland Power Inc.
Burk's Falls East Solar Energy Project
Project Location and Natural Heritage Features

HATCH™

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Back

3. Site Investigation Methodology

3.1 Hatch Site Visits

3.1.1 Site Investigation 1

3.1.1.1 Date, Time and Duration of Site Investigation

- Date: June 5, 2010
- Start Time: 0900 hours
- Duration: approximately 6 hours

3.1.1.2 Weather Conditions During Site Investigation

- Temperature: 17°C
- Beaufort Wind: 4 to 5
- Cloud Cover: 100%

3.1.1.3 Name and Qualifications of Person Conducting Site Investigation

The site investigation was completed by Martine Esraelian.

Martine Esraelian, B.Sc. is an Environmental Scientist specializing in species at risk and terrestrial ecosystems. She has a B.Sc. from Trent University where she specialized in Conservation Biology and Ecological Management and an Ecosystem Management Technician diploma from Sir Sandford Fleming College. During her time at Trent University, she completed a 1-yr internship with the MNR which involved developing a genetic-based protocol for the extraction of DNA from unknown turtle eggshells to assist with species identification. The project entailed extensive molecular genetics research and intensive lab work to develop a protocol able to supplement existing conservation management practices.

She offers expertise across the full breadth of the field from environmental assessments and technical analysis of environmental data to conservation management, corporate and government consulting, and community outreach. Martine has liaised with all levels of government, the community, and a portfolio of clients that includes consulting firms, planners, and high-profile developers. She has both technical and hands-on experience conducting site investigations (terrestrial and aquatic), evaluations of significance, environmental and agricultural impact studies, constraint analyses, water quality and soil assessments, species at risk, wildlife management and fisheries studies to meet regulatory requirements.

Martine has a wide range of field experience related to terrestrial and aquatic ecosystems and species at risk. She has conducted reptile and amphibian surveys, small-mammal trapping, benthic invertebrate monitoring and fisheries inventories (seine netting and electrofishing). She has conducted detailed natural areas inventories which involve species identification of flora and fauna, vegetation community mapping, identifying rare vegetation communities and significant wildlife habitats.

Martine has project management and fieldwork experience for a number of species at risk monitoring projects. Some of the species she has been involved with include: fowler's toad, eastern massasauga rattlesnake, gray ratsnake, queensnake, eastern ribbonsnake, milksnake, blanding's turtle, map turtle, spotted turtle, snapping turtle, Jefferson salamander, northern dusky and mountain alleghany dusky salamander, butternut, flowering dogwood, swamp rose mallow and spoon-leaved moss.

Martine is a certified Butternut Health Assessor (BHA) and also holds a certificate in the Ecological Land Classification (ELC) system.

3.1.2 Site Investigation 2

3.1.2.1 Date, Time and Duration of Site Investigation

- Date: October 7, 2010
- Start Time: 0900 hours
- Duration: approximately 4.5 hours

3.1.2.2 Weather Conditions During Site Investigation

- Temperature: 10°C
- Beaufort Wind: 1 to 3
- Cloud Cover: 0%

3.1.2.3 Name and Qualifications of Person Conducting Site Investigation

The site investigation was completed by Sean K. Male.

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 (*Aegoius 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 for hydro and wind power developments. 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.

3.1.3 Site Investigation 3

3.1.3.1 Date, Time and Duration of Site Investigation

- Date: November 19, 2010
- Start Time: 0923 hours
- Duration: approximately 3 hours

3.1.3.2 Weather Conditions During Site Investigation

- Temperature: -4°C
- Beaufort Wind: 0
- Cloud Cover: 10%

3.1.3.3 Name and Qualifications of Person Conducting Site Investigation

The site investigation was completed by Sean K. Male. His qualifications are identified within Section 3.1.2.3

3.1.4 Survey Methods

The vast majority of the Project location and lands within 120 m were searched by the observer. The majority of these areas were searched on foot in order to document natural features. Areas that were not searched on foot were those portions of the lands within 120 m that were visible from the edge of the Project location, thereby not requiring actual entry onto the area. Only portions of the woodlands (between 90 and 120 m from the Project location) identified within 120 m north of Chetwynd Road were not searched by the observer as access was not obtained from the landowners. However, characteristics of these features were determined from observations of the woodlands $<$90 m from the Project location and interpretation of aerial photography such that any natural features potentially occurring within these areas have been accounted for.

Photographs of the site were taken. Observations of wildlife, vegetation, or natural features were noted.

A copy of the field notes kept by the observer is provided in Appendix A.

3.2 Natural Resource Solutions Inc. Site Visit

Natural Resource Solutions Inc. (NRSI) conducted a site investigation in order to determine boundaries and evaluate significance of wetland communities. Names, qualifications and survey methodologies are identified within their report provided in Appendix B.

3.2.1 Date, Time and Duration of Site Investigation

- Date: August 6, 2010
- Start Time: 0830 hours

- Duration: 8 hours

3.2.2 Weather Conditions during Site Investigation

- Temperature: 20°C, rising to a high of 28°C
- Beaufort Wind: 0 to 2 (0 to 11 km/h)
- Cloud Cover: 15 to 40%

4. Results of Site Investigation

4.1 General Site Description

The Project location is characterized by its rolling topography and mix of upland and lowland vegetation communities. The Project location consists of a mix of poorly drained and well drained sandy loam and loamy sand soils. The majority of the Project location is used for agricultural purposes including an active livestock (i.e., cattle) operation. The agricultural fields are used as cattle pasture and for the production of hay. The areas that are not in agricultural production are comprised of woodlands. A photograph of the meadow component of Project location is shown in Figure 4.1.

4.2 Vegetation Observations

Natural vegetation communities have been identified on and within 120 m of the Project location and include woodlands and an unevaluated wetland. A discussion of these vegetation communities is provided below. A map of the vegetation communities on and within 120 m of the Project location is provided in Figure 4.2.

The vegetation species observed on and within 120 m of the Project location are listed in Table 4.1

Figure 4.1 Photograph of the Agricultural Fields Along the Northwest Portion of the Project Location

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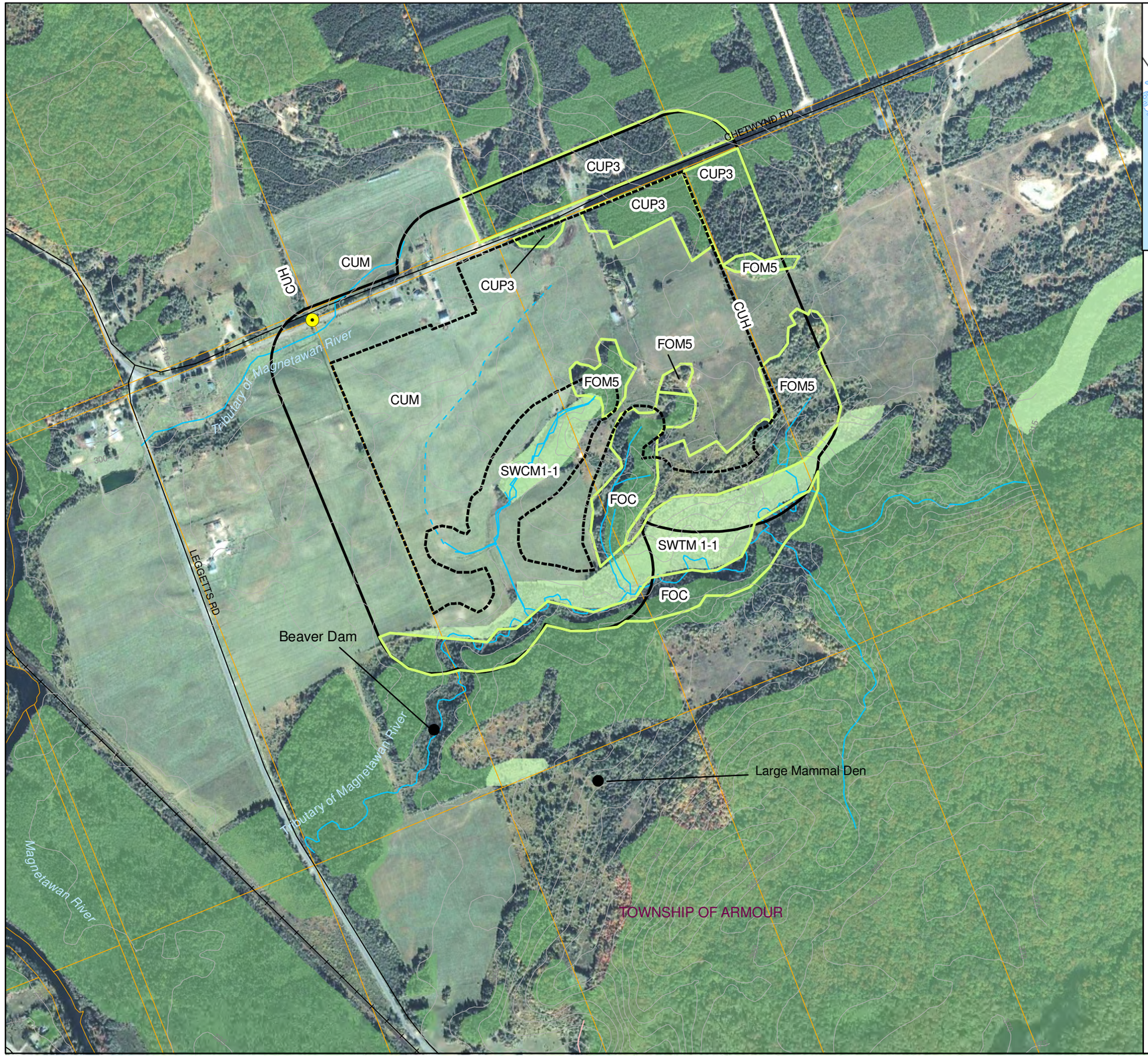

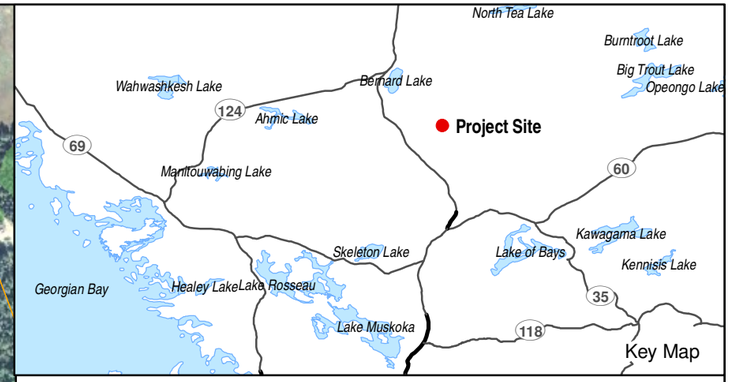

Legend

- Roads
- Rail
- Topographic Contour (5m interval)
- Grassed Waterway
- Watercourse
- Parcels
- Evaluated Wetland
- Wooded Area

Project Components

- Project Location
- 120 m from Project Location
- Connection Point with Existing Distribution Line

ELC

CUM - Cultural Meadow
CUH - Cultural Hedgerow
CUP3 - Coniferous Plantation
FOC - Coniferous Forest
FOM5 - Dry-Fresh White Birch-Poplar-Conifer Mixed Forest
SWTM 1-1 Speckled Alder Mineral Deciduous Thicket Swamp
SWCM 1-1 White Cedar Mineral Coniferous Swamp

0 100 200 400 Meters
1:8,000

Notes:
1. OBM and NRVIS data downloaded from LIO, with permission.
2. Spatial referencing UTM NAD 83.
3. Satellite imagery from Google Earth Pro.

NORTH

Figure 4.2
Northland Power Inc.
Burk's Falls East Solar Energy Project
Ecological Land Classification

HATCH™

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Table 4.1 Vegetation Species Observed on the Project Location

Type	Scientific Name	Common Names	Global Rank (GRank)	Provincial (SRank)
Tree	*Abies balsamea*	Balsam Fir	G5	S5
Tree	*Betula alleghaniensis*	Yellow Birch	G5	S5
Tree	*Betula papyrifera*	White Birch	G5	S5
Tree	*Larix laricina*	Tamarack	G5	S5
Tree	*Picea glauca*	White Spruce	G5	S5
Tree	*Pinus resinosa*	Red Pine	G5	S5
Tree	*Populus grandidentata*	Largetooth Aspen	G5	S5
Tree	*Populus tremuloides*	Trembling Aspen	G5	S5
Tree	*Prunus serotina*	Black Cherry	G5	S5
Tree	*Thuja occidentalis*	Eastern White Cedar	G5	S5
Tree	*Tsuga canadensis*	Eastern Hemlock	G4G5	S5
Tree	*Ulmus americana*	White Elm	G5?	S5
Shrub	*Alnus incana ssp. rugosa*	Speckled Alder	G5	S5
Shrub	*Cornus canadensis*	Bunchberry	G5	S5
Shrub	*Prunus pensylvanica*	Pin Cherry	G5	S5
Shrub	*Ribes cynosbati*	Prickly Gooseberry	G5	S5
Shrub	*Spiraea alba*	Narrow-leaved Meadowsweet	G5	S5
Shrub	*Cornus sp*	Dogwood Species		
Shrub	*Rosa sp*	Rose Species		
Shrub	*Rubus sp*	Raspberry Species		
Shrub	*Salix sp*	Willow Species		
Herb	*Typha latifolia*	Broad-leaved Cattail	G5	S5
Herb	*Achillea millefolium*	Common Yarrow	G5T5?	SNA
Herb	*Apocynum androsaemifolium*	Spreading Dogbane	G5	S5
Herb	*Aralia nudicaulis*	Wild Sarsaparilla	G5	S5
Herb	*Asclepias syriaca*	Common Milkweed	G5	S5
Herb	*Chrysanthemum leucanthemum*	Ox-eye Daisy	GNR	SNA
Herb	*Cirsium vulgare*	Bull Thistle	GNR	SNA
Herb	*Coptis trifolia ssp. groenlandica*	Goldthread	G5	S5
Herb	*Fragaria virginiana*	Common Strawberry	G5	S5
Herb	*Galium triflorum*	Fragrant Bedstraw	G5	S5
Herb	*Geranium robertianum*	Herb Robert	G5	SNA
Herb	*Hieracium aurantiacum*	Orange Hawkweed	GNR	SNA
Herb	*Hieracium piloselloides*	Glaucous King Devil	GNR	SNA
Herb	*Impatiens capensis*	Jewelweed	G5	S5
Herb	*Lemna minor*	Lesser Duckweed	G5	S5
Herb	*Lepidium campestre*	Field Peppergrass	GNR	SNA
Herb	*Malva neglecta*	Cheeses	GNR	SNA
Herb	*Plantago major*	Common Plantain	G5	SNA
Herb	*Potentilla recta*	Rough-fruited Cinquefoil	GNR	SNA
Herb	*Ranunculus acris*	Tall Buttercup	G5	SNA
Herb	*Rumex crispus*	Curly Dock	GNR	SNA

Type	Scientific Name	Common Names	Global Rank (GRank)	Provincial (SRank)
Herb	*Sagittaria latifolia*	Common Arrowhead	G5	S5
Herb	*Silene latifolia*	Bladder Campion	GNR	SNA
Herb	*Tiarella cordifolia*	Foamflower	G5	S5
Herb	*Trientalis borealis*	Starflower	G5	S5
Herb	*Trifolium pratense*	Red Clover	GNR	SNA
Herb	*Trifolium repens*	White Clover	GNR	SNA
Herb	*Lotus corniculatus*	Bird's-foot Trefoil	GNR	SNA
Herb	*Aster sp*	Aster Species		
Herb	*Geum sp*	Avens Species		
Herb	*Solidago sp*	Goldenrod Species		
Herb	*Taraxacum sp*	Dandelion Species		
Herb	*Trillium sp*	Trillium Species		
Herb	*Urtica sp*	Nettle Species		
Herb	*Viola sp*	Violet Species		
Vine	*Clematis virginiana*	Virgin's Bower	G5	S5
Vine	*Vicia cracca*	Cow Vetch	GNR	SNA
Woody Vine	*Vitis riparia*	Riverbank Grape	G5	S5
Graminoid	*Phalaris arundinacea*	Reed Canary Grass	G5	S5
Graminoid	*Beckmannia syzigachne*	American Slough Grass	G5	S4
Graminoid	*Glyceria canadensis*	Rattlesnake Manna Grass	G5	S4S5
Graminoid	*Glyceria maxima*	Tall Manna Grass	GNR	SNA
Graminoid	Poaceae	Grass Species		
Sedge	*Carex bebbii*	Bebb's Sedge	G5	S5
Sedge	*Carex crinita*	Fringed Sedge	G5	S5
Sedge	*Carex diandra*	Lesser Panicled Sedge	G5	S5
Sedge	*Carex intumescens*	Bladder Sedge	G5	S5
Sedge	*Carex lacustris*	Lakebank Sedge	G5	S5
Sedge	*Carex stipata*	Awl-fruited Sedge	G5	S5
Sedge	*Scirpus cyperinus*	Wool Grass	G5	S5
Sedge	*Scirpus microcarpus*	Small-fruited Bulrush	G5	S5
Sedge	Cyperaceae spp	Sedge Species		
Rush	*Juncus effusus ssp. solutus*	Soft Rush	G5	S5
Rush	*Juncus sp.*	Rush Species		
Fern	*Equisetum arvense*	Field Horsetail	G5	S5
Fern	*Gymnocarpium dryopteris*	Common Oak Fern	G5	S5
Fern	*Onoclea sensibilis*	Sensitive Fern	G5	S5
Fern	*Equisetum sp*	Horsetail Species		
Fern	Dryopteridaceae spp	Fern Species		

Type	Scientific Name	Common Names	Global Rank (GRank)	Provincial (SRank)
Acronyms/Definitions ***Global*** G5 – **Very common** (demonstrably secure under present conditions) GNR - Denotes that the species does not have a Global Ranking T – Denotes that the rank applies to a subspecies or variety. Q – Denotes that the taxonomic status of the species, subspecies, or variety is questionable. ***Provincial*** S5 – **Secure** (Common, widespread, and abundant in the nation or state/province) S4 – **Apparently Secure** (Uncommon but not rare; some cause for long-term concern due to declines or other factors) SNA – **Not Applicable** (A conservation status rank is not applicable because the species is not a suitable target for conservation activities) NAR – Not at Risk				

4.2.1 Woodland Communities

Several woodland communities are present on and within 120 m of the Project location These locations are shown in Figure 1.1.

A description of these woodland vegetation communities on or within 120 m of the Project location is provided below. Location of forest communities are shown in Figure 4.3.

Dry-Fresh White Birch-Poplar-Conifer Mixed Forest Community (FOM5)

This forest community is found in scattered locations on and within 120 m of the Project location. Most of this forest community is young to middle-aged, representing an early successional woodland community. The tree species observed included trembling aspen, balsam fir, white spruce, white birch, largetooth aspen, American elm and black cherry. Some of the ground cover vegetation observed included foamflower, Canada mayflower, wild sarsaparilla and cheeses. Areas with open canopies and recent disturbance were dominated by trembling aspen. Ground cover vegetation observed within the open areas included a mix of upland and wet meadow species. Some of the upland vegetation observed included common yarrow, red clover, tall buttercup, orange hawkweed, common strawberry, cow vetch, ox-eye daisy, common milkweed, prickly gooseberry, goldenrod sp., raspberry sp., and aster species. The wet meadow vegetation included grass sp., horsetail sp., sedge spp. and fern species. A photograph showing a portion of the mixed forest community is provided in Figure 4.3.

Figure 4.3 View of the Mixed Forest Vegetation Community

Coniferous Forest Communities (FOC)

This vegetation community was found within the woodland along the southern boundary of the Project location and generally followed a portion of the length of the unevaluated wetland and Tributary A. The dominant species included balsam fir and white spruce. White birch and trembling aspen were also observed but to a much lesser extent. The canopy floor was very stony with several large boulders observed. Ground cover vegetation and species richness was very low. The dominant herb species observed was Canada mayflower. A photograph of the coniferous forest community is provided in Figure 4.4.

Figure 4.4 View of the Coniferous Forest Community

Coniferous Plantation (CUP3)

This vegetation community was found on and within 120 m of the northeast corner of the Project location. The dominant species was red pine, with white pine also commonly planted. White Spruce was occasional in the understorey. Forest openings were populated with raspberry, alders, and maple saplings. Ground cover vegetation and species richness was very low. A photograph of this vegetation community is provided in Figure 4.5.

4.2.2 Wetland Communities

The LIO mapping identified an unevaluated wetland that follows the length of a tributary of the Magnetawan River which flows east to west within 120 m south of the Project location. The site visit confirmed the presence of this wetland and determined that it extends beyond the area shown on the LIO mapping. The wetland communities are described further in Appendix B.

Figure 4.5 View of the Coniferous Plantation Community

4.2.3 Other Vegetation Communities

Beyond woodland and wetland communities described above, two other cultural vegetation communities were recorded on and within 120 m of the Project location. These communities are discussed further below.

Cultural Meadow (CUM)

Several large areas of cultural meadow were identified on and within 120 m of the Project location during the site investigation. These areas have been maintained in a cultural meadow state as a result of agricultural use (i.e., lands actively used for production of hay/pasture of livestock).

The communities typically consists of grassland areas of mixed species, interspersed with common weedy vegetation of active farmlands, including such species as clover, asters, milkweed, and yarrow. A view of the cultural meadow community on the Project location is provided in Figure 4.1.

During the 2010 growing season, all fields on the Project location were ploughed. During site investigations conducted in the fall, no vegetation was visible on these fields.

Cultural Hedgerow (CUH)

There are two hedgerow communities present on and within 120 m of the Project location. Hedgerow communities are commonly found in agricultural landscapes separating various fields. There is one hedgerow community located along the eastern boundary of the Project location, and another within 120 m of the northwest corner of the Project location.

The hedgerow community along the eastern boundary consists of a mix of young to mid-aged trees, commonly poplar and pine trees, in the northern portion of the hedgerow to a depth of a single tree,

with scattered saplings and shrubs (such as dogwood) within the southern portion of the hedgerow. A view of a portion of the northern portion of the hedgerow community is provided in Figure 4.6.

Figure 4.6 View of the Hedgerow Community on the Eastern Boundary of the Project Location

The hedgerow community within 120 m of the northwest corner of the Project location is composed of mid-aged to mature trees, in similar composition to the hedgerow described on the eastern boundary of the Project location. This hedgerow is more continuous than that of the eastern boundary of the Project location, and in the southern end consists of trees to a depth of 2 to 3 tree widths (approximately 20 m).

4.3 Wildlife Observations

Wildlife species observed on the Project location during the time of the site investigation are listed in Table 4.2. In addition to the wildlife species observed, it is expected that other wildlife species occur on the Project location.

Table 4.2 Wildlife Species Observed on the Project Location

Common Name	Scientific Name	Rank		At Risk Status	
		Global (GRank)	Provincial (SRank)	COSEWIC	SARO
Mammals					
Moose	*Alces alces*	G5	S5	-	-
White-tailed Deer	*Odocoileus virginianus*	G5	S5	-	-
Racoon	*Procyon lotor*	G5	S5	-	-
Coyote	*Canis latrans*	G5	S5	-	-
Red fox	*Vulpes vulpes*	G5	S5	-	-
Eastern Cottontail	*Sylvilagus floridanus*	G5	S5	-	-
Eastern Chipmunk	*Tamias striatus*	G5	S5	-	-
Beaver	*Castor canadensis*	G5	S5	-	-
Birds					
Canada Goose	*Branta candensis*	G5	S5	-	-
American Bittern	*Botaurus lentiginosus*	G4	S4B	-	-
Turkey Vulture	*Cathartes aura*	G5	S5B	-	-
Ruffed Grouse	*Bonasa umbellus*	G5	S4	-	-
American Crow	*Corvus brachyrhynchos*	G5	S5B	-	-
Common Raven	*Corvus corax*	G5	S5	-	-
Tree Swallow	*Tachycineta bicolour*	G5	S4B	-	-
Barn Swallow	*Hirundo rustica*	G5	S4B	-	-
Northern Flicker	*Colaptes auratus*	G5	S4B	-	-
Hairy Woodpecker	*Picoides villosus*	G5	S5	-	-
Red-breasted Nuthatch	*Sitta candensis*	G5	S5	-	-
White-breasted Nuthatch	*Sitta carolinensis*	G5	S5	-	-
American Robin	*Turdus migratorius*	G5	S5B	-	-
Black-capped Chickadee	*Poecile atricapillus*	G5	S5	-	-
Common Yellowthroat	*Geothlypis trichas*	G5	S5B	-	-
American Goldfinch	*Carduelis tristis*	G5	S5	-	-
Bobolink	*Dolichonyx oryzivorus*	G5	S4B	THR	-
Dark-eyed Junco	*Junco hyemalis*	G5	S5B	-	-
American Tree Sparrow	*Spizella arborea*	G5	S4B	-	-
Savannah Sparrow	*Passerculus sandwichensis*	G5	S4B	-	-
Amphibians					
Spring Peeper	*Pseudacris crucifer*	G5	S5	-	-
Leopard Frog	*Rana pipiens*	G5	S5	-	-
American Toad	*Bufo americanus*	G5	S5	-	-
Wood Frog	*Rana sylvatica*	G5	S5	-	-

Common Name	Scientific Name	Rank		At Risk Status	
		Global (GRank)	Provincial (SRank)	COSEWIC	SARO
Acronyms/Definitions ***Global*** G5 – **Very common** (demonstrably secure under present conditions) G4 - **Apparently Secure** (Uncommon but not rare) T – Denotes that the rank applies to a subspecies or variety. ***Provincial*** S5 – Secure (Common, widespread, and abundant in the nation or state/province) S4 – **Apparently Secure** (Uncommon but not rare; some cause for long-term concern due to declines or other factors) B Designation applies to a breeding population ***At Risk Status*** COSEWIC Committee on the Status of Endangered Wildlife in Canada SARO Species at Risk in Ontario THR Threatened					

4.3.1 Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG) (MNR, 2000) identifies four main types of wildlife habitat:

- habitat for seasonal concentrations of animals
- rare or specialized habitats for wildlife
- habitat for species of conservation concern
- wildlife movement corridors.

Each of these types of wildlife habitat is considered further below and how they were considered during the site investigation. Where possible, these habitat types are considered in relation to the Significant Wildlife Habitat Ecoregion Criteria Schedules (SWHECS) – Addendum to Significant Wildlife Habitat Technical Guide (MNR, 2009). The SWHECS relates ecological land classifications to potential significant wildlife habitat types for Ecoregions 5E, 6E, and 7E. The Project is located within Ecoregion 5E, however draft criteria schedules for this Ecoregion are still being developed and are currently unavailable (MNR, 2009). As a result, criteria schedules for Ecoregion 6E are relied upon where relevant.

4.3.1.1 Habitats of Seasonal Concentrations of Animals

There are many different kinds of seasonal concentration areas, with the likelihood of occurrence of one of these areas depending on the characteristics of the study location. Those that were considered during the site investigations, and the discussion of their potential occurrence on the Project location, are discussed below.

- Winter deer yards – Winter deer yards are sheltered areas where white-tailed deer congregate during the winter months. As white-tailed deer are not adept at moving through deep snow, a key component of a winter deer yard is a core area predominantly composed of coniferous trees with a 60% canopy cover. The ELC codes that may provide wintering deer areas and were

observed on or within 120 m of the Project location are coniferous forest (FOC), mixedwood forest (FOM), coniferous swamp (SWC) and coniferous plantation (CUP3). MNR mapping provided in the Records Review identified portions of these woodlands as a Stratum 2 deer wintering area, however, the Ecoregion Criteria Schedule identifies only Stratum 1 deer wintering habitats as candidate significant habitats. These communities and their potential for provision of Stratum 1 deer wintering habitat are discussed separately below:

- FOM – Mixedwood forest communities on and within 120 m of the Project location were considered in relation to provision of winter deer yard habitats. These communities were described as young to middle-aged, and were more dominated by deciduous tress species than coniferous. A core coniferous area was not identified in these areas, and no evidence of deer browse was recorded. As a result these habitat are not considered to provide Stratum 1 deer wintering habitat.
- FOC – Coniferous forest communities within 120 m of the Project location are restricted to a small forest patch around a watercourse on and within 120 m of the Project location, and to the forest communities within 120 m of the Project location south of the Tributary of the Magnetawan River. There was no evidence of deer browse within either forest community. Further, the small size of the coniferous forest community on the Project location, and the steep slopes of the coniferous forest community present south of the Tributary of the Magnetawan River, represent conditions that are not ideal for provision of Stratum 1 deer wintering habitat. As a result, these habitats are determined to not meet the requirements of Stratum 1 deer wintering habitat.
- SWC – Coniferous forest communities within 120 m of the Project location are restricted to a small patch around a watercourse on and within 120 m of the Project location. Conifer density within this community was described as low, and would not be considered suitable for provision of winter deer habitat. Further, there was no evidence of deer browse within the forest community and the small size of the coniferous swamp community represent conditions that are not ideal for provision of Stratum 1 deer wintering habitat. As a result, this habitat is determined to not meet the requirements of Stratum 1 deer wintering habitat.
- CUP3 – Coniferous plantation were identified on and within 120 m of the northeastern corner of the Project location. These areas were not identified as deer wintering habitat by MNR. Further, no evidence of deer browse was noted from within the plantations. As a result, this habitat is determined to not provide Stratum 1 deer wintering habitat.

- Moose late winter habitat – Moose late winter habitats are similar to winter deer yards in that they consist of coniferous stands with at least 60% canopy closure, and in which most trees are at least 6 m tall. Ecoregion criteria schedules have not been prepared for moose late winter habitat. Of the woodlands identified on the Project location, suitable late winter habitat for moose was identified solely within the coniferous forest community within 120 m of the Project location south of the Tributary of the Magnetawan River. No evidence of moose wintering was noted from this area, though evidence (lots of browse, accumulations of droppings) were noted from portions of the woodland more than 120 m southwest of the Project location. Therefore, though this habitat type is present in the area, it is not found on or within 120 m of the Project location.

- Colonial bird nesting sites – Colonial bird nesting sites are locations where colonial species, such as herons, gulls, terns, and swallows traditionally nest in colonies of varying size. Swallow colonial-nesting bird breeding habitat are found associated with eroding banks, sandy hills, pits, steep slopes, rock faces, or piles within several ELC codes. Of these codes, only cultural meadows (CUM) were recorded on or within 120 m of the Project location, however none of these habitat features were identified in this area. Heron and Egret colonial nest sites are found associated with deciduous and mixedwood swamp or fens, while gull colonial nest sites are found on rocky islands or peninsulas within a lake or large river; such habitats were not identified on or within 120 m of the Project location.
- Waterfowl stopover and staging areas – Waterfowl traditionally congregate in larger wetlands and relatively undisturbed shorelines with vegetation, corresponding with several wetland ELC Codes (of which none were observed on or within 120 m of the Project location) during spring and fall migration. Further, during the fall migration, waterfowl may commonly congregate in feeding or roosting ponds. The watercourse within 120 m south of the Project location was determined to not contain suitable habitat for waterfowl stopover or staging given its small size, shallow nature, and absence of emergent vegetation (see Figure 4.7). As no wetland habitats corresponding with the relevant wetland ELC Codes are present on or within 120 m of the Project location, this habitat type is not found on or within 120 m of the Project location.

Figure 4.7 View of the Watercourse Crossing the Project Location

- Waterfowl nesting – Waterfowl nesting sites can consist of relatively large, undisturbed upland areas adjacent to ponds or wetlands corresponding with several ELC codes (of which thicket swamp (SWT) was the only one recorded on or within 120 m of the Project location. The thicket swamp was not found to contain suitable large diameter trees capable of supporting cavity nesters. As a result, this habitat type is not found on or within 120 m of the Project location.
- Shorebird and landbird migratory stopover areas – Shorebird and landbird migratory stopover areas are found along the shorelines of the Great Lakes and James Bay, as the Project location is located more than 120 m away from these areas, this habitat type cannot occur on the Project location.
- Raptor winter feeding and roosting areas – This combined habitat type features suitable raptor roosting sites (FOC, FOM) in proximity to winter feeding areas (CUM). Suitable foraging habitat is currently absent from the Project location following ploughing of the fields after the current growing season. As a result, suitable foraging habitat within 120 m of the Project location is restricted to the fields within 120 m east of the Project location. No evidence of raptors on or within 120 m of the Project location was noted during site investigations in early winter (November 2010). Given the small amount of suitable habitat presently available, the absence of raptors observed in early winter, and the high amount of snowfall within this area that would restrict the ability of upland areas to support raptor over-wintering, such habitat is determined to not be found on or within 120 m of the Project location.
- Wild turkey winter range – Similar to winter deer yards, wild turkey rely on coniferous forest stands for winter protection. Ecoregion criteria schedules have not been prepared for wild turkey winter range. As was noted for winter deer yards, coniferous forest content is found in some of the woodland communities within 120 m of the Project location. However, no evidence of wild turkey occurrence was noted during the site investigations, and wild turkey are relatively uncommon within this portion of the province. As a result, this habitat type is not considered to be present on the Project location.
- Turkey vulture summer roosting areas – Turkey vulture summer roosting areas traditionally consist of cliff ledges and large snags. Ecoregion criteria schedules have not been prepared for turkey vulture summer roosting areas. No cliff ledges were noted during the site investigation, and there were few large dead or partially dead trees present within the area. Further, any large or dead trees exhibited no evidence of white-washing, which would be expected were the tree supportive of turkey vulture roosting. Though a turkey vulture was recorded during the site investigation, this observation was consistent with turkey vulture foraging on the wing, and no evidence of roosting on or within 120 m of the Project location was noted. Therefore this habitat type is not found on or within 120 m of the Project location.
- Reptile hibernacula – Reptile hibernacula are commonly found in rock piles and rock crevices, no ELC codes are specified in the Ecoregion Criteria Schedule. A small bedrock outcrop is identified within 120 m north of the Project location opposite Chetwynd Road, however the outcrop was not identified as containing crevices capable of supporting reptile hibernacula. In addition, a small rock retaining wall is present on the Project location (see Figure 4.8), however this feature would not provide access to subterranean site below the frost line. Therefore, there

are no features capable of supporting reptile hibernacula identified on or within 120 m of the Project location during the site investigation.

Figure 4.8 View of the Rock Pile on the Project Location

- Bat hibernacula – Bat hibernacula are found in caves or abandoned mines. These features were not identified on or within 120 m of the Project location during the site investigation.
- Bullfrog concentration areas – Bullfrog concentration areas are predominantly found in areas of marsh habitat. Suitable marshland habitat was not found on or within 120 m of the Project location, and therefore this habitat type is not present in these areas.

Therefore, no candidate significant seasonal concentration areas are present on or within 120 m of the Project location.

4.3.1.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare vegetation communities include alvars, tall-grass prairies, savannahs, old-growth forest, cliff and talus slopes, and sand barrens. None of these vegetation communities were identified during the site investigation. Vegetation communities that were observed during the site investigation have been previously described in Section 4.1; none of these communities are considered to be rare or uncommon within the local or provincial area.

Specialized wildlife habitats include

- areas that support species that have highly specific habitat requirements

- areas with high species and community diversity
- areas that provide habitat that greatly enhances species' survival.

There are many habitat types that may meet these definitions; those that were considered during the site investigations as they had the potential to be present in the area, and the discussion of their potential occurrence on the Project location, are addressed below:

- Habitat for area-sensitive species – The SWHECS identifies the following types of habitat for area sensitive species that can be considered significant:
  - Marsh Bird Breeding Habitat – Of the ELC codes that can support this habitat type, none were recorded on or within 120 m of the Project location.
  - Area-Sensitive Bird Breeding Habitat – Of the ELC codes that can support this habitat type, only FOC, SWC and FOM were observed on or within 120 m of the Project location. Woodlands must be greater than 30 ha in size, which restricts areas of suitable habitat to the woodland within 120 m of the Project location south of the tributary of the Magnetawan River. Only one of the indicator species, Red-breasted Nuthatch, were recorded during baseline surveys. Further, area of forest within 120 m of the Project location are located less than 100 m from the forest edge, and are therefore considered to be edge habitats and not forest interior habitats capable of supporting area sensitive species. As a result, this habitat type is not found on or within 120 m of the Project location.
  - Open Country Bird Breeding Habitat – Cultural meadows, such as those found on or within 120 m of the Project location, may support this habitat type. Of the indicator species, Bobolink were the only species confirmed as nesting on the Project location. As only one of the indicator species was confirmed as breeding, this habitat type is determined to not be found on or within 120 m of the Project location.
  - Shrub/Early Succession Bird Breeding Habitat – Suitable habitat corresponding with the ELC codes is not found on or within 120 m of the Project location.
- Foraging areas with abundant mast – An abundance of beech and oak trees, species which serve as a primary food source for black bears, was not recorded on or within 120 m of the Project location during the site investigation. Similarly, no large patches of berry producing shrubs, or mountain ash, apple or black cherry trees were recorded. As a result, this specialized habitat is not found.
- Woodlands supporting amphibian breeding ponds – Vernal pools were not recorded within the woodlands (FOM, FOC, SWC) that are found on or within 120 m of the Project location. As a result, this habitat type is not present.
- Turtle nesting/over-wintering habitat – These habitats are found associated with certain wetland ELC codes, of which none were found on or within 120 m of the Project location. As a result, this habitat type is not found on or within 120 m of the Project location.
- Specialized raptor nesting habitat – Raptor nesting habitat is found associated with intermediate-aged to mature woodland communities associated with the following ELC codes (FOM, FOC, SWC and CUP3) that are greater than 120 ha in size. Of the woodland

communities on and within 120 m of the Project location, the only community greater than 10 ha in size is that found south of the Tributary of the Magnetawan River. Portions of this woodland within 120 m of the Project location were searched in November 2010 for evidence of raptor nesting. Suitable habitat for nesting raptors is very limited within this area as most trees are too immature to support raptor nesting. Further, the limited number of suitable nest support trees were not found to contain raptor nests. As a result, this habitat type is not found on or within 120 m of the Project location.

- Mink, otter, marten, and fisher denning sites – Denning sites for these members of the weasel family were not recorded on or within 120 m of the Project location during the site investigation.
- Moose calving areas/aquatic feeding areas/mineral licks – None of these areas were identified on or within 120 m of the Project location during the site investigation.
- Cliffs and caves – These features were not identified on or within 120 m of the Project location during the site investigation.
- Seeps and springs – No springs were identified in the vicinity of the Project location during the site investigation. Several seepages areas were identified during the site investigation (see Hatch 2010 b), and are considered further.

As a result seepage areas within 120 m of the Project location are considered to be candidate significant wildlife habitats.

4.3.1.3 Habitat of Species of Conservation Concern

Species of conservation concern that were considered during the site investigation include the following:

- Olive-sided Flycatcher – Olive-sided Flycatchers use tall trees or snags in open areas. Though suitable breeding habitat is found, no Olive-sided Flycatchers were recorded during site investigations conducted at a suitable time of year to enable detection. As none were observed on or within 120 m of the Project location and also given that its distinctive call was not recorded, they are determined to not be present on the Project location.
- Common Nighthawk – There is very little bare ground present on or within 120 m of the Project location that would serve as suitable breeding habitat for Common Nighthawk. Areas of suitable habitat were walked during the time period suitable for Common Nighthawk nesting and no nighthawks were observed. As a result, it is determined that Common Nighthawk do not occur on or within 120 m of the Project location.
- Canada Warbler – Though suitable habitat is found within 120 m of the Project location, none were detected during the site investigations and therefore they are determined to not be found on or within 120 m of the Project location.
- Golden-winged Warbler – Neither suitable habitat (cultural thickets or early successional bird breeding habitat), not Golden-winged Warblers were detected during the site investigations on or within 120 m of the Project location.

- Milksnake – As Milksnake are habitat generalists, suitable habitat is present on and within 120 m of the Project location. It is assumed that they are present.
- Eastern Ribbonsnake – Though use is not confirmed, the watercourses within 120 m of the Project location provides suitable habitat for Eastern Ribbonsnake. Given the relative difficulty of detecting snake species, they are assumed to be present.
- Five-lined Skink – Neither five-lined skink, nor suitable habitat (early successional forest with rock outcrops) were recorded during the site investigation, and therefore this species is not expected to occur.
- Western Chorus Frog – Neither Western Chorus Frogs, nor suitable breeding habitat (vernal pools) were identified on or within 120 m of the Project location.
- Species of turtles - The shallow nature of the waterbody present within 120 m south of the Project location (see Figure 4.7) suggests that it is not conducive to permanent occupancy by turtles. However, this feature may be used by turtles moving from Three Mile Lake to the Magnetawan River, and as a result may represent a movement corridor for Northern Map and Snapping Turtles.

Based on the results of the site investigation, potential habitat for Milksnake, Eastern Ribbonsnake, Northern Map Turtles, and Snapping Turtles will be considered during the evaluation of significance.

4.3.1.4 Animal Movement Corridors

The SWHTG (MNR, 2000) defines animal movement corridors as "elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another". Animal movement corridors were considered during the site investigation. Such features were found to be present within the Tributary of the Magnetawan River present within 120 m south of the Project location, the hedgerow within 120 m east of the Project location, and the woodlands on and within 120 of the Project location.

These features will be further assessed in the evaluation of significance report.

4.4 Endangered and Threatened Species

Bobolink listed as Threatened on the Species at Risk in Ontario (SARO) list, was recorded on the Project location. Suitable breeding habitat for Bobolink is found on the Project location. Discussion will be held with MNR in order to determine requirements for a permit under the ESA, should one be required.

Species that were identified as having potential for occurrence on the Project location are discussed further below:

- Whip-poor-will – Uses open areas for foraging and forested areas for nesting. Suitable foraging habitat was not identified on the Project location, and as result they are not expected to occur.
- Similar to the discussion of turtle species of conservation concern, the shallow nature of the waterbody present within 120 m south of the Project location suggests that it is not conducive to permanent occupancy by Blanding's or Stinkpot turtles. However, this feature may be used by these species as a movement corridor from Three Mile Lake to the Magnetawan.

- Eastern Hog-nosed Snake – Uses sandy, well drained soils and open vegetation cover and is often found near water. There is a minor occurrence of sand immediately adjacent to the Project location on the same property, however there was no evidence of snake activity noted within this feature, and the sands appeared to have been compacted by agricultural operations in this area (see Figure 4.9). There is a larger sand pit located within 120 m north of the Project location opposite Chetwynd Road (see Figure 4.10). Though use by Hog-nosed Snakes is not confirmed, it will be assumed that they may be present within this area and suitable mitigation measures will be implemented to ensure that there is no impact on the species. Discussions will be held with the MNR to ensure that mitigation measures satisfy the requirements of the ESA.

Figure 4.9 View of the Sandy Area Located Immediately Adjacent to the Project Location

Figure 4.10 View of the Potential Eastern Hog-nosed Snake Habitat within 120 m of the Project Location

5. Conclusions

Based on the results of the site investigation identified above, there are some minor corrections to the Records Review Report required. These are identified in Table 5.1.

Table 5.1 Corrections to Records Review Report

Natural Heritage Feature	Results of Records Review	Correction Required Following Site Investigation
Wetlands	Wetland habitats were present within 120 m of the Project location.	The amount of wetland habitat available within 120 m of the Project location is greater than identified through the Records Review. Updated mapping of wetland communities is shown in Figure 1.1
Wildlife Habitat	The only specific wildlife habitat feature identified during the Records Review that was present on or within 120 m of the Project location is Stratum 2 Deer Wintering Habitat.	Specific wildlife habitat features that were identified during the site investigations included • habitat for Species of Conservation Concern (Milksnake, Northern Ribbonsnake, Snapping Turtle, Northern Map Turtle) • specialized Habitat for Wildlife (Seeps and Springs) • animal Movement Corridors. The locations of these features are shown in Figure 1.1. The site investigation determined that there are no Stratum 1 Deer Wintering Areas on or within 120 m of the Project location.

The following natural features are present on and within the vicinity of the Project location and will require an evaluation of significance in order to determine whether an environmental impact study is required:

- wildlife habitat on and adjacent to the Project location including
  - seepage areas
  - habitat for species of conservation concern (Milksnake, Northern Ribbonsnake, Northern Map Turtle, Snapping Turtle)
  - animal movement corridors
- wetland communities within 120 m of the Project location

6. References

Hatch Ltd. 2010a. Burk's Falls East Solar Project – Natural Heritage Records Review. Prepared for Northland Power Inc. on behalf of Northland Power Solar Burk's Falls East L.P. August 2010.

Hatch Ltd. 2010b. Burk's Falls East Solar Project – Water Body Site Investigation Report. Prepared for Northland Power Inc. on behalf of Northland Power Solar Burk's Falls East L.P. August 2010.

Ministry of Natural Resources (MNR). 2009. Significant Wildlife Habitat Ecoregion Criteria Schedules – Addendum to Significant Wildlife Habitat Technical Guide. Working Draft.

MNR. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section and Science Development and Transfer Branch, Southcentral Sciences Section.

Appendix A

Site Investigation Field Notes

No

Location: Chatwynd [illegible] Page

Project: Burks Falls East

Date: June 5, 2010

Time: 0900-1500 (6.0 hrs)

% C.C - 100%

Temp: 17 °C

Beaufort Wind: 4-5

Rolling Topography

- Red clover (O)
- cow vetch
- ox-eye daisy (A)
- dandelion spp (A)
- Tall Buttercup (O)
- horsetail spp (O)

2 american elm in field

- yarrow
- peppergrass
- white clover (R)

common strawberry (R)

- birds foot trefoil
- common plantain

No

Date Page

Bobolink (A) in field / actively calling along watercourse

[illegible] [illegible] & foraged over

American robin Savannah Sparrow

American Crow

American Bittern within watercourse

[illegible] observed [illegible]

watercourse [illegible]

Sensitive fern (R) [illegible]

Fringed sedge (A) [illegible]

small-fruited bulrush (O)

Tall manna grass (O)

Soft rush (A)

Awl-fruited sedge (A)

Rattlesnake manna grass (O)

[illegible] panicled sedge

Bebb's sedge

Lakebank sedge

broad-leaved cattail

Slough grass

Reed canary grass

willow spp

orange hawkweed (R)

No ....
Date ....Page..........

Forested area SE

White cedar — oak fern ?

White Spruce (D) — canada mayflower

Balsam Fir — goldthread ?

Hemlock — early meadowrue ?

yellow birch

hairy woodpecker — hooked spur violet

bobolink

wood frog

Water course flows through woodland

possibly a spruce/cedar swamp

open area dominated by

speckled alder + willow spp

white birch (R)

jewelweed (A)

grasses (D)

sedges (A)

Trembling aspen (R) - Canopy (O) understory

avens sp.

watercourse - n/t

- minnows

- 12°C

- possible brook trout observed

violet sp.

No ....
Date ....Page..........

open area [illegible] ?

Spruce (R) saplings

Ferns (D)

willow spp

Trembling aspen saplings (O)

Woodland (South)

Trembling aspen (D) canopy, (O) understory

White Spruce (A)/(D) sub-canopy

Elm

bull thistle

No
Date Page

Coniferous forest
moist soil
bunchberry — groundcover sparse

Spruce (A)
Trembling aspen (
Balsam Fir (D)
White birch
downed debris (A)
Sensitive fern
curled dock (O)
sedges
reed sp.
wool grass
duckweed
arrow head
horsetail (O)
jewelweed
mosses (A)

(margin note beside list: wetland ... sample ...)

Damselfly
wild sarsaparilla

No
Date Page

Upland slope clearing
- ferns (D)
raspberries (A)
grasses
goldenrod sp.
bladder sedge (R)
prickly gooseberries
orange hawkweed (R)
red clover, cow vetch
SE border
Black cherry (R)
Largetooth Aspen (D) canopy
White birch (O)
milkweed (O)
ruffed grouse
common strawberry
meadowsweet
sedges
ox-eye daisy (O)
[illegible]
red clover
king devil ( ) ?
rough-fruited cinquefoil
birdsfoot trefoil
cow vetch

No ....
Date .... Page..........

open area

- Speckled Alder (O)
buttercup
[illegible]
goldenrod
[illegible]
orange hawkweed
[illegible]
red clover
yarrow
common strawberry
spruce sapling/mature (A)
Tamarack (A)
black cherry (O)
red pine (R)
- large spruce south side of open area
pin cherry [illegible]

No ....
Date .... Page..........

virgin's bower
foamflower
trillium sp.
goldthread
lily sp.
wild sarsaparilla
violet sp.
spreading dogbane
bladder campion
riverbank grape

BBE
Nov 19/10
Obs. SKm
Temp -1°C
light dusting of snow on ground
maybe in trees
10% o.c.c.
B 0

Start 09:23 Gate 12:15

BCCH → ploughed fields
RNGR winter feeding
AmGO – habitat
CORA
WBNU

Note small pond area.
near boundary & 2 props.

→ lots of dog, deer, moose tracks.

→ hole?

no nest observed

→ most of the woodland is
too immature to support
stick nests.
→ no raptors obs.

Buck's Falls E Site Visit

Oct 7/10

Started 09:28am. → end @ 14:00

Obs - SKM

Weather - clear skies, B1, ~10°C

SWH considerations

→ Winter Deer Yards
→ Moose late winter
→ Waterfowl stopover + staging
→ Raptor Winter Feeding + Roosting
→ Reptile Hibernacula

Values → High diversity of habitats
Old growth
Abandoned mine
Vernal pools
→ specialized raptor nesting

v.12.14

CORA
red squirrel

DEJU AMGO
RBNH
BCCH

(1) milkweed / goldenrod / grassland

(2) Red Pine Plantation
→ White Pine
→ occ. white spruce in understory
→ poor undergrowth development
→ opening → raspberry, maple saplings, alders
→ no diversity, several peeks, evidence of rig browse
→ not old growth

(3) [illegible] field
→ [illegible], little growth
→ deer, coyote, fox, raccoon tracks, weasel tracks

(4). Field E of site
→ open grassland
→ milkweed abundant
→ occasional willows / red pine saplings
→ on 1010 [illegible]

AMTS

(5) Poplar woodland
→ trembling aspen predominates
→ maple common in understory, occ in overstory
→ open canopy, low diversity
→ no animal [illegible]

(6) Hedgerow or animal movement corridor
→ does patch to be of big benefit to large mammal movement when considered in relation to availability of naturalized habitats in the area.
→ movement benefits restricted to small mammals, passerines!

HATCH™

wind B3 @ 10:30

→ dog kennel nearby? → several loud dogs barking to NG

(7) Transitional habitat

-> heavy regenerating forest
-> currently very open
-> regenerating to poplar / pine
-> currently very open habitat, in many areas where trees no taller than 10 m
-> other areas - trees to 30 m
-> regenerating to pine mixedwood
-> Red pine [illegible]
  -> larch -> uncommon
  -> [illegible] -> [illegible]
  -> [illegible] birch
  -> [illegible] -> [illegible] uncommon
  -> maple [illegible]
-> goldenrod & aster predominate in open areas
-> ATV trail through back of woods

(8) Poplar mixedwood
-> trembling aspen [illegible] species
-> border stream draining [illegible] [illegible] F.

- - o - -

Watercourse
-> surface drainage [illegible]
-> shallow [illegible]
-> minor [illegible] [illegible] ~ 2 m width
-> turns into wide floodplain that would be [illegible] wetland
-> eventually reaches meandering creek
-> [illegible]
-> [illegible]
-> some [illegible] and grasses
-> larger floodplain [illegible] (grasses)
-> [illegible] [illegible] thicket
-> conifers predominate in lowlands.
-> lots of beaver activity.

Tab B   RNGK

→ Grasses Cottonwoods   (cottonwood)

Ferns, Asters

→ water in channel

→ surrounded by spruce ~~forest~~

Forest to South

→ [illegible] [illegible]
open [illegible] areas
wetlands
lowlands & valleys around drainage [illegible]
upland areas

Three [illegible] [illegible] trees
through [illegible] producing stands ([illegible]) obs., no large [illegible] found.

(9) White Spruce Forest around Drainage feature
Mix
Poplar / White Birch
Larch etc.

Opposite side of Creek

Red [illegible]
↳ large sand pit.

Sandy area → hagwood site E

(10) Cum → ~~[illegible]~~ Pasture
- ice [illegible]

HATCH™

(8) poor understory diversity
→ except → spruce/moss slopes where goldenrods + raspberries are more.

· AGO → 20 flying the Trib A to Lake

AMCR → 30 flying S

Low Area
→ cut before thing
→ spruce lagoon

Prelim. Conclusions
→ Animal Movement Corridor S of site along watercourse
→ candidate SWH for diversity of forest habitat
→ no other candidate SWH confirmed during site visit
→ wetlands prev. evaluated
→ 2 new features identified.

HATCH™

Appendix B

Natural Resource Solutions Inc.
Wetland Evaluations

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Memo

Project No. 1141

To: **Sean Male**

From: **David Stephenson; Kevin Dance**

Date: **February 22, 2011**

Re: **Burk's Falls Solar Project Wetland Evaluations**
Response to MNR Comments

The wetlands in the vicinity of the proposed Burk's Falls Solar Project lands are unevaluated at this time. The new Natural Heritage Assessment Guide (NHAG) for Renewable Energy Projects (OMNR 2010) allows for the evaluation of these wetlands using Appendix C.

Our assessment of the unevaluated wetland complex, within the catchment area provided on the attached Catchment Area map in accordance with the appropriate sections of the Ontario Wetland Evaluation System for Northern Ontario (MNR 2002), is attached as Table 1. It is our understanding that this table will be used by Hatch to identify potential negative environmental effects and mitigations as required for preparation of an EIS as per the NHAG.

The filed study approach taken by NRSI during the August 6th and 7th, 2010 site visit included:

- Collection and review of background information on wetland-related natural features in the vicinity of the project location.
- Identification of all wetlands, evaluated and non-evaluated, within approximately 750m of the subject wetlands to assess the extent of wetland mapping that would be required to address whether wetlands in the vicinity of the project location would be complexed with other wetlands (i.e. to identify whether a 'string' of unevaluated wetlands occur between the subject wetlands and the nearest evaluated wetland)
- Conduct field surveys of subject wetlands on the project location as well as on neighbouring lands. This included mapping of wetland vegetation communities based on Ontario Wetland Evaluation System (OWES) Northern Manual as well as Ecological Land Classification (ELC), and recording all species of flora and fauna within the wetlands.

Some of the wetlands in the catchment area were not able to be visited in the field on August 6th and 7th , 2010 by NRSI staff, as they were on private property and not visible from public roads. For wetlands which were not accessible during the site visit, information on those wetlands was then based on air photo interpretation. Air photos and MNR NRVIS wetland mapping was used to determine wetland boundaries for wetlands that were inaccessible in the field. This allowed for the size of the wetlands to be determined for use in completing the Appendix C evaluation (see the attached Catchment Area and Wetland Size map).

As part of Appendix C of the NHAG, we have completed an interspersion map covering the wetlands in the catchment area, and have attached the interspersion map with this memo.

I trust that this information is adequate. If any further information or clarification is needed please contact me.

Yours Sincerely,
Natural Resource Solutions Inc.

David Stephenson, M.Sc.,
Senior Biologist

Work Cited

Work Cited:

Natural Heritage Information Centre (NHIC). 2010. Species Search. Ministry of Natural Resources. Available Online: https://www.biodiversityexplorer.mnr.gov.on.ca/nhicWEB/mainSubmit.do

Ontario Ministry of Natural Resources. 2010. Natural heritage assessment guide for renewable energy projects. Ontario Ministry of Natural Resources. Pp86.

Ontario Ministry of Natural Resources (MNR). 2002. Ontario Wetland Evaluation System: Northern Mannual. Ontario Ministry of Natural Resources. 252p.

Table 1 Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects, Wetland Complex

<table>
<tr><th>Characteristic/ Ecological Function</th><th>Evaluation Results</th><th>Scoring</th></tr>
<tr><td>Actual Wetland Size (ha)</td><td>Wetland 1:
Tall shrub, swamp #1 (tsS1) =0.81ha
Coniferous, swamp #1 (cS1) = 1.58ha
Tall shrub, swamp #2 (tsS2) =1.38ha
Wetland 2:
Narrow-leaved emergent, marsh #1(neM1) =1.59ha
Tall shrub, swamp #3 (tsS3) =1.98ha
Wetland 3:
Tall shrub, swamp #4 (tsS4) =0.82
Wetland 4:
Coniferous, swamp #2 (cS2) =1.25ha
Narrow-leaved emergent, marsh #2 (neM2) =1.41ha
Tall shrub, swamp #5 (tsS5) =3.41ha
Narrow-leaved emergent, marsh #3 (neM3) =0.90ha
Tall shrub, swamp #6 (tsS6) =6.76ha
Narrow-leaved emergent, marsh #4 (neM4) =0.47ha
Wetland 5:
Coniferous, swamp #3 (cS3) =1.35ha
Wetland 6:
Narrow-leaved emergent, marsh #6 (neM6) = 4.40ha
Wetland 7:
Narrow-leaved emergent, marsh #5 (neM5) =0.75ha
Coniferous, swamp #7 (cS7) =25.43ha
Tall shrub, swamp #7 (tsS7) =1.9ha

Total : 56.19ha</td><td></td></tr>
<tr><td>Wetland Type</td><td>1.1.2 WETLAND TYPE (Fractional Area = area of wetland type/total wetland area)

<table>
<tr><th></th><th>Fractional Area</th><th></th><th></th><th>Score</th></tr>
<tr><td>Bog</td><td></td><td>x</td><td>3</td><td>0.00</td></tr>
<tr><td>Fen</td><td></td><td>x</td><td>6</td><td>0.00</td></tr>
<tr><td>Swamp</td><td>0.831</td><td>x</td><td>8</td><td>6.648</td></tr>
<tr><td>Marsh</td><td>0.169</td><td>x</td><td>15</td><td>2.535</td></tr>
</table>
Wetland type score (maximum 15 points) 9

Fractional Area of Wetland Types:
Swamp:
Swamp (ha)
Total ha = 46.67</td><td>9</td></tr>
</table>

	FA=46.67/56.19 =0.831 **Marsh:** *Marsh (ha)* Total ha = 9.52 FA =9.52/56.19 =0.169	
Site Type	Palustrine: 0.048 *2 =0.096 Riverine: 0.952 *4 =3.808	4
Vegetation Communities	Seven wetland areas have information on vegetation communities. Ten of the wetlands have no detailed vegetation information as only available information is from air photos as there was no property access to these private property areas. Areas with known vegetation 7= 6 pts Assuming all areas have only 1-3 forms 17= 11	6 (11 max)
Proximity to other Wetlands	Hydrologically connected by surface water to other wetlands (same dominant wetland type), within 0.5 km	8
Interspersion	See Appended Interspersion Map Total vertical: 31 Total horizontal: 27 **Total =58**	9
Open Water Types	Open water occupies 5-25% of the wetland area, occurring in a central area	8
Flood Attenuation (total)	Details of Flood Attenuation calculations are provided below Table 1	73
Water Quality Improvement (Total)	Details of water quality improvement calculations are provided below Table 1	10 +8
Shoreline Erosion Control	**Step 1:** If any part of the wetland is riverine or lacustrine (proceed to Step 2) = Yes, therefore go to step 2 **Step 2:** Choose the one characteristic that best describes the shoreline vegetation = Emergent vegetation	8
Groundwater Recharge (Total)	Details of Groundwater Recharge calculations are provided below Table 1	21
Species Rarity(Total)	No rare species noted during 2010 surveys within the wetland. **Section**	0 0

	4.1.2.1 Breeding Habitat for Endangered or Threatened Species = none **4.1.2.2** T**raditional Migration or Feeding Areas for an Endangered or Threatened Species** = none **4.1.2.3** and **4.1.2.4 Provincially Significant Plant and Animal Species** = none **4.1.2.5 Regionally Significant Species** = none **4.1.2.6 Locally Significant Species** = none **4.1.2.7 Species of Special Status** = none	
Significant Features and Habitats (Total)	**Section:** **4.2.1 Colonial Waterbirds** = none **4.2.2 Winter Cover for Wildlife** = none **4.2.3 Waterfowl Staging and/or Molting Area** = none **4.2.4 Waterfowl Breeding** = none	0
Fish Habitat (Total)	A visual observation survey of aquatic habitat within the wetland area was conducted on June 5, 2010 by Hatch. No specific fish community assessment work was conducted by Hatch. Hatch staff observed Brook Trout in several areas during the field investigation and it was determined that the watercourse within the wetland provides cold water habitat for this species. There were groundwater seepage areas, observed by both NRSI staff on August 6, 2010 and Hatch staff during their June site visit, throughout the wetland which assist in maintenance of base flow and cold water temperatures to maintain aquatic habitat values. Wetland vegetation provides overhanging and in stream cover along the periphery of the watercourse, which would provide habitat for brook trout and other fish species. The watercourse/wetland also is 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 based on observations by Hatch staff. According to Hatch staff there was no background information regarding fisheries within the wetland was obtained during the Records Review process.	

Flood Attenuation Calculations:

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION

If the wetland is a complex including isolated wetlands, apportion the l00 points according to area. For example if 10 ha of a l00 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)		56.19
(b)	Total area (ha) of upstream detention areas (include the wetland itself)		56.19
(c)	Ratio of (a):(b)		1.00
(d)	Upstream detention factor: (c) x 2 = (maximum allowable factor = 1)	2.00	1.00

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

(a)	Wetland area (ha)		56.19
(b)	Size of catchment basin (ha) upstream of wetland (include wetland itself in catchment area)		468.45
(c)	Ratio of (a):(b)		0.12
(d)	Wetland attenuation factor: (c) x 10 = (maximum allowable factor = 1)	1.2	1.00

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

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

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

Surface Form Factor (FF): 0.2

(Maximum allowable factor = 1)

Flood Attenuation Continued:

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)	0.20
	[(DF + AF + FF)/3] x 100*	73.33333

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

Total Flood Attenuation Score (maximum 100 points) 73.000

Water Quality Improvement Calculations:

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.

Site Type	Improvement Factor (IF)						
Isolated	FA	0	x	0.5	=	0.00
Riverine	FA	0.952	x	1	=	0.95
Palustrine with no inflow	FA	0.048	x	0.7	=	0.03
Palustrine with inflows	FA		x	1	=	0.00
Lacustrine on lake shoreline	FA		x	0.2	=	0.00
Lacustrine at lake inflow or outflow	FA		x	1	=	0.00

Watershed Improvement Score (IF x 30) (maximum = 30) 29.40

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	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	6
Temporary or abandoned	3
None	0

Score for LUU 6

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	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

Ground Water Discharge Calculations:

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	
Weland 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		1-3 seeps = 5	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	0	Moderate 4.2-5.7 = 5		High >5.7 = 10	
Catchment soil coverage	Patchy = 0		Thin (<20cm) = 2		Thick = 5	5
Catchment soil permeability	Low = 0		Moderate = 2	2	High = 5	
Totals		5		11		5

(Scores are cumulative maximum score 30 points)

Groundwater Discharge Score (maximum 30 points) 21

Catchment Area and Wetland Size (ha) Map

Burks Falls East Solar Project

Wetland Vegetation with Measurements

Natural Resource Solutions Inc.
Aquatic, Terrestrial and Wetland Biologists

January 12, 2011
Project No: NRSI-1141
UTM Zone 17, NAD 83
Scale: 1:10,000 (at 11x17")

N

Kernick Lake

1.897424
25.425921
0.746446
0.467566
468.446344
1.346098
6.761928
0.903051
3.414056
4.401889
1.414028
1.245616
1.591606
0.817756
1.376256
1.982841
1.584584
0.813539

MOSSOM RD
GRAHAM RD
CRAWFORD RD
CRAWFORD RD
YONGE ST
VICTORIA ST
JAMES ST
DAVIDSON ST
HIGH ST
HIGH ST
VICTORIA ST
1ST AVE
DAVIDSON ST
TOWER RD
PEGGS MTN RD
HWY 11
FERGUSON RD
MAG VIEW DR
LEGGETT RD
RELATIVE RD
SLIGO LINE
SKYLINE RD
HORIZON RD
SANDY COVE DR
SUNNYLEA DR

Legend

- Project Site
- Ecological Land Classification
- Catchment Area
- Road
- Watercourse Permanent
- Watercourse Intermittent
- Waterbody
- Wetland Area
- Wooded Area

0 200 400 600 800 Meters

625000 625500 626000 626500 627000 627500 628000 628500 629000 629500 630000 630500 631000 631500 632000 632500 633000

5054500 5054000 5053500 5053000 5052500 5052000 5051500 5051000 5050500 5050000 5049500

Burks Falls East Solar Project

Interspersion Map

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

January 12, 2011
Project No: NRSI-1141
UTM Zone 17, NAD 83
Scale: 1:10,000 (at 11x17")

N

Kernick Lake

Wetland #1
Wetland #2
Wetland #3
Wetland #4
Wetland #5
Wetland #6
Wetland #7

tsS_1 tsS_2 tsS_3 tsS_4 tsS_5 tsS_6 tsS_7
cS_1 cS_2 cS_3
neM_1 neM_2 neM_3 neM_4

Legend
- Project Site
- Ecological Land Classification
- 355.01m x 355.01m
- Road
- Watercourse Permanent
- Watercourse Intermittent
- Waterbody
- Wetland Area
- Wooded Area

0 200 400 600 800 Meters

NRSI_1141_Interspersion_10K_2011_01_12_SWM

Project Team:

Member	Qualifications	Role
David Stephenson, MSc	Certified Wetland Evaluator Certified ELC Certified Arborist	• Project Management • Field Survey • Data Analysis, Evaluation, Reporting • Natural Heritage Assessment Guide Appendix C – for revised catchment area (air photo interpretation, interspersion mapping, and evaluation)
Kevin Dance, MES.	Certified ELC	• Field Survey • Data Analysis • Evaluation • Natural Heritage Assessment Guide Appendix C – for revised catchment area (evaluation)
Ken Burrell, BES	Field Biologist	• Field Survey
Cheryl-Anne Payette B.Sc, FWT	Field Biologist	• Data Analysis • Evaluation
Caleb Coughlin, FWT	Field Biologist	• Field Survey
Shawn MacDonald, B.A.	GIS Mapping	• Mapping

NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: Burk's Falls **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 6/10 **Time (24h):** 905

Field #: C **Weather:** Precipitation: 0 Temp (°C): 19

Map Code: cS2 Wind Speed & Direction: 2 Cloud %: 15

Wetland Type: S **Site Type:** P **Dominant Form:** C

% Open Water: 8% **ELC Code:** SWMM2

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	Trembling ~~Aspen~~, white birch, red maple
c	white spruce = Tamarack, black spruce
dc,dh,ds	
ts	Willow sp.
ls	narrow leaved Meadowsweet, black chokeberry
gc	aster sp, canada mayflower, bunchberry, Dewberry, bracken
ne	Sedge sp,
be	
re	broad-leaved cattail
ff	
f	
su	
m	moss sp.

Rare Species (Local, Regional, Provincial):	Wildlife Notes:
	Am. Toad

SAR observations must also include a specific UTM location.

Forms: **h**=deciduous trees; **c**=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: **S**=swamp; **M**=marsh; **B**=bog; **F**=fen

Site Type: **L**=lacustrine; **P**=palustrine; **R**=riverine; **IS**=isolated

NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: Burk's Falls **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 7/10 **Time (24h):** 830

Field #: D **Weather:** Precipitation: 0 Temp (°C): 15cc

Map Code: tsS3 Wind Speed & Direction: 0 Cloud %: 40

Wetland Type: S **Site Type:** R **Dominant Form:** ts

% Open Water: 20% **ELC Code:** SWTH1-1

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	
c	
dc,dh,ds	
ts	speckled Alder
ls	narrow leaved meadowsweet
gc	grass sp., rough leaved goldenrod,
ne	sedge sp., marsh cinquefoil, marsh st. johnswort
be	giant burreed, water arum
re	broad-leaved cattail, hardstemmed bulrush, ~~sp~~ wool grass
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):	Wildlife Notes:

SAR observations must also include a specific UTM location.

Forms: **h**=deciduous trees; **c**=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: **S**=swamp; **M**=marsh; **B**=bog; **F**=fen

Site Type: **L**=lacustrine; **P**=palustrine; **R**=riverine; **IS**=isolated

NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: Burk's Falls **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 7/10 **Time (24h):** 912

Field #: E **Weather:** Precipitation: Temp (°C):

Map Code: MAM3 Wind Speed & Direction: Cloud %:

Wetland Type: M **Site Type:** R **Dominant Form:** ne

% Open Water: 10% **ELC Code:** MAMM3

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	
c	
dc,dh,ds	
ts	speckled alder
ls	
(gc)	jewelweed, black raspberry, northern bugleweed, joe pye weed
(ne)	hop sedge, rice cut grass, sedge sp.
be	broad leaved arrowhead
(re)	black bulrush, wool grass
ff	
f	pondweed sp.
su	
m	moss sp.

Rare Species (Local, Regional, Provincial):	Wildlife Notes:
	Deer - tk COYE AMRO BCCH Leopard frog

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated

mineral meadow marsh

NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: Burk's Falls **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 7/10 **Time (24h):** 938

Field #: F **Weather:** Precipitation: Temp (°C):

Map Code: MAM4 Wind Speed & Direction: Cloud %:

Wetland Type: M **Site Type:** R **Dominant Form:** re

% Open Water: 100 **ELC Code:** MASH1-1

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	
c	
dc,dh,ds	
ts	
ls	
gc	
(ne)	grass sp.
be	
(re)	broad-leaved cattail, hard stemmed bulrush
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):	Wildlife Notes:

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated

NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: Burk's Falls Solar Park **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 6/10 **Time (24h):** 915

Field #: 1 **Weather:** Precipitation: 0 Temp (°C): 28°

Map Code: neM, Wind Speed & Direction: 1 Cloud %: 40%

Wetland Type: M **Site Type:** P **Dominant Form:** ne

% Open Water: 3% **ELC Code:** MAMM3

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	White birch, Trembling Aspen
c	white spruce, Eastern white cedar
dc,dh,ds	E. wh. cedar
ts	grass sp,
ls	speckled Alder, willow sp.
(gc)	sensitive fern, field horsetail, arrowleaved tearthumb, spotted jewelweed
(ne)	Sedge sp (fringed sedge, hop sedge),
be	
re	hard stemmed bulrush, woolgrass
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):

→ seepage coming from hills

Wildlife Notes:

Cabbage white BARS
white Admiral
E. chipmunk
Common wood nymph
SAVS
MYCR
COYE

SAR observations must also include a specific UTM location.

Forms: **h**=deciduous trees; **c**=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: **S**=swamp; **M**=marsh; **B**=bog; **F**=fen

Site Type: **L**=lacustrine; **P**=palustrine; **R**=riverine; **IS**=isolated

Mineral meadow marsh

NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: Burk's Falls Solar Park **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 6/10 **Time (24h):** 915

Field #: 2 **Weather:** Precipitation: 0 Temp (°C): 28

Map Code: +SS1 Wind Speed & Direction: 1 Cloud %: 40

Wetland Type: S **Site Type:** R **Dominant Form:** ts

% Open Water: 15% **ELC Code:** SWTN1-1

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	white birch
c	white spruce,
dc,dh,ds	
(ts)	speckled Alder
ls	
(gc)	sensitive fern, lance leaved goldenrod, red clover, spotted jewelweed, joe pye weed
ne	sedge sp.
be	
re	hard-stemmed bulrush, woolgrass
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):

Wildlife Notes:

brook trout in creek BCCH
ebony jewelwing
Monarch
white Admiral
creek chub

SAR observations must also include a specific UTM location.

Forms: **h**=deciduous trees; **c**=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: **S**=swamp; **M**=marsh; **B**=bog; **F**=fen

Site Type: **L**=lacustrine; **P**=palustrine; **R**=riverine; **IS**=isolated

circa ground creek

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Wetland Vegetation Communities

Project Name: Burk's Falls **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 6/10 **Time (24h):** 830

Field #: A **Weather:** Precipitation: 0 Temp (°C): 19

Map Code: tsS4 Wind Speed & Direction: 2 Cloud %: 15

Wetland Type: S **Site Type:** R **Dominant Form:** ts

% Open Water: none **ELC Code:** SWTM1-1

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	
c	
dc,dh,ds	
(ts)	speckled Alder
ls	
gc	fowl meadow grass, timothy, bracken fern, wild evening primrose
ne	fringed sedge, spotted jewelweed, sedge sp.
be	
re	
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):	Wildlife Notes:

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated

alder thicket

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Wetland Vegetation Communities

Project Name: Burk's Falls **Project #:** 1141

Observer(s): KSD, KGB

Date: Aug. 6/10 **Time (24h):** 840

Field #: B **Weather:** Precipitation: 0 Temp (°C): 19

Map Code: neM5 Wind Speed & Direction: 2 Cloud %: 15

Wetland Type: M **Site Type:** P **Dominant Form:** ne

% Open Water: none **ELC Code:** MANM1-7

Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	
c	white spruce
dc,dh,ds	
ts	speckled Alder
(ls)	narrow leaved meadowsweet
gc	, sensitive fern, showy goldenrod
(ne)	fringed sedge, sedge sp. fowl meadow grass
be	
re	broad-leaved cattail
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):	Wildlife Notes:
	NOFL TuVu BCCH CoRA

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated

min. meadow

NATURAL RESOURCE SOLUTIONS INC.
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Wetland Vegetation Communities

Project Name: Burk's Falls **Project #:** 1141
Observer(s): KSD, KGB
Date: Aug. 6/10 **Time (24h):** 915
Field #: 5 **Weather:** Precipitation: 0 Temp (°C): 28+
Map Code: neM2 Wind Speed & Direction: 1 Cloud %: 40
Wetland Type: M **Site Type:** **Dominant Form:** ne
% Open Water: ø **ELC Code:** MAMM3
Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	
c	white spruce, tamarack
dc,dh,ds	
ts	speckled Alder
(ls)	narrow leaved Meadowsweet
gc	sensitive fern, ~~meado~~ joe pye weed, rough leaved goldenrod
(ne)	grass sp. fringed sedge, hop sedge, meadow horsetail, Kentucky blue grass
be	-
re	woolgrass,
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):

Wildlife Notes:

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated

Sedge Meadow

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Wetland Vegetation Communities

Project Name: **Project #:**
Observer(s):
Date: **Time (24h):**
Field #: **Weather:** Precipitation: Temp (°C):
Map Code: Wind Speed & Direction: Cloud %:
Wetland Type: **Site Type:** **Dominant Form:**
% Open Water: **ELC Code:**
Photos:

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h	
c	
dc,dh,ds	
ts	
ls	
gc	
ne	
be	
re	
ff	
f	
su	
m	

Rare Species (Local, Regional, Provincial):

Wildlife Notes:

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; **dh, dc, ds**=dead trees/shrubs; **ts**=tall shrubs; **ls**=low shrubs; **gc**=ground cover; **ne**=narrow emergents; **be**=broad emergents; **f**=floating plants; **ff**=free-floating plants; **su**=submerged plants; **m**=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated