

November 1, 2012

To: Amy Cameron, MNR

From: Martine Esraelian

cc: Rob Miller, Northland Power

Northland Power Burks Falls West Solar Project

Field Study Report

1. Introduction

The *Natural Heritage Assessment (NHA) Site Investigation Report* (Hatch, 2012) identified three narrow wetlands along the southern boundary of the Project Location. Further clarification on the extent and classification of these wetlands was requested by Northland Power on October 2, 2012. As a result, Hatch conducted a site visit on October 11, 2012 to verify the wetland boundaries. The methodology and findings from the site visit is provided in the subsequent sections.

2. Methods

A site visit was completed on October 11, 2012 to verify the extent of the three narrow wetlands identified in the *NHA Site Investigation Report* (Hatch, 2012). The following criteria were used to verify the extent and classification of each wetland:

- **Vegetation:** The “**50% wetland vegetation rule**,” where possible, was used to establish the relative cover of wetland species and determine the extent of each wetland.
- **Substrate:** Soil samples were taken within each of the wetlands, where possible, using a hand-held auger. The composition and moisture regimes of the soils were used to determine if the wetland communities are comprised of hydric substrates.

3. Results

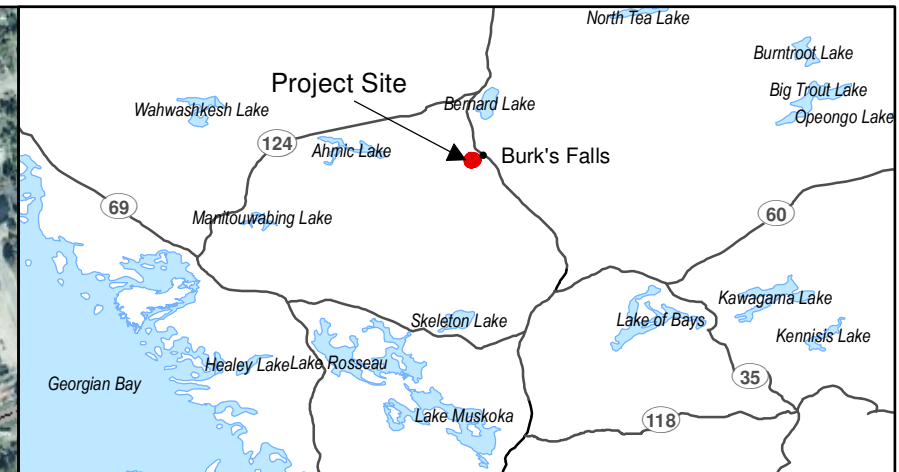
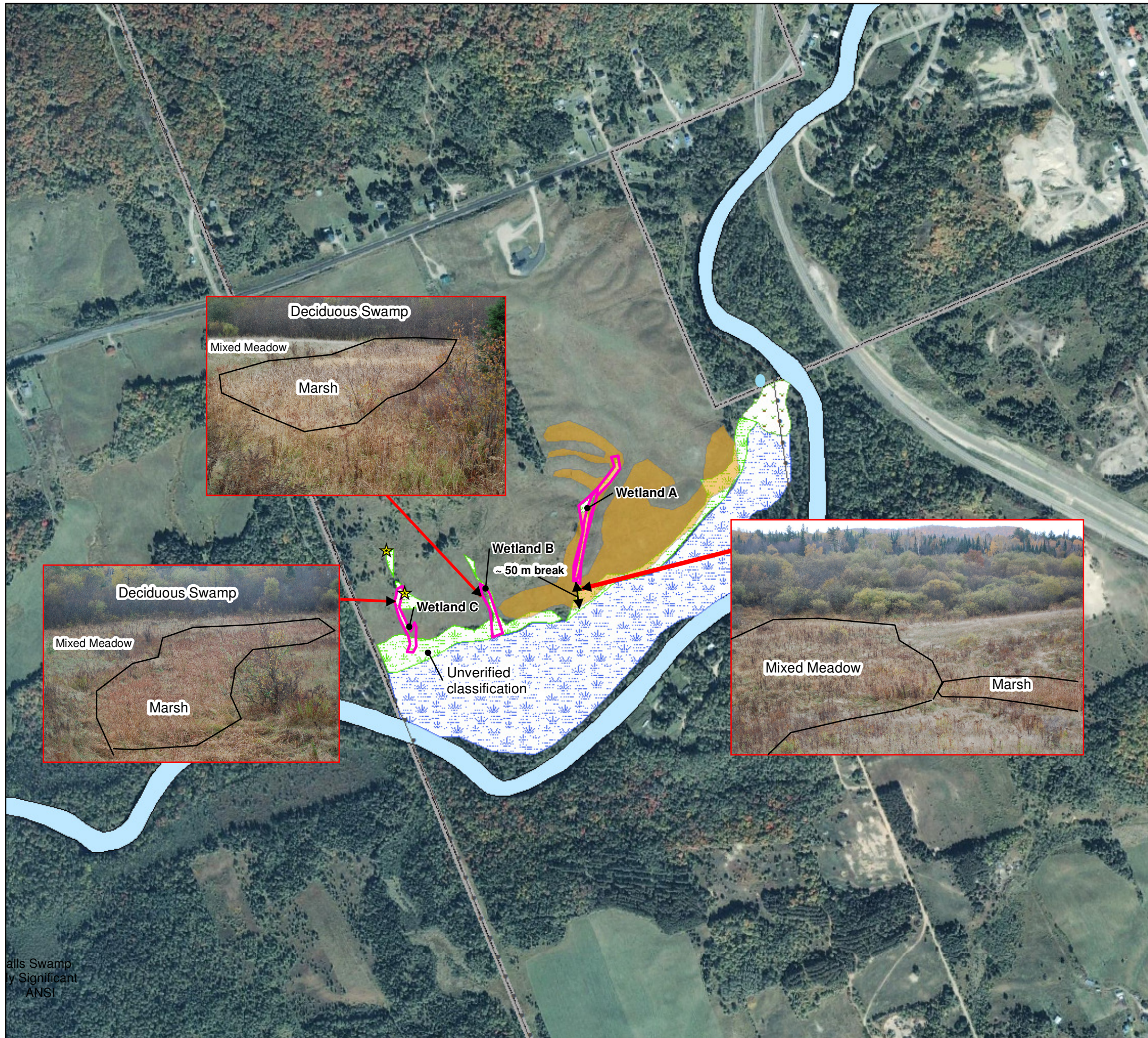
The Burks Falls West Project Location is situated on agricultural lands, formerly used as pasture. The topography is described as rolling with steep slopes and narrow valleys that naturally convey water south toward the Magnetawan River. The drastic variations in elevation and direction of surface water flows have resulted in the formation of wetlands in some of the low relief areas. Details on each of the wetlands observed during this field study are provided in the subsequent sections. A map showing the locations of the wetlands assessed during the site investigation is provided in Figure 3.1. Figure 3.2 provides a comparison between the original Project location and the proposed revised Project location boundaries.

If you disagree with any information contained herein, please advise immediately.



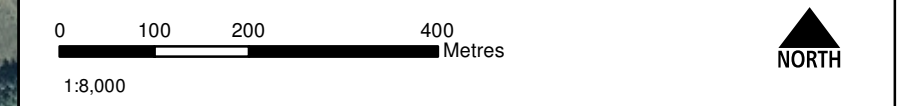
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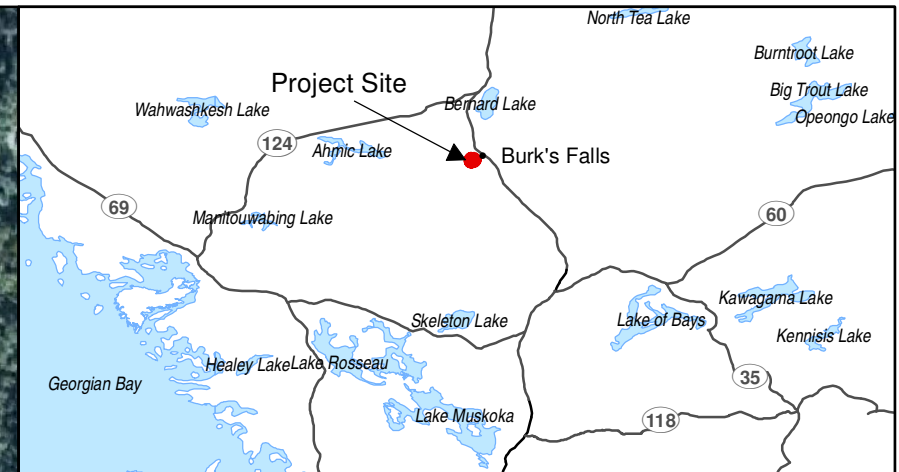
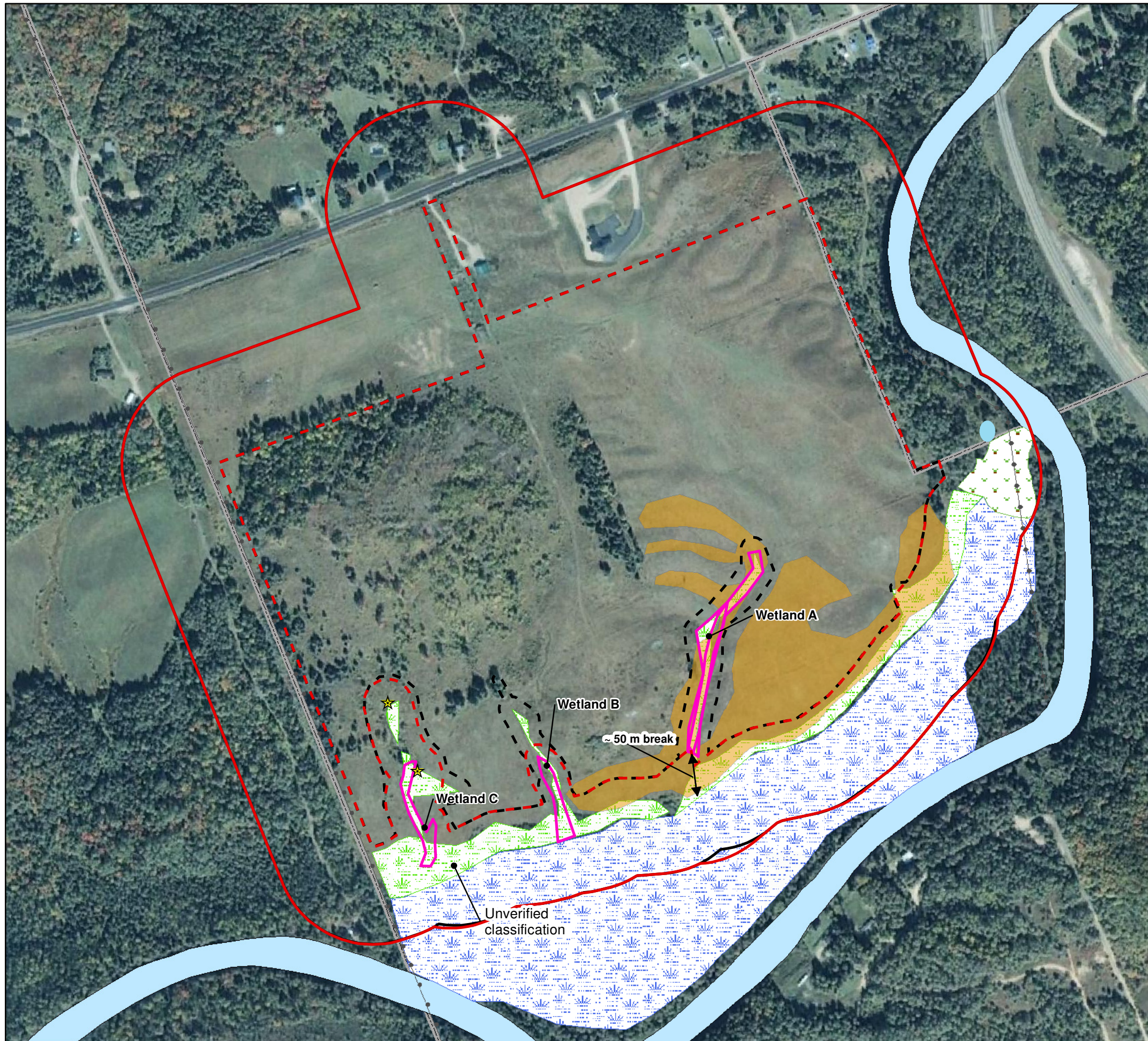
LEGEND

- ★ Seepage Area
- ▭ Magnetawan River
- Draft Revised Classifications (2012)**
- ▭ Marsh (estimated boundaries - October 11, 2012)
- ▭ Mixed Meadow (estimated boundaries - October 11, 2012)
- Wetland Classifications (2011)**
- ▭ Mineral Alder Thicket Swamp (current classification)
- ▭ Mineral Meadow Marsh (current classification)
- ▭ Mineral Mixed Swamp (current classification)



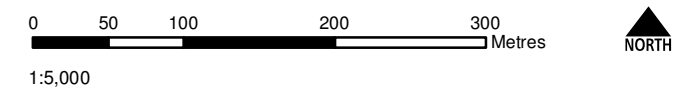
Notes:
 1. Base and Environmental data downloaded from LIO, Feb 18, 2011.
 2. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
 3. Spatial referencing UTM NAD 83.
 4. Satellite imagery obtained from Google earth Pro, captured 2007.

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LEGEND

- ★ Seepage Area
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- Wetland Classifications (2011)**
- Mineral Alder Thicket Swamp (current classification)
- Mineral Meadow Marsh (current classification)
- Mineral Mixed Swamp (current classification)
- Project Boundaries**
- Project Location (October 2012)
- 120 m from Project Location (October 2012)
- Project Location (August 2011)
- 120 m from Project Location (August 2011)



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3.1 Wetland A

The *NHA Site Investigation Report* (Hatch, 2012) identifies Wetland A as a *Narrow-leaved Sedge Mineral Meadow Marsh* (MAM3-5). This wetland is shown as connected to the *Alder Mineral Thicket Swamp Type* (SWT3-1) located south of the Project Location, within the 120-m setback (Appendix A).

Wetland A is found between two rolling hills in a narrow valley that naturally conveys surface water runoff from the adjacent lands (Figure 3.1). This wetland community is dominated by small-fruited bulrush (*Scirpus microcarpus*) with lakebank sedge (*Carex lacustre*), beaked sedge (*Carex utriculata*). The substrate was found to be a silty clay loam over sandy loam with imperfect drainage and a moisture regime (MR) of 5. These soils showed distinct mottling, indicating periodic saturation and aeration. No gleying was observed within the soil profile. Substrates with a MR of 5 are considered “*nearly hydric*” soils and therefore, to consider these areas as wetlands, the “**50% wetland vegetation rule**” must be met. The vegetation community within the 50-m gap is characterized as a *Mixed Meadow* (MEM) as it was dominated by upland species. This included, cow vetch (*Vicia cracca*), wild strawberry (*Fragaria virginiana*), goldenrod species (*Solidago sp.*) and aster species (*Aster sp.*).

Based on findings from the site visit completed on October 11, 2012, the extent of Wetland A has been determined to be smaller than what was originally delineated. It was also found that there is a 50-m gap between Wetland A and the SWT3-1 community. Overall, Wetland A was found to be approximately 0.2 ha. This narrow wetland is approximately 268 m in length and ranged between 15 to 30 m in width. This suggests an increase in developable area within the Project Location. Development of these additional lands must ensure that post-development volume, rate and delivery points of surface flow are similar to pre-development conditions. Setbacks and mitigation measures previously established for wetlands in the Environmental Impact Study (Hatch, 2012) would remain accurate for the remaining wetland communities as per the revised boundaries shown in Figure 3.2 are followed. The following photograph (Figure 3.3) shows the southern-most extent of Wetland A (MAM3-5), MEM and SWT3-1 communities.

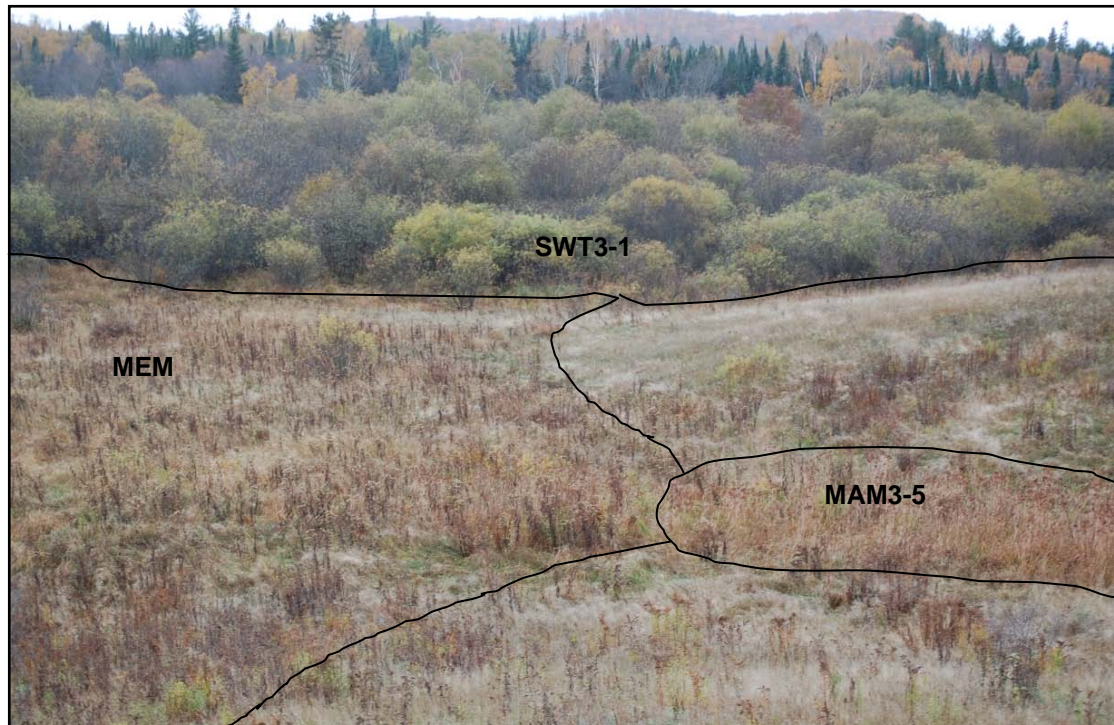
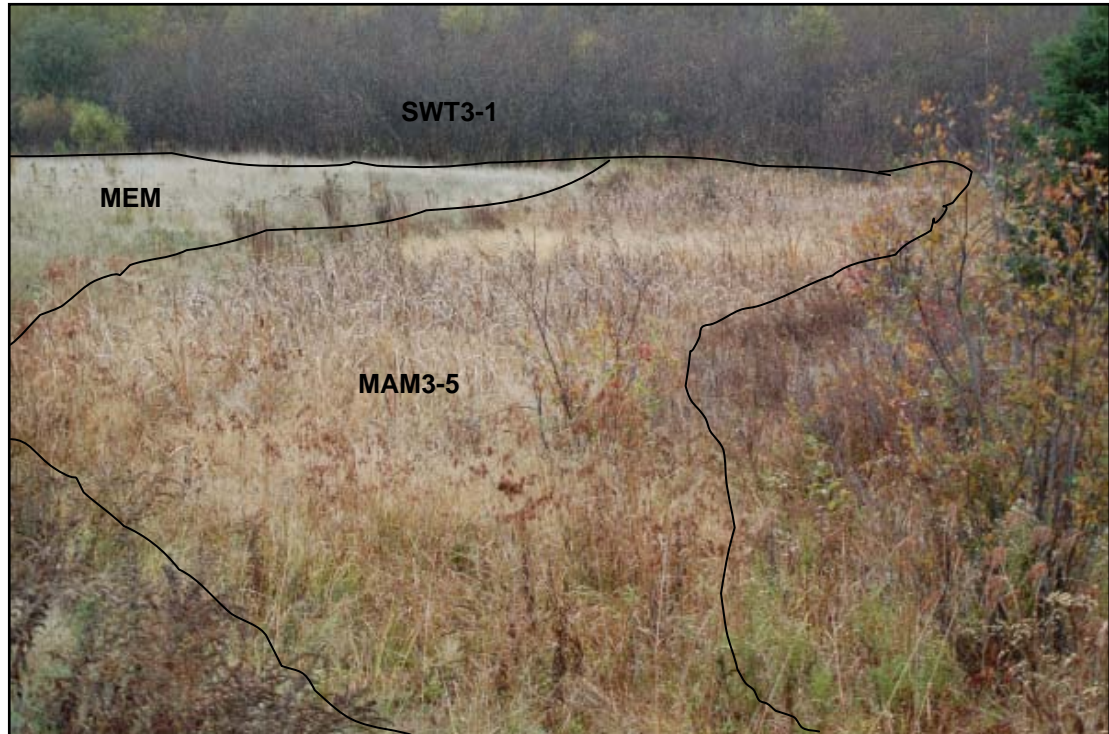


Figure 3.3 View From the Top of a Knoll Along the Southern Boundary, Facing South Toward the 120-m Setback

3.2 Wetland B

Wetland B is identified as a *Narrow-leaved Sedge Mineral Meadow Marsh* (MAM3-5) in the *NHA Site Investigation Report* (Hatch, 2012). This wetland is shown as connected to the *Alder Mineral Thicket Swamp Type* (SWT3-1) located south of the Project Location, within the 120-m setback (Appendix A).

Wetland B is found in a narrow valley between two rolling hills that naturally convey surface water runoff from the adjacent lands (Figure 3.1). The site visit completed on October 11, 2012, determined that Wetland B does not extend as far north as previously delineated. It was also confirmed that this wetland is directly connected to the SWT3-1 community that extends beyond the 120-m setback. Overall, Wetland B was found to be approximately 0.08 ha. This narrow wetland is approximately 110 m in length and ranged between 10 to 25 m in width. This wetland community is dominated by small-fruited bulrush (*Scirpus microcarpus*) and narrow-leaved cattail (*Typha angustifolia*) with lakebank sedge (*Carex lacustre*). The substrate was found to be a silty clay loam with very poor drainage and a moisture regime (MR) of 9. Substrates with a MR >5 are “*hydric*” soils and considered a wetland. These soils showed a distinctive grey gley layer throughout the profile, indicating prolonged water saturation. The following photograph (Figure 3.4) shows the northern-most extent of Wetland B, facing south toward the 120 m setback.



**Figure 3.4 View of the Northern Boundary of Wetland B,
Facing South Toward the 120-m Setback**

The vegetation north of this wetland community (previously associated with Wetland B) is characterized as a *Mixed Meadow* (MEM) as it is dominated by upland species. This community is situated on shallow soils. As a result, a soil sample was not obtained. Therefore, the “**50% wetland vegetation rule**” was used to determine community type. The dominant vegetation included, cow vetch (*Vicia cracca*), common yarrow (*Achillea millefolium*) wild strawberry (*Fragaria virginiana*), goldenrod species (*Solidago sp.*) and aster species (*Aster sp.*). It is recommended that the setbacks previously established for Wetland B, follow the revised boundaries shown in Figure 3.1. The following photograph (Figure 3.5) shows the *Mixed Meadow* (MEM) community no longer associated with Wetland B.

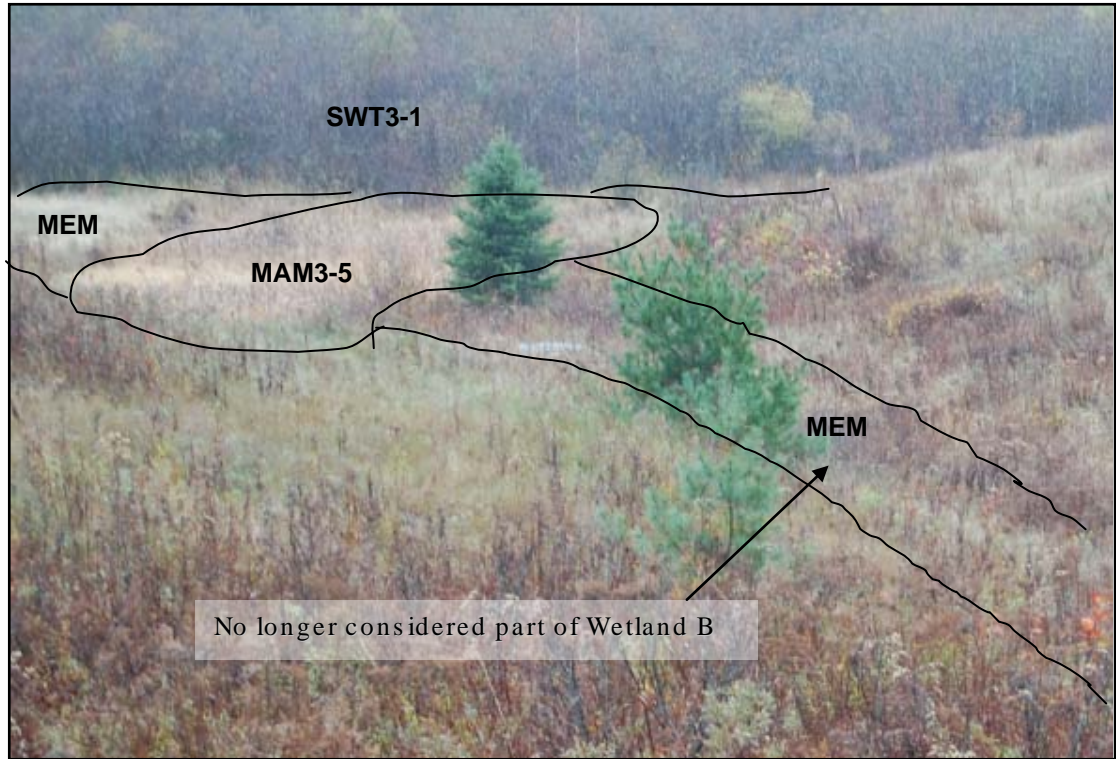


Figure 3.5 View of the Mixed Meadow Community and Wetland B, Facing South Toward the 120-m Setback

3.3 Wetland C

Wetland C is identified as a *Narrow-leaved Sedge Mineral Meadow Marsh* (MAM3-5) in the NHA Site Investigation Report (Hatch, 2012). This wetland is shown as connected to the *Alder Mineral Thicket Swamp Type* (SWT3-1) located south of the Project Location, within the 120-m setback (Appendix A).

Wetland C is found along a grassed ridge that slopes downhill and naturally conveys surface water runoff from the adjacent lands (Figure 3.1). The site visit completed on October 11, 2012, determined that Wetland C does not extend as far north as previously delineated. The southern boundary of this wetland was not assessed. Therefore, the previous delineated boundary for the southern portion remains unchanged. Overall, Wetland C was found to be approximately 0.16 ha. This narrow wetland is approximately 134 m in length and ranged between 10 to 20 m in width. The substrate for this wetland was not determined, although it is presumed to be similar to Wetland A as it has similar characteristics and species composition (i.e., dominated by small-fruited bulrush (*Scirpus microcarpus*)). The “**50% wetland vegetation rule**” was used to determine community type. The following photograph (Figure 3.5) shows the northern boundary of Wetland C and the *Dry-Moist Old Field Meadow Type* (CUM1-1) community no longer associated with Wetland C. The area along the southern boundary not verified during the site investigation is also indicated in Figure 3.6.

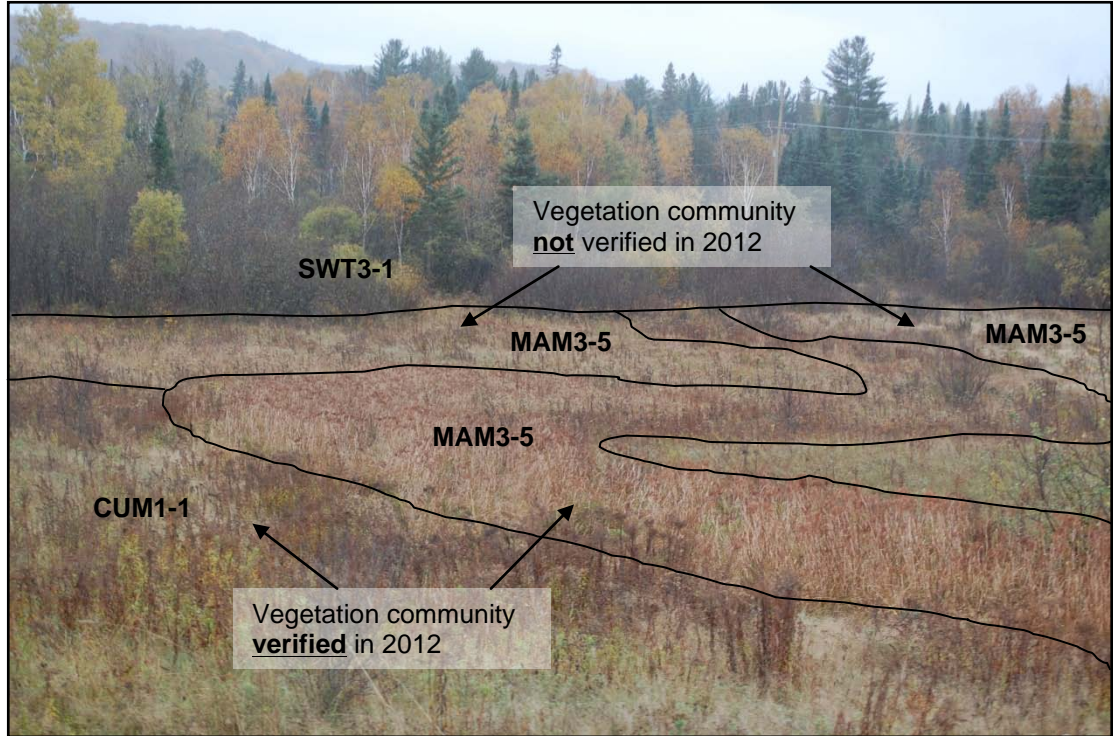


Figure 3.6 View of the Northern Boundary of Wetland C, Facing South Toward the 120-m Setback

The vegetation north of this wetland community (previously associated with Wetland C) is characterized as a *Mineral Cultural Thicket Ecosite* (CUT1), dominated by a mix of early successional tree species and upland meadow species. A soil sample was not obtained as this community type is situated on shallow soils. The *Water Body Site Investigation Report* (Hatch, 2012) identified a stream and two seepage areas within the CUT1 and MAM3-5 communities (Appendix A). A 30-m setback will be maintained from the watercourse and two seepage areas. It is recommended that the setbacks previously established for Wetland C, follow the revised boundaries shown in Figure 3.1. The following photograph (Figure 3.7) shows the CUT1 community, facing south toward Wetland C.



Figure 3.7 View of the Cultural Thicket Community, Facing South Toward Wetland C

Martine Esraelian
ME:srg
Attachment

Appendix A

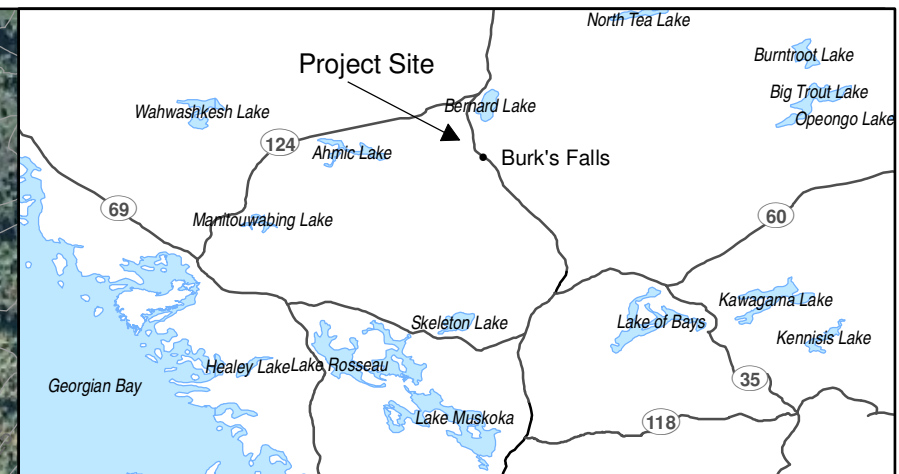
Ecological Land Classification - November 2011

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Legend

- Seepage Area
 - Watercourse
 - Road
 - +— Railway
 - - - Trail
 - Topographic Contour (5 m Interval)
 - Project Location
 - 120 m from Project Location
 - Parcel
 - Waterbody
- Ecological Land Classification Boundaries**
- CUM1-1 - Dry-Moist Old Field Meadow Type
 - CUT1 - Mineral Cultural Thicket Ecosite
 - FOC - Fresh-Moist Coniferous Forest Ecosite (Balsam Fir)
 - FOD - Dry-Fresh Deciduous Forest Type
 - FOD3-1 - Dry-Fresh Poplar Deciduous Forest Type
 - FOD5-4 - Dry-Fresh Sugar Maple - Ironwood Deciduous Forest Type
 - MAM3-5 - Narrow Leaved Sedge Mineral Meadow Marsh
 - SWM - Mixed Swamp Ecosite
 - SWT3-1 - Alder Mineral Thicket Swamp Type



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Figure 4.1
 Northland Power Inc.
Burk's Falls West Solar Project
Ecological Land Classification