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Jan 29 2016

Mr. Glenn Goudey
Nova Scotia Power Inc.
25 Lakeside Park Drive
Halifax, NS, B3J 2W5
Glenn.goudey@nspower.ca

Dear Mr. Goudey:

RE: Canso Strait 2nd Crossing Wetland Determination Report – Aulds Cove and Newtown, Nova Scotia (FINAL REPORT).

Introduction

CBCL Limited was retained by the Nova Scotia Power Incorporated (NSPI) to survey and delineate the extent of wetlands at the site of a proposed 2nd crossing of High Voltage Transmission Lines located at Aulds Cove and Newtown, Nova Scotia. The two areas surveyed are located on either side of the Canso Strait running immediately parallel and to the south of the existing set of lines (Figures 1 and 2).

The purpose of the survey was to confirm the presence or absence of wetlands and, should wetlands be identified, to delineate their boundaries and collect summary information.

Methodology

Desktop Analysis

The Nova Scotia Department of Natural Resources (NSDNR) wetlands database, wet areas mapping, forest cover mapping and recent aerial photographs were reviewed prior to fieldwork. Additionally, an ACCDC rare taxa data report was acquired and reviewed to provide insights on the potential presence of rare species at the Project site.

Field Program: Wetland Determination and Delineation

Ground level determination and delineation was performed as per the protocols outlined by the US Army Corps of Engineers Wetland Delineation Manual. Wetland determination and delineation is focused on establishing the wetland-upland edge and is based upon the presence of positive indicators for three parameters:

- Hydric soils;
- Hydrophytic vegetation; and
- Wetland hydrology.

In most situations, a positive indicator must be present for all three parameters in order to definitively identify any given site as a wetland. Sample points for these three parameters were established at representative locations, both within the suspected wetlands and in adjacent upland control sites. Wetland Determination Data Forms (Appendix A) were completed at certain sample locations describing the vegetation, soils and hydrology to aid in the determination of the wetland /upland boundary.

Hydrophytic Vegetation: Hydrophytic vegetation occurs in areas where saturation or inundation by water is of duration sufficient to exert a controlling influence on plant species presence. In such areas, plant species, which are adapted to a high-moisture environment, tend to dominate. In order for a given area to classify as a wetland, hydrophytic vegetation should account for the majority (>50%) of the sample sites' total vegetation.

For every plant species there is a wetland indicator status (Explained in Appendix B), which may be interpreted as that species' estimated probability of occurring within a wetland. If the majority of plant cover in the sample area is comprised of species with facultative (FAC), facultative wetland (FACW) or obligate (OBL) statuses, then the positive indicator for hydrophytic vegetation is met.

Dominant species encountered at each of the sample locations were analyzed at three strata (tree, shrub, and herb); they were documented in terms of their percent cover within a given plot size (10 m, 5 m and 2 m radius, respectively) and by their wetland indicator status.

Hydric Soils: Hydric soil conditions are formed when an area is exposed to flooding or saturation for a sufficient length of time during the growing season to enable an anaerobic (oxygen free) environment to form in the soil. These anaerobic conditions may manifest themselves in a variety of ways, such as through the formation of redox features (reduction-oxidation), organic soils, i.e., peat, formation of hydrogen sulphide (rotten egg odour), among many other indicators. Interpretation of soil profiles, their associated colour, texture and the presence/absence of any hydric soil indicators provides the basis for judgement as to whether or not any given soil is a hydric soil.

Soil samples were collected using a standard soil auger to identify conditions in both wetland and upland soils. Soil horizons were documented in terms of their texture, thickness, color (Munsell chroma/value) and presence of hydric soil indicators (where applicable). Hydric soil indicators were determined as per US Department of Agriculture "Field Indicators of Hydric Soils in the United States".

Wetland Hydrology: Both at the formal sample locations and over the greater area of each individual wetland, observations were made concerning the presence of a hydrological regime, which would sustain wetland processes. Taken into consideration was the location of the site in general, as well as the micro-topography of the wetland area specifically.

Primary hydrology indicators (of which at least one must be present) include surface water, high water table, saturation and sediment deposits. Secondary indicators (of which two are required, in the absence of a primary indicator) include surface soil cracks, drainage patterns among others.

Wetland Delineation: Upon positive wetland determination, i.e., positive indicators identified for soils, hydrology and vegetation, a wetland edge condition was established based on the indicators identified at the three-parameter sample points. This edge condition was used to navigate around the periphery of the wetlands. As the wetlands were delineated, flags were placed at the wetland-upland boundary, in order to facilitate a relocation or surveying by others, if required. Handheld GPS waypoints (3 to 5 m accuracy) were recorded at each flag location as the delineation was performed. This handheld GPS boundary provides the basis for the final wetland habitat mapping.

Rare Species: During the course of wetland surveys, observations were made related to the presence of rare species or potential habitat for rare species on the project site.

Personnel: The assessment was conducted by Chris Kennedy of CBCL Ltd., who is a certified wetland delineator in the Province of Nova Scotia, with assistance from Kyle Blades of NSPI.

- Active Railroad
- Auld's Cove - Area of Impact
- Delineated Wetlands
- Delinated Watercourses
- Wetland Delineation Test Pits
- Rivers and Streams

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Figure 1:
Auld's Cove, Mainland NS

Drawn: MD/KS	**Date: 15/06/2015**
Checked: IB	-
Approved: IB	**Scale @ 11"x17"** 1:4,000

Notes:

0 40 80 160 m

Coordinate System: NAD 1983 UTM Zone 20N
Units: Meter

Wetland #8
Area: 1001.9m²

Wetland #9
Area: 768.1m²

Wetland #7
Area: 1362.5m²

Wetland #12
Area: 1261.0m²

Wetland #10
Area: 2290.3m²

Wetland #11
Area: 7840.5m²

Wetland #13
Area: 184.8m²

Wetland #15
Area: 4988.7m²

Wetland #14
Area: 1430.9m²

- Active Railroad
- Auld's Cove - Area of Impact
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Figure 2:
Newtown, Cape Breton, NS

Drawn: MD/KS	**Date: 15/06/2015**
Checked: IB	**-**
Approved: IB	**Scale @ 11"x17"** 1:4,000

Notes:

0 40 80 160 m

Coordinate System: NAD 1983 UTM Zone 20N
Units: Meter

Results

Wetlands and Watercourses: Fifteen wetlands and three unmapped watercourses were surveyed and delineated during the May 26th, 2015 site visit. Six of those wetlands and two of the watercourses are located on the mainland side of the Canso Strait at Aulds Cove, NS. (Figure 1). The remaining nine wetlands and one (1) watercourse are located on the Cape Breton side of the Canso Strait in Newtown, NS (Figure 2.).

The vast majority of the fifteen (15) wetlands encountered were treed or shrub swamps with some level of disturbance, whether it be historic logging operations or ongoing corridor vegetation management. Nova Scotia experienced an uncharacteristically long winter and subsequent late spring, as such flora observations were limited by the delayed onset of leaves, flowers and other vegetative structures that allow for accurate identification.

All three of the mapped watercourses were either intermittent or ephemeral in nature. None sustain permanent water flow and all have sections that flow underground. As such, none of the three delineated watercourses represent viable fish habitat.

The section that follows summarizes each wetland encountered and includes an identification of wetland type, approximate size, and dominant vegetation. For more information on different wetland types in Nova Scotia please visit: https://www.novascotia.ca/nse/wetland/.

Rare Species: Being a site that that has been disturbed at various points in the past, the overall habitat value of the site was considered rather low. The highest potential for presence of rare species was in the wetlands and along the watercourses referenced above. However, no species of interest were noted during surveys. None of the species identified in the ACCDC report (Appendix C) were identified onsite during surveys, and are not considered likely to be present on site.

Wetland #1

Wetland Type: Disturbed Swamp

Approximate Area: 5,080 m^2

Location: Aulds Cove, Nova Scotia

Dominant Vegetation:

Trees: Due to ongoing vegetation management, there were no trees within this wetland.

Shrubs: Red maple (*Acer rubrum*) and white spruce (*Picea glauca*)

Herbs/ground cover: Soft rush (*Juncus effusus*) and Cinnamon Fern (*Osmunda cinnamomea*).

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water marks
- Water stained leaves

Secondary Indicators:

- Drainage patterns

Wetland #2

Wetland Type: Treed Swamp

Approximate Area: 1,243 m^2

Location: Aulds Cove, Mainland Nova Scotia

Dominant Vegetation:

Trees: Black Spruce (*Picea mariana*)

Shrubs: Balsam fir (*Abies balsamea*)

Herbs/ground cover: Cinnamon Fern and sensitive fern (*Onoclea sensibilis*)

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water marks
- Sparsely vegetated concave surfaces
- Water stained leaves
- Aquatic fauna observed

Secondary Indicators:

- Drainage patterns

Wetland #3

Wetland Type: Treed Swamp

Approximate Area: 999 m^2

Location: Aulds Cove, Mainland Nova Scotia

Dominant Vegetation:

Trees: Due to ongoing vegetation management, there were no trees within this wetland.

Shrubs: Cinnamon fern, sensitive fern and soft rush.

Herbs/ground cover: Meadow-sweet (*Spiraea alba*)

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water marks
- Sparsely vegetated concave surfaces
- Water stained leaves
- Aquatic fauna observed
- Thin muck surfaces

Secondary Indicators:

- Surface soil cracks

Wetland #4

Wetland Type: Treed Swamp

Approximate Area: 977 m^2

Location: Aulds Cove, Mainland Nova Scotia

Dominant Vegetation:

Trees: Yellow birch (*Betula allegheniensis*), red maple and balsam fir.

Shrubs: Meadow-sweet

Herbs/ground cover: Cinnamon fern and sensitive fern.

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Water stained leaves
- Aquatic fauna observed

Secondary Indicators:

- Drainage patterns
- Stunted or stressed plants


DELINEATION

Wetland #5

Wetland Type: Treed Swamp

Approximate Area: 1,008 m^2

Location: Aulds Cove, Mainland Nova Scotia

Dominant Vegetation:

Trees: Yellow birch and balsam fir.

Shrubs: Balsam fir and meadow-sweet.

Herbs/ground cover: Cinnamon Fern and sensitive fern.

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water stained leaves

Secondary Indicators:

- Drainage patterns

Wetland #6

Wetland Type: Shrub Swamp

Approximate Area: 5,080 m^2

Location: Aulds Cove, Mainland Nova Scotia

Dominant Vegetation:

Trees: Red maple.

Shrubs: Meadow-sweet and red swamp currant (*Ribes triste*)

Herbs/ground cover: Sensitive Fern and cinnamon fern

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water stained leaves
- Hydrogen sulfide odour

Secondary Indicators:

- Surface soil cracks
- Drainage patterns
- Stunted or stressed plants

Wetland #7

Wetland Type: Disturbed Swamp

Approximate Area: 1,362 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: Due to ongoing vegetation management, there were no trees within this wetland.

Shrubs: Speckled alder (*Alnus incana*) and meadow-sweet.

Herbs/ground cover: Cinnamon fern and woolgrass (*Scirpus cyperinus*)

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:
- High water table
- Ground saturation
- Water stained leaves

Secondary Indicators:
- Surface soil cracks
- Drainage patterns

Wetland #8

Wetland Type: Disturbed Swamp

Approximate Area: 1,002 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: White spruce and black spruce.

Shrubs: Red maple and meadow-sweet.

Herbs/ground cover: Common cattail (*Typha latipholia*), woolgrass and cinnamon fern.

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water stained leaves
- Aquatic fauna observed

Secondary Indicators:

- Drainage patterns

Wetland #9

Wetland Type: Disturbed Swamp

Approximate Area: 768 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: Black spruce and balsam fir.

Shrubs: Meadow-sweet.

Herbs/ground cover: Cinnamon fern and woolgrass.

Hydric Soil Indicator: Depleted below dark surface.

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Aquatic fauna observed

Secondary Indicators:

- Drainage patterns
- Stunted or stressed plants

Wetland #10

Wetland Type: Treed Swamp

Approximate Area: 2,290 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: Black spruce and balsam fir

Shrubs: Meadow-sweet

Herbs/ground cover: Cinnamon fern and spotted jewel-weed (*Impatiens capensis*).

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water stained leaves
- Aquatic fauna observed

Secondary Indicators:

- Surface soil cracks
- Drainage patterns
- Moss trim lines

Wetland #11

Wetland Type: Bog

Approximate Area: 7,841 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: Black spruce, red maple and eastern larch (*Larix laricina*)

Shrubs: Labrador tea (*Ledum groenlandicum*) and leather-leaf (*Chamaedaphe calyculata*)

Herbs/ground cover: Cinnamon fern, woolgrass and three-leaved Solomon's plume (*Maianthemum trifolium*)

Hydric Soil Indicator: Histosol

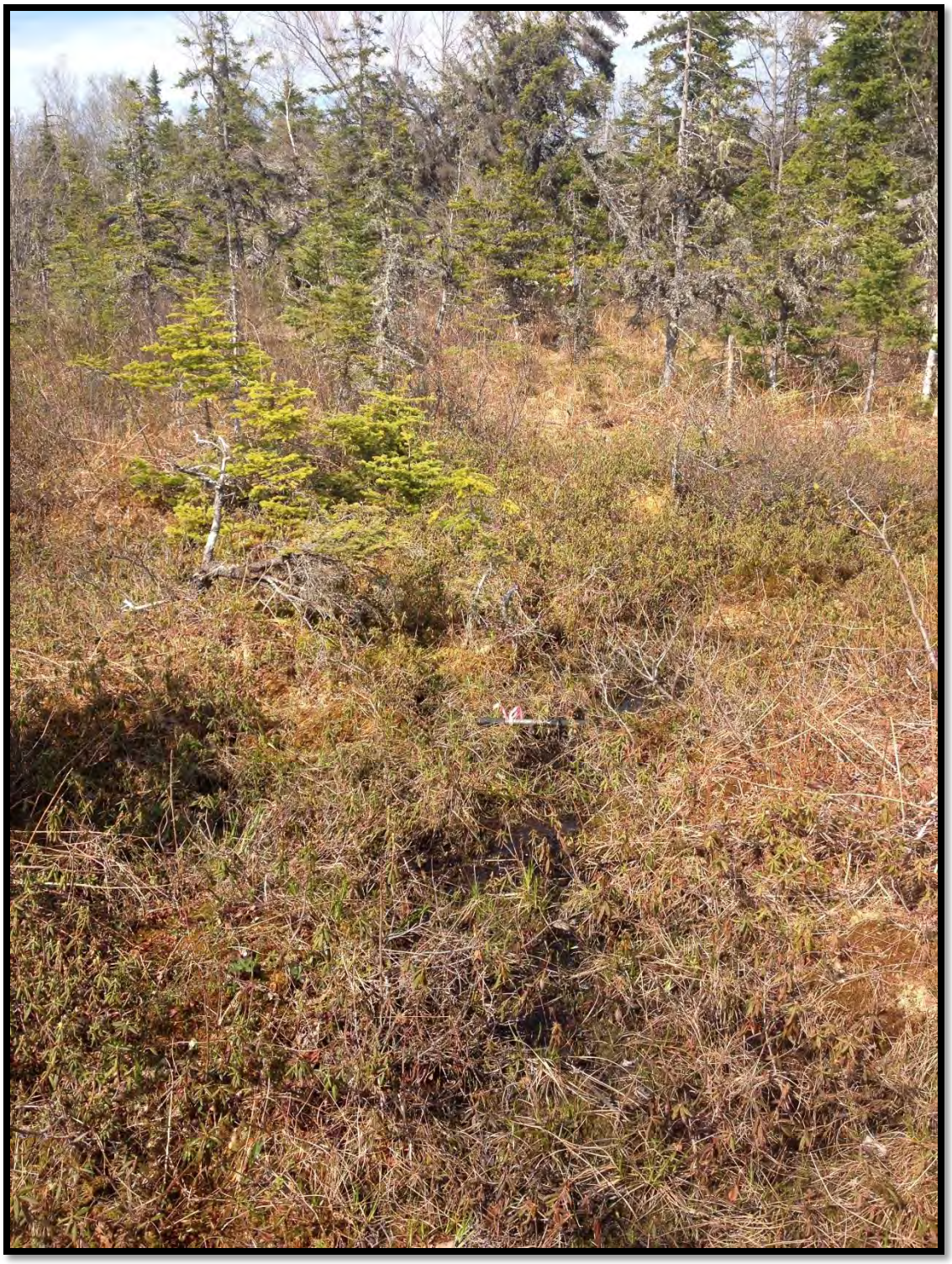
Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water stained leaves
- Aquatic fauna observed

Secondary Indicators:

- Drainage patterns
- Stunted or stressed plants
- Geomorphic position



Wetland #12

Wetland Type: Shrub Swamp

Approximate Area: 1,261 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: There were no trees within this wetland.

Shrubs: White spruce and meadow-sweet.

Herbs/ground cover: Soft rush and woolgrass.

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water stained leaves

Secondary Indicators:

- Surface soil cracks
- Drainage patterns

Wetland #13

Wetland Type: Shrub Swamp

Approximate Area: 185 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: There were no trees within this wetland.

Shrubs: Speckled alder and an unidentified willow species.

Herbs/ground cover: Water purslane (*Ludwigia paulstris*), creeping buttercup (*Ranunculus repens*) and cinnamon fern.

Hydric Soil Indicator: Histosol

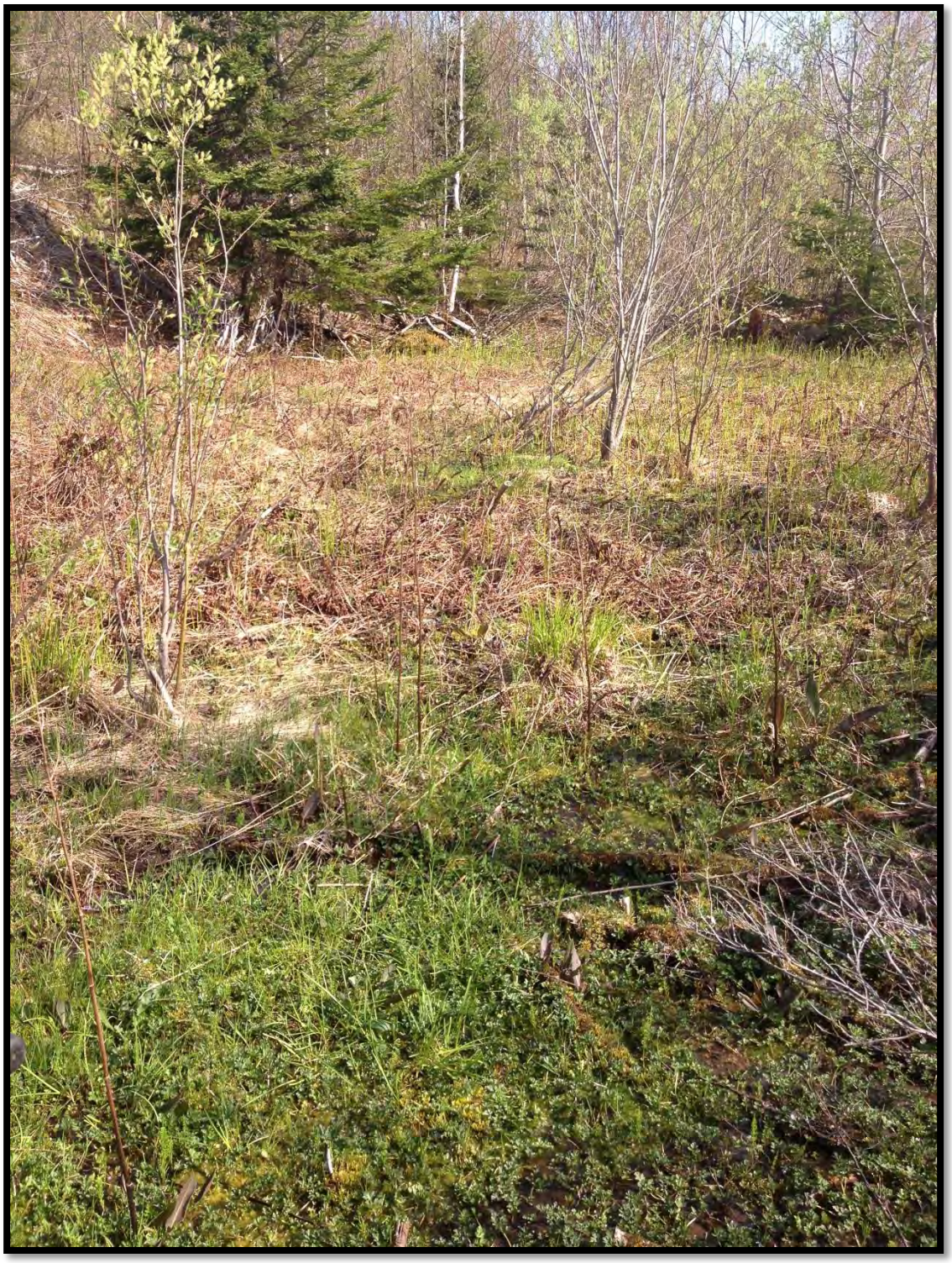
Wetland Hydrology Indicators:

Primary Indicators:

- High water table
- Ground saturation
- Water stained leaves

Secondary Indicators:

- Surface soil cracks
- Drainage patterns



Wetland #14

Wetland Type: Treed Swamp

Approximate Area: 1,431 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: White spruce, black spruce and balsam fir.

Shrubs: Speckled alder, meadow-sweet and Canadian fly-honeysuckle (*Lonicera canadensis*).

Herbs/ground cover: Wild lily-of-the-valley (*Maianthemum canadensis*), spotted jewel-weed and cinnamon fern.

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Water stained leaves

Secondary Indicators:

- Surface soil cracks
- Drainage patterns

Wetland #15

Wetland Type: Shrub Swamp

Approximate Area: 4,989 m^2

Location: Newtown, Cape Breton, Nova Scotia

Dominant Vegetation:

Trees: White spruce and red maple.

Shrubs: Speckled alder and meadow-sweet.

Herbs/ground cover: Common cattail, woolgrass and cinnamon fern.

Hydric Soil Indicator: Histosol

Wetland Hydrology Indicators:

Primary Indicators:

- Surface water
- High water table
- Ground saturation
- Aquatic fauna observed

Secondary Indicators:

- Drainage patterns

Conclusion

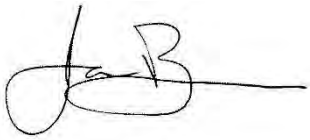
If the Project should alter the study area wetlands, either directly or indirectly, through the course of any project works, Wetland Alteration Approval Applications will need to be prepared and submitted to NSE. The information contained in the present report could form the basis for such applications, should they be required.

It should be noted that NSE now requires that proponents applying for wetland approvals be very explicit about how compensation will be conducted to offset wetland losses. As a general rule of thumb, wetland compensation is at a ratio of 2:1 or 3:1, relative to the amount of wetland lost. For most proponents, the recommended route to providing wetland compensation is to draft a 'Letter of Understanding' or 'Letter of Intent' with a third party wetland restoration professional to conduct the required compensation; this letter would, in turn, be submitted with Wetland Alteration Approval Applications.

Respectfully submitted,

CBCL Limited

Prepared by:
Chris Kennedy, M.Sc.
Field Ecologist



Reviewed by:
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