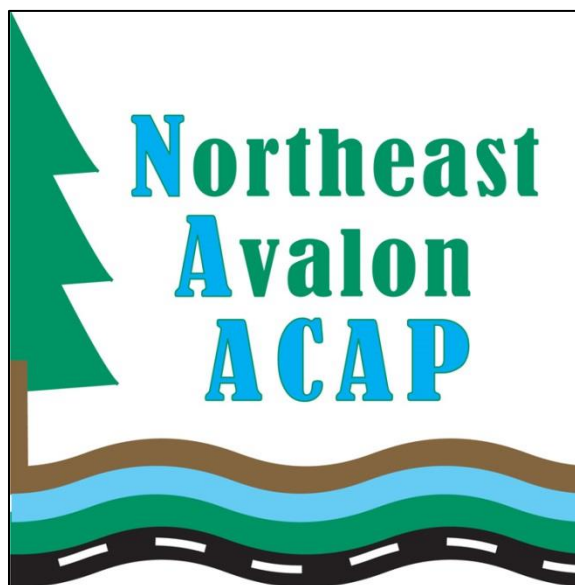


**Northeast Avalon ACAP's Wetland Survey Project Final Report for 2013-2014**

**April 2014**



## Executive Summary

Northeast Avalon ACAP (NAACAP) began surveying Northeast Avalon Peninsula wetlands to obtain baseline data during 2011, and continued the effort into 2012 and 2013. During the 2013 field season, an additional 17 wetlands were surveyed. Data collected included plant, invertebrate and water quality sampling. Field assessments were also performed to determine wetland classification (based on the Canadian Wetland Classification System) and wetland function. Wetland boundaries were delineated from aerial imagery and a score was assigned to each of the wetlands based on nearby human surroundings that have the potential to cause stress to the ecosystem using the previously developed *Stress Evaluation Rubric* (see Section 2.5). Citizen bird sightings data obtained from ebird and NLNature were also linked to the wetlands visited by NAACAP from 2011 to 2013 as an indication of which species are commonly found in Northeast Avalon wetlands.

Overall, there was a wide variety of plants and invertebrates identified during the 2013 field season. There was a total of 64 different plant species identified, of which three were determined to be non-native (*Eragrostis minor*, *Cardamine pratensis* and *Eleocharis erythropoda*). There were also a number of ubiquitous wetland plant species that were found at all of the surveyed sites, including leatherleaf (*Chamaedaphne calyculata*), sweetgale (*Myrica gale*), and sphagnum moss (*Sphagnum papillosum*). Invertebrates of the taxonomic Order Amphipoda and Hemiptera were found most widely amongst the surveyed wetlands.

The CCME Water Quality Guidelines for the Protection of Aquatic Life were met in most cases, with dissolved oxygen levels lower than recommended in some cases because of a lack of water flow associated with standing water. Some of the pH values were lower than the range recommended in the CCME Water Quality Guidelines for the Protection of Aquatic Life, which is believed to be related to the low pH typically associated with peatland soils.

The *Stress Evaluation Rubric* scores varied from 0 (the lowest possible score) to 44, indicating that the surveyed wetlands were not subjected to the same pressures, with some having more potential threats from human surroundings. All of the wetlands functioned as water storage sites, and many had evidence of wildlife other than the plants and invertebrates sampled, including amphibians, small mammals and birds. Comparing locations of bird sightings to the locations of wetlands surveyed since 2011 revealed 15 species that are commonly seen in and near the surveyed wetlands.

## Acknowledgements

Northeast Avalon ACAP (NAACAP) received funding for this project through Environment Canada's Atlantic Ecosystem Initiatives (AEI) program. NAACAP's board of directors offered assistance and guidance through all aspects of this project. Surveying was completed by a Conservation Corps Newfoundland and Labrador Green Team consisting of post-secondary students. Green Team members were Julia Collins, Rebecca Barney, and Tuan Hoang. Al Hanson with Environment Canada's Canadian Wildlife Service provided the Nova Scotia Wetland Assessment Method (NovaWAM) document on which determination of wetland function was based. John Maunder (retired Curator of Natural History for the province of Newfoundland and Labrador) provided assistance to the Green Team on identification of plants that were collected in the surveyed wetlands and dried.

Dr. Yolanda Wiersma and Roman Lukyanenko provided bird sighting data through the NL Nature project. Josh Mailhiot at Canadian Wildlife Service and Doug Hynes provided insight into classifying birds as wetland species to assist in developing a checklist of wetland birds.

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## ***1.0 Introduction:***

Wetlands can be defined as “land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment” (National Wetlands Working Group, 1988 as cited in Hanson et al, 2008). Wetlands are usually wet areas and are dominated by anaerobic processes, as the water present doesn’t allow for high amounts of oxygen exchange between air and soil. As such, wetland flora and fauna must have adaptations to wet environments and low oxygen. Wetland ecosystems are unique from other ecosystems; they are home to unique flora and fauna and provide unique services.

Wetlands provide natural benefits to the surrounding environment and the people and animals that live there. Wetlands can store carbon, filter water removing pollutants and flocculants, and absorb water for slow release to surrounding waterways. These functions contribute to clean air and water, and reduce flooding. Wetlands also serve as habitat for a large variety of flora and fauna, with some species found only in wetlands and others utilizing wetlands only for specific life stages. They are also valuable for recreation and education and are often used for bird watching, canoeing, and nature walks.

Wetlands are widespread on the island of Newfoundland, especially on the Northeast Avalon Peninsula. However, with increased human development and presence, the integrity of natural wetlands is now at risk as human activities place pressure on wetland ecosystems. These pressures vary, and include in-filling, toxic inputs from surface water runoff, the introduction of non- native species, altered hydrology, and altered habitat connectivity.

In 2011 the Northeast Avalon ACAP (NAACAP) began its wetland survey project to collect baseline information on 22 wetlands located on the Northeast Avalon Peninsula in light of an increase in development taking place in the area. This work continued in 2012, when an additional 14 wetlands and 12 coastal barachois ponds were investigated. Reports containing information on this work are titled *Northeast Avalon ACAP’s Wetland Survey Project Final Report for 2011-2012*, *Northeast Avalon ACAP’s Wetland Survey Project Final Report for 2012-2013* and *An Examination of the Barachois Pond Ecosystems on the Northeast Avalon Peninsula of Newfoundland and Labrador*. The vast number of wetlands in the region and the continued pressure that increased land development places on them warranted further work in 2013.

During the 2013 field season, a focus was placed on surveying wetlands within the boundaries of the municipalities within the Northeast Avalon region that were not studied during the 2011 and 2012 field seasons. An additional 17 wetlands were surveyed for plant, invertebrate and water quality sampling, classified based on the Canadian Wetland Classification System, and assessed for wetland function. Public bird sighting data were also connected to all wetland sites studied between 2011 and 2013.

## 2.0 Methods:

Wetland surveys were conducted by a three person Conservation Corps Newfoundland and Labrador Green Team with guidance from NAACAP staff. Methodology for the 2013 wetland survey project followed the protocols refined based on the prior two years of sampling for the plant, macroinvertebrate, and water quality sampling and for wetland boundary determination. However, the field assessment to determine wetland class based on the Canadian Wetland Classification System, assessment of wetland function and the linking of bird sightings to surveyed wetlands were a new addition to the methodology used.

### 2.1 Plant Sampling

Plant inventory data were collected using a belt transect survey method. The length of each transect varied depending on the size and accessibility of the wetland, with a goal of a 50 m transect; if this was not possible, the transect length was always a multiple of five. A one meter squared quadrat was centered on the transect line at five meter intervals. The number of transects surveyed varied between wetlands, as they were based on relative wetland size (wetland area was not calculated prior to field work), but generally each surveyed wetland had two plant transects.

Plants found within each quadrat were counted and percent cover estimated. Plants were identified to species where possible. However, in some cases, grasses, sedges, rushes and ferns were not identified to species level due to difficulty in correctly identifying species. Plant identification was determined on site using identification field guide booklets including: *A Field Guide to Wildflowers Northeastern and North-Central North America* by Roger Tory Peterson and Margaret McKenny; *Trees and Shrubs of Newfoundland and Labrador* by Todd Boland; *A Travellers' Guide to Wild Flowers of Newfoundland Canada* by Bill and June Titford; and *Native Trees and Shrubs of Newfoundland and Labrador* by A. Glen Ryan. Plants that could not be identified in the field were noted, sketched or photographed and a sample taken and dried in a plant press so that they could be later identified with the help of botanists including John Maunder, Curator Emeritus of Natural History, The Rooms Provincial Museum, and Originator, Webmaster, Editor, and Principal Contributor of *A Digital Natural History of Newfoundland and Labrador* (<http://www.digitalnaturalhistory.com/index.html>). Data obtained during the field visits were later transferred to digital format by the Green Team.

Using the plant survey data collected, a species (or group) richness value was obtained by counting the number of different plant species (or higher order taxonomic plant groups where species were unidentified) identified at each site. The values underestimate the true richness, due to the species grouping.

The number of non- native plant species at each site was determined. Non-native plants were identified based on correspondence with local authorities during the 2011 – 2012 Wetland Survey Project (J. Maunder, personal communication, August 15, 2011) and lists of non- native plant species developed by the Memorial University of Newfoundland Botanical Gardens and the Newfoundland and Labrador Invasive Species Council. Plant species names were also entered into the search engine on the Canadensys website (<http://data.canadensys.net/vscan/search>), in order to view a distribution map which indicated whether a species was native or introduced.

## 2.2 Benthic Macroinvertebrate Sampling

Ideally, sampling for benthic macroinvertebrates was performed at two sites within each wetland. These two sites corresponded with the inflow and outflow of the target wetland where possible. Depending on substrate type at each sample location, one of two methods was used for benthic macroinvertebrate sampling. A kick net was used at locations of sandy or fine sediment substrates, and a Surber sampler methodology, involving turning over rocks and scrubbing them to obtain invertebrates, was used to investigate invertebrates in areas with a rocky substrate.

When a kick net was used, sample effort was kept consistent through the use of a timed sample collection. Substrate was disturbed for thirty seconds and collected in the net by moving the net in a zig-zag motion through the disturbed material. The collected material was then transferred to a white dish pan where macroinvertebrates were separated from organic material. In areas with rocky substrates a dish pan was partially filled with water from the sample location. An area of approximately 30 square centimetres was selected randomly and rocks within that space were removed from their location and scrubbed into the dish pan to loosen macroinvertebrates for identification.

Invertebrates were identified in the field where possible with specimens returned to the environment; specimens that could not be identified in the field were kept in ethanol and later observed with a microscope to aid in identification. Resources used for identification included *Insects-Their Natural History and Diversity: With a Photographic Guide to Insects of North America* by Stephen A. Marshall. While identifying to species was not possible, attempts were made to identify all organisms to Order, with some organisms only identified to Phylum. Invertebrate richness was calculated for each wetland site by counting the number of different macroinvertebrate types (Orders and Phyla) identified there; the richness value would also be an underestimate of the true biodiversity.

Macroinvertebrates are used as indicators to determine water quality, as some types are more sensitive to pollutants than others. For this study, identified macroinvertebrates were assigned to one of three categories based on their tolerance to pollution. These categories were: sensitive to pollution; somewhat pollution tolerant; and tolerant to pollution, as taken from the guidebook *Volunteer Water Quality Monitoring Part of the Missouri Stream Team Program*, which is a partnership between the Missouri Department of Natural Resources, the Missouri Department of Conservation, and the Conservation Federation of Missouri. The invertebrate scoring was found in Chapter 4, *Biological Monitoring* and is available online at <http://www.dnr.mo.gov/env/wpp/vmqmp/vwqm-intro04.pdf> and was adopted from the Save Our Streams program by the Izaak Walton League of America. This categorization was sometimes challenging, as the above mentioned reference mainly used common names, with class, order, or family given in some cases. The difficulty was in trying to match the organisms given in the reference with the organism found in the sample at varying taxonomic levels.



### *2.3 Water Quality*

Water quality parameters of surface waters were measured for each wetland site using a Hach Stream Survey kit and a LaMotte Dissolved Oxygen Tracer Pocketester. Temperature was measured using a thermometer, pH was measured using a pH pen (Hach kit), and dissolved oxygen was measured with the LaMotte Pocketester in the field. The LaMotte Pocketester was believed to be more effective than the dissolved oxygen test in the Hach kit because it allowed for in situ readings rather than having to collect a sample, which is important with the volatile nature of dissolved oxygen. The other parameters tested using the Hach kits were: nitrate nitrogen; nitrate; total phosphate; meta(poly)phosphate; and orthophosphate. Total inorganic phosphate values were obtained by summing orthophosphate and meta(poly)phosphate, and total organic phosphate was calculated by subtracting total inorganic phosphate from total phosphate values. Some of these tests were difficult to perform in the field due to safety reasons, mainly the hazardous nature of some of the reagents used and because of the need to boil the sample for the phosphate test. Testing for nitrate nitrogen and nitrates was performed in the field if the weather conditions allowed the team to do so safely, without risk to staff or the surrounding environment. All phosphate testing was performed after returning from the field with a water sample kept chilled in a cooler with ice. During the 2012 field work, testing was performed for ammonia and ammonium ion. These parameters were not included in the 2013 field work because of the error associated with the Hach kit test (designed for salt water applications) which could have as much as 16% error when used in freshwater.

### *2.4 Determination of Wetland Boundaries*

The wetland boundaries were identified using 2010 aerial images collected by the Province. During the 2011 and 2012 projects, these boundaries were delineated using Google Earth, but obtaining images from 2010 allowed for delineation of wetlands from imagery taken at the same time, which is sometimes a challenge faced with using Google imagery where images taken on different dates are combined. The 2010 aerial photographs were also very high resolution, which helped with defining boundaries. However, while many wetland boundaries were distinct and evident from visual inspection, others were difficult to delineate due to unclear transition zones. A consistent set of criteria was required to identify the boundaries of wetland areas. This study used forest borders, topographic borders, deep-water pond boundaries, developed borders, and wetland complexes to delineate the wetland sites. These criteria were adopted from Buchanan and Ringius (1993), and were also used to delineate boundaries during the 2011 and 2012 wetlands surveys, and are described in Table 1.

**Table 1.** Criteria used for delineating wetland boundaries, as adopted from Buchanan & Ringius (1993).

| Criteria                   | Definition  |
|----------------------------|---|
| Forest Borders             | A well-defined tree line indicates a wetland boundary. There may be a transition zone of stunted, chlorotic (i.e. lacking green color due to chlorophyll deficiency) trees. This transition zone was included within the wetland boundary when the trees are sparse, and excluded when the tree line is dense and defined as per Buchanan & Ringius (1993). |
| Topographic Borders        | Wetlands occur where the land slopes into a depression. Slopes may be abrupt or gradual in nature. The boundary was chosen where the topography clearly showed a visible depression (Buchanan & Ringius 1993).  |
| Deep Water Pond Boundaries | A wetland bordering a lake or pond is arbitrarily chosen to coincide with water greater than two meters in depth (Buchanan & Ringius, 1993). Information regarding water depth was unavailable at the time of analysis. Therefore, wetland boundaries around deep water ponds were delineated at the shoreline.   |
| Developed Borders          | Development contiguous to the wetland area indicated a boundary for this study. Development was defined to include roadways, building lots, and farm fields; development does not include walkways, foot bridges, or other similar small developmental features (Buchanan & Ringius, 1993).   |
| Wetland Complexes          | Wetland areas that are close in proximity to each other or hydrologically connected were treated as a single unit (Buchanan & Ringius 1993).  |

### *2.5 Ranking of Wetland Stressors*

The wetlands studied during the summer of 2013 were ranked based on the threats in the immediate area surrounding the wetland (such as roads, residential areas, agriculture, and impervious surfaces) to give a comparative score that represents the potential for stress to the wetland ecosystem. These threats were identified using 2010 aerial imagery. While this did not allow features that have been built since the date of the aerial imagery to be included in the scoring, it did allow for comparison of all sites on the same date.

During NAACAP's 2011-2012 Wetlands Survey project, a *Stress Evaluation Rubric* was designed to assign a number based on potential stressors located near the wetland boundary. This same rubric was used for this project (Appendix B). A value was assigned in each stressor category based on the distance of the stressor from the wetland boundary. Pasture lands and farm fields fall under the agriculture category. Areas of continuous asphalt, concrete, roofs, or other similar impermeable surfaces, were considered an impervious surface feature. Sparsely developed areas, those with no more than one building lot within 100 meters of roadway, were given a lower value than those areas with building lots more densely developed (more than one building lot within 100 meters of roadway). Larger roadways had a higher stress value. If the stressors were located at a higher elevation than the wetland, the value assigned for that stressor was multiplied by two, as there could be a greater potential for negative impact on the wetland as runoff that flows down slope to the wetland area could carry contaminants with it. A change in elevation of 3% over 100 m or greater was considered to be a higher elevation.

Features identified as stressors were quantified using ArcGIS. The features were located on aerial imagery from 2010 and traced to give a polygon whose approximate area could be calculated. A

15 m, 30 m, and 50 m buffer was drawn around the wetland boundary to determine what range the feature was located within. The slope between the wetland and the stressor was estimated using 1 m contour interval data created in ArcGIS from a digital elevation model (DEM) with 10 m resolution.

## *2.6 Determining Wetland Class and Assessment of Wetland Function*

Wetlands visited in 2013 were classified according to the Canadian Wetland Classification System, which defines five wetland classes: bog, fen, marsh, swamp and shallow water. Each of these five classes can be further subdivided, but for this project wetlands were classified based on these five general classes. The classification key contained in the Canadian Wetland Classification was reformatted in the form of a dichotomous key, with some terms defined for easier field use (Appendix C).

Wetland function is defined as the ecological service that the wetland serves independent of human benefits. The Nova Scotia Wetland Assessment Method (NovaWAM) was developed to assess the function of wetlands in Nova Scotia and was shared with NAACAP by the Canadian Wildlife Service. Excerpts from the NovaWAM were combined on a field sheet along with parameters needed to determine wetland classification (Appendix D).

## *2.7 Determination of Bird Habitat*

NAACAP identified the need for a checklist which could be utilized by birders, to provide more consistent information both as a “stand alone” list and incorporated into a wetlands evaluation. The checklist may also provide support to various organizations that undertake a citizen science style initiative for gathering wetland bird data from bird watchers.

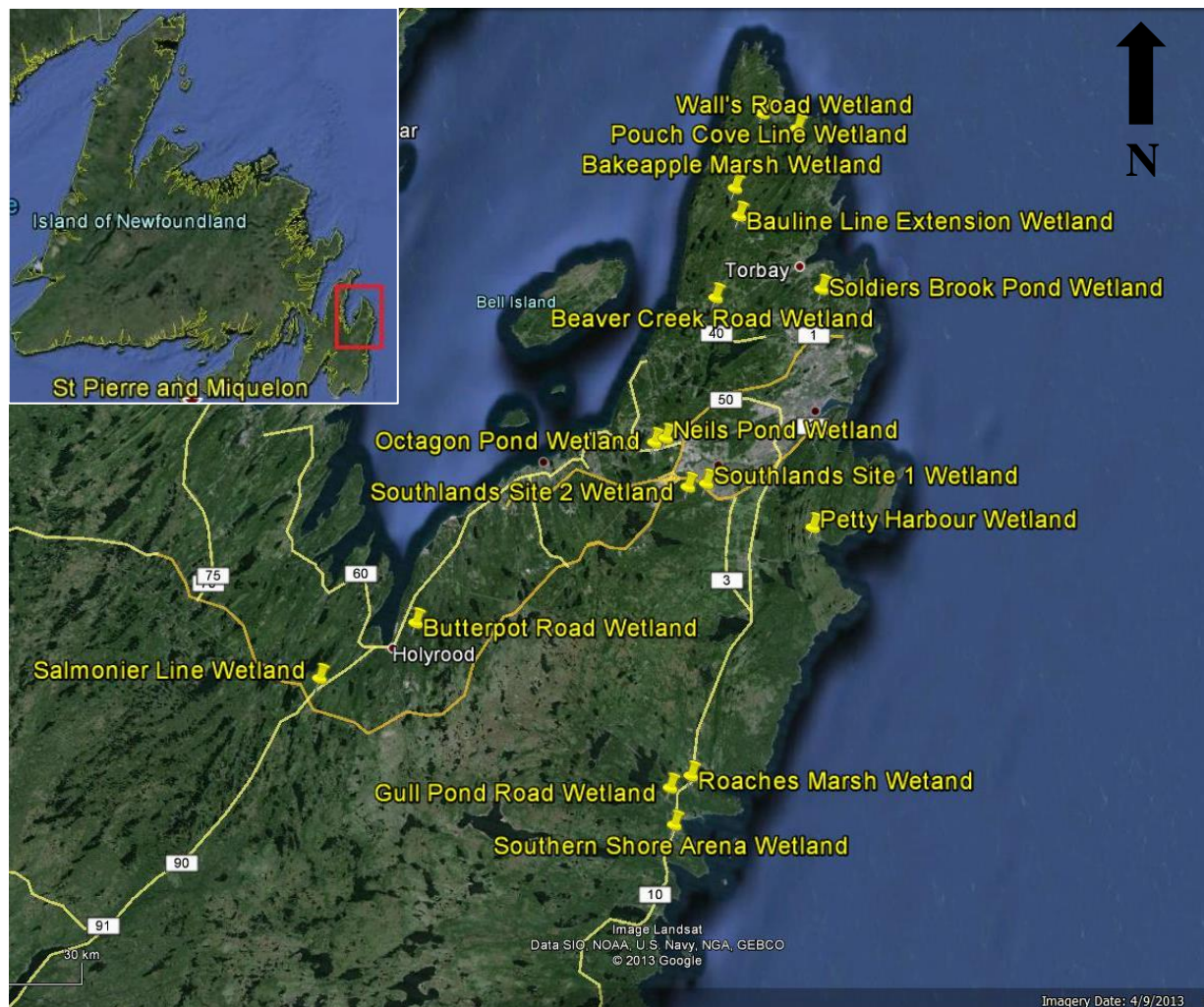
NAACAP collected relevant data from two different websites that utilize sightings submitted by the public. The websites allow interested individuals or organizations to download the data for any particular region or timeframe to carry on analyses. These websites were eBird ([www.ebird.org](http://www.ebird.org)) and Newfoundland Nature ([www.nlnature.com](http://www.nlnature.com)). eBird is the larger bird-sighting website, with sightings logged globally while NLNature is a province wide site that logs bird, insect, plant and animal sightings, with sightings particularly concentrated on the Northeast Avalon Peninsula. For both websites, data were restricted to the provincial boundary, as this amount of data was a suitable size for handling and further filtering. eBird data were downloaded in October, 2013 and NLNature data in August, 2013. Filtering was done using ArcGIS ArcMap 10, extracting only those entries in both citizen datasets that fell within 200 meters of the wetlands NAACAP surveyed during 2011-2013.

Filtering of the eBird data provided a list of 1547 bird sightings within the specified geographical area. Filtering of the NLNature data provided a list of 621 sightings. With help from NAACAP's 2013 Conservation Corps Green Team, both lists were reviewed, classified and the data were further filtered into the following categories: Migratory, Resident, or a combination of Migratory/Seabird or Migratory/Resident. Sightings were tallied for all birds, with sightings of one or more bird of the same type (common name, scientific name) at the same time being counted as one sighting. This provided a listing of 134 different birds sighted by the public and logged at one website or the other. Finally, in consultation with relevant organizations, bird experts and reference material, a

list of 56 migratory-only birds sighted within 200 m of the 2011-2013 NAACAP studied wetlands was created (Appendix G).

### 3.0 Results:

Figure 1 illustrates the location of the wetland sites visited during 2013. Detailed maps showing individual wetland delineations and locations of sample sites can be found in Appendix A.



**Figure 1.** The locations (represented by yellow markers) of the wetlands surveyed during the 2013-2014 project year throughout the Northeast Avalon Peninsula of Newfoundland and Labrador. (Google Earth Image. [Accessed February 12, 2014.] )

### 3.1 Plant Sampling

The plant sampling is summarized as richness, indicating the number of different plant types found at each wetland (Table 2). The Bakeapple Marsh wetland was divided into north and south because the two plant survey transects were performed on opposite sides of the road. The road defines one of the wetland boundaries (Section 2.4.4 above); according to this there were 2 wetland sites surveyed at Bakeapple Marsh. Data for individual transects are found in Appendix E.

**Table 2.** Richness data, expressing the number of different plant types observed, for each wetland surveyed in 2013. Wetland sites are listed in order of date that they were sampled.

| Wetland Site Name      | Plant Richness | Number of Non-native Plants |
|------------------------|----------------|-----------------------------|
| Soldiers Brook Pond    | 19             | 3                           |
| Bakeapple Marsh South  | 14             | 0                           |
| Bakeapple Marsh North  | 17             | 0                           |
| Wall's Road            | 24             | 0                           |
| Southern Shore Arena   | 23             | 0                           |
| Octagon Pond           | 14             | 0                           |
| Petty Harbour          | 27             | 0                           |
| Roaches Marsh          | 21             | 0                           |
| Beaver Creek Road      | 21             | 1                           |
| Butterpot Road         | 21             | 0                           |
| Southlands Site 1      | 30             | 0                           |
| Southlands Site 2      | 25             | 0                           |
| Gull Pond Road         | 22             | 0                           |
| Bauline Line Extension | 24             | 1                           |
| Pouch Cove Line        | 19             | 0                           |
| Salmonier Line         | 15             | 0                           |
| Neils Pond             | 18             | 0                           |

The plant richness values for identified plant types varied from 14 (Bakeapple Marsh South and Octagon Pond) to 30 (Southlands Site 1). The Beaver Creek Road, Bauline Line Extension and Soldiers Brook wetland sites had non-native plants identified during plant sampling. Little lovegrass (*Eragrostis minor*) was identified at the Beaver Creek Road site and lady's smock (*Cardamine pratensis*) at the Bauline Line Extension site. The Soldiers Brook Pond site had three non-native species identified; lady's smock, creeping spikerush (*Eleocharis erythropoda*) and little lovegrass.

There were a total of 64 plant species identified during plant sampling throughout the surveyed wetlands. Some plant species were found in all the surveyed wetlands, while other species were rarely found. Leatherleaf (*Chamaedaphne calyculata*), sweetgale (*Myrica gale*), and sphagnum moss (*Sphagnum papillosum*) were found in all of the surveyed wetlands. There were 34 plant species which were found only in one or two wetland sites, with there being 21 that were found in only 1 wetland,

and 13 that were found in 2 wetlands. A list of identified plants with these rarely identified species can be found in Appendix F.

### 3.2 Benthic Macroinvertebrate Sampling

The results of macroinvertebrate sampling at the surveyed wetlands are presented in Table 3. The results are displayed as a richness value, indicating the number of different invertebrate types identified at the site. Organisms were identified to Order in most cases, with some only identified to Phylum. Therefore, richness is indicative of the number of different taxonomic classifications (Orders and Phyla) that were identified. Complete invertebrate sample data can be found in Appendix E.

**Table 3.** Benthic macroinvertebrate richness values obtained from organism identification to Order, or in some cases Phylum, at each wetland site surveyed in 2013. N/A indicates that there was no invertebrate sample collected at that site. Taxonomic classifications have been abbreviated, the full names are found below the table.

| Wetland Site Name      | Sample locations   | Identified to Phylum |     |     | Identified to Order |     |     |     |     |     |     |     |     |     |     |     |     | Invertebrate Richness |
|------------------------|--------------------|----------------------|-----|-----|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------------|
|                        |                    | Ann                  | Mol | Nem | Amp                 | Ano | Ara | Arc | Col | Dip | Eph | Hem | Hir | Odo | Ple | Tri | Ven |                       |
| Soldiers Brook Pond    | outflow            |                      |     | ✓   | ✓                   |     |     |     | ✓   |     |     | ✓   | ✓   | ✓   | ✓   |     |     | 7                     |
| Bakeapple Marsh        | standing pool      |                      |     |     | ✓                   |     |     |     |     |     |     |     |     | ✓   |     |     |     | 2                     |
| Wall's Road            |                    |                      |     |     |                     |     |     |     |     |     |     |     |     |     |     |     |     | N/A                   |
| Southern Shore Arena   | outflow            |                      |     |     | ✓                   |     |     |     |     |     |     |     |     |     |     |     |     | 1                     |
| Octagon Pond           |                    |                      |     |     |                     |     |     |     |     |     |     |     |     |     |     |     |     | N/A                   |
| Petty Harbour          | outflow            |                      |     |     |                     |     |     |     |     |     |     | ✓   |     |     |     |     |     | 1                     |
| Roaches Marsh          | inflow and outflow |                      | ✓   |     | ✓                   |     |     | ✓   |     | ✓   |     | ✓   | ✓   | ✓   |     |     |     | 7                     |
| Beaver Creek Road      | inflow and outflow | ✓                    |     |     |                     |     |     |     |     | ✓   |     | ✓   |     | ✓   |     | ✓   |     | 5                     |
| Butterpot Road         | inflow and outflow | ✓                    |     |     | ✓                   |     | ✓   |     |     | ✓   |     |     | ✓   | ✓   |     |     | ✓   | 7                     |
| Southlands Site 1      | South Brook        |                      |     |     |                     |     |     |     |     | ✓   |     | ✓   |     | ✓   |     |     |     | 3                     |
| Southlands Site 2      | South Brook        |                      |     |     | ✓                   |     |     |     |     |     |     | ✓   |     |     |     |     | ✓   | 3                     |
| Gull Pond Road         | standing pool      |                      |     |     |                     |     |     |     |     |     |     | ✓   |     | ✓   |     |     |     | 2                     |
| Bauline Line Extension |                    |                      |     |     |                     |     |     |     |     |     |     |     |     |     |     |     |     | N/A                   |
| Pouch Cove Line        | pond water         |                      |     |     |                     |     |     |     | ✓   |     |     | ✓   |     |     |     |     |     | 2                     |
| Salmonier Line         | inflow and outflow |                      |     |     | ✓                   | ✓   |     |     | ✓   |     | ✓   |     |     |     |     | ✓   |     | 5                     |
| Neils Pond             | pond water         |                      |     |     | ✓                   |     |     |     | ✓   | ✓   | ✓   |     | ✓   |     |     |     |     | 5                     |

Ann= Annelida; Mol= Mollusca; Nem= Nematoda; Amp=Amphipoda; Ano= Anostraca; Ara=Araneae; Arc=Archaeogastropoda; Col=Coleoptera; Dip=Diptera; Eph=Ephemeroptera; Hem=Hemiptera; Hir= Hirudinea, Odo= Odonata; Ple=Plecoptera; Tri=Trichoptera, Ven=Veneroida

The invertebrate richness values ranged from 1 (Southern Shore Arena) to 7 (Soldiers Brook Pond and Roaches Marsh). The orders found most widely across the wetland sites were Amphipoda and Hemiptera (identified at 8 of the wetland sites).

The macroinvertebrates found at each wetland site classified based on their pollution tolerance are given in Table 4.

**Table 4.** Invertebrates identified during sampling at wetland sites in 2013 classified based on their pollution tolerance. Those organisms that did not clearly fit into one of the classifications were classified as *Other*. Organism life stage is included where it was identified in the data.

| Wetland Site Name                                      | Sensitive to Pollution            | Somewhat sensitive to pollution                | Tolerant to pollution  | Other   |
|--|-----------------------------------|--|------------------------|---|
| <i>Soldiers Brook Pond</i>                             | -Stonefly larva                   | -Dragonfly nymph<br>-Scud                      | -Leech<br>-Worms       | -Water boatmen<br>-Beetle (type unknown)                          |
| <i>Bakeapple Marsh</i>                                 |                                   | -Scud<br>-Dragonfly nymph                      |                        |   |
| <i>Wall's Road.(No invertebrate sample)</i>            |                                   |  |                        |   |
| <i>Southern Shore Arena</i>                            |                                   | -Scuds   |                        |   |
| <i>Octagon Pond (no invertebrate sample)</i>           |                                   |  |                        |   |
| <i>Petty Harbour</i>                                   |                                   |  |                        | -Water boatmen<br>-Back swimmer                                   |
| <i>Roaches Marsh</i>                                   | -Gilled snail                     | -Dragonfly nymph<br>-Scud                      | -Midge larva<br>-Leech | -Soldierfly nymph<br>-Water boatmen                               |
| <i>Beaver Creek Road</i>                               | -Caddisfly                        | -Dragonfly nymph                               | -Midge larva           | -Earthworm*<br>-Water boatmen<br>-Mosquito larva                  |
| <i>Butterpot Road</i>                                  |                                   | -Dragonfly nymph<br>-Scud<br>-Clam (pill clam) | -Leech                 | -Stout (horsefly) nymph<br>-Earthworm*<br>-Shamrock Spider*       |
| <i>Southlands Site 1</i>                               |                                   | -Dragonfly nymph                               | -Midge larva           | -Water boatmen<br>-Flower fly*                                    |
| <i>Southlands Site 2</i>                               |                                   | -Scud<br>-Clam (pill clam)                     |                        | -Water boatmen  |
| <i>Gull Pond Road</i>                                  |                                   | -Dragonfly nymph                               |                        | -Pygmy backswimmer<br>-Water boatmen                              |
| <i>Bauline Line Extension (no invertebrate sample)</i> |                                   |  |                        |   |
| <i>Pouch Cove Line</i>                                 |                                   |  |                        | -Water boatmen<br>-Water scavenger beetle<br>-Diving beetle larva |
| <i>Salmonier Line</i>                                  | -Mayfly nymph<br>-Caddisfly larva | -Whirligig beetle<br>-Scud                     |                        | -Fairy shrimp   |
| <i>Neils Pond</i>                                      | -Mayfly larva                     | -Scud  | -Leech<br>-Midge larva | -Diving beetle  |

\*Indicates that invertebrate was determined to be terrestrial, not aquatic

Organisms classified as being sensitive to pollution were found at the Soldiers Brook Pond, Roaches Marsh, Beaver Creek Road, Salmonier Line, and Neils Pond wetland sites. These sites all had

organisms that were classified as being somewhat tolerant to pollution and tolerant to pollution as well, with the exception of the Salmonier Line site, which did not have any invertebrates classified as tolerant to pollution. A wide range of pollution tolerances among invertebrates identified at these sites is an indication of water quality which is suitable for a diversity of aquatic life.

### 3.3 Water Quality

The water quality results collected from each of the wetlands surveyed in 2013 are given below in Table 5.

**Table 5.** Water quality data (temperature, pH, dissolved oxygen (DO), nitrate nitrogen ( $\text{NO}_3^-$ -N), nitrate ( $\text{NO}_3^-$ ), total phosphate ( $\text{PO}_4^{3-}$ ), total inorganic phosphate, orthophosphate, meta(poly)phosphate, and total organic phosphate) obtained from the surveyed wetland sites. Values in red exceed the Canadian Water Quality Guidelines for the Protection of Aquatic Life. N/A indicates that data is not available for a particular site, while LTD stands for lower than detectable using the Hach Stream Survey test kits.

| Wetland Site Name    | Sample Location          | Temp. (°C) | pH  | DO (mg/L) | $\text{NO}_3^-$ -N (mg/L) | $\text{NO}_3^-$ (mg/L) | Total $\text{PO}_4^{3-}$ (mg/L) | Total Inorganic $\text{PO}_4^{3-}$ (mg/L) | Ortho- $\text{PO}_4^{3-}$ (mg/L) | Meta(poly)- $\text{PO}_4^{3-}$ (mg/L) | Total Organic $\text{PO}_4^{3-}$ (mg/L) |
|----------------------|--------------------------|------------|-----|-----------|---------------------------|------------------------|---------------------------------|---|----------------------------------|---------------------------------------|---|
| Soldiers Brook Pond  | Inflow                   | 18.1       | 7.2 | 8.1       | 0.05                      | 0.22                   | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Bakeapple Marsh      | Standing Pool            | 24.7       | 7.2 | 5.6       | LTD                       | LTD                    | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Wall's Road          | NA                       | N/A        | N/A | N/A       | N/A                       | N/A                    | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Southern Shore Arena | Inflow                   | 19.5       | 7.1 | 10.3      | LTD                       | LTD                    | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Southern Shore Arena | Outflow                  | 19.3       | 6.8 | 9.6       | LTD                       | LTD                    | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Octagon Pond         | Pond                     | 23.2       | 6.6 | 8.64      | LTD                       | LTD                    | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Octagon Pond         | Standing Pool            | 17.9       | 5.9 | 3.2       | 0.02                      | 0.088                  | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Petty Harbour        | Standing Pool            | 31.1       | 5.9 | 3.8       | LTD                       | LTD                    | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Petty Harbour        | Outflow/<br>Small Spring | 13.9       | 6.8 | 3.2       | 0.02                      | 0.088                  | N/A                             | N/A                                       | N/A                              | N/A                                   | N/A                                     |
| Roaches Marsh        | Inflow                   | 28.7       | 7.3 | 8.0       | LTD                       | LTD                    | 0.04                            | 0.04                                      | LTD                              | 0.04                                  | LTD                                     |
| Roaches Marsh        | Outflow                  | 28.2       | 7.3 | 8.0       | LTD                       | LTD                    | 0.08                            | 0.08                                      | 0.08                             | LTD                                   | LTD                                     |
| Beaver Creek Road    | Inflow                   | 18.5       | 7.6 | 9.0       | LTD                       | LTD                    | 0.16                            | 0.08                                      | 0.04                             | 0.04                                  | 0.08                                    |
| Beaver Creek Road    | Outflow                  | 17.9       | 7.6 | 9.0       | LTD                       | LTD                    | 0.08                            | 0.04                                      | LTD                              | 0.04                                  | 0.04                                    |
| Butterpot Road       | Standing Pool            | 21.2       | 6.8 | 6.0       | LTD                       | LTD                    | LTD                             | LTD                                       | LTD                              | LTD                                   | LTD                                     |



| Wetland Site Name      | Sample Location | Temp. (°C) | pH  | DO (mg/L) | NO <sub>3</sub> <sup>-</sup> -N (mg/L) | NO <sub>3</sub> <sup>-</sup> (mg/L) | Total PO <sub>4</sub> <sup>3-</sup> (mg/L) | Total Inorganic PO <sub>4</sub> <sup>3-</sup> (mg/L) | Ortho-PO <sub>4</sub> <sup>3-</sup> (mg/L) | Meta(poly)-PO <sub>4</sub> <sup>3-</sup> (mg/L) | Total Organic PO <sub>4</sub> <sup>3-</sup> (mg/L) |
|------------------------|-----------------|------------|-----|-----------|--|-------------------------------------|--|--|--|---|--|
| Butterpot Road         | Outflow         | 19.7       | 7.4 | 8.0       | LTD                                    | LTD                                 | LTD  | LTD  | LTD  | LTD   | LTD  |
| Southlands Site 1      | Standing Pool   | 21.4       | 7.7 | 9.0       | LTD                                    | LTD                                 | 0.08                                       | 0.04   | 0.04                                       | LTD   | 0.04   |
| Southlands Site 1      | Outflow         | 18.9       | 6.2 | 8.0       | LTD                                    | LTD                                 | 0.08                                       | 0.04   | LTD  | 0.04  | 0.04   |
| Southlands Site 2      | Inflow          | 22.8       | 6.5 | 9.0       | LTD                                    | LTD                                 | 0.04                                       | LTD  | LTD  | LTD   | 0.04   |
| Southlands Site 2      | Outflow         | 16.5       | 7.5 | 4.0       | LTD                                    | LTD                                 | 0.08                                       | LTD  | LTD  | LTD   | 0.08   |
| Gull Pond Road         | Standing Pool   | 22.7       | 7.1 | 8.0       | LTD                                    | LTD                                 | 0.04                                       | 0.04   | LTD  | 0.04  | LTD  |
| Gull Pond Road         | Outflow         | 27.8       | 6.8 | N/A       | LTD                                    | LTD                                 | 0.08                                       | LTD  | LTD  | LTD   | 0.08   |
| Bauline Line Extension | Standing Pool   | 17.2       | 7.6 | 3.0       | LTD                                    | LTD                                 | 0.08                                       | LTD  | LTD  | LTD   | 0.08   |
| Bauline Line Extension | Outflow         | 18.5       | 7.3 | 6.0       | LTD                                    | LTD                                 | 0.08                                       | 0.04   | LTD  | 0.04  | 0.04   |
| Pouch Cove Line        | Standing Pool   | 21         | 8   | 8.0       | LTD                                    | LTD                                 | 0.08                                       | 0.08   | LTD  | 0.08  | LTD  |
| Salmonier Line         | Outflow         | 15.2       | 7.9 | 8.0       | LTD                                    | LTD                                 | 0.16                                       | 0.12   | 0.04                                       | 0.08  | 0.04   |
| Salmonier Line         | Inflow          | 13.5       | 8.3 | 10.0      | LTD                                    | LTD                                 | N/A  | N/A  | N/A  | N/A   | N/A  |
| Neils Pond             | Pond            | 19.8       | 8.5 | 10.0      | LTD                                    | LTD                                 | 0.04                                       | 0.04   | LTD  | 0.04  | LTD  |

The CCME Water Quality Guidelines for the Protection of Aquatic Life have recommendations for pH, dissolved oxygen, nitrate nitrogen, and nitrate. There are no guidelines for phosphate, as phosphorus is essential for life and the levels that cause problems can vary amongst different ecosystems (CCME, 2004). The CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life present a framework for phosphorus levels, where it is recommended that values not exceed “trigger ranges” or increase more than 50% over baseline values (CCME, 2004).

The pH recorded at the Petty Harbour sample taken from a standing pool and the Southlands Site 1 outflow were below the 6.5-9 range suggested in the CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2006). One possible reason for these values being lower than the range suggested by the CCME is that peatland soils in Newfoundland typically have a pH ranging from 3.54-6.52 (Wells and Pollett, 1983). Also, low flows could be responsible for the low pH, as low flows limit the exchange of hydrogen ions and contribute to low pH (Wells and Pollett, 1983). All of the other samples had values within the recommended range for pH.

The dissolved oxygen concentrations measured at both of the sample sites at the Petty Harbour wetland, the outflow at the Southlands Site 2 wetland, and the standing water at the Bauline Line

Extension wetland were all below the lowest acceptable level in warm water of 6.0 mg/L for early life stages and 5.5 mg/L for other life stages suggested in the CCME Water Quality Guidelines for the Protection of Aquatic Life (CCME, 1999), and are likely the result of low flow rates resulting in low exchange of atmospheric oxygen with the water.

The water within the sampled wetlands did not contain much nitrate; the maximum recommended levels of nitrates of 13 mg/L and nitrate nitrogen of 3.0 mg/L (CCME, 2012) were not exceeded at any of the wetland sites, with most of the samples having concentrations that were below that detectable with the Hach Stream Survey kits (lowest detectable concentration for nitrate nitrogen was 0.02 mg/L and nitrate was 0.088 mg/L). This is typical of wetlands, where the rate of denitrification, the conversion of nitrates to nitrogen gas, usually exceeds the rate of nitrogen fixation (Keddy, 2010), where atmospheric nitrogen is converted to ammonium and then subsequently nitrate through nitrification. Also, nitrate is the form of nitrogen used by plants, meaning that there is less available in water when aquatic plants are present. If nitrogen loads from runoff, etc. is such that the rate of nitrate input to the water is greater than the rate of denitrification or uptake from plants, the concentration of nitrate in the water would increase.

Overall, total phosphate concentrations ranged from being lower than detectable by the Hach Stream Survey kits to 0.16 mg/L. Generally, wetland sites that had detectable total phosphate concentrations contained both inorganic and organic forms that constituted the total concentration. As mentioned above, there are no CCME guidelines for phosphates, but there is a framework for phosphorus, where values are either compared to baseline values such that up to a 50% increase in concentrations above baseline levels is acceptable, or compared to trigger ranges whereby the upper limit of the desired range for phosphorus concentration is not exceeded (CCME, 2004). Baseline phosphate levels are not available for all of the sample sites, but phosphate levels were also tested during summer 2013 in reference wetlands for NAACAP's assessment of water quality surrounding sod farms. Comparing phosphate levels to trigger ranges for phosphorus, these reference wetlands were mainly classified as ultra-oligotrophic (<0.004 mg/L P) or oligotrophic (0.004-0.01mg/L P) in the framework for phosphorus given in the CCME Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2004). The detected values for total phosphate in Table 5 (0.04 mg/L, 0.08 mg/L and 0.16 mg/L) all exceed the upper limits of these trophic classifications at the reference sites. This suggests that all the detectable phosphate levels (detected at the Roaches Marsh, Beaver Creek Road, Southlands Site 1, Southlands Site 2, Gull Pond Road, Bauline line Extension, Pouch Cove Line, Salmonier Line and Neils Pond wetland sites) could be a risk to water quality and the aquatic environment. However, more sampling would be needed to determine if these recorded values are typical of the individual wetlands.

### 3.4 Stress Evaluation Rubric Values

The completed *Stress Evaluation Rubric* score for each wetland site is available in Appendix E. Table 6 contains the final rubric score for each wetland site. A wetland with a higher score has greater potential for stress from surrounding human land uses.

**Table 6.** *Stress Evaluation Rubric scores for the wetland sites surveyed during 2013.*

| <b>Wetland Site Name</b> | <b><i>Stress<br/>Evaluation<br/>Rubric Score</i></b> |
|--------------------------|--|
| Soldiers Brook Pond      | 24   |
| Bakeapple Marsh South    | 22   |
| Bakeapple Marsh North    | 14   |
| Wall's Road              | 6  |
| Southern Shore Arena     | 44   |
| Octagon Pond             | 0  |
| Petty Harbour            | 6  |
| Roaches Marsh            | 8  |
| Beaver Creek Road        | 40   |
| Butterpot Road           | 10   |
| Southlands Site 1        | 0  |
| Southlands Site 2        | 0  |
| Gull Pond Road           | 28   |
| Bauline Line Extension   | 33   |
| Pouch Cove Line          | 12   |
| Salmonier Line           | 22   |
| Neils Pond               | 0  |

The *Stress Evaluation Rubric* scores ranged from zero to 44 (Table 6), indicating that the surveyed wetlands had varying degrees of human features surrounding them. Wetland sites that received a score of zero and had none of the stressors listed in the rubric within 50 m of the wetland boundary are: Octagon Pond, Southlands Site 1, Southlands Site 2, and Neils Pond. The Southern Shore Arena wetland site had the highest score of 44, and has the highest potential for stress from its surroundings. However, the rubric scores can be considered conservative. In many cases there were human features within the designated 50 m which were not reflected in the rubric score. For example, walking trails and pole lines were not included in the rubric, but could influence the wetlands. Also, the 50 m extent used in the *Stress Evaluation Rubric* is conservative, as features outside of this distance likely have an effect as well. Using the aerial photography from 2010 did not allow any developments since the date that imagery was taken to be included in the rubric score. Appendix E contains notes about features that were not captured in the rubric but could influence the wetlands.

### 3.5 Determining Wetland Class and Assessment of Wetland Function

Table 7 contains the wetland classifications and a summary of wetland functions for each wetland, as determined by the Green Team during their 2013 field visits. Wetland Classifications were determined using the dichotomous key adapted from the Canadian Wetland Classification System (Appendix C) and wetland functions were determined using field sheets with portions taken from the Nova Scotia Wetland Assessment Method (NovaWAM) (Appendix D).

**Table 7.** Wetland classification and summary of wetland function as determined by the Green Team during their site visits in 2013. *Y* indicates that the wetland was determined to serve a particular function, while *N* indicates that it was determined not to serve a particular function.

| Wetland Site Name      | Classification | Wetland Function      |                      |                       |                        |                                |                         |
|------------------------|----------------|-----------------------|----------------------|-----------------------|------------------------|--------------------------------|-------------------------|
|                        |                | Storing Surface Water | Maintain Stream Flow | Ground-water Recharge | Ground-water Discharge | Retain Sediment & Particulates | Shoreline Stabilization |
| Soldiers Brook Pond    | Shallow Water  | Y                     | Y                    | Y                     | Y                      | N                              | Y                       |
| Bakeapple Marsh        | Bog            | Y                     | Y                    | N                     | Y                      | N                              | N                       |
| Wall's Road            | Marsh          | Y                     | N                    | Y                     | Y                      | N                              | N                       |
| Southern Shore Arena   | Marsh          | Y                     | Y                    | Y                     | Y                      | N                              | Y                       |
| Octagon Pond           | Marsh          | Y                     | N                    | Y                     | Y                      | Y                              | Y                       |
| Petty Harbour          | Marsh          | Y                     | N                    | N                     | Y                      | N                              | N                       |
| Roaches Marsh          | Marsh          | Y                     | Y                    | Y                     | N                      | N                              | Y                       |
| Beaver Creek Road      | Marsh          | Y                     | Y                    | N                     | Y                      | Y                              | Y                       |
| Butterpot Road         | Marsh          | Y                     | Y                    | Y                     | Y                      | N                              | Y                       |
| Southlands Site 1      | Marsh          | Y                     | N                    | N                     | Y                      | N                              | N                       |
| Southlands Site 2      | Marsh          | Y                     | Y                    | N                     | Y                      | Y                              | Y                       |
| Gull Pond Road         | Marsh          | Y                     | N                    | N                     | Y                      | N                              | N                       |
| Bauline Line Extension | Marsh          | Y                     | Y                    | Y                     | Y                      | Y                              | N                       |
| Pouch Cove Line        | Marsh          | Y                     | N                    | N                     | Y                      | N                              | Y                       |
| Salmonier Line         | Marsh          | Y                     | N                    | N                     | Y                      | N                              | N                       |
| Neils Pond             | Marsh          | Y                     | N                    | Y                     | N                      | N                              | Y                       |

Most of the surveyed wetlands were classified as marsh, mainly because of the composition of mineral soils rather than peat. The classification was made based on a rapid field assessment, and it is possible that some of the wetland sites may actually consist of more than one wetland type or be in transition between different types.

All the wetland sites were believed to have a wetland function of storing surface water. The other wetland functions that were assessed were: maintaining stream flow; serving as a source for groundwater recharge or discharge; retaining sediments and particulates in runoff; and stabilizing the shoreline of an adjacent water body. These functions varied across the visited wetlands, with none of them applying to all of the wetlands.

Another wetland function is serving as wildlife habitat. Table 8 indicates wildlife types (other than the invertebrates and plants identified through sampling) that were observed directly in the wetlands, whose presence was audible, and those believed to have utilized the wetland as evidenced by the presence of tracks or scat.

**Table 8.** Summary of wildlife which were observed directly or for which there was evidence of them being present (for example, tracks and scat). Y indicates that the wildlife type was determined to be present in the wetland, while N indicates that it was determined not to be present.

| <b>Wetland Site Name</b> | <b>Amphibians</b> | <b>Waterfowl</b> | <b>Other Birds</b> | <b>Mammals</b> | <b>Fish</b> |
|--------------------------|-------------------|------------------|--------------------|----------------|-------------|
| Soldiers Brook Pond      | Y                 | Y                | Y                  | N              | N           |
| Bakeapple Marsh          | Y                 | N                | Y                  | N              | N           |
| Wall's Road              | Y                 | N                | Y                  | N              | N           |
| Southern Shore Arena     | N                 | N                | Y                  | N              | N           |
| Octagon Pond             | N                 | N                | N                  | N              | N           |
| Petty Harbour            | Y                 | N                | N                  | N              | N           |
| Roaches Marsh            | N                 | N                | N                  | N              | N           |
| Beaver Creek Road        | Y                 | Y                | Y                  | N              | Y           |
| Butterpot Road           | Y                 | N                | Y                  | Y              | Y           |
| Southlands Site 1        | Y                 | N                | Y                  | Y              | N           |
| Southlands Site 2        | Y                 | N                | Y                  | Y              | N           |
| Gull Pond Road           | Y                 | N                | Y                  | N              | N           |
| Bauline Line Extension   | N                 | N                | N                  | N              | N           |
| Pouch Cove Line          | N                 | N                | Y                  | N              | N           |
| Salmonier Line           | Y                 | N                | Y                  | N              | N           |
| Neils Pond               | N                 | Y                | Y                  | Y              | N           |

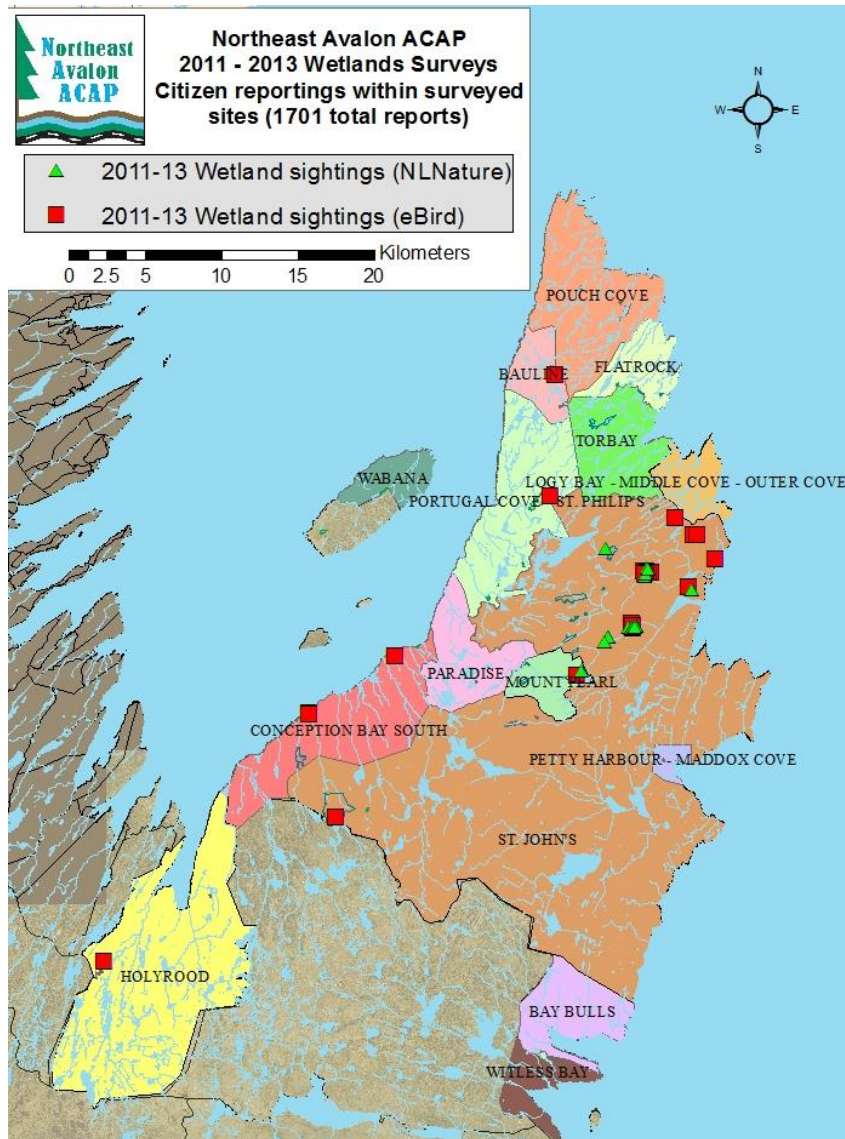
The types of wildlife found in each wetland site varied, but included ducks and various other types of birds, frogs, moose, snowshoe hare and small rodents. The wetlands likely serve as habitat to more wildlife than indicated in Table 8, but some types were hard to identify with an untrained eye, or were simply not observed during the one site visit.

### 3.6 Determination of Bird Habitat

The 15 most commonly observed migratory birds in or within 200 m of NAACAP studied wetlands (2011-2013), sourced from eBird and NLNature data, are given in Table 9. A full list of 56 such commonly sighted birds is in Appendix G. The list has been reviewed and edited with support from Canadian Wildlife Service and expert Doug Hynes (Memorial University of Newfoundland). These bird sightings were recorded throughout the Northeast Avalon, as shown in Figure 2. For some birds there were a low number of total observations, but more birds observed per sighting. There were also some species that only had one report, with only one individual reported.

**Table 9:** The most commonly observed migratory birds found within 200 meters of NAACAP surveyed wetlands on the Northeast Avalon Peninsula of Newfoundland and Labrador from 2011-2013, as reported to eBird and NLNature. Birds are arranged in ascending order based on number of observations.

| Common Name           | Scientific Name                  | Number of Observations | Total Observed |
|-----------------------|----------------------------------|------------------------|----------------|
| Herring Gull          | <i>Larus argentatus</i>          | 67                     | 2616           |
| Green-winged Teal     | <i>Anas crecca</i>               | 64                     | 592            |
| Mallard               | <i>Anas platyrhynchos</i>        | 57                     | 384            |
| Savannah Sparrow      | <i>Passerculus sandwichensis</i> | 49                     | 165            |
| Swamp Sparrow         | <i>Melospiza georgiana</i>       | 30                     | 97             |
| Yellow Warbler        | <i>Setophaga petechia</i>        | 27                     | 95             |
| Yellow-rumped Warbler | <i>Setophaga coronata</i>        | 21                     | 62             |
| Black-bellied Plover  | <i>Pluvialis squatarola</i>      | 16                     | 77             |
| Lesser Scaup          | <i>Aythya affinis</i>            | 15                     | 31             |
| Fox Sparrow           | <i>Passerella iliaca</i>         | 14                     | 15             |
| Common Tern           | <i>Sterna hirundo</i>            | 14                     | 51             |
| Eurasian Wigeon       | <i>Anas penelope</i>             | 13                     | 13             |
| American Bittern      | <i>Botaurus lentiginosus</i>     | 13                     | 14             |
| Gadwall               | <i>Anas strepera</i>             | 12                     | 17             |
| Song Sparrow          | <i>Melospiza melodia</i>         | 11                     | 14             |



**Figure 2.** Distribution of bird sightings reported to eBird and NLNature that were found to be within 200 meters of wetlands surveyed 2011-2013. The various municipalities are coloured and labelled.

Figure 2 shows that there were a limited number of the surveyed wetland sites in which birds were observed and reported to an online bird database. The reasoning behind this, according to discussions with bird experts and Canadian Wildlife Service, is that many people who report bird sightings tend to report the more fascinating, rarer sightings than the average, everyday sightings. This means the data may be biased toward a smaller variety of birds while simultaneously neglecting (not on purpose) higher numbers of common wetland birds that are seen more often. This fundamental observation, in combination with the limited number of studied wetlands over a three year period compared to the actual number of existing wetlands, is a limitation of the bird sighting data. Reliance on reported sightings also means there is a dependency on the population numbers and distribution of the birders themselves rather than the location of actual bird habitat. Higher numbers of bird observations were evident in St. John's and less in surrounding municipalities, which might be attributed to the higher population density for this city area versus surrounding municipalities. The

higher population density likely plays a significant role in how many people are reporting the sightings and where the sightings are completed.

#### **4.0 Discussion:**

Loss and degradation of wetlands have serious negative impacts on water quality both for humans and wildlife. This study will assist municipalities in land-use planning with the goal of minimizing the loss of wetlands. The wetland sites visited during the 2012-2013 project year were found to contain varying flora and fauna, and had different potential stress from surrounding anthropogenic pressures. There were some relationships between the different parameters sampled or assessed and there were common functions determined throughout the surveyed wetlands.

There appears to be a relationship between the presence of non-native plants and higher scores in the *Stress Evaluation Rubric*. The Beaver Creek Road, Bauline Line Extension, and Soldiers Brook wetland sites all contained non-native plant species, and scored within the top 5 highest values on the rubric, with highest human footprint. This confirms that anthropogenic influences are conduits to the invasion of non-native plant species into wetlands.

There were connections between invertebrate populations and water quality. Wetlands that were found to contain invertebrates sensitive to pollution also had water quality that met guidelines. This was the case at the Soldiers Brook Pond, Roaches Marsh, Beaver Creek Road, Salmonier Line and Neils Pond wetland sites. These wetland sites also had the highest invertebrate richness values and (with the exception of the Salmonier Line wetland site) had invertebrates that were also categorized as both somewhat tolerant to pollution and tolerant to pollution, indicating a wide diversity of invertebrate types. Conversely, the Bakeapple Marsh and Petty Harbour wetlands had low invertebrate richness and low dissolved oxygen levels that did not meet water quality guidelines.

One wetland function that is increasingly important with increased amounts of impervious surfaces associated with increased development that comes along with increased population growth is surface water storage. The surveyed wetland sites all served as surface water storage; all wetlands showed some sign of storing water. Some wetland sites appeared to be mainly dry, likely because of the summer weather, but had areas where past puddles and pools were present, indicating that they had stored water during periods of wetter weather. Besides storing water in puddles, wetland vegetation also slows water flow rates, which can decrease the risk from flash floods.

#### **5.0 Recommendations**

Continued monitoring of the wetland sites will be needed to determine if there are any negative changes to them with changes to the landscape and variations in any development located adjacent to the wetlands. These changes would take time, so it is recommended that future monitoring be undertaken at five year intervals.

Increased awareness of wetland locations, functions and biodiversity is necessary to conserve and preserve remaining wetlands on the Northeast Avalon Peninsula. Wetland destruction and



alteration is often done without the realization of the ecosystem level impacts and their natural functions as water retention reservoirs and habitat, services that are expensive to effectively reproduce anthropogenically. A provincial wetland inventory that shows size, functionality, ecosystem services, and wetland loss would assist with this awareness and could be coupled with provincial legislation specific to wetlands so that development can proceed in areas that are deemed non-essential for sustainable water quality and abundance. The highest priority wetlands in each watershed should be preserved to ensure the sustainability of the waterway.

## **References:**

- Canadian Council of Ministers of the Environment. (1999). *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Dissolved Oxygen (freshwater)*. In: Canadian Environmental Quality Guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.
- Canadian Council of Ministers of the Environment. (2004). *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Phosphorus: Canadian Guidance Framework for the Management of Freshwater Systems*. In: Canadian Environmental Quality Guidelines, 2004, Canadian Council of Ministers of the Environment, Winnipeg.
- Canadian Council of Ministers of the Environment (2006). *Canadian Water Quality Guidelines for the Protection of Aquatic Life Summary Table*. In: Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment, Winnipeg.
- Canadian Council of Ministers of the Environment. (2012). *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Nitrate* . In: Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment, Winnipeg.
- Hanson, A., Swanson, L., Ewing, D., Grabas, G., Meyer, S., Ross, L., Watmough, M., Kirkby, J. (2008). Wetland Ecological Function Assessment: An Overview of Approaches. Canadian Wildlife Service Technical Report Services No. 497. Atlantic Region 63pp.
- Keddy, P.A. (2010). *Wetland Ecology Principles and Conservation* (2<sup>nd</sup> ed.). New York: Cambridge University Press.
- Wells, E.D.; Pollett, F.C. (1983). Peatlands. In G. Robin South (Ed.), *Biogeography and Ecology of the Island of Newfoundland* (pp. 207-265). The Hague, The Netherlands: Dr W. Junk Publishers.

**Appendix A Wetland Delineations and Sample Site Locations for Wetlands  
Surveyed by Northeast Avalon ACAP in 2013**

General Notes about this appendix:

- For details on wetland boundary delineation criteria, see Section 2.4
- As wetlands were delineated using 2010 aerial photography, they may not reflect the current size and shape of the wetland, as there may have been changes to the surrounding land uses since 2010.
- Coordinates of sample locations were collected in the field using a handheld GPS, therefore there may be some error associated with the accuracy of the GPS
- Plant sample transects in the below images are not to scale. The coordinate of the transect start point and end point were recorded, and a line drawn between the two using GIS software, but the accuracy of the line is limited by lack of accuracy obtainable with a handheld GPS.

### Soldiers Brook Pond Wetland Site:

The Soldiers Brook Pond wetland study site was located in Logy Bay-Middle Cove-Outer Cove along Pine Line. It was accessed from Pine Line by walking along the pole line. The wetland boundary was defined by the treeline in most cases, except where it ran alongside the golf course, where it is defined by developed borders.



**Figure A1.** Soldiers Brook Pond wetland study site (Logy Bay-Middle Cove-Outer Cove) with the boundary indicated in red. The location of the plant survey transect is indicated in yellow. The location of the water sample was also the location of invertebrate sampling.

## Bakeapple Marsh South and Bakeapple Marsh North Wetland Sites

The Bakeapple Marsh study sites were located in Bauline, along Bauline Line. The two wetlands were separated by Bauline Line, as a road is included under the developed borders delineation criteria (Table 1, Section 2.4), and named based on their location (north or south) relative to Bauline Line. Duck Pond was located to the west of both wetland sites, and provided a boundary to the Bakeapple Marsh South site, along with the sod farm area and forested areas. The Bakeapple Marsh North site was delineated mainly by forest borders, as the area east of the wetland is mostly forested.

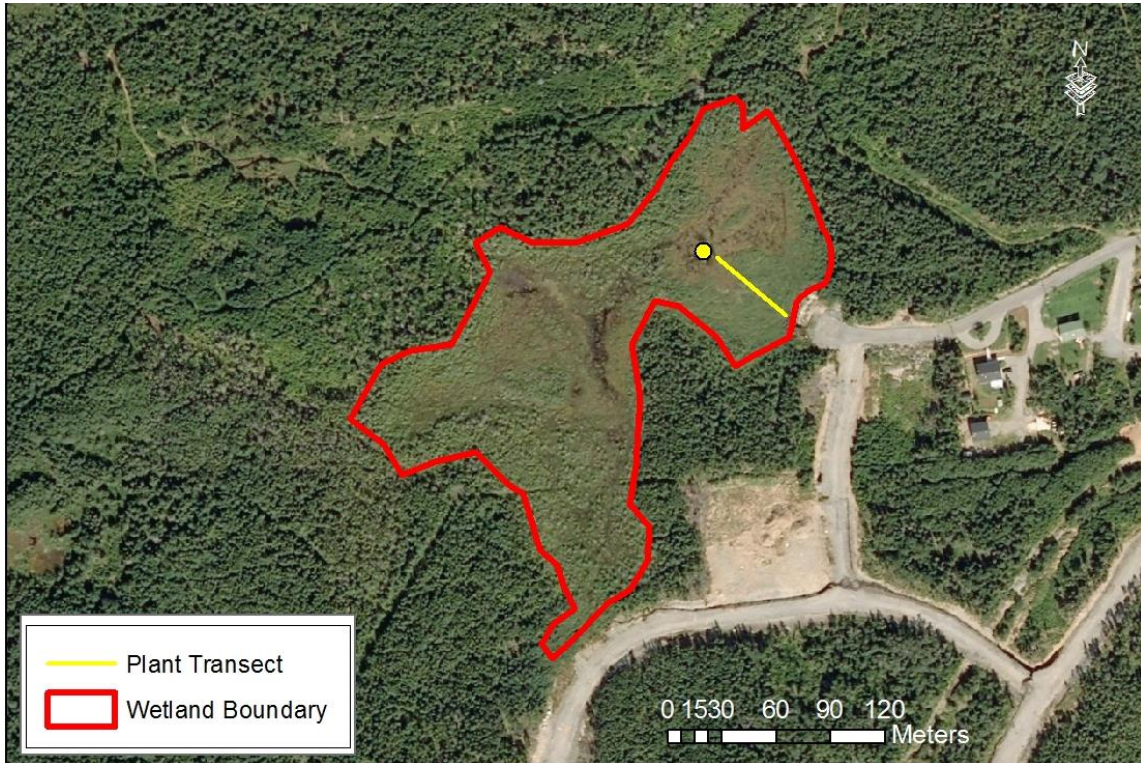


**Figure A2.** Bakeapple Marsh North and Bakeapple Marsh South wetland study sites (Bauline) with the boundaries indicated in red. A standing pool was used for both the invertebrate sample collection and water quality sample collection. There was one plant transect located in each of the Bakeapple Marsh North and Bakeapple Marsh South sites, indicated by yellow lines.



### Wall's Road Wetland Site:

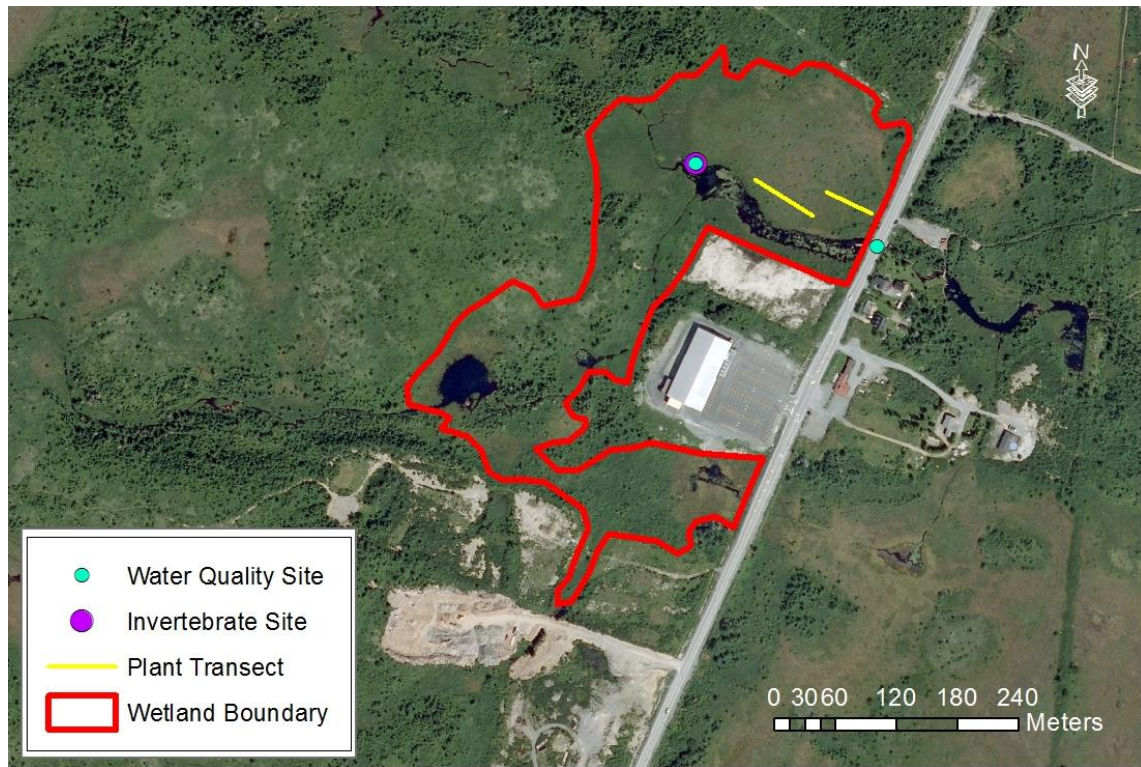
The Wall's Road wetland site was located in Pouch Cove. Its boundary was delineated by developed area, Wall's Road and Mountain Crescent, and by forest borders. The area is the location of new residential development.



**Figure A3.** Wall's Road wetland study site (Pouch Cove) with the boundary indicated in red. There were two plant transects at this site, but the location of only one (yellow line) is shown because the coordinate of the endpoint was missing for the second transect and a line could not be drawn. However, the start point of the second transect is shown as a yellow dot. There were no invertebrate or water quality samples collected because of a lack of water present during the sampling visit.

### Southern Shore Arena Wetland Site:

The Southern Shore Arena wetland study site was predominately located in the municipality of Witless Bay, with a small portion falling in neighbouring Mobile. The wetland boundary was delineated by forest borders and developed borders which included the Southern Shore Arena, the Southern Shore Highway and what appears to be a quarry. Water quality and invertebrate samples were taken in the Gallows Cove River.



**Figure A4.** Southern Shore Arena wetland study site (Witless Bay) with the wetland boundary in red. There were two water quality samples collected from this wetland, and one invertebrate sample. There were also two plant transects sampled, which are indicated by the yellow lines.



### Octagon Pond Wetland Site:

The Octagon Pond wetland study site was located next to the eastern shore of Octagon Pond, in Paradise. The surveyed wetland was located next to the Octagon Pond walking trail, which was one of the boundaries used for the delineation of the wetland. The remaining wetland boundary was determined by the treeline.



**Figure A5.** Octagon Pond wetland study site (Paradise) with the boundary delineated in red. Water Quality samples were taken at a standing pool adjacent to the walking trail, and from Octagon Pond adjacent to the wetland. One plant transect (yellow line) was sampled at the north end of wetland. There were no invertebrate samples collected from this site.

### Petty Harbour Wetland Site:

The Petty Harbour wetland study site was located in the municipality of Petty Harbour-Maddox Cove. It is surrounded by forest, with a road passing along the south end of the wetland. A graveyard also sits south of wetland. The wetland delineation was based on forest borders and changes in topography.

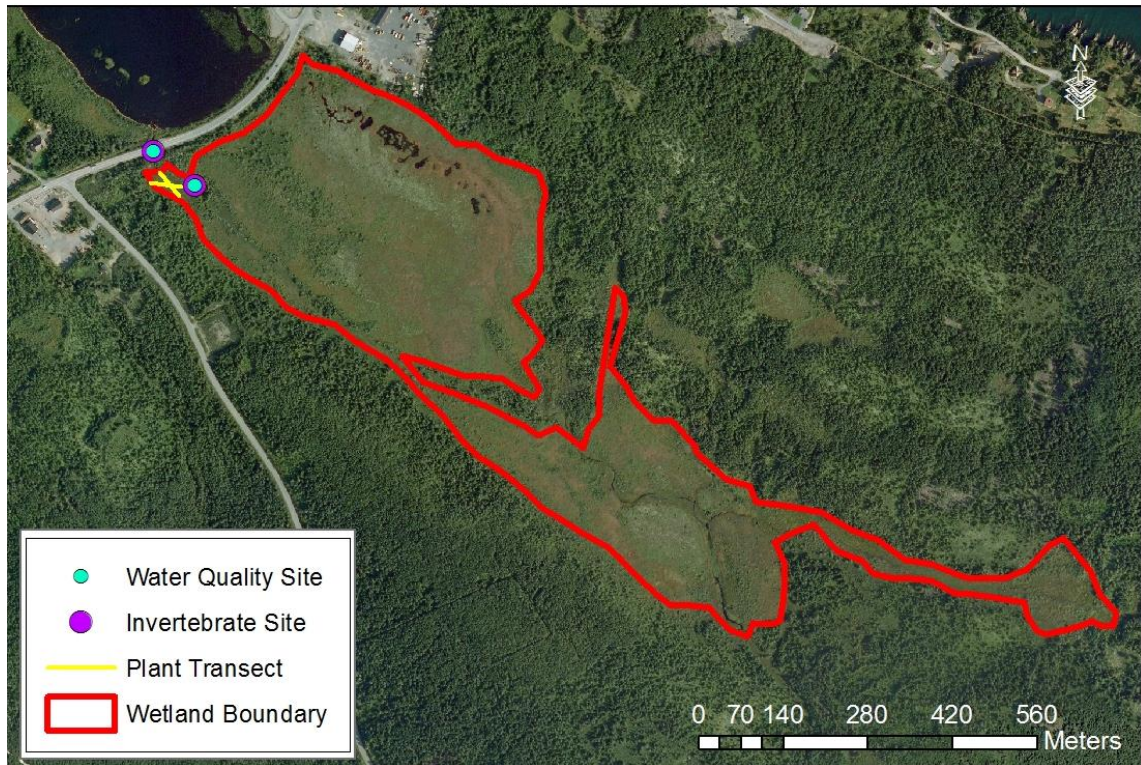


**Figure A6.** Petty Harbour wetland study site (Petty Harbour- Maddox Cove) with the wetland boundary shown in red. Water quality samples were collected from a standing pool and small spring. There was also an invertebrate sample taken at the spring. There were two plant transects sampled (yellow lines).



### Roaches Marsh Wetland Site:

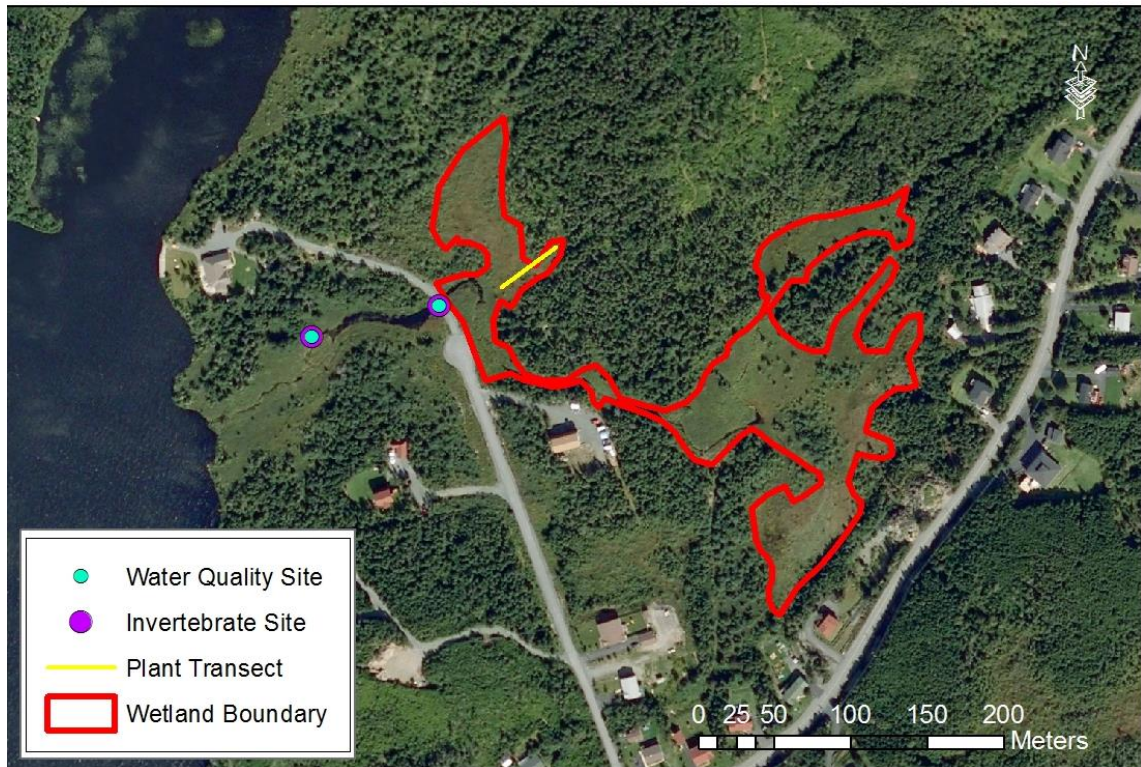
The Roaches Marsh wetland study site was located at the border between the municipalities of Bay Bulls and Witless Bay. The wetland was delineated by the Southern Shore Highway, a commercial establishment to the north, and forest on the other sides.



**Figure A7.** Roaches Marsh wetland study site (Witless Bay) with the wetland boundary in red. All sampling occurred in the northwest corner near the Southern Shore Highway. Water Quality and invertebrate samples were collected at the same locations in the northwest corner of the wetland. There were two plant transects sampled (yellow lines).

### Beaver Creek Road Wetland Site:

This wetland study site was located to the northeast of Beaver Creek Road, a residential area in Portugal Cove-St. Philip's. The wetland boundary was delineated based on developed borders and forest cover.

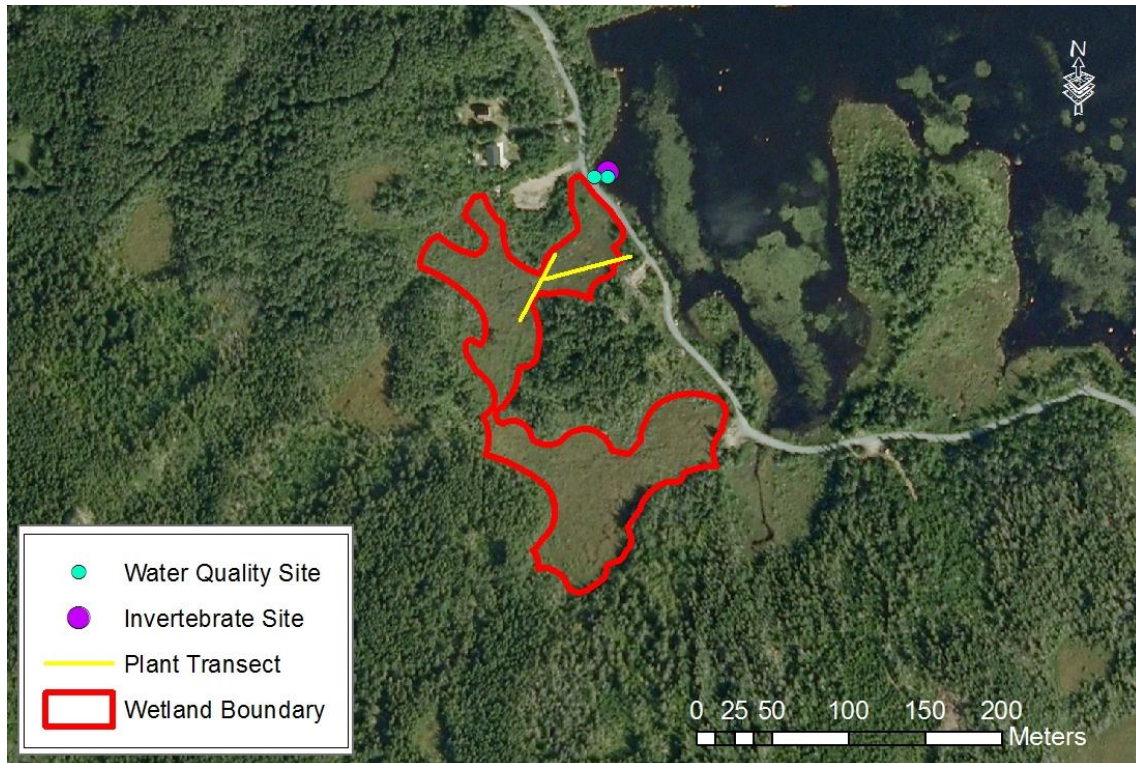


**Figure A8.** Beaver Creek Road wetland study site (Portugal Cove-St. Philip's) with the boundary in red. Water Quality and invertebrate samples were taken at the same locations, west of the delineated wetland boundary. There was one plant transect sampled (yellow line) at this wetland site.



### Butterpot Road Wetland Site:

The Butterpot Pond wetland study site was located in Holyrood, adjacent to Butterpot Road. The area surrounding the study site was mostly forested, with the exception of a single residence to the north of wetland. Therefore, the wetland was delineated from forest and developed borders.



**Figure A9.** Butterpot Road wetland study site (Holyrood) with the delineated wetland boundary in red. There were two water quality and two invertebrate samples collected, but coordinates were only recorded for one invertebrate sample location. There were two plant transects sampled (yellow lines).

### Southlands Site 1 Wetland Site:

The Southlands Site 1 wetland study site was located in the City of St. John's, south of the City of Mount Pearl. It was accessible by a walking path that ran to the north of the wetland from the Southlands development area. The boundary was delineated based on forest borders.

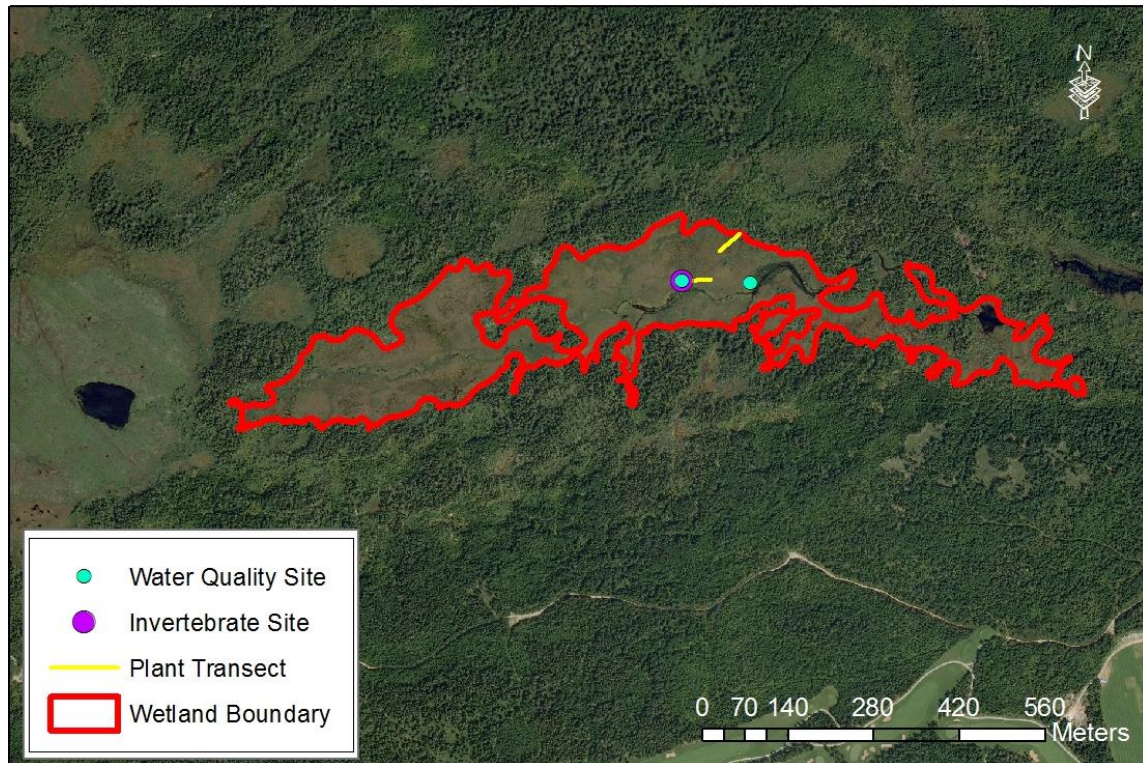


**Figure A10.** Southlands Site 1 wetland study site (St. John's), with the delineated wetland boundary in red. Water quality and invertebrate sampling were performed in South Brook, downstream from the wetland site. There was also another water quality sample taken from a standing pool area within the wetland, for which the correct GPS coordinates were not displayed. There were two plant transects (yellow lines) sampled within the boundary of the wetland.



### Southlands Site 2 Wetland Site:

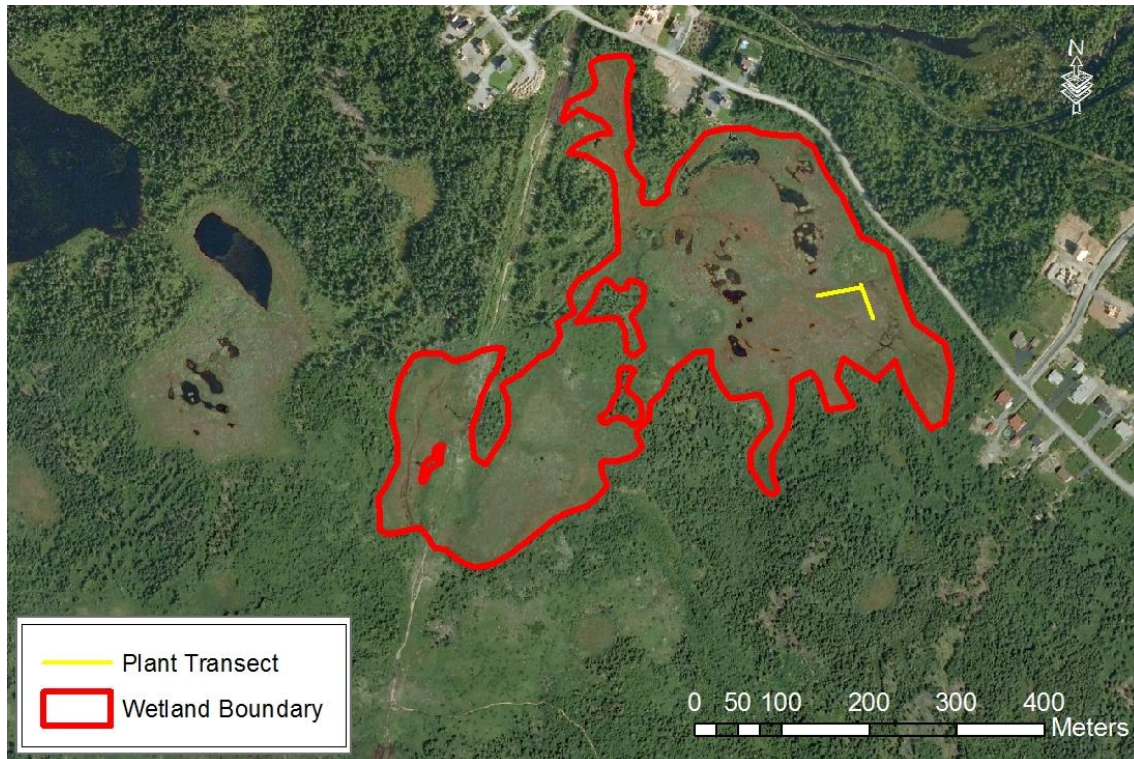
The Southlands Site 2 wetland study site was located within the City of St. John's. The wetland was accessed via a pole line and small path north of the wetland. The wetland was delineated by forest borders.



**Figure A11.** Southlands Site 2 wetland study site (St. John's), with the delineated boundary in red. There were two plant transects (yellow lines) sampled at this site. There were two water quality samples collected from South Brook which flowed through the wetland. There was one invertebrate sample site, which was at the same location as one of the water quality sample sites.

### Gull Pond Road Wetland Site:

The Gull Pond Road wetland study site was located in Witless Bay, south of Gull Pond Road. The wetland was delineated by forest borders.

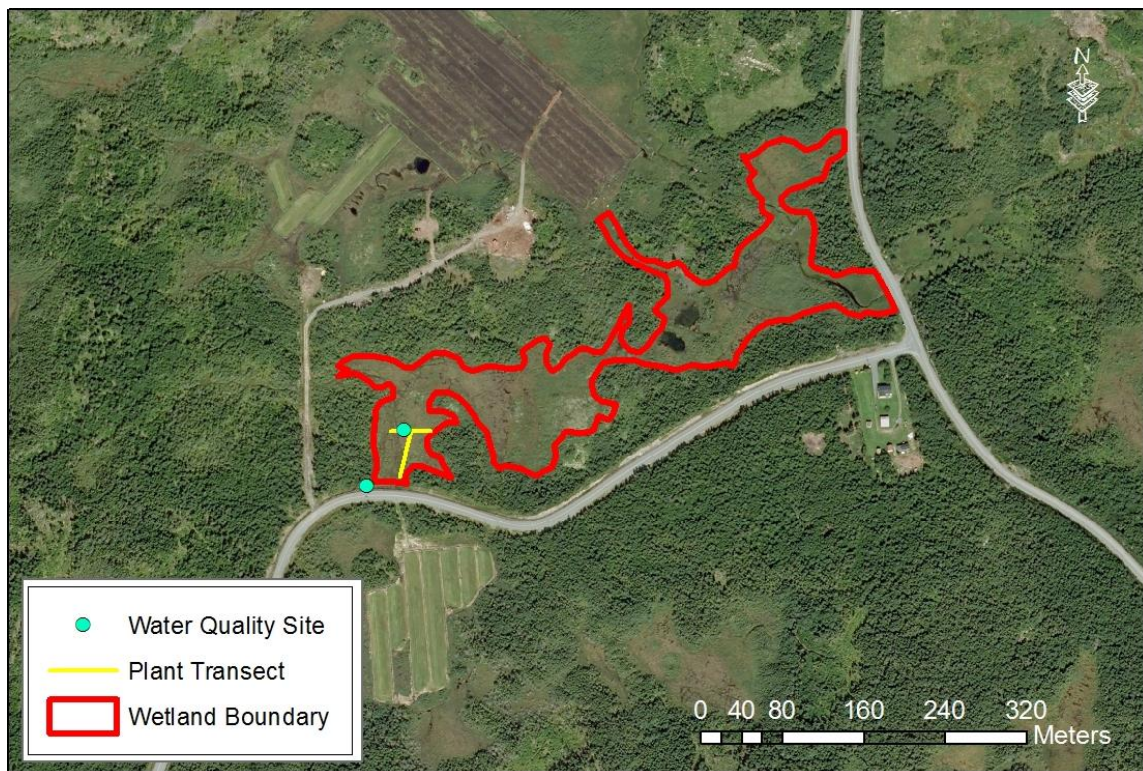


**Figure A12** Gull Pond Road wetland study site (Witless Bay), with the delineated wetland boundary in red. Two plant transects (yellow lines) were sampled westward and southward from the same start point. There was one water sample site and one invertebrate sample site at this wetland, but GPS coordinates were not recorded.



### Bauline Line Extension Wetland Site:

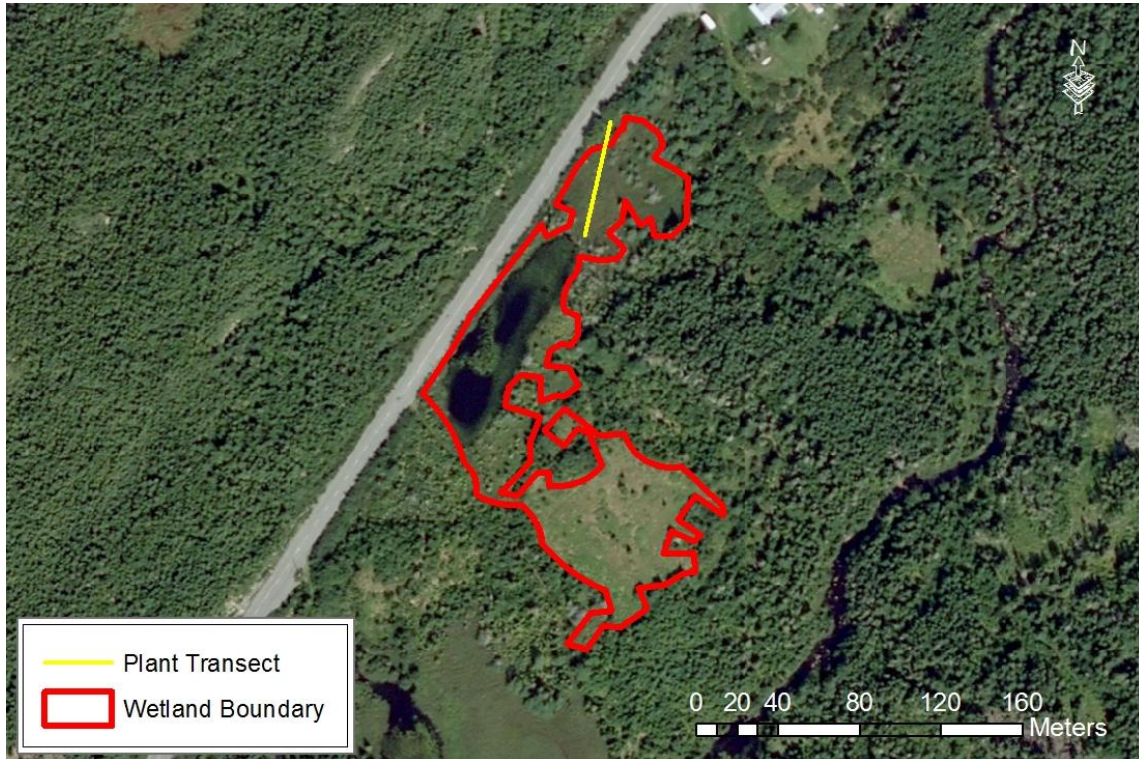
The Bauline Line Extension study site was located in Bauline, near the municipal boundaries to Pouch Cove, Flatrock and Torbay. Bauline Line Extension runs along the south side of the wetland, with Bauline Line to the east. Sod farms lay to the north and south of the wetland. The wetland boundary was delineated based on forest borders, with small pieces of developed borders where the wetland met a road.



**Figure A13.** Bauline Line Extension wetland study site (Bauline), with the delineated wetland boundary in red. There were two plant transects (yellow lines) and two water quality sites sampled in the southwest corner of the delineated wetland. There was no invertebrate sample collected for this site.

### Pouch Cove Line Wetland Site:

The Pouch Cove Line wetland study site was located in the municipality of Pouch Cove. The wetland delineation was based on forest borders and developed borders, Pouch Cove Line.

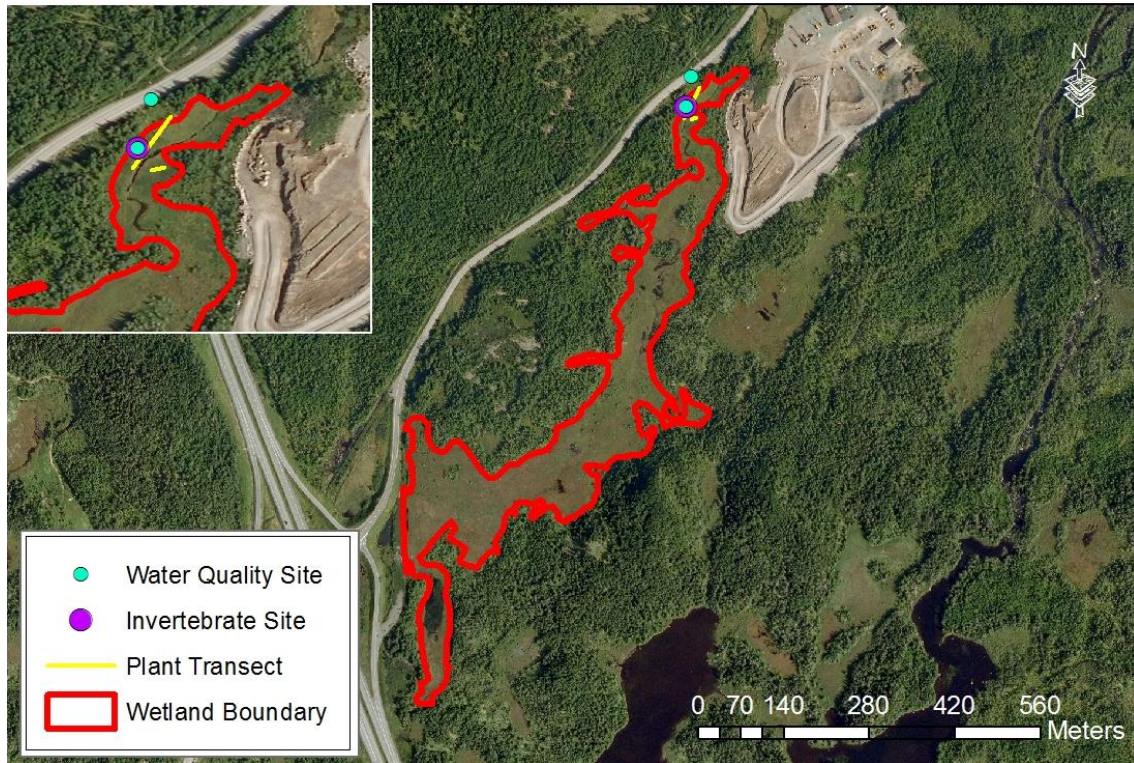


**Figure A14.** Pouch Cove Line wetland study site (Pouch Cove) with the delineation in red. There was one plant transect sampled at this wetland site (yellow line). There was also one invertebrate site and one water quality site sampled; however, they are not displayed because of error with GPS coordinates.



### Salmonier Line Wetland Site:

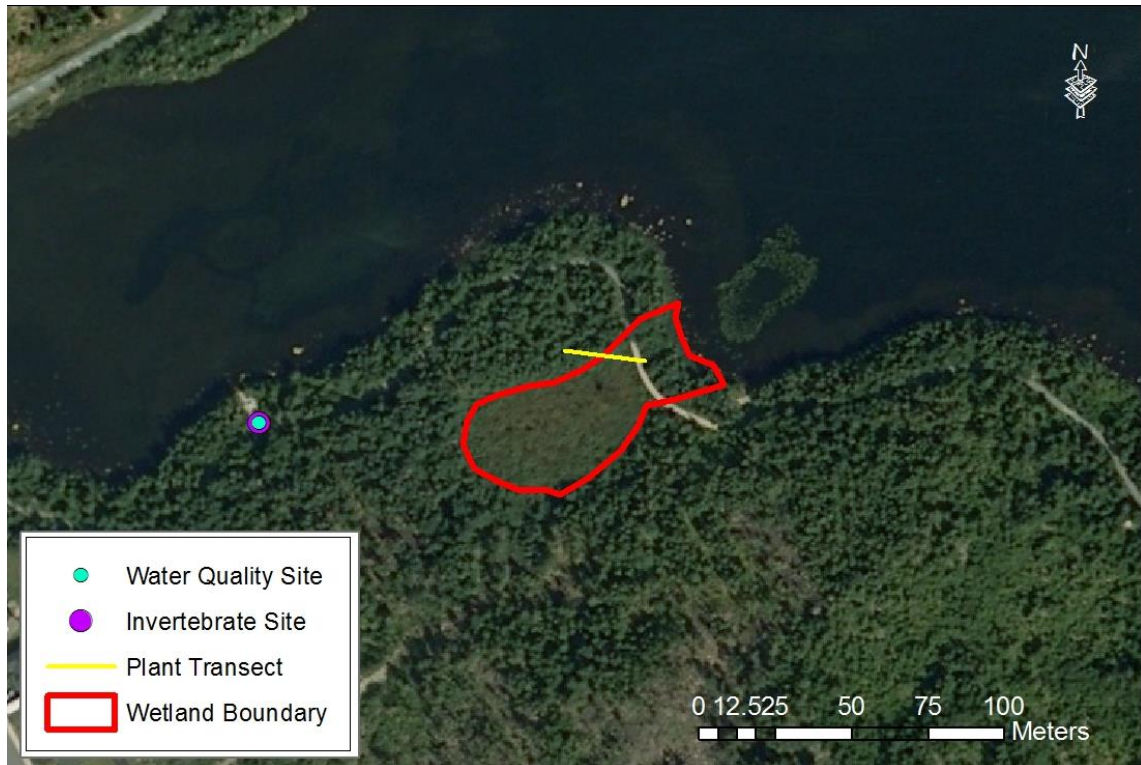
The Salmonier Line wetland study site was located in Holyrood, south of Salmonier Line and to the east of the Trans-Canada Highway. To the east of the wetland is a construction training college. The wetland delineation was based on forest borders and followed the treeline.



**Figure A15.** Salmonier Line wetland study site (Holyrood) with the delineated boundary in red. Sampling was conducted in the northernmost corner of the delineated boundary, the area which is zoomed in on in the inset map in the top left corner of the image. There were two plant transects (yellow lines), two water quality sample sites and two invertebrate sample sites, however, only one invertebrate sample location is displayed because of a GPS error with the other location.

### Neils Pond Wetland Site:

The Neils Pond wetland study site was located in Paradise, adjacent to the southern shore of Neils Pond. The wetland was delineated based on forest borders and open water.



**Figure A16.** Neils Pond wetland study site (Paradise), with the wetland delineation in red. There was one plant transect sampled at this wetland (yellow line), and the same location in Neils Pond was sampled for invertebrates and water quality.

**Appendix B- Stress Evaluation Rubric Template Developed During Northeast  
Avalon ACAP's 2011-2012 Wetland Survey Project**

Wetland Study Site Stress Evaluation Rubric

Part 1: Area Features

|                            | Feature |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|---------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |         | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
|                            |         |       |                  |      |             |             |                      |        |

Part 2: Roadways

|             | Feature |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|---------|-------|------|-------------|-------------|----------------------|--------|
|             |         | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |         | 1     |      |             |             |                      |        |
| 2 Lane Road |         | 2     |      |             |             |                      |        |
| 4 Lane Road |         | 3     |      |             |             |                      |        |
|             |         |       |      |             |             |                      |        |
|             |         |       |      |             |             |                      |        |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         |        |

|         | TOTALS |
|---------|--------|
| Table 1 |        |
| Table 2 |        |
| Table 3 |        |
| Score   |        |

**Appendix C – Key Used For Wetland Classification During Northeast Avalon  
ACAP’s Wetland Surveying, Summer 2013**



*The following was taken from the Canadian Wetland Classification System, and reformatted with some terms defined for in field use.*

- 1a) Terrain not affected by high water table or excess surface water, or if affected, only for short periods such that hydrophytic vegetation or aquatic processes do not exist.....**Upland (non- wetland)**
- 1b) Terrain affected by water table at, near or above the land surface and which is saturated for sufficient time to promote wetland or aquatic processes .....**go to 2 (Wetland)**
- 2a) Wetland Ecosystems characterized by **an accumulation of peat** .....**go to 3 (Peatland)**
- 2b) Wetland Ecosystems characterised by **minimal or no peat accumulation**, although thin layers of muck and a mix of mineral and organic muck may be present..... **go to 5 (Mineral Wetland)**

#### **PEATLANDS**

- 3a) Peatland dominated by **bryophytes (non- vascular plants – ie: liverworts and mosses) and graminoids (sedges, grasses, rushes)**..... **go to 4**
- 3b) **Peatland dominated by trees, shrubs and forbs** (herbaceous flowering plants); waters are rich in dissolved minerals.....**Swamp**
- 4a) Peatland **receiving water exclusively from precipitation and not influenced by groundwater**; *Sphagnum*-dominated vegetation.....**Bog**
- 4b) Peatland receiving water rich in dissolved minerals; **vegetation cover composed dominantly of graminoid (sedges, grasses, rushes) and brown moss**..... **Fen**

#### **MINERAL WETLANDS**

- 5a) Wetlands with **free surface water up to 2 m deep**, present for all or most of the year, with less than 25% of the surface water area occluded by standing emergent or woody plants. **Submerged or floating aquatic plants usually dominate the vegetation** .....**Shallow Water**
- 5b) Wetlands with free surface water persisting above the ground surface for variable periods or not at all. If surface water persists through the summer, **water depths are sufficiently shallow to permit survival of woody or herbaceous vegetation which cover more than 25% of the surface area of the wetland**..... **go to 6**
- 6a) Periodically standing surface water and gently moving, nutrient-rich groundwater, with **vegetation dominated by woody plants often more than 1 m high**..... **Swamp**
- 6b) Periodic or persistent standing water or slow moving surface water which is circumneutral to alkaline and generally nutrient-rich. **Vegetation is dominated by graminoids (sedges, grasses, rushes), shrubs, forbs (herbaceous flowering plants) or emergent plants** .....**Marsh**

**Appendix D- Field Sheets Used for Determining Wetland Classification and Function During Northeast Avalon ACAP's Wetland Surveying, Summer 2013**

The following was used as field sheets to collect information needed to assess wetland classification using the key found in Appendix C, as well as wetland function (taken from the Nova Scotia Wetland Assessment Method (NovaWAM)).

### Wetland Function Assessment Form

Wetland site: \_\_\_\_\_

Location (municipality, near what roads, etc): \_\_\_\_\_

Date: \_\_\_\_\_

Weather conditions on day of assessment: \_\_\_\_\_

**Recent rainfall conditions:**

Wet conditions (plenty of precipitation) \_\_\_\_\_ Dry conditions (very little precipitation) \_\_\_\_\_

### **WETLAND SURROUNDINGS AND CLASSIFICATION:**

**1. Surrounding land use:** (check all that apply and location relative to wetland ie: along eastern wetland edge.) *Make sure that these land uses are included in your site sketch*

Forest \_\_\_\_\_ Farm Field/ Pasture \_\_\_\_\_ Residential Area \_\_\_\_\_ Commercial/Industrial \_\_\_\_\_  
Road \_\_\_\_\_ Other (specify) \_\_\_\_\_

**2. Stressors in wetland and along the wetland edge**

Check any stressors observed in and directly adjacent to the wetland (*Make sure that these are included in your site sketch*):

Drainage Ditch \_\_\_\_\_ Dam \_\_\_\_\_ Eroded Bank \_\_\_\_\_ Direct runoff from farmland \_\_\_\_\_ Garbage \_\_\_\_\_ Fill \_\_\_\_\_  
Direct runoff from lawn \_\_\_\_\_ Direct runoff from impervious surface \_\_\_\_\_ ATV traffic \_\_\_\_\_ Culvert \_\_\_\_\_  
Stormwater discharge \_\_\_\_\_ Soil disturbance \_\_\_\_\_ Dead/ dying woody plants \_\_\_\_\_  
Other (specify) \_\_\_\_\_

**3. Wetland soil type:** Peat \_\_\_\_\_ Organics/ Muck \_\_\_\_\_

**4. Describe the water in the wetland:** Flow present \_\_\_\_\_ Standing pools \_\_\_\_\_

**5. Is there a defined inflow and outflow and outflow to the wetland?**

GPS coordinates of Inflow \_\_\_\_\_

GPS coordinates of Outflow \_\_\_\_\_

**6. Is the wetland isolated or is it a part of a wetland complex?** \_\_\_\_\_

**6. Describe the elevation of the wetland in comparison to its surroundings:**

\_\_\_\_\_

\_\_\_\_\_

**7. Is *Sphagnum* moss present?** Yes \_\_\_\_\_ No \_\_\_\_\_

**8. What appears to be the dominant vegetation type?**

Trees \_\_\_\_\_ Shrubs \_\_\_\_\_ Sedges, Grasses and Rushes \_\_\_\_\_ *Sphagnum* moss \_\_\_\_\_  
Herbaceous flowering plants \_\_\_\_\_

**9. Wetland classification** (using the classification key, what type of wetland is this site, and **why** did you arrive at this conclusion?)

\_\_\_\_\_

\_\_\_\_\_

### **PLANT COMMUNITY ASSESSMENT:**

You will sample the plant population using the plant transects. In addition to your plant transects, answer the following.

**1. Vegetation disturbance:** Undisturbed/relatively undisturbed \_\_\_\_\_ Minor \_\_\_\_\_ Severe \_\_\_\_\_

**2. Vegetation stressed:** Dead woody plants \_\_\_\_\_ Other \_\_\_\_\_ (specify \_\_\_\_\_)

**3. Characterize the current vegetative quality of each plant transect.** Use the following definitions to determine the quality (may need to do at office when determine which species are invasive):

Exceptional Quality: Plant community is undisturbed, or sufficiently recovered from past disturbances, such that it represents native conditions. Non-native plant species are absent or, if present, constitute a minor percent cover of the community. Wetland is undisturbed, surrounded by native plant communities.

High Quality: Community composed of native species characteristic of the wetland type. Invasive species are absent or cumulatively comprise less than 20 percent cover of any stratum.

Medium Quality: Community composed mostly of native species characteristic of the wetland type. Invasive species cumulatively comprise 20 to 50 percent cover of a stratum.

Low Quality: Community where invasive species cumulatively comprise >50 percent cover of any stratum.

**FINDING – Plant Community:**

*Wetland contains a diversity of wetland plant communities: Yes \_\_\_ No \_\_\_*

*Vegetative quality rating: Exceptional \_\_\_ High \_\_\_ Medium \_\_\_ Low \_\_\_*

**PERFORMANCE OF FUNCTIONS:**

**A. SURFACE WATER RETENTION**

**1. Describe the wetland surface and subsurface storage capacity and duration:**

A = Water storage capacity and duration not altered; wetland retains its ability to maintain its characteristic hydrologic regime.

B = Minor alteration; constructed, reduced capacity outlet below the ground surface of the wetland; moderate indications of subsurface drainage; outlet raised but managed to mimic natural conditions; constructed outlets keep open-water wetlands open water or keep saturated wetlands saturated for some time – the wetland is able to provide some temporary and long-term water retention (i.e. the wetland is only partially drained).

C = Severe alteration; excavated or enlarged outlet constructed well below the ground surface of the wetland; intensive ditch network; strong indications of subsurface drainage; outlet removes most/all long-term and temporary storage; or outlet changes hydrologic regime drastically; signs of scouring/erosion may be present; include situations where the constructed outlet changes the wetland to non-wetland or to deepwater habitat or from saturated conditions to open water or from open water to saturated

**2. Describe the dominant land use and condition of the immediate upland drainage area of wetland. If the immediate upland drainage is not evident, then within 100 meters.** The more developed and intensively the watershed is used, the greater the delivery of runoff and sediments to the wetland is likely to be and the more likely the wetland will have the opportunity to minimize flooding downstream.

A = Watershed conditions essentially unaltered; < 10% impervious (i.e., low density residential, lots); land use development minimal, idle lands, lands in hay or forests or low intensity grazing.

B = Watershed conditions somewhat modified; e.g., 10–30 % impervious (i.e., medium density residential); moderate intensity grazing or haying with some bare ground; conventional till with residue management on moderate slopes, no-till on steep slopes.

C = Watershed conditions highly modified; e.g., >30 % impervious surfaces (i.e., high density residential, industrial, commercial, high impervious institutional) maximizing overland flow to the wetland; intensive agriculture or grazing with a high amount of bare ground, no residue management on moderate or steep slopes, intensive mining activities.

**3. Describe the condition of the wetland soils:**

A = Undisturbed or relatively undisturbed; no signs or only minor evidence of recent disturbance or alteration to the wetland soils; idle land, hayed or lightly to moderately grazed or logged; minimal compaction, rutting, trampling, or excavation damage to wetland.

B = Minor disturbance; some evidence of disturbance or alteration to the wetland soils; wetland heavily grazed in most years; logging or other activities have created some compaction, rutting, trampling, or excavation in wetland is evident.

C = Severe disturbance; evidence of significant disturbance or alteration to the wetland soils; significantly impacted (e.g., fill, sediment deposits, cleared, excavated); logging or other activities (e.g., ATV use) have created severe compaction, rutting, trampling, or excavation damage to wetland.

**4. Water source:**

A = Natural.

B = Mostly natural; some effect from modified hydrology; only a few storm drains and scattered homes within 2 km; no large dams upstream.

C = Water affected by urban runoff, artificially impounded water (e.g., in-stream pond), water diversions, or other major alteration

D = Water under direct control of upstream reservoir; water flow not natural

**5. Describe water storage.** (Will vary per wetland type.)

Majority of area ponds water: >30cm\_\_\_ 15-30cm\_\_\_ up to 15cm\_\_\_ No ponding\_\_\_

**6. Enter the percent of the wetland that is vegetated with wetland vegetation and the percent that is open water.**

vegetated \_\_\_% open water

\_\_\_\_\_%

**7. For wetlands along a waterbody, describe the roughness coefficient of the potential surface water flow path in relation to wetland vegetation biomass, numeric density and plant morphology:**

A = Dense shrub understory, heavy stand of timber with or without downed trees

B = Dense grass with rigid stems, weeds, tree seedlings, or shrub vegetation where flows can be two to three times the height of the vegetation.

C = Primarily flexible turf grass or other supple vegetative cover or unvegetated.

N/A = Not applicable if wetland is isolated.

Significance: Forest cover and other woody stems increase surface roughness resulting in an increased detention of high flows with the cumulative effect being reduced peak flows downstream. A forest with a dense understory is best for detaining high flows. Manning's roughness coefficient decreases as water depth increases above the macrophytes and other surface roughness characteristics. Dense, robust, tall vegetation is best for floodplains. Without a forest present, woody shrubs can be extremely effective but lose effectiveness once high flows approach and exceed the woody shrub height. Dense, non-woody vegetation (e.g., cattails and tall grasses) are effective at detaining minor flood flows but lay down to higher flows and the surface roughness greatly diminishes. Turf grass and other supple vegetation has minimal effects on flood flows. Open water wetlands with submergent and scattered emergent vegetation are part of the channel characteristics and have minimal effect on detaining flood flows

**8. Describe the extent of observable sediment delivery to the wetland from anthropogenic sources including agriculture and developed areas:**

A = No evidence of sediment delivery to wetland.

B = Minor evidence of accelerated sediment delivery in the form of stabilized deltas, sediment fans, or sediment deposits on vegetation.

C = Major sediment delivery evidenced, recent deposition of water-carried debris, sand and gravel deposits on surface, or recent deltas, sediment plumes, etc. in areas of concentrated flow or sedimentation raising elevation of wetland.

Significance: Wetlands filled by sediment from anthropogenic sources will have reduced capacity to store stormwater. Land use, ground slope, and erodibility characteristics of the soils affect the potential for sediment delivery to the wetland.

**9. Describe the functional level of the wetland in retarding or altering flows based on the surface flow characteristics through the wetland:**

A = No channels present.

B = Channels present, but not connected, or meandering channels.

C = Channels connecting inlet to outlet.

Significance: Channels are formed in the underlying substrate, not just as paths through emergent vegetation. Sheet flow, rather than channel flow, offers greater frictional resistance. The potential for floodflow desynchronization is greater when water flows through the wetland as sheet flow. Connecting channels will carry water directly from the inlet to the outlet preferentially in the channel. Channels not connected indicate that some channelized flow may occur within the wetland but not all the way through the wetland via a single channel; some sheet flow will occur. No channels present represents wetlands in which water from the inlet will spread out over the wetland to the outlet (e.g., unchannelized meadows, shallow marshes, deep marshes, ponds, typical floodplains without meander channels, etc.).

**10. Check indicators of Surface Water Detention Observed:**

Standing water\_\_\_ (depth:\_\_\_) Water-stained leaves\_\_\_ Water-carried debris\_\_\_ Sediment deposits\_\_\_  
Water marks\_\_\_ (depth above ground surface\_\_\_) Algal deposits\_\_\_ Iron deposits\_\_\_  
Silt marks\_\_\_ (depth above ground surface\_\_\_) Aquatic Plants\_\_\_  
Pit and Mound Topography\_\_\_ Aquatic Invertebrates\_\_\_ Other\_\_\_ (specify:\_\_\_)

**FINDING – Surface Water Retention**

*Wetland's hydrologic condition: Natural \_\_\_ Slightly Modified \_\_\_ Significantly Modified \_\_\_*  
*Wetland shows evidence of temporarily storing surface water: Yes \_\_\_ No \_\_\_*  
*Wetland's ability to detain surface water: High \_\_\_ Moderate \_\_\_ Low \_\_\_*

**B. STREAM FLOW MAINTENANCE**

**1. Wetland is the source of a stream:** Yes \_\_\_ No \_\_\_

**2. Wetland is along a headwater stream (order 1 or 2 stream):** Yes \_\_\_ No \_\_\_

**FINDING – Stream Flow Maintenance**

*Wetland is the source of a stream or along a headwater stream and is therefore important for maintaining stream flow: Yes \_\_\_ No \_\_\_*

**C. GROUNDWATER INTERACTIONS**

Classification of a given site as a primarily recharge or discharge wetland will be based on how a majority of the questions are answered and does not offer a definitive result as to the actual movement of groundwater in the assessment area. When the primary hydrology comes from groundwater, wetlands

are labeled discharge, whereas recharge wetlands are those whose hydrology is primarily supported by surface-water that then seeps into a ground-water system.

**1. Describe the soils within the wetland:**

Recharge = Mineral soils with a high organic content (all soils not included in discharge system).

Discharge = Organic soils, formed due to more continuous wetness associated with a ground water discharge system

Significance: Wetlands with mineral hydric soils typically represent drier hydrologic regimes where groundwater recharge is more likely (i.e. saturated, seasonally flooded, and temporarily flooded) where the wetness does not significantly limit oxidation of organic materials. Groundwater discharge wetlands represent more stable and permanent hydrologic regimes where excessive wetness limits the oxidation of organic matter resulting in the accumulation of peat and/or muck. In addition, coarser-grained mineral hydric soils may have higher permeabilities allowing groundwater recharge, while histosols generally have low permeabilities, reducing groundwater discharge. Disturbed soils in excavated wetlands or stormwater ponds are subject to best professional judgement for this question.

**2. Describe the land use/runoff characteristics upstream of the wetland:**

Recharge = Land is primarily developed to high-density residential, commercial, industrial and road land uses indicating impervious surfaces which result in more runoff to wetlands and lowered water tables creating a gradient for recharge under wetlands.

Discharge = Upland watershed primarily undeveloped or with low to moderate density residential development with low percentage of impervious surfaces so upland recharge (to groundwater) and higher water table will be more likely to contribute discharge to wetlands.

Significance: Watersheds with extensive paved surfaces, topographic disruptions, and the presence of wells are associated with human development that lowers the potentiometric contours. Lowered or diversified potentiometric contours enhance the likelihood of recharge, not discharge. Wetlands with unpaved watersheds are more likely to allow groundwater discharge to occur.

**3. Describe the inlet/outlet configuration that best fits the wetland:**

Recharge = No outlet or restricted outlet

Discharge = Outlet but no stream inlet

Significance: A wetland with a permanent stream inlet but no permanent outlet is more likely to recharge groundwater than one with an outlet. Several factors support this ranking. First, a higher hydraulic gradient will likely be present in an area with no outlet, especially if an inlet is present. Second, the longer water is retained in an area, the greater the opportunity for it to percolate through the substrate. Third, wetlands without outlets generally experience more water-level fluctuations, resulting in inundation of unsaturated soils. Finally, lack of an outlet suggests that water is being lost either through recharge or evapotranspiration, especially if an inlet is present. A wetland with a permanent outlet and no inlet is more likely to discharge groundwater than one with other combinations of inlets and outlets. Continuous discharge of water (i.e. permanent outlet) without surface water feeding the wetland through an inlet suggests an internal source of groundwater (e.g., springs or seeps). Throughflow wetlands would be considered discharge wetlands for the purposes of this question.

**4. Characterize the topographic relief surrounding the wetland:**

Recharge = Land slopes away from (below) the wetland (wetland is elevated in the subwatershed, e.g., at a high point).

Discharge = Topography characterized by a downslope toward the wetland around the majority of the wetland (wetland is found lower in the subwatershed).

Significance: Groundwater discharge is more likely to occur in areas where the topographic relief is characterized by a sharp downslope toward the wetland (i.e. wetland is located at the toe of a slope). Groundwater recharge is more likely in wetlands where the topographic relief is characterized by a sharp downslope away from most of the wetland. The slope of the water table with respect to the wetland influences the hydraulic gradient for groundwater movement. The water table usually slopes roughly parallel to the land surface topography. Thus, when local topography slopes sharply toward the wetland, the result is typically a hydraulic gradient favorable for groundwater discharge.

**FINDING – Groundwater Interactions:**

*Wetland likely serves as a recharge site: Yes \_\_\_ No \_\_\_*

*Wetland likely serves as a discharge site: Yes \_\_\_ No \_\_\_*

**D. SEDIMENT AND OTHER PARTICULATE RETENTION**

**1. Check indicators :** Sediment deposits \_\_\_ Silt marks \_\_\_ Water-carried debris \_\_\_

**FINDING – Groundwater Interactions:**

*Wetland shows evidence of retaining sediment and other particulates: Yes \_\_\_ No \_\_\_*

**E. SHORELINE STABILIZATION**



**1. Wetland borders a waterbody:** Yes \_\_\_ No \_\_\_

If “Yes” complete rest of questions in this section; if “No” proceed to next section (Section F).

**2. Describe the emergent vegetation type and resistance within the shoreline wetland:**

A = Dominance of emergent species with strong stems present all year and/or dense root mats in the wash zone (e.g., cattails, shrubs) that are resistant to erosive forces.

B = Presence of some emergent species with strong stems or dominance of weak-stemmed emergent species persisting most of the year and/or moderately dense root mats in the wash zone (e.g., bulrushes, grasses) that are resistant to erosive forces.

C = Presence of some weak-stemmed emergent species and/or no dense root mats in the wash zone (e.g., rushes).

Significance: The erosive strength of waves and currents can be greatly dissipated by a dense, emergent vegetation cover. In addition, species with stronger stems will provide greater protection than weak-stemmed species. The greater the vegetation density, the greater the shoreline protection.

**FINDING Shoreline Stabilization:**

*Wetland shows evidence of stabilizing shorelines:* Yes \_\_\_ No \_\_\_

*Wetland's ability to stabilize shoreline:* High \_\_\_ Moderate \_\_\_ Low \_\_\_ N/A \_\_\_

**F. PROVISION OF HABITAT FOR FISH AND WILDLIFE**

**1. Describe the relative interspersions of various wetlands in the vicinity of the assessment wetland:**

A = The wetland occurs in a complex of wetlands of various types (general guideline: at least three wetlands within 0.8 km of assessment wetland, at least one of which has a different dominant plant community than the assessment wetland); or the assessment wetland is the only wetland within a 3.2 km radius.

B = Other wetlands of the same plant community as the assessment wetland are present within 0.8 km.

C = No other wetlands are present within 0.8 km of the assessment wetland but are present within 3.2 km.

Significance: This question rates wetlands higher for having more wetland neighbors, recognizing, however, that research indicates that the critical radius varies by species. Wetlands that are isolated in the landscape may provide the last refuge for wetland dependent plant and animal species in an otherwise upland or developed area.

**2. Habitat value diminishes when fragmented by barriers, which restrict wildlife migration and movement. Describe barriers present between the wetland and other habitats:**

A = No barriers or minimal barriers present; i.e., low traffic; uncurbed roads, low density housing, golf courses, utility easements, or railroads.

B = Moderate barriers present; i.e., moderately traveled; curbed roads, moderate density housing, residential golf courses, low dikes, row crops.

C = Large barriers present; i.e., four-lane or wider, paved roads, parking lots, high-density residential, industrial and commercial development.

Significance: This variable serves as a measure of habitat fragmentation of the wetland relative to other wetlands and native plant communities to indicate the ecosystem connectivity. It identifies barriers to wildlife migration ranging from very small barriers such as unpaved roads and low-density housing to large hydrologic barriers such as regional canals and levied roads. Reference area will affect this rating: “other habitats” includes upland areas usable as wildlife resting or reproductive habitat. For this question, cropland is not considered “habitat.”

**3. List any wildlife species observed or evidenced** (e.g., tracks, scat, nest/burrow, calls, including birds, mammals, and reptiles (e.g., breeding, forage, resting, overwintering). (Note: This list is for documentation only and is not necessarily an indication of habitat quality.)

Evidence of amphibians observed: Yes \_\_\_ No \_\_\_

Briefly describe: \_\_\_\_\_

\_\_\_\_\_  
Evidence of waterfowl observed: Yes \_\_\_ No \_\_\_

Briefly describe: \_\_\_\_\_

\_\_\_\_\_  
Evidence of other birds observed: Yes \_\_\_ No \_\_\_

Briefly describe: \_\_\_\_\_

Evidence of mammals observed: Yes \_\_\_\_ No \_\_\_\_

Briefly describe: \_\_\_\_\_

---

**4. Is the wetland contiguous or intermittently contiguous with a permanent waterbody or watercourse with a depth greater than 2m? ( such that it may provide spawning/nursery habitat for native fish species)** Yes\_\_\_\_ No \_\_\_\_

**5. Choose the condition from the following list that best describes the wetland in relation to fish habitat:**

Exceptional = Wetland is a known spawning habitat for native fish of high importance/interest.

A = Wetland is lentic, lotic or estuarine or is otherwise contiguous with a permanent waterbody or watercourse and may provide spawning/nursery habitat, refuge for native fish species in adjacent waters, or provides shade to maintain water temperature in adjacent lakes, rivers or streams.

B = Wetland is intermittently connected to a permanent waterbody or watercourse that may support native fish populations as a result of colonization during flood events, or the wetland is isolated and supports native fish species.

C = Wetland is isolated from a permanent waterbody or watercourse

N/A = None of the above. Wetland does not have standing water during most of the growing season; site is not capable of supporting fish.

Significance: Generally, the value of a wetland for fish habitat is related to its connection with deepwater habitats. A wetland should be rated as having high value for fish if it provides spawning/nursery habitat, or refuge for native fish species in adjacent estuaries, lakes, rivers or streams. Isolated wetlands that are not permanently flooded do not generally support fish populations.

**6. List any fish species observed or evidenced.** Note: This list is for documentation only and is not necessarily an indication of habitat quality.

Evidence of fish observed: Yes \_\_\_\_ No \_\_\_\_

Briefly describe: \_\_\_\_\_

---

**FINDING -Provision of Habitat for Fish and Wildlife**

*Wetland shows evidence of providing habitat for wildlife: Yes \_\_\_\_ No \_\_\_\_*

*Wetland shows evidence of providing fish habitat: Yes \_\_\_\_ No \_\_\_\_*

**Appendix E- Wetland Site Data from Northeast Avalon ACAP Wetland  
Surveying, Summer 2013**

## Soldiers Brook Pond Wetland Site – Plant Data

|                                       |   |
|---------------------------------------|---|
| Site Name:                            | SOLDIERS BROOK POND   |
| Transect #                            | 1 OF 1  |
| GPS Coordinates of Start of Transect: | (START) N47.63494 - W52.71560,<br>(END) N47.63449 - W52.71595 |
| Direction of transect:                | SW  |
| Date:                                 | 09-Jul-13   |

|                            |                                   | Total # Standing Counts |        |        |        |        |        |        |        |        |         |
|----------------------------|-----------------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Common Name                | Species Name                      | Quad 1                  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Bedstraw                   | <i>Galium spp.</i>                | 22                      |        |        |        |        |        |        |        |        |         |
| Cuckooflower/ Lady's smock | <i>Cardamine pratensis</i>        | 8                       |        |        |        |        |        |        |        |        |         |
| Creeping Spikerush         | <i>Eleocharis erythropoda</i>     | 52                      |        |        |        |        |        |        |        |        |         |
| Little Lovegrass           | <i>Eragrostis minor</i>           | 19                      |        |        |        |        |        |        |        |        |         |
| Creeping plant*            | Unknown                           | 28                      | 15     |        |        |        |        |        |        |        |         |
| Fringed Willowherb         | <i>Epilobium ciliatum</i>         |                         | 5      |        |        |        |        |        |        |        |         |
| Sweetgale                  | <i>Myrica gale</i>                |                         | 35     | 38     | 6      | 8      | 13     |        | 6      |        |         |
| Leatherleaf                | <i>Chamaedaphne calyculata</i>    |                         |        | 7      | 19     | 21     | 22     | 41     | 22     |        | 17      |
| Meadow Sweet               | <i>Spiraea latifolia</i>          |                         |        | 12     |        |        |        |        |        |        |         |
| Hairy Plant*               | Unknown                           |                         |        | 4      |        |        |        |        |        |        |         |
| Bog Laurel                 | <i>Kalmia polifolia</i> Wang.     |                         |        |        | 5      |        |        |        |        |        |         |
| Northeastern Rose          | <i>Rosa nitida</i>                |                         |        |        | 1      | 1      |        |        |        |        |         |
| Alternate multileaves*     | Unknown                           |                         |        |        |        | 27     | 13     |        |        |        | 15      |
| Sheep Laurel               | <i>Kalmia angustifolia</i>        |                         |        |        |        |        | 2      | 1      | 8      | 9      | 10      |
| Northwest Territory sedge  | <i>Carex utriculata</i>           |                         |        |        |        |        | 8      |        |        |        | 1       |
| Labrador Tea               | <i>Rhododendron groenlandicum</i> |                         |        |        |        |        |        |        |        | 9      | 2       |

|                     |                            | % Cover |        |        |        |        |        |        |        |        |         |
|---------------------|----------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Undergrowth         | Species Name               | Quad 1  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Water               | N/A                        | 60      |        |        |        |        |        |        |        |        |         |
| Aquatic plant*      | Unknown                    | 25      |        |        |        |        |        |        |        |        |         |
| Long grass*         | Unknown                    | 20      | 20     |        | 10     | 5      |        |        | 5      | 5      |         |
| Sphagnum Moss       | <i>Sphagnum papillosum</i> |         |        | 10     | 25     | 65     |        | 15     |        |        |         |
| Dead organic matter | N/A                        |         |        |        | 10     |        | 45     | 20     |        | 25     | 30      |

\*Unidentified plant

Plants listed in red were determined to be non-native

## Soldiers Brook Pond Wetland Site – Invertebrate Data

|  |
|--|
| Site: Soldiers Brook Pond                  |
| GPS Coordinates Inflow W52.71597 N47.63439 |

### INFLOW

| Order      | Family     | Common Name       | Count |
|------------|------------|-------------------|-------|
| Odonata    | Anisoptera | DRAGONFLY NYMPH   | 1     |
| Hemiptera  | Corixidae  | WATER BOATMAN     | 1     |
| Coleoptera | Dytiscidae | BEETLE            | 1     |
| Amphipoda  |            | SCUDS             | 40    |
| Hirudinae  |            | LEECH             | 1     |
| Plecoptera |            | STONEFLY LARVAE   | 1     |
| Nematoda   |            | NEMATODES (WORMS) | 7     |

## Soldiers Brook Pond Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature                |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|------------------------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |                        | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                | Golf Course            | 1     | < 1000 m2        |      |             |             |                      | 18     |
|                            |                        | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |                        | 3     | > 10,000 m2      | 9    |             |             | x2                   |        |
| Impervious Surfaces        |                        | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |                        | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |                        | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                | Residence on Pine Line | 2     | Dense            |      |             |             |                      | 2      |
|                            |                        | 1     | Sparse           |      |             | 1           | x2                   |        |
| Commercial / Institutional |                        | 2     | Dense            |      |             |             |                      |        |
|                            |                        | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |                        | 2     | Dense            |      |             |             |                      |        |
|                            |                        | 1     | Sparse           |      |             |             |                      |        |
|                            |                        |       |                  |      |             |             |                      | 20     |

Part 2: Roadways

|             | Feature   |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|-----------|-------|------|-------------|-------------|----------------------|--------|
|             |           | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |           | 1     |      |             |             |                      |        |
| 2 Lane Road | Pine Line | 2     |      | 4           |             |                      | 4      |
| 4 Lane Road |           | 3     |      |             |             |                      |        |
|             |           |       |      |             |             |                      | 4      |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         |        |

|         | TOTALS |
|---------|--------|
| Table 1 | 20     |
| Table 2 | 4      |
| Table 3 | 0      |
| Score   | 24     |

The wetland delineation found in Appendix A (Figure A1) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. A golf course, residences on Pine Line and Pine Line itself were determined to be within 50 m of the wetland boundary. The golf course and a residence on Pine Line were determined to be at an elevation of concern, with a slope that could have greater potential for runoff. Although not included in the rubric, there was also a pole line that ran perpendicular to Pine Line that fell within the 50 m range and could have impacts on the wetland.

## Bakeapple Marsh North Wetland Site – Plant Data

|  |                                    |
|--|------------------------------------|
| <b>Site Name:</b>                            | BAKEAPPLE MARSH NORTH              |
| <b>Transect #</b>                            | 1 OF 1                             |
|  | (START) N[47.70168] - W [52.80911] |
|  | (END) N[47.70174] - W [ 52.80859]  |
| <b>GPS Coordinates of Start of Transect:</b> |                                    |
| <b>Direction of transect:</b>                | NW                                 |
| <b>Date:</b>                                 | 10-Jul-13                          |

| Total # Standing Counts           |                                   |        |        |        |        |        |        |        |        |        |        |
|-----------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <i>Common Name</i>                | <i>Species Name</i>               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>    | 92     | 10     | 45     | 58     | 26     | 41     | 19     | 21     | 51     | 17     |
| Pitcher Plant                     | <i>Sarracenia purpurea</i>        | 30     | 5      | 14     | 15     |        | 3      | 6      | 14     | 3      | 7      |
| Spoon-leaved Sundew               | <i>Drosera intermedia</i> Hayne   | 22     | 8      | 11     |        |        |        |        | 4      |        | 10     |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      | 162    | 52     | 94     | 72     | 5      |        | 27     | 27     | 10     | 4      |
| Larch Tree                        | <i>Larix laricina</i>             | 4      |        |        |        |        |        |        |        |        | 3      |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     | 25     |        | 4      | 28     | 11     | 31     | 16     | 6      | 25     | 10     |
| Sweetgale                         | <i>Myrica gale</i>                |        | 2      |        | 8      | 21     |        | 7      |        |        |        |
| Mushroom                          | <i>Unknown</i>                    | 1      |        |        |        |        |        |        |        |        |        |
| Labrador Tea                      | <i>Rhododendron groenlandicum</i> |        |        | 6      |        |        | 5      | 3      | 27     | 33     | 41     |
| Sweetgale - like plant*           | <i>Unknown</i>                    |        |        |        | 4      | 7      |        | 10     |        |        |        |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>        |        |        |        |        |        |        | 17     | 34     | 23     | 24     |

| % Cover                      |                            |        |        |        |        |        |        |        |        |        |         |
|------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| <i>Undergrowth</i>           | <i>Species Name</i>        | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Sphagnum moss                | <i>Sphagnum papillosum</i> | 80     | 85     | 80     | 100    | 100    | 50     | 90     | 80     | 80     | 70      |
| Coastal Sedge                | <i>Carex exilis</i>        | 15     | 60     | 45     |        | 25     | 40     | 50     | 70     |        | 10      |
| Small Cranberry / Marshberry | <i>Vaccinium oxycoccus</i> | 50     | 20     | 15     | 5      |        |        |        |        |        |         |
| Common sedge                 | <i>Carex spp.</i>          |        |        |        | 25     |        |        |        |        |        | 10      |
| Dead Shrubs                  | <i>N/A</i>                 |        |        |        |        | 20     |        | 5      |        |        |         |
| Cranberry like shrub*        | <i>Unknown</i>             |        |        |        |        |        | 15     |        | 30     | 40     |         |
| Flatten brownrush*           | <i>Unknown</i>             |        |        |        |        |        |        | 75     | 5      |        |         |

\*Unidentified Plant

## Bakeapple Marsh South Wetland Site – Plant Data

|  |                                    |
|--|------------------------------------|
| <b>Site Name:</b>                            | Bakeapple Marsh South              |
| <b>Transect #</b>                            | 1 OF 1                             |
|  | (START) N[47.70081] - W [52.80774] |
|  | (END) N[47.70044] - W [ 52.80783]  |
| <b>GPS Coordinates of Start of Transect:</b> |                                    |
| <b>Direction of transect:</b>                | SE                                 |
| <b>Date:</b>                                 | 10-Jul-13                          |

| Total # Standing Counts |                                   |        |        |        |        |        |        |        |        |        |        |
|-------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <i>Common Name</i>      | <i>Species Name</i>               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
| Pitcher Plant           | <i>Sarracenia purpurea</i>        | 6      |        |        |        |        |        |        |        |        |        |
| Labrador Tea            | <i>Rhododendron groenlandicum</i> | 3      |        | 1      | 34     | 35     | 9      | 127    | 27     | 72     | 66     |
| Sweetgale               | <i>Myrica gale</i>                | 7      | 4      | 3      |        | 2      |        |        |        |        |        |
| Spoon-leaved Sundew     | <i>Drosera intermedia</i> Hayne   | 35     | 13     | 23     |        |        |        |        |        |        | 25     |
| Bog Laurel              | <i>Kalmia polifolia</i> Wang.     |        | 4      | 8      | 10     | 4      | 6      | 3      | 13     | 9      | 4      |
| Sheep Laurel            | <i>Kalmia angustifolia</i>        |        | 2      | 12     | 105    | 61     | 52     | 32     | 37     | 56     | 42     |
| Leatherleaf             | <i>Chamaedaphne calyculata</i>    |        |        | 11     | 16     | 35     | 31     | 11     | 11     | 21     | 27     |
| Bakeapple / Cloudberry  | <i>Rubus chamaemorus</i>          |        |        |        | 14     | 8      | 3      | 10     | 8      | 9      | 14     |
| Hard needle tree*       | <i>Unknown</i>                    |        |        |        |        | 1      |        |        |        |        |        |

| % Cover                     |                            |        |        |        |        |        |        |        |        |        |         |
|-----------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| <i>Undergrowth</i>          | <i>Species Name</i>        | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Coastal Sedge               | <i>Carex exilis</i>        | 70     | 70     | 10     | 5      | 5      | 5      |        | 10     | 5      | 5       |
| Black Crowberry             | <i>Empetrum nigrum</i>     | 70     |        | 10     | 70     | 55     | 40     | 50     | 40     | 10     | 35      |
| Mud                         | <i>N/A</i>                 | 20     | 65     | 50     |        |        |        |        | 15     |        |         |
| Sphagnum moss               | <i>Sphagnum papillosum</i> | 50     | 15     | 25     |        |        |        |        |        |        | 10      |
| Dry Sphagnum moss           | <i>N/A</i>                 |        | 20     | 5      | 100    | 100    | 100    | 95     | 40     | 100    | 90      |
| Small Cranberry /Marshberry | <i>Vaccinium oxycoccus</i> |        | 5      |        |        |        |        |        |        |        |         |
| Beige Dry Moss*             | <i>Unknown</i>             |        |        |        |        |        |        | 5      |        |        |         |

\*Unidentified Plant

## Bakeapple Marsh Wetland Site- Invertebrate Data

|                 |                      |
|-----------------|----------------------|
| Site:           | BAKEAPPLE MARSH      |
| GPS Coordinates | 47.70044N, 52.80865W |

### STANDING POOL

| Order     | Family     | Common Name     | Count |
|-----------|------------|-----------------|-------|
| Amphipoda |            | SCUD            | 1     |
| Odonata   | Anisoptera | DRAGONFLY NYMPH | 1     |

## Bakeapple Marsh North Wetland Site – *Stress Evaluation Rubric*

### Part 1: Area Features

|                            | Feature                         |             | Area   | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|---------------------------------|-------------|--|------|-------------|-------------|----------------------|--------|
|                            |                                 | Value       |  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                | Field behind residence          | 1<br>2<br>3 | < 1000 m2<br>1000 - 10,000<br>> 10,000 m2    | 3    |             |             |                      | 3      |
| Impervious Surfaces        |                                 | 1<br>2<br>3 | < 1000 m2<br>1000 - 10,000 m2<br>> 10,000 m2 |      |             |             |                      |        |
| Residential                | Residence South of Bauline Line | 2           | Dense  |      |             | 1           |                      | 5      |
|                            | Residence North of Bauline Line | 1           | Sparse                                       |      | 4           |             |                      |        |
| Commercial / Institutional |                                 | 2<br>1      | Dense<br>Sparse                              |      |             |             |                      |        |
|                            |                                 | 2<br>1      | Dense<br>Sparse                              |      |             |             |                      |        |
|                            |                                 |             |  |      |             |             |                      | 8      |

### Part 2: Roadways

|             | Feature      |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|--------------|-------|------|-------------|-------------|----------------------|--------|
|             |              | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |              | 1     |      |             |             |                      |        |
| 2 Lane Road | Bauline Line | 2     | 6    |             |             |                      | 6      |
| 4 Lane Road |              | 3     |      |             |             |                      |        |
|             |              |       |      |             |             |                      | 6      |

### Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 8      |
| Table 2 | 6      |
| Table 3 | 0      |
| Score   | 14     |

The wetland delineation found in Appendix A (Figure A2) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Features determined to be within 50 m of the wetland boundary included a field area, residences both north and south of Bauline Line, and Bauline Line itself. None of these features were determined to be at an elevation of concern. One of the residences on Bauline Line included in the rubric had a long driveway and a long dirt path that lead behind the house. These features were included under the classification of residential because they are part of the footprint of the residence, but could potentially impact runoff to the wetland more than other building lots because of the extended impervious surface area created by them.



## Bakeapple Marsh South Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature               |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|-----------------------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |                       | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                | Sod Farm              | 1     | < 1000 m2        | 9    |             |             |                      | 9      |
|                            |                       | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |                       | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |                       | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |                       | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |                       | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                | Home off Bauline Line | 2     | Dense            |      |             | 1           |                      | 1      |
|                            |                       | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |                       | 2     | Dense            |      |             |             |                      |        |
|                            |                       | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |                       | 2     | Dense            |      |             |             |                      |        |
|                            |                       | 1     | Sparse           |      |             |             |                      |        |
| 10                         |                       |       |                  |      |             |             |                      |        |

Part 2: Roadways

|             | Feature      |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|--------------|-------|------|-------------|-------------|----------------------|--------|
|             |              | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |              | 1     |      |             |             |                      |        |
| 2 Lane Road | Bauline Line | 2     | 6    |             |             | x2                   | 12     |
| 4 Lane Road |              | 3     |      |             |             |                      |        |
|             |              |       |      |             |             |                      | 12     |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         |        |

|         | TOTALS |
|---------|--------|
| Table 1 | 10     |
| Table 2 | 12     |
| Table 3 | 0      |
| Score   | 22     |

The wetland delineation found in Appendix A (Figure A2) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. A sod farm, Bauline Line and a residence on Bauline Line were found to be within 50 m of the wetland boundary, with only Bauline Line believed to be at an elevation of concern, with a slope that could have greater potential for runoff.

## Wall's Road Wetland Site – Plant Data

|  |                                    |
|--|------------------------------------|
| <b>Site Name:</b>                            | WALL'S ROAD, POUCH COVE            |
| <b>Transect #</b>                            | 1 OF 2                             |
|  | (START) N[47.74317] - W [52.74727] |
|  | (END) N[47.74346] - W [ 52.74778]  |
| <b>GPS Coordinates of Start of Transect:</b> |                                    |
| <b>Direction of transect:</b>                | NE                                 |
| <b>Date:</b>                                 | 15-Jul-13                          |

|                              |                                   | Total # Standing Counts |        |        |        |        |        |        |        |        |        |
|------------------------------|-----------------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Common Name</b>           | <b>Species Name</b>               | Quad 1                  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
| White Spruce                 | <i>Picea glauca</i>               | 1                       | 3      | 1      | 4      |        |        |        | 5      |        |        |
| Sheep Laurel                 | <i>Kalmia angustifolia</i>        | 42                      | 31     | 27     | 18     | 24     | 21     | 18     | 6      | 46     |        |
| Leather Leaf                 | <i>Chamaedaphne calyculata</i>    | 4                       | 4      | 19     | 10     | 8      | 8      | 13     | 17     | 5      | 5      |
| Bog Laurel                   | <i>Kalmia polifolia</i> Wang.     | 6                       | 11     | 5      | 5      | 20     | 8      | 3      | 7      | 16     | 3      |
| Labrador Tea                 | <i>Rhododendron groenlandicum</i> | 8                       | 32     | 20     | 29     | 20     | 24     | 21     | 11     | 15     | 4      |
| Black Crowberry              | <i>Empetrum nigrum</i>            | 17                      | 12     | 32     | 51     | 60     | 62     | 35     | 54     | 51     | 5      |
| Three- leaved Solomon's Seal | <i>Maianthemum trifolium</i>      | 2                       | 1      |        | 3      | 3      | 18     | 8      | 8      | 6      | 2      |
| Bog Buckbean                 | <i>Menyanthes trifoliata</i>      | 5                       | 13     | 5      | 22     | 16     | 23     | 3      | 25     | 9      |        |
| Hairy Leaves*                | <i>Unknown</i>                    | 3                       |        |        |        |        |        |        |        |        |        |
| Spoon- leaved Sundew         | <i>Drosera intermedia</i> Hayne   |                         | 21     |        | 62     | 23     | 97     | 80     | 56     | 83     | 6      |
| Canadian Bunchberry          | <i>Cornus canadensis</i>          |                         | 4      |        |        |        | 7      |        |        |        |        |
| Small Cranberry / Marshberry | <i>Vaccinium oxycoccus</i>        |                         | 23     |        |        |        | 3      | 16     |        | 4      | 58     |
| Waxy Smooth Shrub*           | <i>Unknown</i>                    |                         |        | 11     |        |        |        |        | 9      |        |        |
| Mountain Holly               | <i>Ilex mucronata</i>             |                         |        | 1      | 5      | 1      |        |        |        |        |        |
| Larch                        | <i>Larix laricina</i>             |                         |        |        |        |        |        |        | 2      |        | 1      |
| Mushroom                     | <i>Unknown</i>                    |                         |        |        |        |        |        |        |        | 1      |        |
| Larger Blue Flag Iris        | <i>Iris versicolor</i>            |                         |        |        |        |        |        |        |        |        | 1      |

|                    |                            | % Cover |        |        |        |        |        |        |        |        |         |
|--------------------|----------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| <b>Undergrowth</b> | <b>Species Name</b>        | Quad 1  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Dry moss           | N/A                        | 80      | 50     | 80     | 75     |        | 50     | 50     |        |        |         |
| Sphagnum moss      | <i>Sphagnum papillosum</i> | 20      | 50     |        | 25     | 40     | 50     | 50     |        |        |         |
| Coastal Sedge      | <i>Carex exilis</i>        |         |        |        |        | 10     | 25     | 45     | 5      | 50     | 95      |
| Bare Ground        | N/A                        |         |        |        |        |        |        |        | 10     |        |         |

\*Unidentified Plant

|  |   |
|--|---|
| <b>Site Name:</b>                            | WALL'S ROAD, POUCH COVE                               |
| <b>Transect #</b>                            | 2 OF 2  |
|  | (START) N[47.74348] - W [52.74288] (End) Not recorded |
| <b>GPS Coordinates of Start of Transect:</b> |   |
| <b>Direction of transect:</b>                |   |
| <b>Date:</b>                                 | 15-Jul-13   |

|                                    |                                   | Total # Standing Counts |        |        |        |        |        |        |        |        |         |
|------------------------------------|-----------------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| <b>Common Name</b>                 | <b>Species Name</b>               | Quad 1                  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Sheep Laurel                       | <i>Kalmia angustifolia</i>        | 9                       |        | 4      |        |        | 1      | 7      | 15     |        | 6       |
| Leather Leaf                       | <i>Chamaedaphne calyculata</i>    |                         | 4      |        |        |        |        |        | 1      |        | 2       |
| Bog Laurel                         | <i>Kalmia polifolia</i> Wang.     | 5                       |        | 5      | 7      | 1      | 3      | 2      | 4      | 3      | 1       |
| Labrador Tea                       | <i>Rhododendron groenlandicum</i> | 2                       |        |        |        | 26     | 5      | 2      | 2      | 8      | 2       |
| Black Crowberry                    | <i>Empetrum nigrum</i>            | 21                      |        |        |        | 10     | 6      | 24     | 2      |        |         |
| Three- leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      | 12                      | 64     | 18     | 2      | 18     | 15     | 8      |        | 14     |         |
| Spoon-leaved Sundew                | <i>Drosera intermedia</i> Hayne   | 11                      | 19     | 17     | 4      | 3      | 21     | 14     | 10     | 9      | 24      |
| Small Cranberry / Marshberry       | <i>Vaccinium oxycoccus</i>        | 41                      | 8      | 26     |        | 12     | 4      | 7      | 35     | 60     | 42      |
| Larch                              | <i>Larix laricina</i>             | 1                       |        |        | 1      | 1      | 3      | 4      | 1      | 1      | 3       |
| Mountain Holly                     | <i>Ilex mucronata</i>             | 5                       | 13     | 2      |        | 1      |        |        |        |        |         |
| Sweetgale                          | <i>Myrica gale</i>                |                         | 12     | 3      |        |        |        | 1      |        |        |         |
| Narrow-leaved Burreed              | <i>Sparganium angustifolium</i>   |                         | 4      |        |        |        |        |        |        |        |         |
| Bog Aster                          | <i>Oclemena nemoralis</i>         |                         | 10     | 13     | 6      | 9      | 15     | 13     |        | 4      | 6       |
| Grass-leaved Goldenrod             | <i>Euthamia graminifolia</i>      |                         |        |        |        | 1      | 2      |        | 2      |        |         |
| Mushroom                           | <i>Unknown</i>                    |                         |        |        |        | 1      |        |        |        |        |         |
| Hairy Leaves*                      | <i>Unknown</i>                    |                         |        |        |        |        |        | 7      |        |        |         |

|                    |                            | % Cover |        |        |        |        |        |        |        |        |         |
|--------------------|----------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| <b>Undergrowth</b> | <b>Species Name</b>        | Quad 1  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Spiky Brown Rush*  | <i>Unknown</i>             | 5       | 20     | 25     | 65     | 10     | 10     | 30     | 40     | 5      | 75      |
| Sphagnum moss      | <i>Sphagnum papillosum</i> | 90      | 50     | 95     | 25     | 100    | 5      | 70     | 80     | 40     | 40      |
| Muck               | N/A                        |         | 30     |        | 5      |        | 5      |        |        |        |         |
| Dry moss           | N/A                        |         |        |        | 5      |        |        | 30     |        | 5      |         |
| Grass              | <i>Unknown</i>             |         |        |        |        |        |        |        |        | 50     | 60      |

\*Unidentified Plant

## Wall's Road Wetland Site – Invertebrate Data

*No invertebrate sample collected for this site*

## Wall's Road Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|---------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |         | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| 0                          |         |       |                  |      |             |             |                      |        |

Part 2: Roadways

|             | Feature           |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|-------------------|-------|------|-------------|-------------|----------------------|--------|
|             |                   | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |                   | 1     |      |             |             |                      |        |
| 2 Lane Road | Walls Road        | 2     |      |             | 2           |                      | 6      |
|             | Mountain Crescent |       |      |             | 2           | x2                   |        |
| 4 Lane Road |                   | 3     |      |             |             |                      |        |
|             |                   |       |      |             |             |                      | 6      |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 0      |
| Table 2 | 6      |
| Table 3 | 0      |
| Score   | 6      |

The wetland delineation found in Appendix A (Figure A3) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Only Walls Road and Mountain Crescent were determined to be within 50 m of the wetland boundary, with Mountain Crescent determined to be at an elevation of concern, with a slope that could have greater potential for runoff. It should be noted however, that there was new residential construction taking place in the area, which could cause potential stress to the wetland in the future.

## Southern Shore Arena Wetland Site – Plant Data

|                                       |   |
|---------------------------------------|---|
| Site Name:                            | SOUTHERN SHORE ARENA  |
| Transect #                            | 1 OF 2  |
| GPS Coordinates of Start of Transect: | (START) N[47.26617] - W [52.83581]<br>(END) N[47.26649] - W [ 52.83655] |
| Direction of transect:                | NE  |
| Date:                                 | 16-Jul-13   |

Total # Standing Counts

| Common Name                       | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|-----------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Black Crowberry                   | <i>Empetrum nigrum</i>            | 210    | 61     | 82     | 82     | 90     | 31     | 71     | 15     | 71     | 65     |
| Labrador Tea                      | <i>Rhododendron groenlandicum</i> | 51     | 61     | 62     | 39     | 171    | 74     | 45     | 64     | 65     | 52     |
| Pink Flower Shrub*                | <i>Unknown</i>                    | 5      |        |        |        |        |        |        |        |        |        |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>        | 5      | 22     | 2      | 16     | 12     | 28     | 13     | 20     | 48     | 3      |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>    | 39     | 15     | 19     | 23     | 21     | 10     | 4      | 11     | 4      | 21     |
| Larch                             | <i>Larix laricina</i>             | 1      |        |        | 1      | 2      |        |        |        |        | 2      |
| Pitcher Plant                     | <i>Sarracenia purpurea</i>        | 1      | 14     | 39     | 12     | 15     | 13     | 8      | 5      | 5      | 6      |
| Bog Buckbean                      | <i>Menyanthes trifoliata</i>      | 7      | 16     | 5      | 6      | 14     | 9      | 2      |        | 3      | 2      |
| Bakeapple                         | <i>Rubus chamaemorus</i>          | 6      | 10     | 23     | 12     | 19     | 2      |        | 3      | 19     |        |
| Canadian Bunchberry               | <i>Cornus canadensis</i>          | 1      | 8      |        |        |        |        |        | 5      | 24     | 31     |
| Sweetgale                         | <i>Myrica gale</i>                | 2      |        |        |        |        | 3      |        |        | 8      | 2      |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     |        | 5      | 24     | 6      | 10     | 8      | 2      | 1      |        | 2      |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>        | 15     | 27     | 35     | 25     | 14     | 15     | 5      | 8      | 29     | 21     |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      |        | 2      | 1      | 11     |        |        |        |        | 4      | 52     |
| Spoon-leaved Sundew               | <i>Drosera intermedia</i> Hayne   |        | 10     | 13     | 3      | 8      | 15     | 5      | 7      | 7      | 5      |
| Serated Leaves*                   | <i>Unknown</i>                    |        |        |        | 16     | 7      | 13     | 2      | 2      | 2      | 12     |

% Cover

| Undergrowth       | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Beaked Rush*      | <i>Unknown</i>             | 5      | 30     | 5      |        | 10     | 10     | 40     | 5      | 5      | 5       |
| Moss              | <i>Sphagnum papillosum</i> | 25     | 70     | 90     | 10     | 85     | 100    | 90     | 90     | 70     | 85      |
| Soil              | N/A                        | 50     |        |        | 80     | 85     |        | 10     |        |        |         |
| Dry moss/ lichen* | <i>Unknown</i>             |        |        | 5      | 10     |        |        |        | 5      | 25     | 10      |

\*Unidentified Plant

|                                       |  |
|---------------------------------------|--|
| Site Name:                            | SOUTHERN SHORE ARENA   |
| Transect #                            | 2 OF 2   |
| GPS Coordinates of Start of Transect: | (START) N[47.26619] - W [52.83504] (END) N[47.26638] - W [ 52.83563] |
| Direction of transect:                | NE   |
| Date:                                 | 16-Jul-13  |

Total # Standing Counts

| Overgrowth Species                 | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|------------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sweetgale                          | <i>Myrica gale</i>                | 9      |        | 3      |        | 5      | 2      |        | 2      |        |        |
| Pitcher Plant                      | <i>Sarracenia purpurea</i>        | 34     | 25     | 10     | 9      | 8      | 7      | 7      | 10     | 1      | 7      |
| Labrador Tea                       | <i>Rhododendron groenlandicum</i> | 15     | 175    | 58     | 34     | 56     | 62     | 42     | 135    | 127    | 127    |
| Bog Laurel                         | <i>Kalmia polifolia</i> Wang.     | 17     | 25     | 20     | 16     | 11     | 19     | 15     | 9      | 14     | 15     |
| Sphagnum Moss (Male gametophyte)   | <i>Sphagnum papillosum</i>        | 10     | 24     |        |        |        |        |        |        |        |        |
| Small Cranberry / Marshberry       | <i>Vaccinium oxycoccus</i>        | 67     | 38     | 52     | 80     | 41     | 16     | 75     | 90     | 27     | 25     |
| Bog Aster                          | <i>Oclemena nemoralis</i>         | 9      |        |        | 2      |        |        |        |        |        |        |
| Sheep Laurel                       | <i>Kalmia angustifolia</i>        | 29     | 5      | 3      | 26     | 8      | 5      | 3      | 38     | 29     | 26     |
| Canadian Bunchberry                | <i>Cornus canadensis</i>          | 3      | 8      | 7      | 40     | 15     |        | 15     | 21     | 12     | 18     |
| Leatherleaf                        | <i>Chamaedaphne calyculata</i>    | 20     | 16     | 23     | 13     | 22     | 23     | 10     | 5      | 9      | 4      |
| Larch                              | <i>Larix laricina</i>             | 1      | 3      | 3      | 1      |        |        | 3      | 1      |        |        |
| Goldthread                         | <i>Coptis trifolia</i>            | 11     | 33     | 29     | 350    | 184    | 242    | 125    | 45     | 25     |        |
| Spoon-leaved Sundew                | <i>Menyanthes trifoliata</i>      | 3      | 12     | 7      | 18     | 4      | 21     |        | 17     |        | 5      |
| Black Crowberry                    | <i>Empetrum nigrum</i>            |        | 23     | 27     |        | 15     | 36     | 310    | 44     | 121    |        |
| 4 Leaves Serated*                  | <i>Unknown</i>                    |        | 5      | 9      | 6      | 3      | 3      |        | 7      |        | 5      |
| Three- leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      |        |        |        |        | 17     | 4      | 111    | 10     | 6      | 9      |
| Bakeapple                          | <i>Rubus chamaemorus</i>          |        |        |        |        | 12     |        |        | 56     | 2      | 13     |
| Juniper                            | <i>Juniperus communis</i>         |        |        |        |        |        |        | 1      |        |        |        |

% Cover

| Undergrowth       | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Brown Beaked Rush | <i>Rhynchospora fusca</i>  | 5      | 80     | 10     | 5      | 20     | 30     | 15     | 15     | 40     | 5       |
| Sphagnum Moss     | <i>Sphagnum papillosum</i> | 100    | 100    | 85     | 90     | 80     | 70     | 75     | 80     | 5      | 20      |
| Dry moss          | N/A                        |        |        | 5      | 5      |        |        | 25     | 20     | 95     | 70      |

\*Unidentified Plant

## Southern Shore Arena Wetland Site – Invertebrate Data

|                            |           |           |
|----------------------------|-----------|-----------|
| Site: Southern Shore Arena |           |           |
| GPS coordinates:           | W52.83732 | N47.26663 |

### Outflow

| Order     | Family | Common Name | Count |
|-----------|--------|-------------|-------|
| Amphipoda |        | SCUDS       | 13    |

## Southern Shore Arena Wetland Site – *Stress Evaluation Rubric*

### Part 1: Area Features

|                            | Feature                        |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|--------------------------------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |                                | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |                                | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |                                | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |                                | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        | Commercial parking lot         | 1     | < 1000 m2        |      |             |             |                      | 18     |
|                            |                                | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |                                | 3     | > 10,000 m2      | 9    |             |             | x2                   |        |
| Residential                | Home on Southern Shore Hwy     | 2     | Dense            |      |             | 2           |                      | 4      |
|                            |                                | 1     | Sparse           |      |             |             | x2                   |        |
| Commercial / Institutional | Building on Southern Shore Hwy | 2     | Dense            |      |             |             |                      | 2      |
|                            |                                | 1     | Sparse           |      |             | 1           | x2                   |        |
| Industrial                 | Quarry                         | 2     | Dense            |      |             |             |                      | 6      |
|                            |                                | 1     | Sparse           | 3    |             |             | x2                   |        |
|                            |                                |       |                  |      |             |             |                      | 30     |

### Part 2: Roadways

|             | Feature            |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|--------------------|-------|------|-------------|-------------|----------------------|--------|
|             |                    | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |                    | 1     |      |             |             |                      |        |
| 2 Lane Road | Southern Shore Hwy | 2     | 6    |             |             | x2                   | 12     |
| 4 Lane Road |                    | 3     |      |             |             |                      |        |
|             |                    |       |      |             |             |                      | 12     |

### Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert | 2         |         | 2      |
| Dam     |           |         |        |
|         |           |         | 2      |

|         | TOTALS |
|---------|--------|
| Table 1 | 30     |
| Table 2 | 12     |
| Table 3 | 2      |
| Score   | 44     |

The wetland delineation found in Appendix A (Figure A4) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. The Southern Shore Arena and its parking lot, the Southern Shore Highway, a quarry, and a residence on the Southern Shore Highway were found to be within 50 m of the wetland boundary. All of these features were determined to be at an elevation of concern, with a slope that could have greater potential for runoff.

## Octagon Pond Wetland Site – Plant Data

|                                       |                                    |
|---------------------------------------|------------------------------------|
| Site Name:                            | OCTAGON POND (PARADISE) NL         |
| Transect #                            | 1 OF 1                             |
|                                       | (START) N[47.52525] - W [52.87611] |
|                                       | (END) N[47.52531] - W [ 52.87619]  |
| GPS Coordinates of Start of Transect: |                                    |
| Direction of transect:                | NW                                 |
| Date:                                 | JULY 18 2013 (THURSDAY)            |

Total # Standing Counts

| <i>Overgrowth Species</i> | <i>Species Name</i>            | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|---------------------------|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sweetgale                 | <i>Myrica gale</i>             | 6      | 1      | 8      | 2      | 3      |        |        |        |        |        |
| Bog buckbean              | <i>Menyanthes trifoliata</i>   | 16     | 28     | 17     | 28     | 35     | 17     | 48     |        |        | 4      |
| Fringed Willowherb        | <i>Epilobium ciliatum</i>      | 9      | 3      |        |        |        |        |        |        |        |        |
| Sweetgale- like plant*    | <i>Unknown</i>                 | 5      | 5      |        | 4      |        |        |        |        |        |        |
| Leatherleaf               | <i>Chamaedaphne calyculata</i> |        | 4      | 15     | 23     |        |        |        |        |        |        |
| Northeastern Rose         | <i>Rosa nitida</i>             |        |        |        | 4      |        |        |        |        |        |        |
| Grass-leaved Goldenrod    | <i>Euthamia graminifolia</i>   |        |        |        | 1      | 1      | 2      |        |        |        |        |
| Green Bulrush             | <i>Scirpus atrovirens</i>      |        |        |        |        |        | 1      |        |        |        |        |
| Bog Rush                  | <i>Juncus effusus</i>          |        |        |        |        |        | 3      |        |        |        |        |
| Purple Grass*             | <i>Unknown</i>                 |        |        |        |        |        |        |        | 2      |        |        |
| Water Sedge               | <i>Carex aquatilis</i>         |        |        |        |        |        |        |        | 28     | 3      | 8      |
| Sensitive fern            | <i>Onoclea sensibilis</i>      |        |        |        |        |        |        |        |        |        | 10     |

% Cover

| <i>Undergrowth (% Cover)</i> | <i>Species Name</i>        | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Grass*                       | <i>Unknown</i>             | 60     | 40     | 45     | 75     | 60     | 50     | 25     | 40     | 90     | 80      |
| Dead Grass                   | <i>N/A</i>                 | 40     | 80     | 40     | 25     | 20     | 50     | 25     |        | 10     | 15      |
| Muck/ Open Water             | <i>N/A</i>                 |        |        | 15     |        | 20     |        | 50     | 60     |        |         |
| Sphagnum moss                | <i>Sphagnum papillosum</i> |        |        |        |        |        |        |        |        |        | 5       |

\*Unidentified Plant

## Octagon Pond Wetland Site – Invertebrate Data

*No invertebrate sample collected for this site, but there were water striders and water boatmen observed.*

## Octagon Pond Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |   |
|----------------------------|---------|-------|------------------|------|-------------|-------------|----------------------|--------|---|
|                            |         | Value |                  | 3    | 2           | 1           | X 2                  |        |   |
| Agriculture                |         | 1     | < 1000 m2        |      |             |             |                      |        |   |
|                            |         | 2     | 1000 - 10,000    |      |             |             |                      |        |   |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |   |
| Impervious Surfaces        |         | 1     | < 1000 m2        |      |             |             |                      |        |   |
|                            |         | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |   |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |   |
| Residential                |         | 2     | Dense            |      |             |             |                      |        |   |
|                            |         | 1     | Sparse           |      |             |             |                      |        |   |
| Commercial / Institutional |         | 2     | Dense            |      |             |             |                      |        |   |
|                            |         | 1     | Sparse           |      |             |             |                      |        |   |
| Industrial                 |         | 2     | Dense            |      |             |             |                      |        |   |
|                            |         | 1     | Sparse           |      |             |             |                      |        |   |
|                            |         |       |                  |      |             |             |                      |        | 0 |

Part 2: Roadways

|             | Feature |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|---------|-------|------|-------------|-------------|----------------------|--------|
|             |         | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |         | 1     |      |             |             |                      |        |
| 2 Lane Road |         | 2     |      |             |             |                      |        |
| 4 Lane Road |         | 3     |      |             |             |                      |        |
|             |         |       |      |             |             |                      | 0      |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 0      |
| Table 2 | 0      |
| Table 3 | 0      |
| Score   | 0      |

The wetland delineation found in Appendix A (Figure A5) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. The Octagon Pond wetland study site received a score of zero in the rubric as there were no features that fit the rubric found within 50 m of the wetland boundary. However, the Octagon Pond walking trail was found in the 50 m, and could potentially have some degree of impact as it enables frequent human access and presence

## Petty Harbour Wetland Site – Plant Data

|  |                                    |
|--|------------------------------------|
| <b>Site Name:</b>                            | PETTY HARBOUR                      |
| <b>Transect #</b>                            | 1 OF 2                             |
|  | (START) N[47.47276] - W [52.71277] |
|  | (END) N[47.47295] - W [ 52.71288]  |
| <b>GPS Coordinates of Start of Transect:</b> |                                    |
| <b>Direction of transect:</b>                | SW                                 |
| <b>Date:</b>                                 | JULY 22 2013 (MONDAY)              |

|                              |                                    | Total # Standing Counts |        |        |        |        |        |        |        |        |        |
|------------------------------|------------------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <i>Common Name</i>           | <i>Species Name</i>                | Quad 1                  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
| Bog Huckleberry              | <i>Gaylussacia bigeloviana</i>     | 12                      | 5      | 25     |        | 7      | 51     | 5      |        |        | 29     |
| Bog Aster                    | <i>Oclemena nemoralis</i>          | 13                      | 8      | 5      |        | 5      | 5      | 10     |        | 29     | 12     |
| Sweetgale                    | <i>Myrica gale</i>                 | 2                       | 5      |        |        |        |        |        |        |        |        |
| Few-seeded Sedge             | <i>Carex oligosperma</i>           | 6                       |        |        |        |        |        |        |        | 15     |        |
| White-beakrush               | <i>Rhynchospora alba</i>           | 21                      | 25     | 25     | 41     |        |        |        |        | 10     |        |
| Rose Pogonia                 | <i>Pogonia ophioglossoides</i>     |                         | 2      |        |        | 1      |        |        | 15     | 5      |        |
| Spoon-leaved Sundew          | <i>Drosera intermedia</i> Hayne    |                         | 10     | 20     | 102    | 14     | 17     |        |        | 24     | 2      |
| Labrador Tea                 | <i>Rhododendron groenlandicum</i>  |                         | 2      | 2      |        |        | 19     | 5      |        |        | 2      |
| Bog Laurel                   | <i>Kalmia polifolia</i> Wang.      |                         | 4      | 2      |        |        | 9      |        |        |        | 4      |
| Goldthread                   | <i>Coptis trifolia</i>             |                         | 25     | 5      |        |        |        |        |        |        | 7      |
| Starburst Rush*              | <i>Unknown</i>                     |                         | 25     |        | 29     | 2      |        |        | 1      |        |        |
| Pitcher Plant                | <i>Sarracenia purpurea</i>         |                         |        |        |        | 2      |        | 3      |        |        |        |
| Larch                        | <i>Larix laricina</i>              |                         |        |        |        |        | 2      |        |        |        |        |
| Mountain Holly               | <i>Ilex mucronata</i>              |                         |        |        |        |        | 21     |        |        |        |        |
| Black Crowberry              | <i>Empetrum nigrum</i>             |                         |        |        |        |        | 7      | 5      |        |        |        |
| White-fringed Orchid         | <i>Platanthera blephariglottis</i> |                         |        |        |        |        |        | 2      |        | 42     | 14     |
| Small Cranberry / Marshberry | <i>Vaccinium oxycoccus</i>         |                         |        |        |        |        |        | 13     |        | 10     | 15     |

|                     |                            | % Cover |        |        |        |        |        |        |        |        |         |
|---------------------|----------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| <i>Undergrowth</i>  | <i>Species Name</i>        | Quad 1  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Sphagnum moss       | <i>Sphagnum papillosum</i> | 25      | 50     |        | 70     |        | 10     | 10     |        | 70     | 50      |
| Water               | N/A                        | 75      | 50     |        |        | 10     | 5      |        |        |        |         |
| Mud                 | N/A                        |         |        | 15     | 30     |        |        | 10     | 90     | 10     |         |
| Beaked Spike sedge* | <i>Unknown</i>             |         |        |        |        |        | 5      |        |        |        | 5       |
| Grass*              | <i>Unknown</i>             |         |        | 55     |        | 90     | 80     | 80     | 10     | 20     | 45      |

\*Unidentified Plant

|  |                                    |
|--|------------------------------------|
| <b>Site Name:</b>                            | PETTY HARBOUR (CEMETARY)           |
| <b>Transect #</b>                            | 2 OF 2                             |
|  | (START) N[47.47327] - W [52.83504] |
|  | (END) N[47.26638] - W [ 52.83563]  |
| <b>GPS Coordinates of Start of Transect:</b> |                                    |
| <b>Direction of transect:</b>                | NW                                 |
| <b>Date:</b>                                 | 2013-07-22 (MONDAY)                |

|                                   |                                    | Total # Standing Counts |        |        |        |        |        |        |        |        |        |
|-----------------------------------|------------------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <i>Common Name</i>                | <i>Species Name</i>                | Quad 1                  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
| Bog Huckleberry                   | <i>Gaylussacia bigeloviana</i>     | 29                      | 73     | 60     | 57     | 24     | 50     |        | 20     | 39     | 25     |
| Bog Aster                         | <i>Oclemena nemoralis</i>          | 9                       | 8      | 6      | 6      | 29     | 19     | 15     | 3      | 36     | 34     |
| Sweetgale                         | <i>Myrica gale</i>                 | 17                      |        | 12     | 2      | 13     |        |        | 6      |        |        |
| White-beakrush                    | <i>Rhynchospora alba</i>           |                         |        |        |        |        |        | 52     | 65     | 25     |        |
| Rose Pogonia                      | <i>Pogonia ophioglossoides</i>     |                         |        |        |        |        |        | 2      | 2      |        |        |
| Spoon-leaved Sundew               | <i>Drosera intermedia</i> Hayne    | 4                       |        | 3      | 12     | 18     | 12     | 121    | 32     | 43     | 13     |
| Labrador Tea                      | <i>Rhododendron groenlandicum</i>  |                         |        | 1      | 3      |        | 5      |        |        |        |        |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.      | 4                       | 9      | 13     | 2      | 4      | 12     |        | 2      | 4      | 7      |
| Goldthread                        | <i>Coptis trifolia</i>             |                         |        |        |        |        | 32     |        |        |        |        |
| Pitcher Plant                     | <i>Sarracenia purpurea</i>         |                         | 12     | 6      | 3      | 3      |        |        |        | 7      | 5      |
| Larch                             | <i>Larix laricina</i>              | 5                       | 4      | 5      | 1      |        | 3      |        |        |        | 1      |
| Mountain Holly                    | <i>Ilex mucronata</i>              |                         |        |        |        |        | 2      |        |        | 1      | 3      |
| Black Crowberry                   | <i>Empetrum nigrum</i>             |                         | 25     |        |        |        | 7      |        |        | 2      | 2      |
| White-fringed Orchid              | <i>Platanthera blephariglottis</i> | 15                      | 13     | 16     | 26     | 17     |        | 18     | 17     | 8      | 16     |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>         | 9                       |        | 34     | 16     | 10     |        | 6      | 4      | 16     | 15     |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>     | 10                      |        |        |        |        |        |        |        | 2      |        |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>       | 2                       | 1      |        | 5      |        | 1      | 3      |        |        |        |
| Snowberry*                        | <i>Unknown</i>                     | 8                       |        |        |        | 4      | 20     | 2      | 8      | 15     |        |
| Twinflower                        | <i>Linnaea borealis</i>            |                         | 17     | 13     |        | 12     | 5      | 6      |        |        | 13     |
| Juniper                           | <i>Juniperus communis</i>          |                         |        |        |        |        | 3      |        |        | 1      |        |
| Purple Chokeberry                 | <i>Aronia xprunifolia</i>          | 3                       | 5      | 3      |        |        | 8      |        | 5      |        | 14     |

|                    |                            | % Cover |        |        |        |        |        |        |        |        |         |
|--------------------|----------------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| <i>Undergrowth</i> | <i>Species Name</i>        | Quad 1  | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
| Sphagnum moss      | <i>Sphagnum papillosum</i> | 20      |        | 20     | 25     | 20     | 25     |        | 40     | 25     | 30      |
| Mud                | N/A                        |         |        |        |        | 10     |        | 60     | 10     | 10     | 10      |
| Grass*             | <i>Unknown</i>             | 15      | 25     | 10     | 5      | 10     |        |        | 25     | 30     | 15      |
| Lichen*            | <i>Unknown</i>             |         |        |        |        |        | 5      |        |        | 5      | 5       |
| Dead Grass         | N/A                        | 30      | 60     | 60     | 40     | 60     | 50     |        | 25     | 30     | 40      |

\*Unidentified Plant



## Petty Harbour Wetland Site – Invertebrate Data

|                     |           |          |
|---------------------|-----------|----------|
| Site: Petty Harbour |           |          |
| GPS Coordinates     |           |          |
| Outflow             | W52.71252 | N47.4722 |

### Outflow

| Order     | Family       | Common Name   | Count |
|-----------|--------------|---------------|-------|
| Hemiptera | Notonectidae | Backswimmer   | 1     |
| Hemiptera | Corixidae    | Water Boatman | 3     |

## Petty Harbour Wetland Site – *Stress Evaluation Rubric*

### Part 1: Area Features

| Land Use / Land Cover Features | Feature                  |             | Area   | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|--------------------------------|--------------------------|-------------|--|------|-------------|-------------|----------------------|--------|
|                                |                          | Value       |  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                    |                          | 1<br>2<br>3 | < 1000 m2<br>1000 - 10,000<br>> 10,000 m2    |      |             |             |                      |        |
| Impervious Surfaces            | Parking area at cemetery | 1<br>2<br>3 | < 1000 m2<br>1000 - 10,000 m2<br>> 10,000 m2 |      | 2           |             | x2                   | 4      |
| Residential                    |                          | 2<br>1      | Dense<br>Sparse                              |      |             |             |                      |        |
| Commercial / Institutional     |                          | 2<br>1      | Dense<br>Sparse                              |      |             |             |                      |        |
| Industrial                     |                          | 2<br>1      | Dense<br>Sparse                              |      |             |             |                      |        |
|                                |                          |             |  |      |             |             |                      | 4      |

### Part 2: Roadways

|             | Feature                |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|------------------------|-------|------|-------------|-------------|----------------------|--------|
|             |                        | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   | Old Petty Harbour Road | 1     |      |             | 1           | x2                   | 2      |
| 2 Lane Road |                        | 2     |      |             |             |                      |        |
| 4 Lane Road |                        | 3     |      |             |             |                      |        |
|             |                        |       |      |             |             |                      | 2      |

### Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 4      |
| Table 2 | 2      |
| Table 3 | 0      |
| Score   | 6      |

The wetland delineation found in Appendix A (Figure A6) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Old Petty Harbour Road and the cemetery parking area were found to be located within 50 m of the wetland boundary, both at an elevation of concern, with a slope that could have greater potential for runoff.

## Roaches Marsh Wetland Site – Plant Data

|  |                                    |
|--|------------------------------------|
| <b>Site Name:</b>                            | Roaches Marsh                      |
| <b>Transect #</b>                            | 1 OF 2                             |
|  | (START) N[47.30079] - W [52.82280] |
|  | (END) N[47.30045] - W [ 52.82240]  |
| <b>GPS Coordinates of Start of Transect:</b> |                                    |
| <b>Direction of transect:</b>                | SW                                 |
| <b>Date:</b>                                 | JULY 25 2013 (THURSDAY)            |

Total # Standing Counts

| <b>Common Name</b>           | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|------------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Sweetgale                    | <i>Myrica gale</i>                | 12            | 4             | 19            | 4             | 26            | 3             | 7             | 5             |               |                |
| Labrador Tea                 | <i>Rhododendron groenlandicum</i> | 13            | 2             | 5             | 5             | 26            | 2             | 34            | 16            | 20            | 10             |
| Larch                        | <i>Larix laricina</i>             | 6             |               | 2             | 8             | 7             | 3             | 2             |               | 3             | 7              |
| Bog Laurel                   | <i>Kalmia polifolia</i> Wang.     | 11            | 34            | 11            | 23            | 17            | 15            | 20            | 10            | 21            | 8              |
| Leatherleaf                  | <i>Chamaedaphne calyculata</i>    | 23            | 38            | 14            | 18            | 28            | 10            | 52            | 5             | 36            | 55             |
| Small Cranberry / Marshberry | <i>Vaccinium oxycoccus</i>        | 80            | 130           | 150           | 110           | 221           | 111           | 30            |               | 5             | 51             |
| Light Green Shrub*           | <i>Unknown</i>                    |               | 4             |               |               | 3             |               |               |               |               |                |
| Bog Aster                    | <i>Oclemena nemoralis</i>         |               |               | 5             |               |               |               |               |               |               |                |
| Michaux's Sedge              | <i>Carex michauxiana</i>          |               |               | 8             | 3             |               |               |               |               |               |                |
| Spoon-leaved Sundew          | <i>Drosera intermedia</i> Hayne   |               |               | 9             | 3             | 17            |               |               |               |               |                |
| Sheep Laurel                 | <i>Kalmia angustifolia</i>        |               |               |               |               | 7             | 46            | 8             | 7             |               |                |
| Chuckley Pear                | <i>Amelanchier</i> spp.           |               |               |               |               |               | 2             | 1             | 1             |               | 19             |
| Northern Honey Suckle        | <i>Diervilla lonicera</i>         |               |               |               |               |               |               | 6             |               | 3             |                |
| Canadian Bunchberry          | <i>Cornus canadensis</i>          |               |               |               |               |               |               | 21            | 12            |               |                |
| Paper Birch                  | <i>Betula papyrifera</i>          |               |               |               |               |               |               |               | 4             |               |                |
| Serated Shrub*               | <i>Unknown</i>                    |               |               |               |               |               |               |               |               |               | 17             |

% Cover

| <b>Undergrowth</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|--------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Sphagnum Moss      | <i>Sphagnum papillosum</i> | 75            | 85            | 100           | 100           | 95            | 70            | 100           | 100           | 90            | 80             |
| Grass*             | <i>Unknown</i>             | 20            | 30            | 30            | 5             | 5             | 5             |               |               |               | 10             |
| Mud                | N/A                        | 5             | 15            |               |               | 5             |               |               |               |               |                |
| Dead Grass         | N/A                        |               | 15            | 40            | 50            | 5             |               | 5             |               |               |                |
| Lichen             | <i>Unknown</i>             |               |               |               | 5             |               |               |               |               |               | 30             |
| Soil               | N/A                        |               |               |               |               |               | 30            |               |               | 10            |                |

\*Unidentified Plant

|  |                                    |
|--|------------------------------------|
| <b>Site Name:</b>                            | Roaches Marsh                      |
| <b>Transect #</b>                            | 2 OF 2                             |
|  | (START) N[47.30665] - W [52.82304] |
|  | (END) N[47.30058] - W [ 52.82235]  |
| <b>GPS Coordinates of Start of Transect:</b> |                                    |
| <b>Direction of transect:</b>                | SE                                 |
| <b>Date:</b>                                 | JULY 25 2013                       |

Total # Standing Counts

| <b>Common Name</b>           | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|------------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Sweetgale                    | <i>Myrica gale</i>                | 7             | 7             | 5             | 17            | 7             | 14            | 10            | 12            | 7             | 3              |
| Meadow Sweet                 | <i>Spiraea latifolia</i>          | 10            | 5             |               |               |               |               |               |               |               |                |
| Leatherleaf                  | <i>Chamaedaphne calyculata</i>    | 8             | 15            | 5             | 17            | 15            | 22            | 41            | 4             |               | 11             |
| Larch                        | <i>Larix laricina</i>             |               |               | 5             | 4             | 2             | 8             | 3             | 4             |               | 6              |
| Michaux's Sedge              | <i>Carex michauxiana</i>          |               |               | 2             | 8             | 7             | 2             | 2             | 3             | 7             |                |
| Bog Laurel                   | <i>Kalmia polifolia</i> Wang.     |               | 8             | 8             | 21            | 32            | 41            | 37            | 6             | 4             | 21             |
| Small Cranberry / Marshberry | <i>Vaccinium oxycoccus</i>        |               |               | 71            | 61            | 41            | 77            | 36            | 50            | 47            | 96             |
| Labrador Tea                 | <i>Rhododendron groenlandicum</i> |               |               |               | 4             | 15            | 12            | 32            | 79            |               | 16             |
| Spoon-leaved Sundew          | <i>Drosera intermedia</i> Hayne   |               |               |               |               | 3             | 3             |               | 4             |               |                |
| Sheep Laurel                 | <i>Kalmia angustifolia</i>        |               |               |               |               |               |               | 11            | 5             |               |                |
| Chestnut Sedge               | <i>Carex castanea</i>             |               |               |               |               |               |               |               |               |               | 30             |
| Canadian Bunchberry          | <i>Cornus canadensis</i>          |               |               |               |               |               |               |               |               |               | 4              |

% Cover

| <b>Undergrowth (% Cover)</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|------------------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Grass*                       | <i>Unknown</i>             | 5             |               | 10            |               | 10            | 5             | 5             | 10            | 50            |                |
| Sphagnum moss                | <i>Sphagnum papillosum</i> | 10            | 50            | 95            | 50            | 25            | 100           | 100           | 100           | 50            | 100            |
| Dead grass                   | N/A                        | 15            |               | 5             | 10            |               | 5             |               | 5             |               | 10             |
| Soil                         | N/A                        | 70            | 50            |               |               |               |               |               | 10            | 5             |                |
| Dry Moss                     | N/A                        |               |               |               | 40            | 75            |               |               |               |               |                |

\* Unidentified Plant

## Roaches Marsh Wetland Site – Invertebrate Data

|                            |              |             |
|----------------------------|--------------|-------------|
| <b>Site: Roaches Marsh</b> |              |             |
| <b>GPS Coordinates</b>     |              |             |
| <b>Inflow</b>              | W (52.82297) | N(47.30111) |
| <b>GPS Coordinates</b>     |              |             |
| <b>Outflow</b>             | W(52.82207)  | N(47.30060) |

| <b>INFLOW</b>      |               |                    |              |
|--------------------|---------------|--------------------|--------------|
| <b>Order</b>       | <b>Family</b> | <b>Common Name</b> | <b>Count</b> |
|                    |               | Phylum Mollusca    | 3            |
| Diptera            | Chironimidae  | MIDGE LARVAE       | 29           |
| Hemiptera          | Corixidae     | WATER BOATMAN      | 4            |
| Amphipoda          |               | SCUD               | 4            |
| Hirudinae          |               | LEECH              | 1            |
| Archaeogastropoda. |               | GILLED SNAIL       | 3            |

| <b>Outflow</b> |                 |                     |              |
|----------------|-----------------|---------------------|--------------|
| <b>Order</b>   | <b>Family</b>   | <b>Common Name</b>  | <b>Count</b> |
| Amphipoda      |                 | SCUD                | 5            |
| Odonata        | Anisoptera      | DRAGONFLY NYMPH     | 1            |
| Diptera        | Stratiomyidae   | SOLDIERFLY LARVAE   | 1            |
| Diptera        | Ceratopogonidae | BITING MIDGE LARVAE | 4            |
| Diptera        | Chironimidae    | MIDGE LARVAE        | 2            |

## Roaches Marsh Wetland Site – Stress Evaluation Rubric

**Part 1: Area Features**

| Part 1: Area Features      |                                    |       |                  |      |             |             |                      |        |
|----------------------------|------------------------------------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            | Feature                            |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|                            |                                    | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |                                    | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |                                    | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |                                    | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |                                    | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |                                    | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |                                    | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                |                                    | 2     | Dense            |      |             |             |                      |        |
|                            |                                    | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |                                    | 2     | Dense            |      |             |             |                      |        |
|                            |                                    | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 | Industrial space, north of wetland | 2     | Dense            |      |             |             |                      | 4      |
|                            |                                    | 1     | Sparse           |      | 2           |             | x2                   |        |
|                            |                                    |       |                  |      |             |             |                      | 4      |

**Part 2: Roadways**

|             | Feature              |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | <b>TOTALS</b> |
|-------------|----------------------|-------|------|-------------|-------------|----------------------|---------------|
|             |                      | Value | 3    | 2           | 1           |                      |               |
| Dirt Road   |                      | 1     |      |             |             |                      |               |
| 2 Lane Road | Main Road, Bay Bulls | 2     |      | 4           |             |                      | 4             |
| 4 Lane Road |                      | 3     |      |             |             |                      |               |
|             |                      |       |      |             |             |                      | <b>4</b>      |

**Part 3: Culverts and Dams**

|         | # Present | Comment | <b>TOTALS</b> |
|---------|-----------|---------|---------------|
| Culvert |           |         |               |
| Dam     |           |         |               |
|         |           |         | <b>0</b>      |

|              | <b>TOTALS</b> |
|--------------|---------------|
| Table 1      | 4             |
| Table 2      | 4             |
| Table 3      | 0             |
| <b>Score</b> | <b>8</b>      |

The wetland delineation found in Appendix A (FigureA7) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Features determined to be within 50 m of the wetland boundary were Main Road (Route 10) and an industrial area which was believed to be at an elevation of concern, with a slope that could have greater potential for runoff.

## Beaver Creek Road Wetland Site – Plant Data

|                                       |                                    |
|---------------------------------------|------------------------------------|
| Site Name:                            | BEAVER CREEK RD                    |
| Transect #                            | 1 OF 1                             |
|                                       | (START) N[47.62562] - W [52.82128] |
|                                       | (END) N[47.52586] - W [ 52.82080]  |
| GPS Coordinates of Start of Transect: |                                    |
| Direction of transect:                | NE                                 |
| Date:                                 | JULY 29 2013 (MONDAY)              |

Total # Standing Counts

| Common Name                       | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-----------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Larger Blue Flag Iris             | <i>Iris versicolor</i>            | 7      |        |        |        |        |        |        |        |        |         |
| Spoon-leaved Sundew               | <i>Drosera intermedia</i> Hayne   | 4      | 18     | 5      | 15     |        | 7      | 10     | 3      | 7      | 25      |
| Bog Aster                         | <i>Oclemena nemoralis</i>         | 31     | 84     | 95     | 15     | 7      | 9      | 12     |        |        | 11      |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      | 7      | 40     | 20     | 66     | 35     | 7      | 120    | 10     | 22     |         |
| Little Love Grass                 | <i>Eragrostis minor</i>           | 1      |        |        |        |        |        |        |        |        |         |
| White Beakrush                    | <i>Rhynchospora alba</i>          | 51     | 102    | 20     | 20     | 62     | 10     | 55     | 12     | 70     | 210     |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     | 2      |        | 24     | 9      | 7      | 5      | 11     | 70     | 5      | 3       |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>    | 3      |        | 7      | 25     | 4      | 16     | 7      | 10     | 22     | 42      |
| Sweetgale                         | <i>Myrica gale</i>                | 4      | 2      | 2      | 7      | 4      | 7      | 5      | 4      | 9      | 10      |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>        | 42     | 40     | 35     | 105    | 18     | 30     | 61     |        | 48     | 15      |
| North Eastern Rose                | <i>Rosa nitida</i>                |        |        | 5      |        |        |        |        |        |        |         |
| White Spruce                      | <i>Picea glauca</i>               |        |        |        | 26     |        |        |        |        |        |         |
| Larch                             | <i>Larix laricina</i>             |        |        |        | 1      |        |        | 1      |        | 1      |         |
| Bog buckbean                      | <i>Menyanthes trifoliata</i>      |        |        |        | 25     |        |        | 1      |        |        |         |
| Labrador Tea                      | <i>Rhododendron groenlandicum</i> |        |        |        | 2      |        |        | 15     | 40     | 2      |         |
| Goldthread                        | <i>Coptis trifolia</i>            |        |        |        | 1      |        |        | 15     | 31     |        |         |
| Purple Chokeberry                 | <i>Aronia xprunifolia</i>         |        |        |        |        |        | 13     |        | 1      |        |         |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>        |        |        |        |        |        |        | 42     | 39     | 9      |         |
| Canadian Bunchberry               | <i>Cornus canadensis</i>          |        |        |        |        |        |        |        | 5      |        |         |
| Twinflower                        | <i>Linnaea borealis</i>           |        |        |        |        |        |        |        | 30     |        |         |

% Cover

| Undergrowth   | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|---------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Sphagnum Moss | <i>Sphagnum papillosum</i> | 100    | 85     | 100    | 95     | 80     | 100    | 85     | 90     | 90     | 95      |
| Open Water    | N/A                        |        | 15     |        | 5      | 5      |        |        |        |        |         |
| Grass*        | Unknown                    | 40     | 40     | 50     | 5      | 35     | 55     | 30     | 5      | 5      | 5       |
| Mud           | N/A                        |        |        |        |        | 20     |        | 15     | 10     | 5      | 5       |

\*Unidentified Plant

Plants listed in red were determined to be non-native

## Beaver Creek Road Wetland Site – Invertebrate Data

|                         |            |            |
|-------------------------|------------|------------|
| Site: Beaver Creek Road |            |            |
| GPS Coordinates         |            |            |
| Inflow                  | W 52.82182 | N 47.62551 |
| GPS Coordinates         |            |            |
| Outflow                 | W 52.82293 | N 47.62533 |

### INFLOW

| Order       | Family        | Common Name   | Count |
|-------------|---------------|---------------|-------|
| Trichoptera | Limnephilidae | Caddis fly    | 1     |
| Annelida    |               | Earthworm     | 3     |
| Diptera     | Chironimidae  | Midge Larvae  | 1     |
| Hemiptera   | Corixidae     | Water Boatman | 1     |

### Outflow

| Order       | Family        | Common Name     | Count |
|-------------|---------------|-----------------|-------|
| Trichoptera | Limnephilidae | Caddis Fly      | 7     |
| Odonata     | Anisoptera    | Dragonfly nymph | 3     |
| Diptera     | Culicidae     | Mosquito Larvae | 1     |

Also identified but not an invertebrate - 4-spined stickleback

## Beaver Creek Road Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature                       |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |    |
|----------------------------|-------------------------------|-------|------------------|------|-------------|-------------|----------------------|--------|----|
|                            |                               | Value |                  | 3    | 2           | 1           | X 2                  |        |    |
| Agriculture                |                               | 1     | < 1000 m2        |      |             |             |                      |        |    |
|                            |                               | 2     | 1000 - 10,000    |      |             |             |                      |        |    |
|                            |                               | 3     | > 10,000 m2      |      |             |             |                      |        |    |
| Impervious Surfaces        |                               | 1     | < 1000 m2        |      |             |             |                      |        |    |
|                            |                               | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |    |
|                            |                               | 3     | > 10,000 m2      |      |             |             |                      |        |    |
| Residential                | Residence on Indian Meal Line | 2     | Dense            |      |             | 2           | x2                   | 4      |    |
|                            | Residence on Indian Meal Line |       |                  |      |             | 2           | x2                   | 4      |    |
|                            | Residence on Indian Meal Line | 1     | Sparse           |      |             | 4           | x2                   | 8      |    |
|                            | Residence on Indian Meal Line |       |                  |      |             | 4           | x2                   | 8      |    |
|                            | Residence on Beaver Creek Rd. |       |                  |      |             | 3           |                      |        |    |
|                            |                               |       |                  |      |             |             |                      |        |    |
| Commercial / Institutional |                               | 2     | Dense            |      |             |             |                      |        |    |
|                            |                               | 1     | Sparse           |      |             |             |                      |        |    |
| Industrial                 |                               | 2     | Dense            |      |             |             |                      |        |    |
|                            |                               | 1     | Sparse           |      |             |             |                      |        |    |
|                            |                               |       |                  |      |             |             |                      |        | 27 |

Part 2: Roadways

|             | Feature           |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|-------------------|-------|------|-------------|-------------|----------------------|--------|
|             |                   | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |                   | 1     |      |             |             |                      |        |
| 2 Lane Road | Beaver Creek Road | 2     | 6    |             |             | x2                   | 12     |
| 4 Lane Road |                   | 3     |      |             |             |                      |        |
|             |                   |       |      |             |             |                      | 12     |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert | 1         |         | 1      |
| Dam     |           |         |        |
|         |           |         | 1      |

|         | TOTALS |
|---------|--------|
| Table 1 | 27     |
| Table 2 | 12     |
| Table 3 | 1      |
| Score   | 40     |

The wetland delineation found in Appendix A (Figure A8) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Residences on Indian Meal Line and Beaver Creek Road along with Beaver Creek Road itself were determined to be within 50 m of the wetland boundary, with all except the residence on Beaver Creek Road considered to be at an elevation of concern, with a slope that could have greater potential for runoff.

## Butterpot Road Wetland Site – Plant Data

|                                       |                                    |
|---------------------------------------|------------------------------------|
| Site Name:                            | BUTTER POT ROAD                    |
| Transect #                            | 1 OF 2                             |
|                                       | (START) N[47.39461] - W [53.10531] |
| GPS Coordinates of Start of Transect: | (END) N[47.39447] - W [ 53.10606]  |
| Direction of transect:                | NW                                 |
| Date:                                 | JULY 30 2013 (TUESDAY)             |

Total # Standing Counts

| Common Name                        | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|------------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Pitcher Plant                      | <i>Sarracenia purpurea</i>        | 4      | 3      | 3      |        | 3      | 4      | 7      |        | 2      | 2      |
| Sweetgale                          | <i>Myrica gale</i>                | 14     | 5      | 3      | 7      | 5      | 6      | 8      | 5      | 7      | 8      |
| Bog Aster                          | <i>Oclemena nemoralis</i>         | 7      | 8      | 12     | 4      | 7      | 5      | 7      | 15     | 5      | 4      |
| Three -leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      | 4      |        |        |        |        | 1      | 1      | 2      | 2      |        |
| Leatherleaf                        | <i>Chamaedaphne calyculata</i>    | 2      |        |        | 5      | 4      |        |        |        | 1      |        |
| Tawny Cotton Grass                 | <i>Eriophorum virginicum</i>      | 3      | 5      |        | 4      |        | 3      | 2      |        |        |        |
| Grass-leaved Goldenrod             | <i>Euthamia graminifolia</i>      | 7      | 4      | 3      | 2      | 7      | 2      | 7      | 1      | 2      | 5      |
| Small Cranberry / Marshberry       | <i>Vaccinium oxycoccus</i>        | 50     | 25     | 15     | 105    | 15     | 10     | 10     | 15     | 24     |        |
| Meadow Sweet                       | <i>Spiraea latifolia</i>          |        | 4      |        |        |        |        |        |        |        |        |
| Shrubby Cinquefoil                 | <i>Dasiphora fruticosa</i>        |        |        | 9      |        | 4      |        |        |        | 5      |        |
| Spoon-leaved Sundew                | <i>Drosera intermedia</i> Hayne   |        |        |        |        |        | 7      |        |        |        | 2      |
| Meadow-Rue                         | <i>Thalictrum pubescens</i> Pursh |        |        |        |        |        |        |        | 3      | 5      |        |
| Water Beaked Black Rush*           | Unknown                           |        |        |        |        |        |        | 1      |        |        |        |

% Cover

| Undergrowth     | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-----------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Grass*          | Unknown                    | 60     | 50     | 45     | 10     | 50     | 25     | 50     | 5      | 10     | 5       |
| Sphagnum moss   | <i>Sphagnum papillosum</i> | 80     | 50     | 90     | 50     | 75     | 75     | 75     | 100    | 100    | 95      |
| Black Crowberry | <i>Empetrum nigrum</i>     |        | 5      | 10     |        |        |        |        |        |        | 5       |
| Dry Moss        | N/A                        |        |        |        | 50     |        |        |        |        |        |         |
| Open water      | N/A                        |        |        |        |        |        | 25     |        |        |        |         |

\* Unidentified Plant

|                                       |                                    |
|---------------------------------------|------------------------------------|
| Site Name:                            | BUTTER POT ROAD                    |
| Transect #                            | 2 OF 2                             |
|                                       | (START) N[47.39423] - W [53.10027] |
| GPS Coordinates of Start of Transect: | (END) N[47.39462] - W [ 53.10597]  |
| Direction of transect:                | NW                                 |
| Date:                                 | JULY 30 2013 (TUESDAY)             |

Total # Standing Counts

| Common Name                        | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|------------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Meadow Sweet                       | <i>Spiraea latifolia</i>          | 15     | 17     | 3      |        |        |        |        |        |        |        |
| Sweetgale                          | <i>Myrica gale</i>                | 3      | 12     | 2      |        |        | 3      |        |        | 7      | 8      |
| Bog Aster                          | <i>Oclemena nemoralis</i>         | 15     | 5      | 7      |        |        | 5      |        |        | 25     | 17     |
| Leatherleaf                        | <i>Chamaedaphne calyculata</i>    | 4      |        | 3      |        |        |        |        |        |        | 2      |
| Grass-leaved Goldenrod             | <i>Euthamia graminifolia</i>      | 1      |        | 3      | 4      | 2      | 2      | 5      | 2      | 3      | 7      |
| Pitcher Plant                      | <i>Sarracenia purpurea</i>        |        | 1      |        |        | 7      | 1      |        | 5      | 4      | 2      |
| Tawny Cotton Grass                 | <i>Eriophorum virginicum</i>      |        | 1      |        |        |        |        | 4      |        |        | 4      |
| Larch                              | <i>Larix laricina</i>             |        |        | 1      |        |        |        |        | 2      | 1      |        |
| Bog Rush                           | <i>Juncus effusus</i>             |        |        | 4      |        |        |        |        |        |        |        |
| Meadow-Rue                         | <i>Thalictrum pubescens</i> Pursh |        |        | 3      | 7      | 4      |        | 4      |        |        |        |
| Labrador Tea                       | <i>Rhododendron groenlandicum</i> |        |        |        |        | 3      | 4      | 3      | 5      |        |        |
| Rose Pogonia                       | <i>Pogonia ophioglossoides</i>    |        |        |        |        |        | 1      | 2      |        | 2      |        |
| Three- leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      |        |        |        |        |        | 2      |        |        | 2      |        |
| Spoon-leaved Sundew                | <i>Drosera intermedia</i> Hayne   |        |        |        |        |        |        | 3      | 2      |        |        |
| Bog Laurel                         | <i>Kalmia polifolia</i> Wang.     |        |        |        |        |        |        | 3      | 7      | 7      | 5      |

% Cover

| Undergrowth       | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Moss              | <i>Sphagnum papillosum</i> | 90     | 70     | 100    | 70     | 50     | 80     | 40     | 100    | 100    | 100     |
| Grass*            | Unknown                    | 10     | 40     | 10     | 70     | 70     | 30     | 80     | 40     | 40     | 40      |
| Muck              | N/A                        |        | 30     |        |        | 10     | 10     |        |        |        |         |
| Dry Sphagnum Moss | N/A                        |        |        |        | 30     | 40     |        |        |        |        |         |
| Open Water        | N/A                        |        |        |        |        |        | 10     |        |        |        |         |

\*Unidentified Plant



## Butterpot Road Wetland Site – Invertebrate Data

|                      |            |           |
|----------------------|------------|-----------|
| Site: Butterpot Road |            |           |
| GPS Coordinates      |            |           |
| Inflow               | N/A        |           |
| GPS Coordinates      |            |           |
| Outflow              | W 53.10551 | N 47.3951 |

| INFLOW    |             |                 |       |
|-----------|-------------|-----------------|-------|
| Order     | Family      | Common Name     | Count |
| Hirudinae |             | leech           | 1     |
| Veneroida | Sphaeriidae | pill clam       | 2     |
| Odonata   | Anisoptera  | dragonfly nymph | 4     |
| Diptera   | Tabanidae   | stout nymph     | 2     |
| Annelida  |             | Earthworms      | 5     |
| Amphipoda |             | Scuds           | 3     |

| Outflow   |            |                 |       |
|-----------|------------|-----------------|-------|
| Order     | Family     | Common Name     | Count |
| Odonata   | Anisoptera | Dragonfly Nymph | ?     |
| Amphipoda |            | scud            | ?     |
| Diptera   | Tabanidae  | stout           | ?     |
| Araneae   | Araneidae  | Shamrock spider | ?     |

Also identified but not an invertebrate - 3-spined stickleback

? Indicates that counts were not recorded

## Butterpot Road Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

| Table 1: Area Features     |                            |       |                  |      |             |             |                      |        |
|----------------------------|----------------------------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            | Feature                    |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|                            |                            | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |                            | 1     | < 1000 m2        |      | 2           |             |                      |        |
|                            |                            | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |                            | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |                            | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |                            | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |                            | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                | Residence North of wetland | 2     | Dense            |      |             |             |                      | 4      |
|                            |                            | 1     | Sparse           |      | 2           |             | x2                   |        |
| Commercial / Institutional |                            | 2     | Dense            |      |             |             |                      |        |
|                            |                            | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |                            | 2     | Dense            |      |             |             |                      |        |
|                            |                            | 1     | Sparse           |      |             |             |                      |        |
|                            |                            |       |                  |      |             |             |                      |        |
|                            |                            |       |                  |      |             |             |                      | 4      |

Part 2: Roadways

|             | Feature        |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|----------------|-------|------|-------------|-------------|----------------------|--------|
|             |                | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |                | 1     |      |             |             |                      |        |
| 2 Lane Road | Butterpot Road | 2     | 6    |             |             |                      | 6      |
| 4 Lane Road |                | 3     |      |             |             |                      |        |
|             |                |       |      |             |             |                      | 6      |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 4      |
| Table 2 | 6      |
| Table 3 | 0      |
| Score   | 10     |

The wetland delineation found in Appendix A (Figure A9) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Butterpot Road and one residence were determined to be located within 50 m of the wetland boundary, with the residence believed to be at an elevation of concern, with a slope that could have greater potential for runoff.

## Southlands Site 1 Wetland Site – Plant Data

|                                    |   |
|------------------------------------|---|
| <b>Site Name:</b>                  | SOUTHLANDS SITE 1   |
| <b>Transect #</b>                  | 1 OF 2  |
| <b>GPS Coordinates of Transect</b> | (START) N[47.39461] - W [53.10531]<br>(END) N[47.39447] - W [ 53.10606] |
| <b>Direction of transect:</b>      | SE  |
| <b>Date:</b>                       | AUGUST 06 2013 (TUESDAY)  |

Total # Standing Counts

| Common Name                        | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|------------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sweetgale                          | <i>Myrica gale</i>                | 30     | 25     |        | 8      | 7      | 4      | 3      | 5      | 4      | 12     |
| Common Bedstraw                    | <i>Galium palustre</i>            | 25     |        |        |        |        |        |        |        |        |        |
| Cotton Grass                       | <i>Eriophorum viridicarinatum</i> |        | 3      | 2      |        |        |        | 3      |        |        |        |
| Burreed                            | <i>Sparganium spp.</i>            |        | 14     |        |        |        |        |        |        |        |        |
| Northwest Territory sedge          | <i>Carex utriculata</i>           |        |        | 41     | 8      | 15     |        |        |        |        |        |
| Canadian rush                      | <i>Juncus canadensis</i>          |        |        |        | 12     | 5      | 7      |        |        |        |        |
| Bog Aster                          | <i>Oclemena nemoralis</i>         |        |        |        | 5      | 21     | 12     | 25     | 22     | 8      | 5      |
| Leatherleaf                        | <i>Chamaedaphne calyculata</i>    |        |        |        | 4      |        | 1      | 7      | 4      | 7      | 17     |
| Northern Long Sedge                | <i>Carex folliculata</i>          |        |        |        |        | 2      | 5      |        | 5      |        |        |
| Grass-leaved Goldenrod             | <i>Euthamia graminifolia</i>      |        |        |        |        | 7      |        |        |        | 21     | 8      |
| White Beakrush                     | <i>Rhynchospora alba</i>          |        |        |        |        | 8      | 8      |        |        |        |        |
| Bog Laurel                         | <i>Kalmia polifolia</i> Wang.     |        |        |        |        |        | 2      |        |        | 4      | 11     |
| Spoon-leaved Sundew                | <i>Drosera intermedia</i> Hayne   |        |        |        |        | 4      | 7      | 8      | 5      | 4      |        |
| Pitcher Plant                      | <i>Sarracenia purpurea</i>        |        |        |        |        |        |        | 1      |        |        |        |
| Northeastern Rose                  | <i>Rosa nitida</i>                |        |        |        |        |        |        | 5      |        |        | 7      |
| Three- leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      |        |        |        |        |        |        | 5      | 18     | 9      | 25     |
| Labrador Tea                       | <i>Rhododendron groenlandicum</i> |        |        |        |        |        |        | 4      |        | 3      | 4      |
| Black Crowberry                    | <i>Empetrum nigrum</i>            |        |        |        |        |        |        |        | 1      |        |        |

% Cover

| Undergrowth | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Grass*      | Unknown                    | 20     | 40     | 5      | 5      | 10     | 25     | 5      | 5      |        |         |
| Open Water  | N/A                        | 40     | 20     | 80     |        |        | 5      |        |        |        |         |
| Moss        | <i>Sphagnum papillosum</i> | 20     | 40     |        | 90     | 95     | 80     | 90     | 95     | 95     | 95      |

\*Unidentified Plant

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | SOUTHLAND GLENCREST-1   |
| <b>Transect #</b>                   | 2 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.49907] - W [52.82245]<br>(END) N[47.49911] - W [ 52.82178] |
| <b>Direction of transect:</b>       | NW  |
| <b>Date:</b>                        | AUGUST 06 2013 (TUESDAY)  |

Total # Standing Counts

| Common Name                       | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|-----------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Labrador Tea                      | <i>Rhododendron groenlandicum</i> | 8      | 7      | 32     | 23     | 11     |        |        |        |        |        |
| Sweetgale                         | <i>Myrica gale</i>                | 26     | 9      | 17     | 8      | 23     | 28     | 20     | 13     | 12     | 11     |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>    | 15     | 27     | 28     | 19     | 12     | 11     | 4      |        | 2      |        |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     | 15     | 16     | 31     | 14     | 4      |        |        |        |        |        |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>        | 10     | 8      | 17     | 8      | 1      |        |        |        |        |        |
| Pitcher Plant                     | <i>Sarracenia purpurea</i>        | 8      | 5      |        | 2      | 4      | 3      |        |        |        |        |
| Larch                             | <i>Larix laricina</i>             | 3      |        |        | 1      | 3      | 2      |        |        |        |        |
| Bog aster                         | <i>Oclemena nemoralis</i>         | 15     | 7      |        |        | 7      | 15     | 24     | 4      | 67     | 5      |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>        | 25     | 31     | 42     | 10     | 7      | 7      |        |        |        |        |
| Clover*                           | Unknown                           | 24     | 1      | 4      |        |        |        |        |        |        |        |
| Canadian Bunchberry               | <i>Cornus canadensis</i>          |        | 27     | 24     | 4      |        |        |        |        |        |        |
| Common Juniper                    | <i>Juniperus communis</i>         |        | 1      |        |        |        |        |        |        |        |        |
| Mountain Holly                    | <i>Ilex mucronata</i>             | 1      | 4      |        |        | 2      | 2      |        | 3      | 3      |        |
| Northern Wild Raisin              | <i>Viburnum nudum</i>             |        |        |        | 7      |        |        |        |        |        | 34     |
| Grass-leaved Goldenrod            | <i>Euthamia graminifolia</i>      |        |        |        |        |        | 3      |        |        |        |        |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      |        |        |        |        |        | 3      |        |        |        |        |
| Canadian Rush                     | <i>Juncus canadensis</i>          |        |        |        |        |        |        |        | 5      | 4      |        |
| Narrow-leaved Burreed             | <i>Sparganium angustifolium</i>   |        |        |        |        |        |        |        | 1      | 15     |        |
| Northeastern Rose                 | <i>Rosa nitida</i>                |        |        |        |        |        |        |        |        |        | 3      |
| Turtlehead                        | <i>Chelone glabra</i>             |        |        |        |        |        |        |        |        |        | 4      |

% Cover

| Undergrowth         | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|---------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Moss                | <i>Sphagnum papillosum</i> | 90     | 100    | 95     | 100    | 100    | 100    |        | 5      |        | 10      |
| Grass / Shrubs*     | Unknown                    | 10     | 25     | 10     | 15     | 5      | 25     |        |        | 50     |         |
| Dead Organic Matter | N/A                        | 5      |        | 15     | 5      |        |        | 30     |        |        |         |
| Beaked Sedge*       | Unknown                    |        |        |        |        |        |        | 70     | 70     |        |         |
| Open Water          | N/A                        |        |        |        |        |        |        |        |        | 75     |         |

\*Unidentified Plant

## Southlands Site 1 Wetland Site – Invertebrate Data

|                         |            |           |
|-------------------------|------------|-----------|
| Site: Southlands Site 1 |            |           |
| GPS Coordinates         |            |           |
| Inflow                  | N/A        |           |
| GPS Coordinates         |            |           |
| Outflow                 | W 52.81286 | N 47.4957 |

### Portion of South Brook (Outflow)

| Order     | Family                | Common Name     | Count |
|-----------|-----------------------|-----------------|-------|
| Odonata   |                       | Dragonfly nymph | 6     |
| Hemiptera | Notonectidae          | Water boatman   | 12    |
| Diptera   | Nematocera (suborder) | Midge Larvae    | 12    |
| Diptera   | Syrphidae             | Flower flies    | 1     |

## Southlands Site 1 Wetland Site – Stress Evaluation Rubric

### Part 1: Area Features

|                            | Feature |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|---------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |         | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
|                            |         |       |                  |      |             |             |                      | 0      |

### Part 2: Roadways

|             | Feature |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|---------|-------|------|-------------|-------------|----------------------|--------|
|             |         | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |         | 1     |      |             |             |                      |        |
| 2 Lane Road |         | 2     |      |             |             |                      |        |
| 4 Lane Road |         | 3     |      |             |             |                      |        |
|             |         |       |      |             |             |                      | 0      |

### Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 0      |
| Table 2 | 0      |
| Table 3 | 0      |
| Score   | 0      |

The wetland delineation found in Appendix A (Figure A10) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. The Southlands Site 1 wetland study site received a score of zero in the rubric because there were no human features that fit in the rubric found within 50 m of the wetland boundary. There was a gravel path (believed to be an access way to the water towers at the top of the hill) which was not included in the rubric because it was not believed to have as large an impact as a groomed gravel road would. This wetland is located within the proposed Galway development area, and as such will likely have more intensive land development in the surroundings in the future.

## Southlands Site 2 Wetland Site – Plant Data

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Southlands Site 2   |
| <b>Transect #</b>                   | 1 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.49657] - W [52.83960]<br>(END) N[47.49630] - W [ 52.84005] |
| <b>Direction of transect:</b>       | SE  |
| <b>Date:</b>                        | AUGUST 07 2013 (WEDNESDAY)  |

Total # Standing Counts

| <b>Common Name</b>                | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad10</b> |
|-----------------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      | 80            | 25            | 54            | 259           | 108           | 185           | 285           | 210           | 205           | 85            |
| Sweetgale                         | <i>Myrica gale</i>                | 3             | 4             | 3             | 3             | 4             |               | 1             | 3             | 1             |               |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>        | 45            | 10            | 54            | 15            | 60            | 45            | 48            | 55            | 13            | 10            |
| Bog Aster                         | <i>Oclemena nemoralis</i>         |               | 24            | 10            | 7             | 3             | 3             |               |               |               |               |
| White Beakrush                    | <i>Rhynchospora alba</i>          |               | 75            | 200           | 210           |               |               |               |               |               |               |
| Pitcher Plant                     | <i>Sarracenia purpurea</i>        |               |               | 3             |               |               |               |               |               |               |               |
| Canadian Rush                     | <i>Juncus canadensis</i>          |               |               | 17            |               |               |               |               |               |               |               |
| Labrador Tea                      | <i>Rhododendron groenlandicum</i> |               |               |               | 4             | 10            | 5             | 18            | 25            | 28            | 35            |
| Spoon-leaved Sundew               | <i>Drosera intermedia</i> Hayne   |               |               |               | 7             | 4             | 12            | 18            | 3             | 7             | 5             |
| Larch                             | <i>Larix laricina</i>             |               |               |               |               | 4             | 4             |               | 2             | 7             | 3             |
| Grass-leaved Goldenrod            | <i>Euthamia graminifolia</i>      |               |               |               |               |               | 1             |               |               |               |               |
| Black Crowberry                   | <i>Empetrum nigrum</i>            |               |               |               | 18            | 85            | 120           | 180           | 78            | 155           | 120           |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     |               |               |               |               |               |               | 3             | 2             | 4             | 3             |
| Clover*                           | Unknown                           |               |               |               |               |               |               |               | 3             | 3             |               |
| Bakeapple                         | <i>Rubus chamaemorus</i>          |               |               |               |               |               |               |               |               | 2             | 3             |

% Cover

| <b>Undergrowth</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|--------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Grass*             | Unknown                    | 5             | 10            | 15            | 20            |               |               |               |               |               |                |
| Moss               | <i>Sphagnum papillosum</i> | 80            | 60            | 75            | 80            | 60            | 80            | 100           | 95            | 100           | 95             |
| Water              | N/A                        |               | 40            | 5             |               | 10            | 5             |               | 5             |               |                |
| Lichen*            | Unknown                    |               |               |               |               |               |               |               |               |               | 5              |

\*Unidentified Plant

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Southlands Site 2   |
| <b>Transect #</b>                   | 2 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.49590] - W [52.84024]<br>(END) N[47.49587] - W [ 53.84087] |
| <b>Direction of transect:</b>       | SE  |
| <b>Date:</b>                        | AUGUST 07 2013 (WEDNESDAY)  |

Total # Standing Counts

| <b>Common Name</b>                | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad10</b> |
|-----------------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Sweetgale                         | <i>Myrica gale</i>                | 15            | 29            | 17            | 2             | 17            | 17            | 15            | 24            |               | 32            |
| Labrador tea                      | <i>Rhododendron groenlandicum</i> | 5             | 10            | 16            |               | 5             | 17            | 8             | 38            | 25            | 3             |
| Bog Aster                         | <i>Oclemena nemoralis</i>         | 6             |               | 7             | 1             |               | 1             | 1             |               |               | 4             |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>    | 11            | 3             | 6             | 4             | 82            | 9             | 32            | 18            | 11            | 28            |
| Pitcher Plant                     | <i>Sarracenia purpurea</i>        | 1             | 2             | 2             | 1             | 5             | 7             | 9             |               |               |               |
| Mountain Holly                    | <i>Ilex mucronata</i>             | 3             | 5             | 5             | 3             | 7             | 5             | 3             | 2             |               |               |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>        | 45            | 25            | 15            | 12            | 25            | 15            | 28            | 45            | 48            | 40            |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      | 2             | 7             |               |               | 10            | 8             |               |               |               |               |
| Northern Wild Raisin              | <i>Viburnum nudum</i>             |               | 7             | 1             |               |               |               | 1             |               |               |               |
| Grass-leaved Goldenrod            | <i>Euthamia graminifolia</i>      |               | 11            | 5             | 5             | 4             |               | 1             |               |               |               |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     | 2             | 1             | 1             | 3             | 8             | 2             | 6             | 6             | 24            | 11            |
| Black Crowberry                   | <i>Empetrum nigrum</i>            |               | 16            | 19            |               | 110           | 40            |               | 208           | 22            |               |
| Larch                             | <i>Larix laricina</i>             |               | 1             |               |               | 2             | 2             |               | 1             |               |               |
| Mushroom                          | Unknown                           |               | 1             | 2             |               | 1             |               | 2             |               |               |               |
| Canadian Bunchberry               | <i>Cornus canadensis</i>          |               |               | 16            |               |               | 1             |               |               |               |               |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>        |               |               | 4             | 10            | 8             | 9             | 24            |               | 19            | 8             |
| Lowbush Blueberry                 | <i>Vaccinium angustifolium</i>    |               |               |               |               |               | 2             |               |               |               |               |
| Spoon-leaved Sundew               | <i>Drosera intermedia</i> Hayne   |               |               |               |               |               |               | 18            |               |               |               |

% Cover

| <b>Undergrowth</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|--------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Moss               | <i>Sphagnum papillosum</i> | 100           | 100           | 90            | 100           | 100           | 75            | 90            | 50            | 100           | 100            |
| Grass*             | Unknown                    | 5             | 50            |               |               |               |               | 5             | 5             | 15            | 5              |
| Dead shrubs        | N/A                        | 70            |               | 60            |               | 60            | 55            | 40            |               |               | 15             |

\*Unidentified Plant

## Southlands Site 2 Wetland Site – Invertebrate Data

|                   |                             |            |
|-------------------|-----------------------------|------------|
| Southlands Site 2 |                             |            |
| GPS Coordinates   |                             |            |
| Inflow            | N[47.49587] - W [ 52.84087] |            |
| GPS Coordinates   |                             |            |
| Outflow           | N 47.49584                  | W 52.83939 |

### South Brook

| Order     | Family       | Common Name   | Count |
|-----------|--------------|---------------|-------|
| Veneroida | Sphaeriidae  | Pill Clam     | 3     |
| Hemiptera | Notonectidae | Water boatman | 2     |
| Amphipoda |              | Scud          | 10    |

Also identified but not an invertebrate –tadpoles

## Southlands Site 2 Wetland Site – *Stress Evaluation Rubric*

### Part 1: Area Features

| Land-Use / Land-Cover Features | Feature |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|--------------------------------|---------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                                |         | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                    |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                                |         | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                                |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces            |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                                |         | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                                |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                    |         | 2     | Dense            |      |             |             |                      |        |
|                                |         | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional     |         | 2     | Dense            |      |             |             |                      |        |
|                                |         | 1     | Sparse           |      |             |             |                      |        |
| Industrial                     |         | 2     | Dense            |      |             |             |                      |        |
|                                |         | 1     | Sparse           |      |             |             |                      |        |
|                                |         |       |                  |      |             |             |                      | 0      |

### Part 2: Roadways

|             | Feature |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|---------|-------|------|-------------|-------------|----------------------|--------|
|             |         | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |         | 1     |      |             |             |                      |        |
| 2 Lane Road |         | 2     |      |             |             |                      |        |
| 4 Lane Road |         | 3     |      |             |             |                      |        |
|             |         |       |      |             |             |                      | 0      |

### Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 0      |
| Table 2 | 0      |
| Table 3 | 0      |
| Score   | 0      |

The wetland delineation found in Appendix A (Figure A11) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. The Southlands Site 2 wetland study site received a score of zero in the rubric because there were no features found within 50 m of the boundary that fit the categories used in the rubric. There were a series of hiking trails in the area which were not included in the rubric, and also a series of pole lines to the north that fell outside the 50 m limit. This wetland is located within the proposed Galway development area and there will likely be more intensive land development in the surroundings in the future

## Gull Pond Road Wetland Site – Plant Data

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Gullpond Rd   |
| <b>Transect #</b>                   | 1 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.29194] - W [52.84283]<br>(END) N[47.29159] - W [ 52.84264] |
| <b>Direction of transect:</b>       | SW  |
| <b>Date:</b>                        | AUGUST 13 2013 (Tuesday)  |

| Total # Standing Counts     |                                   |               |               |               |               |               |               |               |               |               |                |
|-----------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| <b>Common Name</b>          | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
| Leatherleaf                 | <i>Chamaedaphne calyculata</i>    | 35            | 7             | 5             | 7             | 18            | 25            | 35            | 15            | 5             | 12             |
| Bog Laurel                  | <i>Kalmia polifolia</i> Wang.     | 18            | 10            | 6             | 3             | 4             | 28            | 7             | 14            | 35            | 5              |
| Pitcher Plant               | <i>Sarracenia purpurea</i>        | 4             | 4             |               |               |               |               | 2             |               | 1             |                |
| Black Crowberry             | <i>Empetrum nigrum</i>            | 80            | 100           | 32            | 15            | 30            | 72            | 42            | 18            | 70            | 25             |
| Sheep Laurel                | <i>Kalmia angustifolia</i>        | 12            |               |               |               | 7             | 3             | 27            | 25            | 17            | 5              |
| Larch                       | <i>Larix laricina</i>             | 1             | 1             |               |               |               |               | 1             |               | 2             |                |
| Labrador Tea                | <i>Rhododendron groenlandicum</i> | 18            | 4             |               |               | 5             | 12            | 27            | 12            | 19            | 5              |
| Tawny Cotton Grass          | <i>Eriophorum virginicum</i>      |               | 1             |               |               |               |               |               |               |               |                |
| White Beakrush              | <i>Rhynchospora alba</i>          |               |               | 18            | 41            |               |               |               |               |               |                |
| Small Cranberry/ Marshberry | <i>Vaccinium oxycoccus</i>        |               |               | 17            | 81            | 144           | 4             |               |               | 7             | 5              |
| Sweetgale                   | <i>Myrica gale</i>                |               |               |               | 1             |               |               |               |               |               |                |
| Spoon-leaved Sundew         | <i>Drosera intermedia</i> Hayne   |               |               |               | 2             | 3             |               |               |               |               |                |
| Bakeapple                   | <i>Rubus chamaemorus</i>          |               |               |               |               |               |               | 8             | 5             |               | 2              |
| Purple Chokeberry           | <i>Aronia xprunifolia</i>         |               |               |               |               |               |               |               | 17            | 14            | 42             |

| % Cover                      |                            |               |               |               |               |               |               |               |               |               |                |
|------------------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| <b>Undergrowth (% Cover)</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
| Moss                         | <i>Sphagnum papillosum</i> | 80            | 90            | 73            | 80            | 100           | 90            | 10            | 10            | 60            | 30             |
| Grass*                       | Unknown                    | 5             | 5             | 5             |               | 5             |               | 5             | 5             | 5             |                |
| Dry Moss                     | N/A                        |               |               |               |               |               | 5             | 80            | 80            | 10            | 5              |
| Lichen*                      | Unknown                    |               |               |               |               |               |               |               | 5             | 10            | 30             |

\*Unidentified Plant

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Gullpond Rd.  |
| <b>Transect #</b>                   | 2 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.29191] - W [52.84284]<br>(END) N[47.29183] - W [ 53.84348] |
| <b>Direction of transect:</b>       | SE  |
| <b>Date:</b>                        | AUGUST 13 2013 (Tuesday)  |

| Total # Standing Counts      |                                   |               |               |               |               |               |               |               |               |               |                |
|------------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| <b>Common Name</b>           | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
| Bog Laurel                   | <i>Kalmia polifolia</i> Wang.     | 81            | 22            | 27            | 13            | 18            | 40            | 28            | 59            | 17            | 57             |
| Sheep Laurel                 | <i>Kalmia angustifolia</i>        | 5             |               | 13            | 18            | 42            | 8             | 22            | 5             | 1             | 1              |
| Black Crowberry              | <i>Empetrum nigrum</i>            | 44            | 7             | 84            | 34            | 22            | 12            | 60            | 35            | 1             | 22             |
| Labrador Tea                 | <i>Rhododendron groenlandicum</i> | 10            |               | 64            | 17            | 24            | 19            | 15            | 6             | 3             | 9              |
| Leatherleaf                  | <i>Chamaedaphne calyculata</i>    | 14            | 2             | 9             | 9             | 25            | 6             | 5             | 6             | 2             | 9              |
| Larch                        | <i>Larix laricina</i>             | 2             |               |               |               |               |               | 1             |               |               |                |
| Small Cranberry / Marshberry | <i>Vaccinium oxycoccus</i>        | 21            | 55            | 35            | 15            | 15            | 65            | 21            | 10            | 45            | 24             |
| Spoon-leaved Sundew          | <i>Drosera intermedia</i> Hayne   |               | 3             | 2             |               |               |               |               |               |               |                |
| Lowbush Blueberry            | <i>Vaccinium angustifolium</i>    |               |               | 15            | 8             | 1             | 2             | 2             | 35            | 22            | 35             |
| Bakeapple                    | <i>Rubus chamaemorus</i>          |               |               | 41            | 19            | 10            | 28            | 25            | 5             | 13            | 8              |
| Canadian Bunchberry          | <i>Cornus canadensis</i>          |               |               | 8             |               |               |               |               |               |               |                |
| Northern Wild Raisin         | <i>Viburnum nudum</i>             |               |               | 3             |               | 3             |               |               |               |               |                |
| Purple Chokeberry            | <i>Aronia xprunifolia</i>         |               |               |               |               | 12            |               |               |               |               |                |
| Spruce                       | <i>Picea spp.</i>                 |               |               |               |               | 2             |               |               |               |               |                |
| Pitcher Plant                | <i>Sarracenia purpurea</i>        |               |               |               |               |               | 4             |               |               |               |                |
| Common Juniper               | <i>Juniperus communis</i>         |               |               |               |               |               | 1             |               |               |               |                |

| % Cover                      |                            |               |               |               |               |               |               |               |               |               |                |
|------------------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| <b>Undergrowth (% Cover)</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
| Lichen*                      | Unknown                    | 5             |               |               |               | 50            | 75            | 5             | 15            | 40            |                |
| Moss                         | <i>Sphagnum papillosum</i> | 100           | 100           | 100           | 20            | 20            | 75            | 95            | 60            | 60            | 100            |
| Grass*                       | Unknown                    | 5             | 5             |               |               | 5             |               |               |               |               |                |
| Dirt                         | N/A                        |               |               |               | 50            |               |               |               | 25            |               |                |

\*Unidentified Plant



## Gull Pond Road Wetland Site – Invertebrate Data

|                         |                |
|-------------------------|----------------|
| Site:                   | Gull Pond Road |
| GPS Coordinates Inflow  | N/A            |
| GPS Coordinates Outflow | N/A            |

### Standing pool

| Order     | Family     | Common Name       | Count |
|-----------|------------|-------------------|-------|
| Odonata   | Anisoptera | Dragon fly Nymph  | 2     |
| Hemiptera | Pleidae    | Pygmy Backswimmer | 3     |
| Hemiptera | Corixidae  | Water Boatman     | 1     |

## Gull Pond Road Wetland Site – *Stress Evaluation Rubric*

### Part 1: Area Features

| Part 1: Area Features         |   |       |                  |      |             |             |                      |        |
|-------------------------------|---|-------|------------------|------|-------------|-------------|----------------------|--------|
|                               | Feature   |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|                               |   | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                   |   | 1     | < 1000 m2        |      |             |             |                      |        |
|                               |   | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                               |   | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces           |   | 1     | < 1000 m2        |      |             |             |                      |        |
|                               |   | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                               |   | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                   | Gull Pond Rd<br>Residence North of<br>wetland     | 2     | Dense            |      | 4           |             | x2                   | 8      |
|                               | Residence on south<br>side of Gull Pond Rd        |       |                  |      | 4           |             | x2                   | 8      |
|                               | Gull Pond Rd<br>Residence Southeast<br>of wetland |       |                  |      | 1           |             | 2                    | x2     |
| Commercial /<br>Institutional |   | 2     | Dense            |      |             |             |                      |        |
|                               |   | 1     | Sparse           |      |             |             |                      |        |
| Industrial                    |   | 2     | Dense            |      |             |             |                      |        |
|                               |   | 1     | Sparse           |      |             |             |                      |        |
|                               |   |       |                  |      |             |             |                      |        |
|                               |   |       |                  |      |             |             |                      |        |
| 20                            |   |       |                  |      |             |             |                      |        |

### Part 2: Roadways

|             | Feature        |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|----------------|-------|------|-------------|-------------|----------------------|--------|
|             |                | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |                | 1     |      |             |             |                      |        |
| 2 Lane Road | Gull Pond Road | 2     |      | 4           |             | x2                   | 8      |
| 4 Lane Road |                | 3     |      |             |             |                      |        |
|             |                |       |      |             |             |                      | 8      |

### Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 20     |
| Table 2 | 8      |
| Table 3 | 0      |
| Score   | 28     |

The wetland delineation found in Appendix A (Figure A12) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Gull Pond Road and residences on Gull Pond Road were determined to be located within 50 m of the wetland boundary, and were all considered to be at an elevation of concern, with a slope that could have greater potential for runoff. There were also trails located to the northwest side, and a pole line that ran through the wetland which were not included in the rubric.

## Bauline Line Extension Wetland Site – Plant Data

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Bauline Line Extension  |
| <b>Transect #</b>                   | 1 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.68131] - W [52.80258]<br>(END) N[47.68172] - W [ 52.80242] |
| <b>Direction of transect:</b>       | NW  |
| <b>Date:</b>                        | AUGUST 14 2013 (Wednesday)  |

Total # Standing Counts

| Common Name                       | Species Name                   | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|-----------------------------------|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Pitcher Plant                     | <i>Sarracenia purpurea</i>     | 3      | 8      |        |        |        |        | 3      | 5      | 2      |        |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>   | 6      |        | 3      |        |        |        |        |        |        |        |
| Meadow-rue                        | <i>Thalictrum pubescens</i>    | 17     | 4      | 5      | 7      | 2      | 3      | 5      | 1      |        | 3      |
| Sweetgale                         | <i>Myrica gale</i>             | 3      | 2      |        |        |        | 7      | 4      |        | 7      | 19     |
| Northeastern Rose                 | <i>Rosa nitida</i>             | 4      | 1      |        |        |        | 1      | 2      |        |        |        |
| Shrubby Cinquefoil                | <i>Dasiphora fruticosa</i>     | 1      |        | 2      | 4      | 5      |        |        |        | 9      | 2      |
| Grass-leaved Goldenrod            | <i>Euthamia graminifolia</i>   | 8      | 3      |        | 1      | 5      |        | 4      | 8      | 12     | 2      |
| Bog Aster                         | <i>Oclemena nemoralis</i>      | 4      | 2      | 2      | 17     | 8      | 9      | 5      | 15     | 7      | 5      |
| Bog Buckbean                      | <i>Menyanthes trifoliata</i>   |        | 40     | 4      |        |        |        |        |        |        | 3      |
| Rough Horsetail                   | <i>Equisetum hyemale</i>       | 1      | 11     | 10     | 14     | 14     | 9      | 8      | 7      | 4      |        |
| Canadian rush                     | <i>Juncus canadensis</i>       |        | 3      | 2      |        | 3      |        |        |        |        |        |
| White Beakrush                    | <i>Rhynchospora alba</i>       |        |        | 15     | 17     |        | 10     |        |        |        |        |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i> |        |        | 1      | 1      | 1      |        |        | 2      |        | 13     |
| Purple Chokeberry                 | <i>Aronia xprunifolia</i>      |        |        |        |        | 5      |        | 3      |        |        |        |
| Cuckooflower / Lady's Smock       | <i>Cardamine pratensis</i>     |        |        |        |        | 5      | 4      |        |        |        |        |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.  |        |        |        |        | 2      | 5      |        | 1      |        |        |
| Larch                             | <i>Larix laricina</i>          |        |        |        |        |        |        | 2      |        |        |        |
| Twinflower                        | <i>Linnaea borealis</i>        |        |        |        |        |        |        | 2      | 1      |        |        |
| Black Crowberry                   | <i>Empetrum nigrum</i>         |        |        |        |        |        |        | 10     |        |        | 15     |
| Small Cranberry/ Marshberry       | <i>Vaccinium oxycoccus</i>     |        |        |        |        |        |        | 2      | 1      |        | 15     |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>     |        |        |        |        |        |        |        |        | 3      |        |

% Cover

| Undergrowth | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Grass       | Unknown                    | 80     | 40     | 70     | 80     | 90     | 90     | 70     | 90     | 90     | 65      |
| Dead grass  | N/A                        |        |        | 10     | 10     | 5      | 5      | 5      |        |        | 20      |
| Open water  | N/A                        |        | 60     | 10     | 5      | 5      | 5      | 5      | 5      | 10     | 10      |
| Moss        | <i>Sphagnum papillosum</i> |        |        |        |        |        |        | 10     |        |        |         |

Plants listed in red were determined to be non-native

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Bauline Line Extension  |
| <b>Transect #</b>                   | 2 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.68131] - W [52.80258]<br>(END) N[47.68172] - W [ 52.80242] |
| <b>Direction of transect:</b>       | NW  |
| <b>Date:</b>                        | AUGUST 14 2013 (Wednesday)  |

Total # Standing Counts

| Common Name                 | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|-----------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Bog Aster                   | <i>Oclemena nemoralis</i>         | 17     | 6      | 6      | 5      | 10     | 2      | 25     | 20     | 4      | 17     |
| Shrubby Cinquefoil          | <i>Dasiphora fruticosa</i>        | 9      |        | 1      |        |        | 1      | 4      |        |        |        |
| Pitcher Plant               | <i>Sarracenia purpurea</i>        | 6      | 6      | 7      | 4      | 8      |        | 4      | 4      |        |        |
| Leatherleaf                 | <i>Chamaedaphne calyculata</i>    | 2      |        |        |        |        | 8      |        | 3      | 4      | 5      |
| Rough Horsetail             | <i>Equisetum hyemale</i>          | 4      |        |        | 4      | 1      | 5      | 2      | 5      | 4      | 2      |
| Grass-leaved Goldenrod      | <i>Euthamia graminifolia</i>      | 19     | 8      | 5      | 2      | 5      | 5      | 5      | 12     | 2      | 5      |
| Bog Buckbean                | <i>Menyanthes trifoliata</i>      | 2      | 15     |        | 3      |        |        |        |        |        |        |
| Bog Laurel                  | <i>Kalmia polifolia</i> Wang.     | 4      | 2      |        |        |        |        |        |        |        |        |
| Meadow-rue                  | <i>Thalictrum pubescens</i> Pursh |        | 4      | 2      | 3      |        | 7      | 8      |        |        |        |
| Sweetgale                   | <i>Myrica gale</i>                |        | 3      | 8      | 11     | 16     | 6      | 20     | 5      | 1      | 21     |
| Small Cranberry/ Marshberry | <i>Vaccinium oxycoccus</i>        |        |        | 2      | 5      | 4      | 4      | 4      | 8      |        | 5      |
| Northeastern Rose           | <i>Rosa nitida</i>                |        |        |        |        | 4      | 2      | 4      |        | 2      |        |
| Larch                       | <i>Larix laricina</i>             |        |        |        |        |        |        |        | 1      | 1      |        |
| Sheep Laurel                | <i>Kalmia angustifolia</i>        |        |        |        |        |        |        |        | 3      |        |        |
| Twinflower                  | <i>Linnaea borealis</i>           |        |        |        |        |        |        |        | 5      |        |        |
| Labrador Tea                | <i>Rhododendron groenlandicum</i> |        |        |        |        |        |        |        |        | 12     |        |
| Common Juniper              | <i>Juniperus communis</i>         |        |        |        |        |        |        |        |        | 4      |        |
| Canadian Rush               | <i>Juncus canadensis</i>          |        |        |        |        |        |        |        |        |        | 20     |

% Cover

| Undergrowth | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Grass       | Unknown                    | 90     | 80     | 80     | 60     | 55     | 65     | 70     | 65     | 50     | 70      |
| Dead grass  | N/A                        | 5      | 10     | 5      | 10     | 35     | 35     | 5      | 15     |        | 5       |
| Water       | N/A                        | 5      | 10     | 10     | 30     |        |        | 5      | 10     |        | 5       |
| Moss        | <i>Sphagnum papillosum</i> |        |        |        |        | 5      |        |        | 5      | 30     | 10      |
| Muck        | N/A                        |        |        |        |        | 5      |        | 20     |        |        |         |

## Bauline Line Extension Wetland Site – Invertebrate Data

*No invertebrate sample collected for this site.*

## Bauline Line Extension Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature                        |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|--------------------------------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |                                | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                | Sod Farm, Northwest of wetland | 1     | < 1000 m2        |      |             |             |                      | 9      |
|                            |                                | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |                                | 3     | > 10,000 m2      | 9    |             |             |                      |        |
|                            | Sod farm, south of wetland     | 1     | < 1000 m2        |      |             |             |                      | 3      |
|                            |                                | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |                                | 3     | > 10,000 m2      |      |             | 3           |                      |        |
| Impervious Surfaces        |                                | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |                                | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |                                | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                |                                | 2     | Dense            |      |             |             |                      |        |
|                            |                                | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |                                | 2     | Dense            |      |             |             |                      |        |
|                            |                                | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |                                | 2     | Dense            |      |             |             |                      |        |
|                            |                                | 1     | Sparse           |      |             |             |                      |        |
| 12                         |                                |       |                  |      |             |             |                      |        |

Part 2: Roadways

|             | Feature                         |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|---------------------------------|-------|------|-------------|-------------|----------------------|--------|
|             |                                 | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   | Dirt Road, west side of wetland | 1     |      |             | 1           | x2                   | 2      |
| 2 Lane Road | Bauline Line                    | 2     | 6    |             |             | x2                   | 12     |
|             | Bauline Line Extension          |       | 6    |             |             |                      | 6      |
| 4 Lane Road |                                 | 3     |      |             |             |                      |        |
|             |                                 |       |      |             |             |                      | 20     |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert | 1         |         | 1      |
| Dam     |           |         |        |
|         |           |         | 1      |

|         | TOTALS |
|---------|--------|
| Table 1 | 12     |
| Table 2 | 20     |
| Table 3 | 1      |
| Score   | 33     |

The wetland delineation found in Appendix A (Figure A13) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Bauline Line, Bauline Line Extension, two sod farms and a dirt road leading into one of the sod farms were found to be within 50 m of the wetland boundary. Although not captured in the 2010 aerial imagery, there has been new housing built along Bauline Line Extension, adjacent to this wetland. If the rubric was applied to current surroundings the score would be higher due to this new housing development.

## Pouch Cove Line Wetland Site – Plant Data

|                              |   |
|------------------------------|---|
| Site Name:                   | Pouch Cove Line   |
| Transect #                   | 1 OF 1  |
| GPS Coordinates of Transect: | (START) N[47.75212] - W [52.78384]<br>(END) N[47.75762] - W [ 52.28367] |
| Direction of transect:       | NW  |
| Date:                        | AUGUST 19 2013 (Monday)   |

Total # Standing Counts

| Common Name                       | Species Name                      | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad10 |
|-----------------------------------|-----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sweetgale                         | <i>Myrica gale</i>                | 24     | 32     | 21     | 15     | 14     | 15     | 10     | 3      | 7      | 10     |
| Canadian rush                     | <i>Juncus canadensis</i>          | 2      |        |        |        |        |        |        | 2      | 23     |        |
| Bog Aster                         | <i>Oclemena nemoralis</i>         | 16     | 11     | 61     | 18     | 38     | 16     | 21     | 28     |        | 12     |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>    | 26     | 34     | 56     | 98     | 16     |        |        |        | 8      | 21     |
| Raspberry                         | <i>Rubus pubescens</i>            | 5      | 3      |        |        |        | 2      |        |        |        | 3      |
| Grass-leaved Goldenrod            | <i>Euthamia graminifolia</i>      | 9      | 8      | 2      | 3      | 3      | 1      | 6      | 8      |        |        |
| Northeastern Rose                 | <i>Rosa nitida</i>                |        | 1      | 5      | 4      | 19     | 14     | 2      |        | 4      | 1      |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      |        | 4      | 18     | 18     | 5      |        | 22     | 32     | 18     |        |
| St. John's Wort                   | <i>Hypericum fraser</i>           | 12     |        |        |        | 4      | 11     | 14     | 5      | 2      |        |
| Labrador Tea                      | <i>Rhododendron groenlandicum</i> |        | 4      |        |        |        |        |        |        |        | 42     |
| Black Crowberry                   | <i>Empetrum nigrum</i>            |        |        | 1      |        |        | 1      |        | 2      |        | 5      |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     |        |        | 1      |        |        |        |        |        | 2      |        |
| Purple Chokeberry                 | <i>Aronia xprunifolia</i>         |        |        |        | 1      |        |        |        |        |        | 2      |
| Larger Blue Flag Iris             | <i>Iris versicolor</i>            |        |        |        | 1      |        |        |        |        |        |        |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>        |        |        |        | 4      |        |        |        |        | 5      |        |
| Pale Shrubs*                      | Unknown                           |        |        |        |        | 4      |        |        |        | 8      | 1      |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>        |        |        |        |        |        |        |        |        |        | 21     |

% Cover

| Undergrowth | Species Name               | Quad 1 | Quad 2 | Quad 3 | Quad 4 | Quad 5 | Quad 6 | Quad 7 | Quad 8 | Quad 9 | Quad 10 |
|-------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Moss        | <i>Sphagnum papillosum</i> | 5      | 90     | 100    | 100    | 100    | 20     | 5      | 30     | 100    | 85      |
| Soil        | N/A                        | 95     | 10     |        |        |        | 40     | 15     | 10     |        |         |
| Dead grass  | N/A                        |        |        |        |        |        | 40     | 10     |        |        |         |
| Grass       | Unknown                    |        |        |        |        |        |        | 50     | 60     |        | 15      |
| Open Water  | N/A                        |        |        |        |        |        |        | 15     | 10     |        |         |

## Pouch Cove Line Wetland Site – Invertebrate Data

|                 |                             |
|-----------------|-----------------------------|
| Site:           | Pouch Cove Line             |
| GPS Coordinates | N[47.49587] - W [ 53.84087] |

### Pond Water

| Order      | Family        | Common Name             | Count |
|------------|---------------|-------------------------|-------|
| Hemiptera  | Corixidae     | Water boatman           | 17    |
| Coleoptera | Hydrophilidae | water scavenger beetles | 18    |
| Coleoptera | Dytiscidae    | Diving beetle Larvae    | 1     |

## Pouch Cove Line Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|---------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |         | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
|                            |         |       |                  |      |             |             |                      | 0      |

Part 2: Roadways

|             | Feature         |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|-----------------|-------|------|-------------|-------------|----------------------|--------|
|             |                 | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |                 | 1     |      |             |             |                      |        |
| 2 Lane Road | Pouch Cove Line | 2     | 6    |             |             | x2                   | 12     |
| 4 Lane Road |                 | 3     |      |             |             |                      |        |
|             |                 |       |      |             |             |                      | 12     |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 0      |
| Table 2 | 12     |
| Table 3 | 0      |
| Score   | 12     |

The wetland delineation found in Appendix A (Figure A14) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Pouch Cove Line was the only feature determined to be located within 50 m of the wetland boundary, and at an elevation of concern, with a slope that could have greater potential for runoff.

## Salmonier Line Wetland Site – Plant Data

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Salmonier Line  |
| <b>Transect #</b>                   | 1 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.35367] - W [53.19903]<br>(END) N[47.35321] - W [ 53.19937] |
| <b>Direction of transect:</b>       | SE  |
| <b>Date:</b>                        | AUGUST 21 2013 (Wednesday)  |

Total # Standing Counts

| <b>Common Name</b>        | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad10</b> |
|---------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Northeastern Rose         | <i>Rosa nitida</i>                | 4             |               |               |               |               |               |               |               |               | 5             |
| Turtlehead                | <i>Chelone glabra</i>             | 12            |               | 7             |               |               |               |               |               | 4             |               |
| St.John's Wort            | <i>Hypericum fraser</i>           | 12            |               | 5             |               |               |               |               |               |               |               |
| Meadow Sweet              | <i>Spiraea latifolia</i>          | 12            |               | 7             | 4             | 4             | 5             | 18            | 4             | 5             |               |
| Sweetgale                 | <i>Myrica gale</i>                | 1             | 3             | 5             | 7             | 7             | 21            | 5             | 5             | 10            | 9             |
| Northwest Territory Sedge | <i>Carex utricularia</i>          |               | 8             |               |               |               |               |               |               |               |               |
| Meadow-rue                | <i>Thalictrum pubescens Pursh</i> |               |               | 3             | 3             |               |               |               |               |               |               |
| Canadian Rush             | <i>Juncus canadensis</i>          |               |               |               | 8             |               | 18            | 25            |               |               |               |
| Leatherleaf               | <i>Chamaedaphne calyculata</i>    |               |               |               | 4             | 5             | 3             | 8             | 22            | 5             | 12            |
| Larger Blue Flag Iris     | <i>Iris versicolor</i>            |               |               |               |               | 6             |               |               |               |               |               |
| Beakrush*                 | Unknown                           |               |               |               |               |               | 5             | 3             |               |               |               |
| Larch                     | <i>Larix laricina</i>             |               |               |               |               |               |               |               |               |               | 1             |

% Cover

| <b>Undergrowth</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|--------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Grass              | Unknown                    | 95            | 40            | 70            | 50            | 10            | 10            | 50            |               | 10            |                |
| Open Water         | N/A                        |               | 50            | 5             | 30            | 30            | 60            | 15            |               |               |                |
| Dead Grass         | N/A                        | 5             | 10            | 10            | 20            | 50            | 10            | 5             |               | 40            | 10             |
| Moss               | <i>Sphagnum papillosum</i> |               |               |               | 5             |               |               |               | 80            |               | 40             |

\*Unidentified Plant

|                                     |   |
|-------------------------------------|---|
| <b>Site Name:</b>                   | Salmonier Line (Constuction site)                                       |
| <b>Transect #</b>                   | 2 OF 2  |
| <b>GPS Coordinates of Transect:</b> | (START) N[47.35322] - W [53.19909]<br>(END) N[47.35319] - W [ 53.19921] |
| <b>Direction of transect:</b>       | NW  |
| <b>Date:</b>                        | AUGUST 21 2013 (Wednesday)  |

Total # Standing Counts

| <b>Common Name</b>    | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad10</b> |
|-----------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Sweetgale             | <i>Myrica gale</i>                | 7             | 17            | 19            | 5             | 5             | 8             | 11            | 4             | 5             | 8             |
| St.John's Wort        | <i>Hypericum fraser</i>           | 12            | 5             | 20            |               |               |               |               |               | 4             |               |
| Larger Blue Flag Iris | <i>Iris versicolor</i>            | 4             |               |               |               |               |               |               |               | 3             |               |
| White Aster*          | Unknown                           |               | 14            |               | 5             | 12            | 4             | 12            | 8             | 5             | 7             |
| Leatherleaf           | <i>Chamaedaphne calyculata</i>    |               | 15            | 25            | 15            | 12            | 32            | 28            | 2             | 5             | 14            |
| Meadow-rue            | <i>Thalictrum pubescens Pursh</i> |               |               | 5             |               |               |               |               |               |               |               |
| Turtlehead            | <i>Menyanthes trifoliata</i>      |               |               | 4             | 5             | 10            | 12            | 7             | 5             | 4             | 2             |
| Meadow Sweet          | <i>Spiraea latifolia</i>          |               |               |               |               |               | 2             |               |               | 12            |               |

% Cover

| <b>Undergrowth</b> | <b>Species Name</b> | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|--------------------|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Grass              | Unknown             | 100           | 90            | 40            | 65            | 30            | 10            | 15            | 20            | 30            | 40             |
| Dirt               | N/A                 | 15            | 5             | 30            | 20            | 15            | 5             | 5             | 5             | 5             | 5              |

\* Unidentified Plant



## Salmonier Line Wetland Site – Invertebrate Data

|                 |                             |           |
|-----------------|-----------------------------|-----------|
| Site:           | Salmonier Line              |           |
| GPS Coordinates |                             |           |
| Inflow          | N[47.49587] - W [ 53.84087] |           |
| GPS Coordinates |                             |           |
| Outflow         | W53.19932                   | N47.35338 |

### INFLOW

| Order         | Family        | Common Name      | Count |
|---------------|---------------|------------------|-------|
| Ephemeroptera | Potamonthidae | May Fly Nymph    | 5     |
| Anostraca     |               | Fairy Shrimp     | 6     |
| Coleoptera    | Gyrinidae     | Whirligig beetle | 2     |

### Outflow

| Order         | Family        | Common Name   | Count |
|---------------|---------------|---------------|-------|
| Amphipoda     |               | Scud          | 2     |
| Trichoptera   | Limnephilidae | Caddis fly    | 5     |
| Ephemeroptera | Potamonthidae | May Fly Nymph | 1     |

## Salmonier Line Wetland Site – Stress Evaluation Rubric

### Part 1: Area Features

| Part 1: Area Features      | Feature                       |             | Area   | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|-------------------------------|-------------|--|------|-------------|-------------|----------------------|--------|
|                            |                               | Value       |  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |                               | 1<br>2<br>3 | < 1000 m2<br>1000 - 10,000<br>> 10,000 m2    |      |             |             |                      |        |
| Impervious Surfaces        | Old section of TCH            | 1<br>2<br>3 | < 1000 m2<br>1000 - 10,000 m2<br>> 10,000 m2 |      | 4           |             |                      | 4      |
| Residential                |                               | 2<br>1      | Dense<br>Sparse                              |      |             |             |                      |        |
| Commercial / Institutional | Construction Training College | 2<br>1      | Dense<br>Sparse                              | 3    |             |             | x2                   | 6      |
| Industrial                 |                               | 2<br>1      | Dense<br>Sparse                              |      |             |             |                      |        |
| 10                         |                               |             |  |      |             |             |                      |        |

### Part 2: Roadways

|             | Feature        |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|-------------|----------------|-------|------|-------------|-------------|----------------------|--------|
|             |                | Value | 3    | 2           | 1           |                      |        |
| Dirt Road   |                | 1     |      |             |             |                      |        |
| 2 Lane Road | Salmonier Line | 2     | 6    |             |             | x2                   | 12     |
| 4 Lane Road |                | 3     |      |             |             |                      |        |
|             |                |       |      |             |             |                      | 12     |

### Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 10     |
| Table 2 | 12     |
| Table 3 | 0      |
| Score   | 22     |

The wetland delineation found in Appendix A (Figure A15) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. Salmonier Line, the Operating Engineers College and an old section of highway no longer in use were found to be located within 50 m of the wetland boundary. The college property and Salmonier Line were determined to be at an elevation of concern, with a slope that could have greater potential for runoff

## Neils Pond Wetland Site – Plant Data

|                               |   |
|-------------------------------|---|
| <b>Site Name:</b>             | Neil's Pond   |
| <b>Transect #</b>             | 1 OF 1  |
| <b>GPS COORDINATES</b>        | START: N [47.52856°] W[52.86470°]<br>END: N [47.52859°] W [52.86505°] |
| <b>Direction of transect:</b> | W   |
| <b>Date:</b>                  | AUGUST 27 2013 (Tuesday)  |

Total # Standing Counts

| <b>Common Name</b>                | <b>Species Name</b>               | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|-----------------------------------|-----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Labrador Tea                      | <i>Rhododendron groenlandicum</i> | 9             | 11            | 11            | 2             |               |               | 2             |               |               | 2              |
| Leatherleaf                       | <i>Chamaedaphne calyculata</i>    | 42            | 2             | 17            | 9             | 14            | 7             | 6             | 5             | 16            | 29             |
| Purple Chokeberry                 | <i>Aronia xprunifolia</i>         |               |               | 1             | 6             |               |               |               |               |               |                |
| Sweetgale                         | <i>Myrica gale</i>                |               | 7             | 5             | 28            | 8             | 3             | 8             | 13            | 6             | 28             |
| Bog Laurel                        | <i>Kalmia polifolia</i> Wang.     | 24            |               | 7             | 31            | 12            | 9             |               | 1             | 13            | 17             |
| Twinflower                        | <i>Linnaea borealis</i>           |               |               | 28            | 5             | 14            | 2             |               |               |               | 3              |
| Canadian Bunchberry               | <i>Cornus canadensis</i>          |               |               |               |               |               | 2             |               |               |               |                |
| Small Cranberry / Marshberry      | <i>Vaccinium oxycoccus</i>        | 66            | 25            | 42            | 48            | 55            | 65            | 25            |               | 120           | 64             |
| Larch                             | <i>Larix laricina</i>             |               | 2             | 3             | 1             |               |               | 5             |               |               | 5              |
| Bog Aster                         | <i>Oclemena nemoralis</i>         | 2             | 30            | 24            | 34            | 44            | 110           | 82            | 5             |               | 7              |
| Sheep Laurel                      | <i>Kalmia angustifolia</i>        | 12            | 1             | 12            | 14            | 6             | 28            | 1             |               |               | 30             |
| Three-leaved False Solomon's Seal | <i>Maianthemum trifolium</i>      | 86            | 28            | 21            | 23            | 11            |               | 22            | 6             | 38            | 3              |
| Black Crowberry                   | <i>Empetrum nigrum</i>            | 18            |               |               | 6             |               |               |               |               |               |                |
| Grass Leaved Goldenrod            | <i>Euthamia graminifolia</i>      | 4             |               |               |               |               | 1             |               |               |               | 6              |
| Spoon- leaved Sundew              | <i>Drosera intermedia</i> Hayne   |               | 12            |               | 4             |               |               |               | 8             | 5             |                |
| Juniper                           | <i>Juniperus communis</i>         |               |               | 5             |               |               | 2             | 1             |               |               |                |

% Cover

| <b>Undergrowth</b> | <b>Species Name</b>        | <b>Quad 1</b> | <b>Quad 2</b> | <b>Quad 3</b> | <b>Quad 4</b> | <b>Quad 5</b> | <b>Quad 6</b> | <b>Quad 7</b> | <b>Quad 8</b> | <b>Quad 9</b> | <b>Quad 10</b> |
|--------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Moss               | <i>Sphagnum papillosum</i> | 100           | 95            | 100           | 60            | 100           | 100           | 50            | 10            | 60            | 100            |
| Open Water         | N/A                        |               |               |               | 15            |               |               | 50            | 90            | 40            |                |
| Dirt               | N/A                        |               | 5             |               |               |               |               |               |               |               |                |
| Grass              | Unknown                    | 5             | 5             | 10            | 25            | 50            | 50            | 20            | 75            | 10            | 20             |

## Neils Pond Wetland Site – Invertebrate Data

|                                |     |
|--------------------------------|-----|
| <b>Site:</b> Neil's Pond       |     |
| <b>GPS Coordinates Inflow</b>  | N/A |
| <b>GPS Coordinates Outflow</b> | N/A |

**Shallow Area of pond** GPS: N [47.52838°] W [52.86638°]

| <b>Order</b>  | <b>Family</b>         | <b>Common Name</b> | <b>Count</b> |
|---------------|-----------------------|--------------------|--------------|
| Coleoptera    | Dytiscidae            | Diving Beetles     | 2            |
| Amphipoda     |                       | Scuds              | 8            |
| Hirudinea     |                       | Leech              | 2            |
| Diptera       | Nematocera (suborder) | Midge Larvae       | 14           |
| Ephemeroptera |                       | Mayfly Larvae      | 2            |

## Neils Pond Wetland Site – *Stress Evaluation Rubric*

Part 1: Area Features

|                            | Feature |       | Area             | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|----------------------------|---------|-------|------------------|------|-------------|-------------|----------------------|--------|
|                            |         | Value |                  | 3    | 2           | 1           | X 2                  |        |
| Agriculture                |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000    |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Impervious Surfaces        |         | 1     | < 1000 m2        |      |             |             |                      |        |
|                            |         | 2     | 1000 - 10,000 m2 |      |             |             |                      |        |
|                            |         | 3     | > 10,000 m2      |      |             |             |                      |        |
| Residential                |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Commercial / Institutional |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
| Industrial                 |         | 2     | Dense            |      |             |             |                      |        |
|                            |         | 1     | Sparse           |      |             |             |                      |        |
|                            |         |       |                  |      |             |             |                      | 0      |

Part 2: Roadways

| Part 2: Roadways |         |       |      |             |             |                      |        |
|------------------|---------|-------|------|-------------|-------------|----------------------|--------|
|                  | Feature |       | <15m | 15 m - 30 m | 30 m - 50 m | Elevation of Concern | TOTALS |
|                  |         | Value | 3    | 2           | 1           |                      |        |
| Dirt Road        |         | 1     |      |             |             |                      |        |
| 2 Lane Road      |         | 2     |      |             |             |                      |        |
| 4 Lane Road      |         | 3     |      |             |             |                      |        |
|                  |         |       |      |             |             |                      | 0      |

Part 3: Culverts and Dams

|         | # Present | Comment | TOTALS |
|---------|-----------|---------|--------|
| Culvert |           |         |        |
| Dam     |           |         |        |
|         |           |         | 0      |

|         | TOTALS |
|---------|--------|
| Table 1 | 0      |
| Table 2 | 0      |
| Table 3 | 0      |
| Score   | 0      |

The wetland delineation found in Appendix A (Figure A16) was used for the analysis of potential stressors in the *Stress Evaluation Rubric*. The Neils Pond wetland study site received a score of zero in the rubric because there were no built features that fit in the rubric located within 50 m of the wetland boundary. The Neils Pond walking trail was located adjacent to the wetland but was not included in the rubric. There are also housing developments nearby, but they fell outside of the 50 m limit set for the rubric. These features, although not included in the rubric, could impact the wetland.

**Appendix F- List of All Identified Plant Species Found in Sampled Wetlands on  
the Northeast Avalon Peninsula, Summer 2013**

The following is an alphabetical list of all the plant species identified at the surveyed wetlands, with indication of how many wetland sites each species was identified in through sampling in summer 2013. Species that were found in only one or two of the surveyed wetlands have been highlighted; those species in blue were identified in only 1 wetland, while those species in green were found in only two wetland sites. Those species marked with an asterisks (\*) were those that were determined to be non-native.

| Plant species                     | Common Name                   | # wetlands where found | Where identified (if only found in one or two wetlands) |
|-----------------------------------|-------------------------------|------------------------|---|
| <i>Amelanchier spp.</i>           | chuckley pear                 | 1                      | only Roaches Marsh                                      |
| <i>Aronia prunifolia</i>          | purple chokeberry             | 6                      |   |
| <i>Betula papyrifera</i>          | paper birch                   | 1                      | only Roaches Marsh                                      |
| <i>Cardamine pratensis*</i>       | cuckooflower/<br>lady's smock | 2                      | Soldiers Brook Pond and Bauline Line Extension          |
| <i>Carex aquatilis</i>            | water sedge                   | 1                      | only Octagon Pond                                       |
| <i>Carex castanea</i>             | chestnut sedge                | 1                      | only Roaches Marsh                                      |
| <i>Carex exilis</i>               | coastal sedge                 | 2                      | Bakeapple Marsh (both transects) and Wall's Road        |
| <i>Carex folliculata</i>          | northern long sedge           | 1                      | Only Southlands Site 1                                  |
| <i>Carex michauxiana</i>          | michaux's sedge               | 1                      | Only Roaches Marsh                                      |
| <i>Carex oligosperma</i>          | few-seeded sedge              | 1                      | Only Petty Harbour                                      |
| <i>Carex spp.</i>                 | sedge species                 | 1                      | only Bakeapple Marsh (in one transect)                  |
| <i>Carex utriculata</i>           | Northwest Territory<br>sedge  | 3                      |   |
| <i>Chamaedaphne calyculata</i>    | leatherleaf                   | 16                     | FOUND IN ALL SITES!!!                                   |
| <i>Chelone glabra</i>             | turtlehead                    | 2                      | Southlands Site 1 and Salmonier Line                    |
| <i>Coptis trifolia</i>            | goldthread                    | 3                      |   |
| <i>Cornus canadensis</i>          | Canadian bunchberry           | 8                      |   |
| <i>Dasiphora fruticosa</i>        | shrubby cinquefoil            | 2                      | Butterpot Road and Bauline Line Extension               |
| <i>Diervilla lonicera</i>         | northern honeysuckle          | 1                      | only Roaches Marsh                                      |
| <i>Drosera intermedia</i>         | spoon-leaved sundew           | 11                     |   |
| <i>Empetrum nigrum</i>            | black crowberry               | 11                     |   |
| <i>Epilobium ciliatum</i>         | fringed willowherb            | 2                      | Soldiers Brook Pond and Octagon Pond                    |
| <i>Equisetum hyemale</i>          | rough horsetail               | 1                      | Only Bauline Line Extension                             |
| <i>Eragrostis minor*</i>          | little lovegrass              | 2                      | Soldiers Brook Pond and Beaver Creek Road               |
| <i>Eriophorum virginicum</i>      | tawny cottongrass             | 2                      | Butterpot Road and Gull Pond Road                       |
| <i>Eriophorum viridicarinatum</i> | cottongrass                   | 1                      | Only Southlands Site 1                                  |
| <i>Euthamia graminifolia</i>      | grass-leaved goldenrod        | 8                      |   |
| <i>Galium palustre</i>            | common bedstraw               | 1                      | Only Southlands Site 1                                  |
| <i>Galium spp.</i>                | bedstraw species              | 1                      | Only Soldiers Brook Pond                                |
| <i>Gaylussacia bigeloviana</i>    | bog huckleberry               | 1                      | Only Petty Harbour                                      |

| Plant species                      | Common Name                        | # wetlands where found | Where identified (if only found in one or two wetlands) |
|------------------------------------|------------------------------------|------------------------|---|
| <i>Hypericum fraser</i>            | St. John's wort                    | 2                      | Only Pouch Cove Line and Salmonier Line                 |
| <i>Ilex mucronata</i>              | mountain holly                     | 4                      |   |
| <i>Iris versicolor</i>             | larger blue flag iris              | 4                      |   |
| <i>Juncus canadensis</i>           | Canadian rush                      | 5                      |   |
| <i>Juncus effusus</i>              | bog rush                           | 2                      | Only Butterpot Road and Octagon Pond                    |
| <i>Juniperus communis</i>          | common juniper                     | 6                      |   |
| <i>Kalmia angustifolia</i>         | sheep laurel                       | 12                     |   |
| <i>Kalmia polifolia</i>            | bog laurel                         | 14                     |   |
| <i>Larix laricina</i>              | larch                              | 13                     |   |
| <i>Linnaea borealis</i>            | twinline                           | 4                      |   |
| <i>Maianthemum trifolium</i>       | three -leaved false solomon's seal | 11                     |   |
| <i>Menyanthes trifoliata</i>       | bog buckbean                       | 6                      |   |
| <i>Myrica gale</i>                 | sweetgale                          | 16                     | FOUND IN ALL SITES!!!                                   |
| <i>Oclemena nemoralis</i>          | bog aster                          | 11                     |   |
| <i>Onoclea sensibilis</i>          | sensitive fern                     | 1                      | Only at Octagon Pond                                    |
| <i>Picea glauca</i>                | white spruce                       | 2                      | Only at Wall's Road and Beaver Creek Road               |
| <i>Picea spp.</i>                  | pine tree                          | 1                      | Only at Gull Pond Road                                  |
| <i>Platanthera blephariglottis</i> | white-fringed orchid               | 1                      | Only at Petty Harbour                                   |
| <i>Pogonia ophioglossoides</i>     | rose pogonia                       | 2                      | Only at Petty Harbour and Butterpot Road                |
| <i>Rhododendron groenlandicum</i>  | Labrador tea                       | 14                     |   |
| <i>Rhynchospora alba</i>           | white-beakrush                     | 6                      |   |
| <i>Rhynchospora fusca</i>          | brown beakrush                     | 1                      | Only Southern Shore Arena                               |
| <i>Rosa nitida</i>                 | northeastern rose                  | 7                      |   |
| <i>Rubus chamaemorus</i>           | bakeapple / cloudberry             | 4                      |   |
| <i>Rubus pubescens</i>             | raspberry                          | 1                      | only Pouch Cove Line                                    |
| <i>Sarracenia purpurea</i>         | pitcher plant                      | 8                      |   |
| <i>Scirpus atrovirens</i>          | green bulrush                      | 1                      | Only Octagon Pond                                       |
| <i>Sparganium angustifolium</i>    | narrow-leaved burreed              | 2                      | Wall's Road and Southlands site 1                       |
| <i>Sparganium spp.</i>             | burreed                            | 1                      | Only Southlands Site 1                                  |
| <i>Sphagnum papillosum</i>         | sphagnum moss                      | 16                     | FOUND IN ALL SITES!!!                                   |
| <i>Spiraea latifolia</i>           | meadowsweet                        | 4                      |   |
| <i>Thalictrum pubescens</i>        | meadow-rue                         | 3                      |   |
| <i>Vaccinium angustifolium</i>     | lowbush blueberry                  | 2                      | only Southlands Site 2 and Gull Pond Road               |
| <i>Vaccinium oxycoccus</i>         | small cranberry / marshberry       | 13                     |   |
| <i>Viburnum nudum</i>              | northern wild raisin               | 3                      |   |

**Appendix G – List of Migratory Birds Found Within 200 m of All Wetlands  
Surveyed by Northeast Avalon ACAP on the Northeast Avalon Peninsula, 2011-  
2013**



The following table contains the most commonly observed migratory birds found within 200 meters of NAACAP surveyed wetlands on the Northeast Avalon Peninsula of Newfoundland and Labrador from 2011-2013, as reported to eBird and NLNature. Birds are arranged in the table in ascending order based on number of observations.

| Common Name            | Scientific Name                  | Number of Observations | Total Observed |
|------------------------|----------------------------------|------------------------|----------------|
| Herring Gull           | <i>Larus argentatus</i>          | 67                     | 2616           |
| Green-winged Teal      | <i>Anas crecca</i>               | 64                     | 592            |
| Mallard                | <i>Anas platyrhynchos</i>        | 57                     | 384            |
| Savannah Sparrow       | <i>Passerculus sandwichensis</i> | 49                     | 165            |
| Swamp Sparrow          | <i>Melospiza georgiana</i>       | 30                     | 97             |
| Yellow Warbler         | <i>Setophaga petechia</i>        | 27                     | 95             |
| Yellow-rumped Warbler  | <i>Setophaga coronata</i>        | 21                     | 62             |
| Black-bellied Plover   | <i>Pluvialis squatarola</i>      | 16                     | 77             |
| Lesser Scaup           | <i>Aythya affinis</i>            | 15                     | 31             |
| Fox Sparrow            | <i>Passerella iliaca</i>         | 14                     | 15             |
| Common Tern            | <i>Sterna hirundo</i>            | 14                     | 51             |
| Eurasian Wigeon        | <i>Anas penelope</i>             | 13                     | 13             |
| American Bittern       | <i>Botaurus lentiginosus</i>     | 13                     | 14             |
| Gadwall                | <i>Anas strepera</i>             | 12                     | 17             |
| Song Sparrow           | <i>Melospiza melodia</i>         | 11                     | 14             |
| Purple Finch           | <i>Haemorhous purpureus</i>      | 11                     | 24             |
| White-throated Sparrow | <i>Zonotrichia albicollis</i>    | 10                     | 13             |
| Cedar Waxwing          | <i>Bombycilla cedrorum</i>       | 10                     | 32             |
| American Coot          | <i>Fulica americana</i>          | 9                      | 25             |
| Hooded Merganser       | <i>Lophodytes cucullatus</i>     | 8                      | 8              |
| Snow Bunting           | <i>Plectrophenax nivalis</i>     | 7                      | 66             |
| Osprey                 | <i>Pandion haliaetus</i>         | 7                      | 7              |
| White-winged Crossbill | <i>Loxia leucoptera</i>          | 6                      | 91             |
| Ring-necked Duck       | <i>Aythya collaris</i>           | 6                      | 6              |
| Alder Flycatcher       | <i>Empidonax alnorum</i>         | 6                      | 6              |
| Sharp-shinned Hawk     | <i>Accipiter striatus</i>        | 5                      | 5              |
| Northern Shoveler      | <i>Anas clypeata</i>             | 5                      | 6              |
| Blackpoll Warbler      | <i>Setophaga striata</i>         | 5                      | 12             |
| American Wigeon        | <i>Anas americana</i>            | 5                      | 7              |
| American Pipit         | <i>Anthus rubescens</i>          | 5                      | 17             |
| Wilson's Warbler       | <i>Cardellina pusilla</i>        | 4                      | 4              |
| Sora                   | <i>Porzana carolina</i>          | 4                      | 4              |
| Tree Swallow           | <i>Tachycineta bicolor</i>       | 3                      | 4              |

|                          |                                     |   |    |
|--------------------------|-------------------------------------|---|----|
| Lapland Longspur         | <i>Calcarius lapponicus</i>         | 3 | 13 |
| Bonaparte's Gull         | <i>Chroicocephalus philadelphia</i> | 3 | 8  |
| Black-and-white Warbler  | <i>Mniotilta varia</i>              | 3 | 3  |
| Rusty Blackbird          | <i>Euphagus carolinus</i>           | 2 | 3  |
| Peregrine Falcon         | <i>Falco peregrinus</i>             | 2 | 4  |
| Northern Waterthrush     | <i>Parkesia noveboracensis</i>      | 2 | 2  |
| Gyr Falcon               | <i>Falco rusticolus</i>             | 2 | 1  |
| Common Yellowthroat      | <i>Geothlypis trichas</i>           | 2 | 1  |
| Common Goldeneye         | <i>Bucephala clangula</i>           | 2 | 25 |
| Buff-breasted Sandpiper  | <i>Tryngites subruficollis</i>      | 2 | 2  |
| Belted Kingfisher        | <i>Megasceryle alcyon</i>           | 2 | 2  |
| Rough-legged Hawk        | <i>Buteo lagopus</i>                | 1 | 2  |
| Northern Harrier         | <i>Circus cyaneus</i>               | 1 | 1  |
| Lark Sparrow             | <i>Chondestes grammacus</i>         | 1 | 1  |
| Hermit Thrush            | <i>Catharus guttatus</i>            | 1 | 1  |
| Eastern Kingbird         | <i>Tyrannus tyrannus</i>            | 1 | 1  |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i>        | 1 | 1  |
| Common Grackle           | <i>Quiscalus quiscula</i>           | 1 | 3  |
| Canada Goose             | <i>Branta canadensis</i>            | 1 | 1  |
| Bufflehead               | <i>Bucephala albeola</i>            | 1 | 1  |
| Bobolink                 | <i>Dolichonyx oryzivorus</i>        | 1 | 1  |
| Barn Swallow             | <i>Hirundo rustica</i>              | 1 | 1  |
| Arctic Tern              | <i>Sterna paradisaea</i>            | 1 | 2  |