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Bio-Resources | Building Systems | Environmental | Geotechnical | Project Management

WETLAND FUNCTIONAL ASSESSMENT

PID 30036008

11 Southers Road in Bayswater, New Brunswick

Prepared for:

Ms. Lisa McGeachy
82 Summer Street
Saint John, New Brunswick
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17 October 2018

Project No: 13429

FUNDY Engineering

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SAINT JOHN CLYDE RIVER HALIFAX

JOB FILE:	13429		
PROJECT TITLE:	11 Southers Road Wetland Functional Assessment		
VERSION	ISSUANCE DATE	PREPARED BY	REVIEWED BY
1	17 October 2018	MDA, PM	MDA

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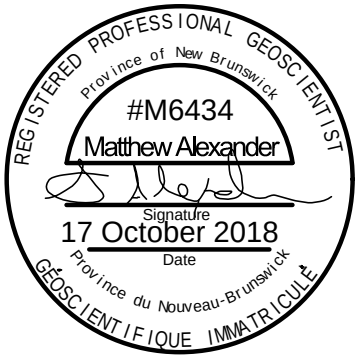

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

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ACRONYMS

ACCDC:	Atlantic Canada Conservation Data Centre
COSEWIC:	Committee On the Status of Endangered Wildlife In Canada
cm:	centimetre
DFO:	Department of Fisheries and Oceans
e.g.:	(*exempli gratia*) for example
EP:	Environmental Professional
et al.:	(*et alii*) and others
etc.:	*et cetera*
ha:	hectare
HADD:	Harmful Alteration, Disruption, and Destruction
i.e.:	(*id est*) namely / that is
km:	kilometre
Ltd.:	Limited
m:	metre
m^2:	metres squared
n.b.:	(*nota bene*) note well / take note
NBDELG:	New Brunswick Department of the Environment and Local Government
NRCS:	Natural Resources Conservation Service
P.Geo.:	Professional Geoscientist
P.Tech.:	Professional Technologist
Ph.D.:	Doctorate of Philosophy
PID:	Property Identification number
PSW:	Provincially Significant Wetland
SARA:	*Species At Risk Act*

WAWA:	Watercourse And Wetland Alteration
WESP-AC:	Wetland Ecosystem Services Protocol – Atlantic Canada
USACE:	United States Army Corps of Engineers
USDA:	United States Department of Agriculture
° C:	degrees Celsius
%:	percent
~:	approximately
>:	greater than
<:	less than

1.0 INTRODUCTION

Fundy Engineering & Consulting Ltd. (Fundy Engineering) was contracted by Ms. Lisa McGeachy (*i.e.*, the Client) to complete a wetland functional assessment (*i.e.*, the Work) for a Provincially Significant Wetland (PSW). The property subject of the Work is identified in the New Brunswick Geomatics Information Centre database as Property IDentification (PID) number 30036008 (Figure 1). This report describes the results of the Work.

Figure 1. Aerial photograph showing the location of PID 30036008 in Bayswater, New Brunswick that is the subject of the wetland functional assessment. The red shading shows the footprint of 11 Southers drive, the yellow shading shows the footprint of the provincially significant wetland and the red line shows the wetland's 30 m protected buffer.

It is understood that during the unprecedented flooding in spring 2018 that a portion of PID 3006008 was lost. Emergency remedial work is required to protect the existing residential structure on the property from potentially being lost in a future flooding event. Discussions

with representatives from the New Brunswick Department of the Environment and Local Government (NBDELG) indicate that a wetland functional assessment is required before any emergency remedial work is permitted due to the presence of the PSW.

1.1 REGULATORY FRAMEWORK

New Brunswick's wetlands and watercourses (*i.e.*, streams) are afforded protection under the *Watercourse and Wetland Alteration Regulation* [**90-80**] of the *New Brunswick Clean Water Act*. Any proposed alterations within most wetlands and / or streams, or within their 30 m regulated buffer, require permitting through the New Brunswick Department of the Environment Watercourse and Wetlands Alteration (WAWA) Program through a WAWA permit. Any project that has the potential to impact a wetland > 2 hectare (ha) in size, and / or its regulated 30 m buffer, must be registered through the *Environmental Impact Assessment Regulation* [**87-83**] of the *New Brunswick Clean Environment Act*. New Brunswick's fish-bearing wetlands and watercourses are also afforded protection under Section **35**(2) of the *Fisheries Act*, administered by the Department of Fisheries and Oceans (DFO), through a Harmful Alteration, Disruption, or Destruction (HADD) of fish habitat authorization. It is the proponent's responsibility to ensure that these features are properly determined through due diligence investigations and that all necessary permits, authorizations, *etc.* are obtained prior to any impact. Failure to do so could result in fines and remediation if a wetland and / or watercourse are impacted without proper approvals in place.

A *no-net-loss* approach to wetlands, which New Brunswick has adopted, acknowledges that alterations will continue to occur, both naturally and through necessary and beneficial human activities. The approach, which does not consider project economics, applies to all wetlands ≥ 1 ha and strives to preserve wetland functions and values and the benefits that are derived from them. The Federal and Provincial government's wetland preference hierarchy is shown in Figure 2. Avoidance is preferred and is achieved by choosing an alternate project, alternative project design, or alternate development site. Minimization is the reduction of adverse effects of development on wetland functions and values at all project stages to the smallest degree possible and must always be undertaken when impacting a wetland. Compensation, which 'makes up' for unavoidable wetland loss or damage, is required for any and all wetland function and value that is impacted by a project. Wetland compensation ratios are established by the NBDENV. A wetland functional analysis may also be required to determine wetland functions, values, and benefits and assess the required compensation ratio.

Provincially Significant Wetlands cannot be impacted without special approval from the Regulator (*i.e.*, the NBDELG and / or the DFO). Because proposed development on the subject property is focused inside the 30 m boundary of the wetland (*i.e.*, the buffer) and also in the wetland, a wetland functional assessment is required for the Regulator(s) to make a determination on the allowable impact.

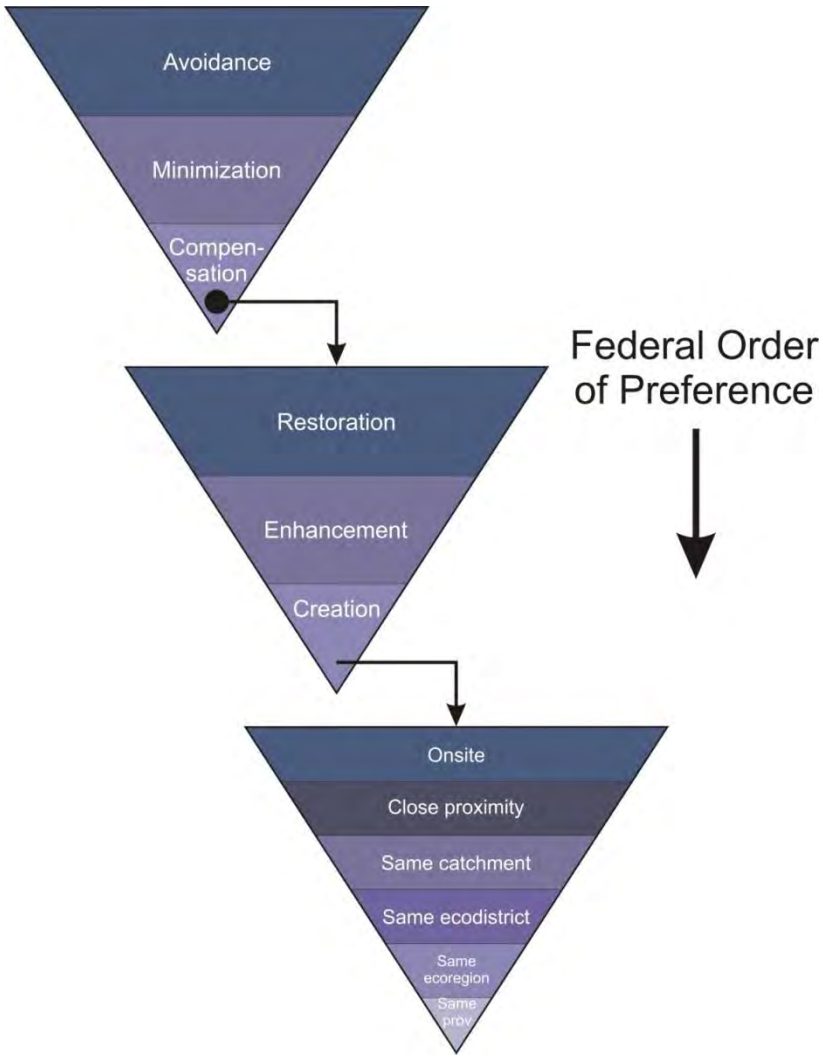


Figure 2. Federal and Provincial Government's preference hierarchy. Based on reports by *Bond et al.* [1992], *Environment Canada* [1996], *Milko* [1998], *Cox and Grose* [2000], and the *Interagency Workshop on Wetland Restoration* [Undated].

1.2 SCOPE OF WORK

The scope of work was to:

- complete the desktop assessment portion of the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC);
- complete the field assessment portion of the WESP-AC; and
- generate a report, complete with maps, describing the results of the WESP-AC assessment.

2.0 METHODOLOGY

2.1 WESP-AC MODEL

The NBDELG requires that a wetland functional assessment be conducted using the WESP-AC, which is a standardized method for assessing some of the important natural functions of all types of wetlands in Atlantic Canada. The Protocol generates normalized scores (*i.e.*, 0 to 10) and ratings (*i.e.*, Lower, Moderate, and Higher) for each of a wetland's functions and benefits and does so in a consistent and transparent manner. The scores and ratings are used by the Regulator(s) to inform their decisions regarding avoidance, minimization, and replacement.

The WESP-AC Model, "WESP-AC_Tidal_Calculator_20March2018_protected" was used for the wetland functional assessment described herein [*NBDELG*, 2018]. The Tidal, versus the Non-Tidal, model was chosen because the site is located below the head of tide on the Saint John and Kennebecasis Rivers. The supplementary data contained in SuppInfo_Tidal_WESP-AC were also used for the assessment.

Tidal wetlands are those predominantly vegetated by vascular plants that experience surface water flooding by tides at least once annually, regardless of salinity. Normally, their vegetation is predominantly herbaceous, but in areas like the Saint John River estuary, tidal influence extends tens of kilometers inland.

After completing a desk-top assessment and a field assessment, input data are used by the logic models programmed within the WESP-AC Excel® spreadsheets to calculate normalized scores and ratings for each of wetland attributes summarized in Table 1.

Table 1. Wetland functions and other attributes scored by Tidal WESP-AC in Atlantic Canada after [*NBDELG*, 2018].

Function or Attribute	Definition	Potential Benefits
Storm surge reduction	The effectiveness for buffering surges of tidal water for short periods before they reach vulnerable uplands	Flood control, protect shoreline structures from erosion
Water purification	The effectiveness for intercepting and filtering suspended inorganic sediments thus allowing their deposition, as well as reducing energy of waves and currents, resisting excessive erosion, and stabilizing underlying sediments or soil	Maintain quality of coastal waters and protect shoreline structures from erosion
Organic nutrient export	The effectiveness for producing and subsequently exporting organic nutrients (mainly carbon), either particulate or dissolved	Support food chains in coastal waters
Fish habitat	The capacity to support an abundance and diversity of native fish (both anadromous and resident species)	Support recreational and ecological values

Function or Attribute	Definition	Potential Benefits
Waterbird habitat	The capacity to support or contribute to an abundance or diversity of waterbirds, mainly those that migrate or winter in the region	Support hunting and ecological values
Songbird, raptor, and mammal habitat	The capacity to support or contribute to an abundance or diversity of native songbird, raptor, and mammal species and functional groups, especially those that are most dependent on tidal wetlands or water	Maintain regional biodiversity and food webs
Biodiversity support	The capacity to support or contribute to a diversity of native plant and animal species, communities, and / or functional groups	Maintain food webs and system stability
Wetland stability*	The potential for long term persistence of a tidal wetland in the face of direct or indirect effects of sea level rise	Protection of the above functions and benefits
Public use and recognition*	Prior designation of the wetland, by a natural resource or environmental agency, as some type of special protected area; also, the potential and actual use of a wetland for low-intensity outdoor recreation, sustainable consumptive uses, education, or research	Commercial and social benefits of recreation and protection of prior public investments

NOTES:
*a tidal wetland attribute that is not considered a function

2.1.1 Desk-Top Assessment

A desk-top assessment is completed prior to visiting the wetland. Aerial images and data from various sources are consulted in order to answer 28 mostly multiple-choice questions about the wetland.

2.1.2 Field Assessment

After the desk-top assessment is completed, the wetland is visited. Field observations and discussions with the landowner(s) are used to answer 18 specific questions related to the wetland.

2.1.3 Wetland Boundary

Fundy Engineering's process for delineating a wetland boundary is based upon the United States Army Corps of Engineers (USACE) Wetlands Delineation Manual [*Environmental Laboratory*, 1987], the *USACE* [2008] regional supplement, and *Tiner* [1999]. We base our assessments on the definition of a wetland:

- either periodically or permanently, has a water table at, near, or above the land's surface or that is saturated with water; and
- sustains aquatic processes as indicated by the presence of hydric soils, hydrophytic vegetation, and biological activities adapted to wet conditions.

We use three criteria for delineating wetland boundaries. Based on this approach, an area is deemed a wetland based on the presence of:

- wetland hydrology;
- wetland hydrophytic vegetation; and
- wetland hydric soils.

The three criteria noted above are not required to be perennially present for an area to be deemed a wetland. For example, wetland hydrology may not exist during a drought or vegetation may not be present if the wetland has been impacted by infilling. The three criteria are discussed in detail below.

2.1.3.1 Hydrology

The *Environmental Laboratory* [1987], defines wetland hydrology as comprising all hydrological characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season (*i.e.*, the period between the last spring killing frost and the first fall killing frost, which is dependent on local climate and geography).

There are primary and secondary hydrological indicators and areas deemed as wetland should have one primary and two or more secondary indicators present in conjunction with the other two wetland criteria (*i.e.*, wetland hydrophytic vegetation and wetland hydric soils).

Primary indicators of wetland hydrology may include, but are not limited to:

- ponded water;
- saturated soils;
- water marks on woody vegetation, fixed objects, *etc.*;
- drift lines;
- sediment and debris deposits on the surface, vegetation, *etc.*; and
- drainage patterns, such as channels, scours, *etc.*

In addition to the primary indicators, there are a variety of secondary wetland hydrology indicators. Secondary indicators include, but are not limited to:

- oxidized root channels in the upper 30 cm of the soil profile;
- water-stained leaves,
- local soil survey hydrology data;
- the faculative-neutral test of the vegetation as described in detail by *Environmental Laboratory* [1987]; and
- salt deposits, mud casts, and surface soil cracks.

2.1.3.2 Hydric Soils

Hydric soils are defined as those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part [*USDA-NRCS*, 2003]. Primary indicators of wetland hydric soils may include, but are not limited to, the presence of:

- organic soils (*i.e.*, histosols), such as peats and mucks;
- histic epipedons;
- sulfidic material (*i.e.*, emits an odour of rotten eggs);
- aquic or peraquic moisture regimes (*i.e.*, soils saturated by groundwater);
- reducing conditions;
- soil colours indicative of hydric soils (*e.g.*, gleyed soils, bright mottles, low matrix chroma, *etc.*);
- iron and manganese concretions;
- high organic matter in the surface horizon;
- streaking of subsurface horizons by organic matter; and
- organic pans.

Hydric soils are assessed in the field by excavating test pits using a shovel. Notes on the soil horizons present and the depth located within the pit(s) are noted. The matrix colour and mottle colour, if present, of the soils are determined using Munsell Soil Colour Charts [*Gretag-Macbeth*, 2000].

2.1.3.3 Hydrophytic Vegetation

Hydrophytic vegetation is defined as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present [*Environmental Laboratory*, 1987]. Hydrophytic vegetation should be the dominant plant type and is characterized by the dominant species that comprises the plant community.

2.1.3.4 Boundary Delineation

The wetland perimeter is delineated assessing the relationship between hydrological indicators, hydrophytic vegetation, and hydric soils. Each datum point in the field, spaced about 5 m apart, is collected using a Garmin GPSmap 60Cx handheld Global Positioning System (GPS) unit with an estimated accuracy rating of +/- 3 m.

2.2 ASSESSOR

Matt Alexander, *Ph.D., P.Geo., EP* completed the wetland functional assessment described herein. Matt attended the WESP-AC training session held on 12 and 13 September 2016 in Aulac, New Brunswick where the instructor was Dr. Paul Adamus. Since 2006, Matt has been doing wetland delineations and wetland functional assessments in New Brunswick, Nova Scotia, and Prince Edward Island.

3.0 DESK-TOP ASSESSMENT

3.1 SITE LOCATION AND FEATURES

The Project site, 11 Southers Road, is located adjacent to Milkish Channel of the Saint John River Estuary at Bayswater (Westfield Parish), New Brunswick (Figure 3). Locally, the area is sometimes referred to as Seadog Cove. According to the GeoNB mapping system, a portion (*i.e.*, 0.19 ha) of a 3 ha PSW exists on the property (Figure 1 and Figure 4). Approximate coordinates for the centre of the PSW are 45.35347 °N and 66.125964 °W. The PSW comprises low-lying portions of PID 30036008 and adjacent properties (Figure 5). A property information report is included in Appendix I.

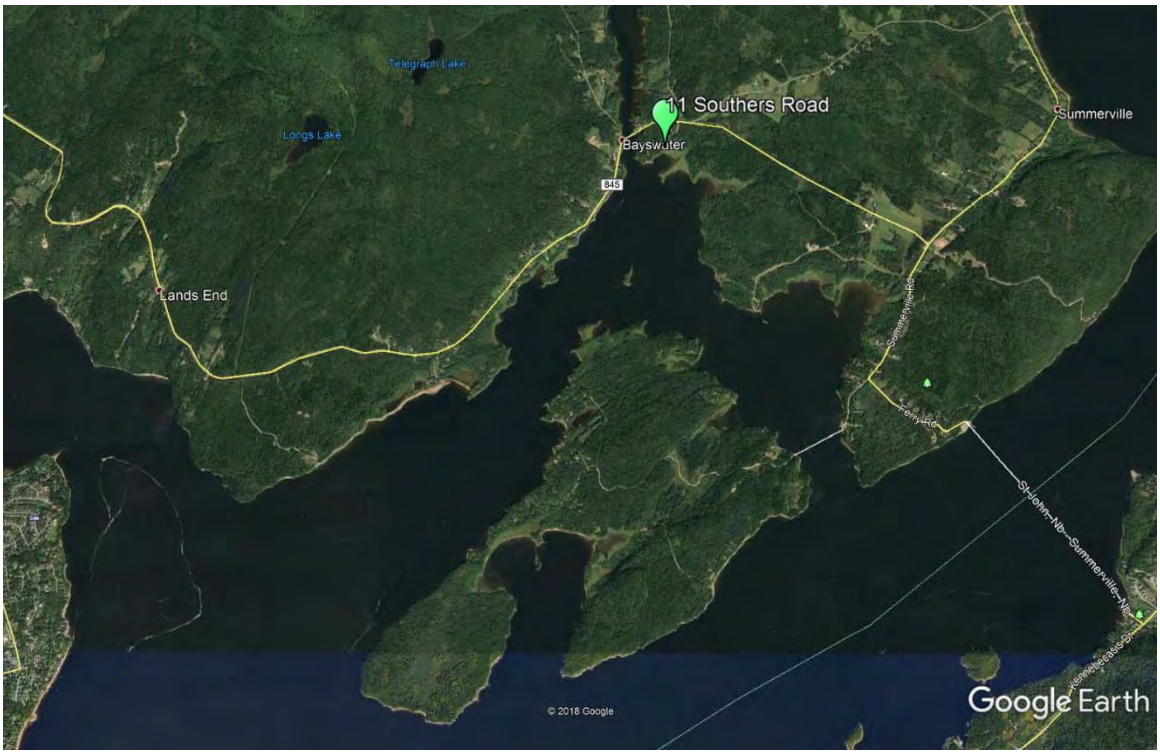


Figure 3. Google Earth image showing the location of the project site within the Saint John River Estuary at Bayswater, New Brunswick.

The 95 m^2 cottage existed on the property when it was purchased by the Client's family in 1992. Some time prior to building the cottage, the lot was built up by placing fill behind cribwork constructed using creosote pressure-treated railway ties. A fence was erected at the edge of the cribwork retaining wall, likely due to the 2 m to 3 m drop-off and a deck was built between the fence and the cottage. An above-ground pool was also placed atop the fill near the edge of the cribwork retaining wall. Figure 6 shows the cottage, deck, pool, and fence as they existed on the property in 2015. Interestingly, the GeoNB mapping shows that the fence, deck, pool, and a portion of the cottage are within the PSW (Figure 1 and Figure 4). That is likely because the PSW was delineate via aerial photography and not ground-truthed.

Figure 7 and Figure 8 show conditions of the property in 1992 when it was purchased by the Client. At that time, the low-lying portion of PID 30036008 adjacent to the River contained a cleared area for a bonfire pit and beaching canoes and kayaks.

Figure 4. Screen capture from GeoNB showing the estimated portion of the provincially significant wetland present on the property at 11 Southers Road Bayswater, New Brunswick.

Figure 5. Google Earth image showing the topography of the properties adjacent to the provincially significant wetland at Bayswater, New Brunswick.

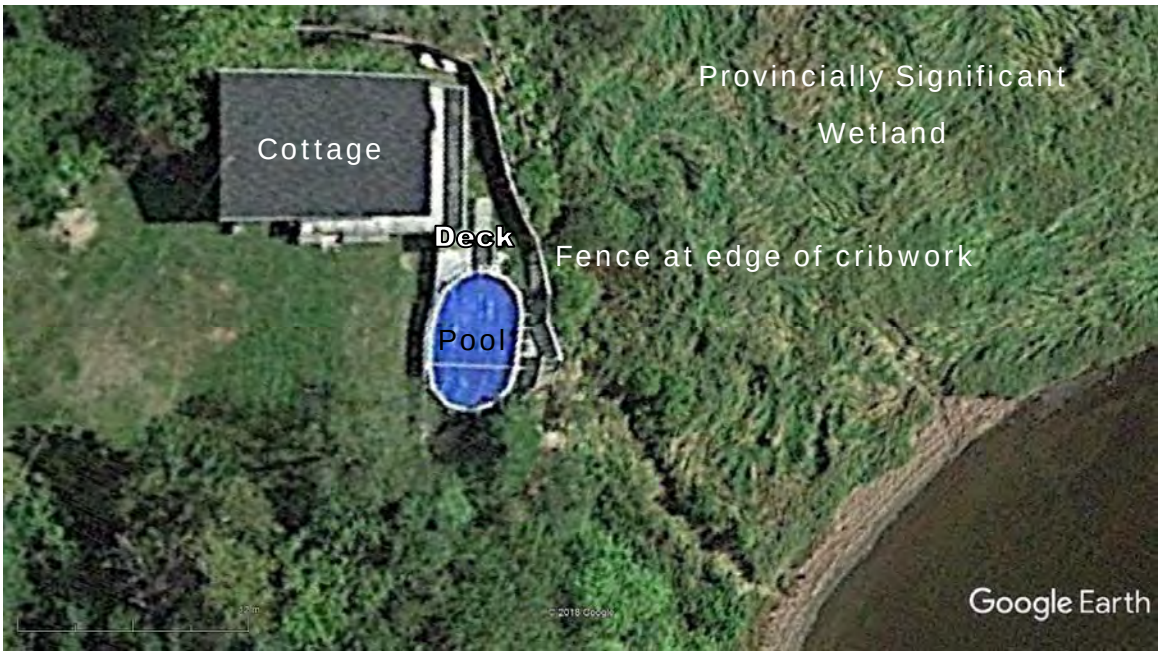


Figure 6. Google Earth image, circa 2015, showing the structures located on PID 30036008 in Bayswater, New Brunswick.

Figure 7. Photograph, circa 1992, looking from large boulder at edge of cribwork on PID 30036008 towards Milkish Channel in Bayswater, New Brunswick. Photograph provided by L. McGeachy.

Figure 8. Photograph, circa 1992, looking from the river's edge towards the cottage and associated infrastructure on PID 30036008 in Bayswater, New Brunswick. Photograph provided by L. McGeachy.

3.2 RECORDS OF LOCALLY OBSERVED RARE AND / OR ENDANGERED FLORA AND FAUNA

The Atlantic Canada Conservation Data Centre (ACCDC) databases were queried for known observation data of federally and provincially protected flora and fauna within a 5 km radius of the Project site (*i.e.*, refer to Appendix II for the ACCDC report). Table 2 lists the rare and / or endangered flora and fauna observed based on status by the Committee on the Status of Endangered Wildlife In Canada (COSEWIC), and the provincial and federal *Species at Risk Act* (*SARA*).

Table 2. Rare and / or endangered flora and fauna that have been observed within 5 km of PID 30036008 in Bayswater, New Brunswick. Data from Atlantic Canada Conservation Data Centre.

Common Name	Scientific Name	COSEWIC Status	*SARA* Status	Provincial Rarity Rank
Flora				
Muehlenbeck's bryum moss	*Bryum muehlenbeckii*			Extremely rare
Lesser brown sedge	*Carex adusta*			Rare to uncommon
Red pigweed	*Chenopodium rubrum*			Rare
Rock willow-grass	*Draba glabella*			Extremely rare
Andean water milfoil	*Myriophyllum quitense*			Rare to uncommon
Siberian water milfoil	*Myriophyllum sibiricum*			Uncommon to fairly common
Glaucous rattlesnake root	*Prenanthes racemose*			Uncommon
Bur oak	*Quercus macrocarpa*			Rare
Swamp rose	*Rosa palustris*			Uncommon
Torrey's bulrush	*Schoenoplectus torreyi*			Uncommon
Eastern skunk cabbage	*Symplocarpus foetidus*			Rare
Horned pondweed	*Zannichellia palustris*			Uncommon
Fauna				
Spotted sandpiper	*Actitis macularius*			Breeding: uncommon to fairly common Migrating: abundant
Greater scaup	*Aythya marila*			Breeding: extremely rare Migrating: fairly common Nesting: rare
Bufflehead	*Bucephala albeola*			Migrating: uncommon Nesting: rare
Turkey vulture	*Cathartes aura*			Breeding: uncommon Migrating: uncommon
Killdeer	*Charadrius vociferous*			Breeding: uncommon Migrating: uncommon
Common nighthawk	*Chordeiles minor*	Special concern	Threatened	Breeding: uncommon Migrating: fairly common
Black-billed cuckoo	*Coccyzus erythropthalmus*			Breeding: uncommon Migrating: uncommon
Evening grosbeak	*Coccothraustes vespertinus*	Special concern		Breeding: uncommon Nesting: uncommon to fairly common Migration: unrankable
Northern bobwhite	*Colinus virginianus*	Endangered	Endangered	
Olive-sided flycatcher	*Contopus cooperi*	Special concern	Threatened	Breeding: uncommon Migrating: uncommon

Common Name	Scientific Name	COSEWIC Status	*SARA* Status	Provincial Rarity Rank
Eastern wood-pewee	*Contopus virens*	Special concern	Special concern	Breeding: fairly common Migrating: fairly common
Cape may warbler	*Dendrioca tigrina*			Breeding: uncommon Migrating: fairly common to abundant
Bobolink	*Dolichonyx oryzivorus*	Threatened	Threatened	Breeding: uncommon Migrating: uncommon
Willow flycatcher	*Empidonax traillii*			Breeding: extremely rare to rare Migrating: extremely rare to rare
Rusty blackbird	*Euphagus carolinus*	Special concern	Special concern	Breeding: uncommon Migrating: uncommon
Barn swallow	*Hirundo rustica*	Threatened	Threatened	Breeding: rare Migrating: rare
Wood thrush	*Hylocichla mustelina*	Threatened	Threatened	Breeding: extremely rare to rare Migrating: extremely rare to rare
Baltimore oriole	*Icterus galbula*			Breeding: uncommon Migrating: uncommon
Tidewater mucket	*Leptodea ochracea*			Uncommon
Northern mockingbird	*Mimus polyglottos*			Breeding: rare Migrating: rare
Brown-headed cowbird	*Molothrus ater*			Breeding: uncommon Migrating: uncommon
Great crested flycatcher	*Myiarchus crinitus*			Breeding: rare to uncommon Migrating: rare to uncommon
Indigo bunting	*Passerina cyanea*			Breeding: uncommon Migrating: uncommon
Cliff swallow	*Petrochelidon pyrrhonota*			Breeding: rare to uncommon Migrating: rare to uncommon
Bank swallow	*Riparia*	Threatened	Threatened	Breeding: rare to uncommon Migrating: rare to uncommon
Saltmarsh hydrobe	*Spurwinkia salsa*			Uncommon
Common tern	*Sterna hirundo*	Not at risk		Breeding: uncommon Migrating: unrankable
Warbling vireo	*Vireo gilvus*			Breeding: uncommon Migrating: uncommon
Canada warbler	*Wilsonia canadensis*	Threatened	Threatened	Breeding: uncommon Migrating: uncommon

3.3 SPRING FRESHET 2018

The 2018 spring freshet brought unprecedented water levels to the lower Saint John River basin. The levels were at least 42 cm and 53 cm higher than the previous high water marks established in 1973 and 2008, respectively (Figure 9). Damage to residential and recreational properties along the River's edge was widespread. The damage was exacerbated by high winds coincident with the flood peak.

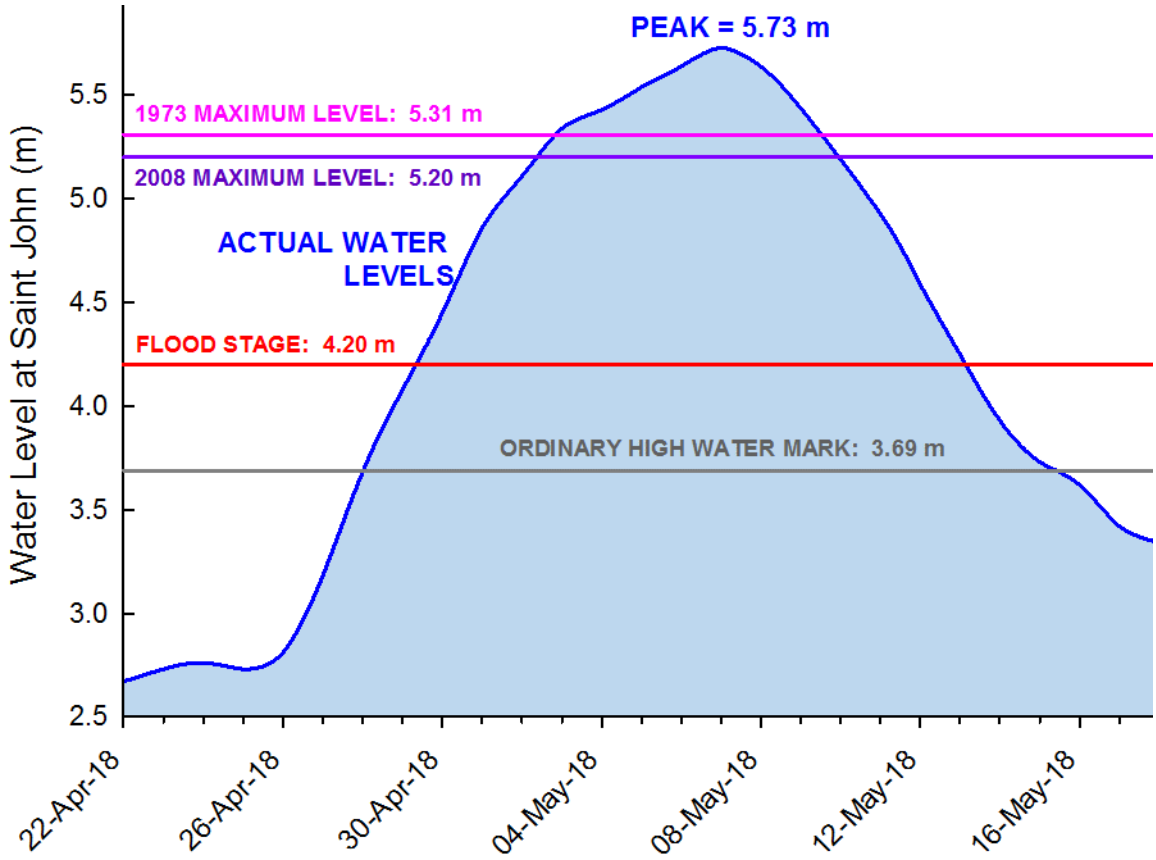


Figure 9. Water levels within the Saint John River measured by Environment Canada at the station located at Saint John, New Brunswick during late April and early May 2018.

Water levels rose nearly to the level of the deck on the property. Figure 10 shows the extent of the 2017 spring freshet. A considerable amount of stabilizing soil and rock behind the cribwork retaining wall was washed away by the wind-driven flood waves. This has caused the fence and deck to become extremely unsafe and unstable and is ultimately threatening the stability of the cottage and pool.

Several aerial photographs of the site taken at varying times of the year are included in Appendix III.

Figure 10. Google Earth image showing the extent of flooding at the Bayswater, New Brunswick on 12 May 2018.

4.0 FIELD ASSESSMENT

On 12 October 2018, Matt Alexander visited PID 30036008 between 1:30PM and 3:30PM to complete the field component of the wetland functional assessment. Peter McKelvey, also of Fundy Engineering, accompanied. During the assessment, skies were overcast, air temperature was about 8 °C, and there were light winds. During the previous 48 hours, there had been ~ 40 mm of precipitation. The tide was rising during the site visit; low tide of 1.024 m occurred at 10:11AM and high tide of 1.626 m occurred at 3:36PM. Almost the entire wetland (~ 95 %) was observed during the field assessment.

Figure 11 shows the PSW as viewed looking southwest from the deck at 11 Southers Road. There is an elevation difference of about 3.5 m between the ground surface behind the cribwork and the PSW, which can be seen in Figure 12.

Figure 11. Photograph taken on 12 October 2018 looking southwest towards Kennebecasis Island from the deck at 11 Southers Road in Bayswater, New Brunswick.

Figure 12. Photograph taken on 12 October 2018 looking north towards the cottage at 11 Southers Road in Bayswater, New Brunswick from the provincially significant wetland.

Figure 13 is a close-up of the cribwork retaining wall structure showing loss of material from behind the structure. The ground at the edge of the cribwork retaining wall where the fence is located appears to have washed away in many locations during the 2018 spring freshet such that there is now a space about 0.5 m wide by 1 m deep between the wall and fence (Figure 14).

Figure 13. Photograph taken on 12 October 2018 looking at a portion of the cribwork retaining wall at 11 Southers Road in Bayswater, New Brunswick.

Figure 14. Photograph taken on 12 October 2018 looking along the fence at the edge of the cribwork retaining wall at 11 Southers Road in Bayswater, New Brunswick.

4.1 WETLAND BOUNDARY

As noted in Section 3.1, the PSW boundary within the GeoNB databases was likely not created during a field assessment. That is likely why the fence, deck, pool, and a portion of the cottage are shown within the PSW. The three wetland criteria, which were all observed during the field assessment and used to delineate the wetland boundary on PID 30036008, are described below.

4.1.1 Hydrology

Saturated soils, water marks on woody vegetation, drift lines, and sediment and debris deposits, which were all observed, are positive primary indicators of wetland hydrology. Despite having rained during the previous 48 hours, there was no standing water within the wetland.

4.1.2 Hydric Soils

Several test pits were excavated using a shovel revealed saturated soils immediately below the root mat. Figure 15 shows a photograph of the soils and water within one of the test pits.

Figure 15. Photograph taken on 12 October 2018 showing hydric soils within a test pit dug within the provincially significant wetland at 11 Southers Road in Bayswater, New Brunswick.

4.1.3 Hydrophytic Vegetation

Table 3 summarizes the hydrophytic vegetation that was observed during the site visit. It should be noted that the site visit was outside the normal wetland delineation season, which complicated identification (*i.e.*, loss of fruits and flowers). The predominant wetland vegetation (*i.e.*, ~ 95 %) is Reed Canary Grass (*Phalaris arundinacea*). None of the rare

and / or endangered flora noted in the ACCDC data (*i.e.*, Table 2) were observed within this PSW. Appendix IV includes photographs showing the representative vegetation within the wetland.

Table 3. List of flora observed on 12 October 2017 within the provincially significant wetland at 11 Southers Road in Bayswater, New Brunswick.

Common Name	Scientific Name	Provincial Rarity Rank	Provincial Status Rank
Red maple	*Acer rubrum*	Abundant	Secure
Speckled alder	*Alnus incana*	Abundant	Secure
Common ragweed	*Ambrosia artemisiifolia*	Abundant	Secure
New York aster	*Aster novi-belgii*	Abundant	Secure
Common beggartick	*Bidens frondosa*	Abundant	Secure
Black mustard	*Brassica nigra*	Accidental	Exotic
White ash	*Fraxinus americana*	Fairly common to abundant	Secure
Common St. John`s Wort	*Hypericum perforatum*	Exotic	Exotic
Prickly lettuce	*Lactuca serriola*	Exotic	Exotic
Purple loosestrife	*Lythrum salicaria*	Exotic	Exotic
Spearmint	*Mentha spicata*	Exotic	Exotic
Weepy primrose	*Oenothera speciosa*		
Sensitive fern	*Onoclea sensibilis*	Abundant	Secure
Cinnamon fern	*Osmunda claytoniana*	Abundant	Secure
Reed canary grass	*Phalaris arundinacea*	Abundant	Secure
Lady`s thumb	*Polygonum persicaria*	Exotic	Exotic
Wild radish	*Raphanus raphanistrum*	Exotic	Exotic
Swamp rose	*Rosa nitida*	Uncommon	Secure
Virginia rosa	*Rosa virginiana*	Abundant	Secure
Sea glasswort	*Salicornia maritim*	Abundant	Secure
Willow	*Salix sp.*		
Common elder	*Sambucu canadensis*	Abundant	Secure
Stinking willie	*Senecio jacobaea*	Exotic	Exotic
Carrion flower	*Smilax herbacea*	Fairly common	Secure
Climbing nightshade	*Solanum dulcamara*	Exotic	Exotic
Freshwater Cordgrass	*Spartina pectinata*	Abundant	Secure
Meadowsweet	*Spirea latifolia*	Abundant	Secure
New York fern	*Thelypteris noveboracensis*	Abundant	Secure
Stinging nettle	*Urtica dioica*	Fairly common	Secure
Vetch	*Vicia sp.*		

4.1.4 Boundary Delineation

There is a definite wetland boundary at the base of the cribwork retaining wall / boulders and the PSW on PID 30036008 (*i.e.*, the abrupt change in elevation). A comparison of the boundary delineated in the field and the GeoNB boundary is shown in Figure 16.

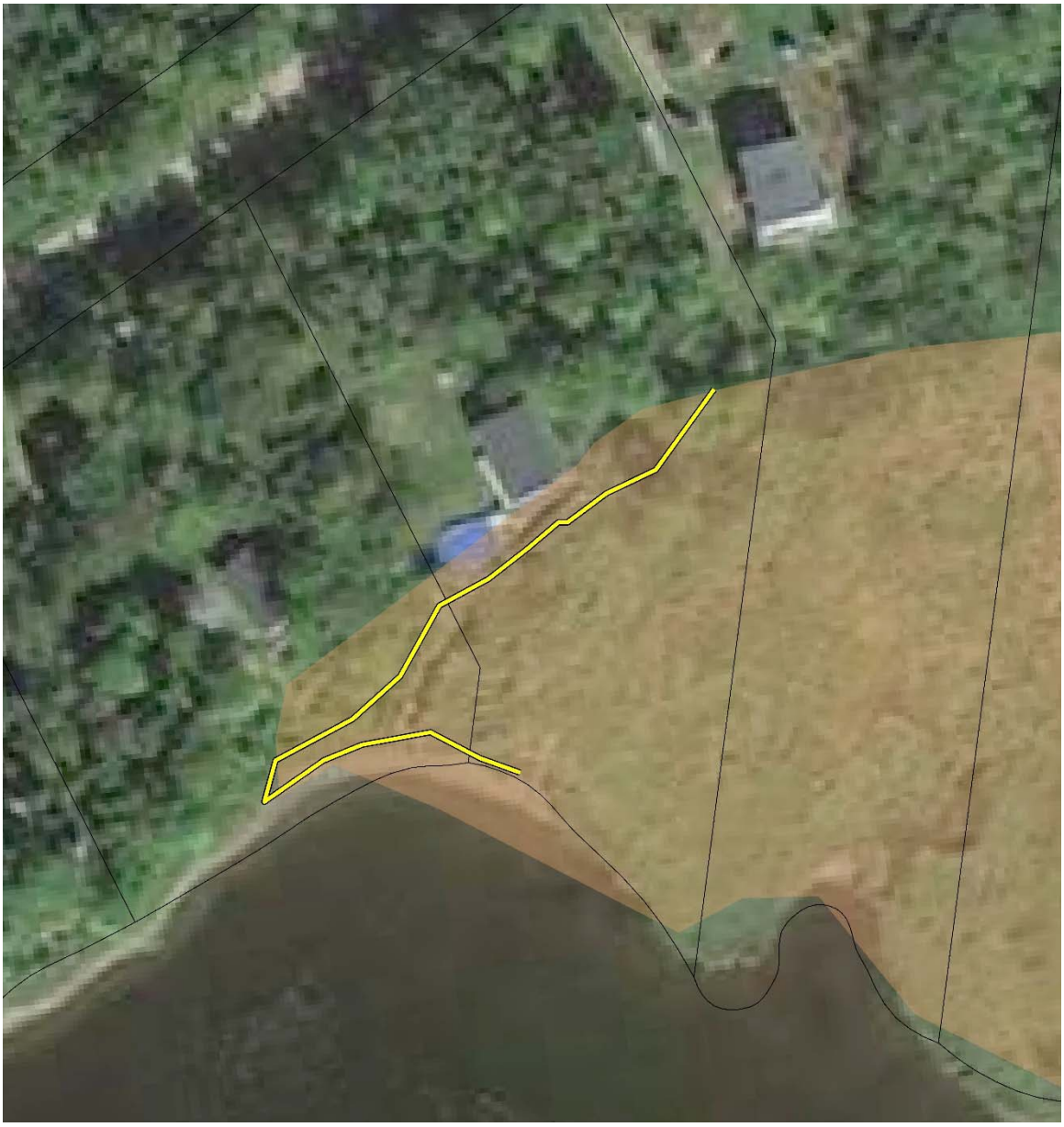


Figure 16. Aerial photograph showing the GeoNB boundary of the provincially significant wetland (orange shading) on PID 30036008 in Bayswater, New Brunswick and the field delineated wetland boundary (yellow line).

5.0 FUNCTIONAL ASSESSMENT

5.1 WESP-AC MODEL RESULTS

The complete WESP-AC Model results for PID 30036008 are included in Appendix V. A summary of the functional assessment is provided in Table 4. The following three functions / attributes received a "higher" rating:

- storm surge reduction;
- biodiversity support; and
- public use and recognition.

Table 4. Summary of the functional assessment results for the provincially significant wetland partially located on PID 30036008 in Bayswater, New Brunswick.

Function or Attribute	Normalized Score	Rating
Storm surge reduction	5.58	Higher
Water purification	3.09	Moderate
Organic nutrient export	5.33	Moderate
Fish habitat	7.06	Moderate
Waterbird habitat	1.74	Lower
Songbird, raptor, and mammal habitat	4.95	Moderate
Biodiversity support	10.00	Higher
Wetland stability	2.75	Moderate
Public use and recognition	6.93	Higher

5.1.1 Storm Surge Reduction

The PSW scored higher than the reference wetlands with respect to storm surge reduction (Table 4). It is located along the shores of the Saint John River Estuary and its low-lying position allows it to reduce moderate storm surges. It is likely unable to protect during severe storm surges as was experienced during the 2018 spring freshet.

A slight loss of the PSW (*i.e.*, up to 408 m^2 or 1 % total area of the wetland using the GeoNB boundary, not the delineated boundary), to allow for the construction of a new retaining wall on PID 30036008, is unlikely to impact this wetland function in the future. Construction of the new retaining wall structure will better protect the property from future storm surges, which should somewhat protect the wetland (*i.e.*, if a new retaining wall is not constructed, the existing wall, deck, fence, pool, cottage, *etc.*, could end up in the wetland, which would likely result in a greater overall impact to the wetland).

5.1.2 Biodiversity Support

The normalized score for the PSW was the highest possible (*i.e.*, 10; Table 4). The PSW scored higher than the reference wetlands with respect to biodiversity support and is likely because the ACCDC data show several rare flora and fauna species within 5 km. As noted in *NBDELG* [2018], a tidal wetland automatically gets the highest score for

biodiversity if at least one of the priority flora or fauna tracked by the ACCDC has been found within it or within 1 km of it.

During the field assessment, no rare and / or endangered species, including those identified within the ACCDC report, were identified. Instead, the wetland is dominated by abundant and exotic species. During construction of the new retaining wall, there will be minimal loss of wetland vegetation. It may be possible, during the work, to place portions of the root mat aside to place at the base of the retaining wall once complete.

5.1.3 Public Use and Recognition

All tidal wetlands in New Brunswick are designated as PSWs because of their outstanding ecological importance. As described in *NBDELG* [2018], tidal wetlands are considered important for public use and recognition because they provide an expanse of open space that contributes to aesthetically to the appeal of the region's coastal areas.

This PSW is located at the head of a cove and is abutted by privately owned lands. It is not part of any recognized ecological or waterfowl reserve and it is unlikely that many people visit the area considering primary access is via a private lane (*i.e.*, Southers Road).

6.0 SUMMARY

A wetland functional assessment was conducted for the provincially significant wetland that extends partially on to PID 30036008 in Bayswater, New Brunswick. The wetland is classified as provincially significant because it is located within the Saint John River Estuary (*i.e.*, it is tidal). The PSW is about 3 ha in size, the majority of which was assessed during a field visit on 12 October 2018. No rare and / or endangered flora were observed within the wetland during the field assessment; however, the functional assessment completed using WESP-AC for tidal wetlands yielded three functions with normalized scores higher than reference wetlands. Those functions included storm surge reduction, biodiversity support, and public use and recognition. It is unlikely that these functions will be impacted in the long-term as a result of the emergency remedial work required to secure the cottage and associated infrastructure on the lot.

Because the wetland is > 2 ha in size, any potential impact to it and / or its 30 m regulated buffer must be approved by undergoing EIA review as per the *Environmental Impact Assessment Regulation* [**87-83**] of the *New Brunswick Clean Environment Act*.

6.1 CLOSING

We trust that you will find the contents of this report satisfactory for your purposes. This report was prepared by Dr. Matthew Alexander, *P.Geo., EP.* Please feel free to contact the undersigned at 506.674.9422 or via email at matt.alexander@fundyeng.com if any clarification is required.

Respectfully Submitted,

FUNDY ENGINEERING & CONSULTING LTD.

Dr. Matthew D. Alexander, *P.Geo., EP*

7.0 GLOSSARY

The following terms are among those used in this wetland functional assessment report, which may not be familiar to all readers. These definitions are intended to be explanatory and therefore may differ from those used in other documents.

clay: a natural, earthy, fine-grained material (*i.e.*, < 3 µm) that develops a plasticity when mixed with limited amounts of water; composed primarily of silica, alumina, and water, often with iron, alkalies, and alkaline earths.

Clean Water Act: a provincial *Act* administered by the New Brunswick Department of the Environment, which deals with protecting the overall water environment for all New Brunswicker's to enjoy.

Clean Environment Act: a provincial *Act* administered by the New Brunswick Department of the Environment, which deals with protecting the overall environment for all New Brunswicker's to enjoy.

conglomerate: cemented, rounded fragments of water-worm rock or pebbles, bound by a siliceous (*i.e.*, containing abundant silica) or argillaceous (*i.e.*, clay-size particles) substance.

dip: the angle that a stratum or fault plane makes with the horizontal.

Environmental Impact Assessment (EIA): a study undertaken to assess the effect on a specified environment of the introduction of any new factor that may upset the current ecological balance and includes the social and physical environment of the surrounding area.

Fisheries Act: a federal *Act* administered by the Department of Fisheries and Oceans with respect to fish and fisheries in Canadian Waters.

Global Positioning System (GPS): a satellite based radio navigation system developed by the US military that provides 24-hour three-dimensional position, velocity, and time information to suitably equipped users anywhere on or near the Earth.

grade: ground level or the elevation at any given point.

gravel: a loose or unconsolidated deposit of rounded pebbles, cobbles, or boulders with a size range from 2 mm to 70 mm.

ground truth: the process of verifying the correctness of remote sensing information by use of ancillary information, such as field studies.

groundwater: subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

Harmful Alteration, Disruption, or Destruction (HADD) authorization: New Brunswick's fish-bearing streams are afforded protection under Section 35(2) of the *Fisheries Act*, which is administered through the Federal Department of Fisheries and Oceans. Whenever there is a chance that fish and fish habitat will be altered, disrupted, or destroyed by an Undertaking, a HADD authorization is required.

hydric soils: soils that are saturated or flooded long enough during the growing season to develop anaerobic conditions in the upper part of the soil that indicate the possibility of wetland presence.

hydrology: an earth science that encompasses the occurrence, distribution, movement, and properties of water.

hydrophytic vegetation: plant life capable of growing in wet conditions, such as in water or in soil or other substrate that is periodically saturated with water and whose presence suggests the possibility of a wetland.

loamy: mixed with sand, silt, clay, and humus.

marsh: a type of wetland that has periodic or persistent standing water or slow moving water.

n: see sample size.

Parcel Information: Service New Brunswick (SNB) maintains a network of registries across the province where legal plans and documents related to the ownership of real property can be registered and made available for public scrutiny. The records in the Registries provide land ownership information dating back to the issuance of the original crown grants. Instruments registered or filed in the registry include deeds, mortgages, wills, subdivision plans, *etc*.

preliminary (watercourse / wetland) delineation: when a feature has been identified and delineated by stereographic methods from high resolution aerial photographs; it only provides information about what may be on the ground and not what actually is on the ground (*i.e.*, no ground-truthing has occurred), which means it is information for the lowest-detail level of planning.

Property Identification (PID) number: a unique number given to a land parcel for tracking information, such as deed holders, size, environmental issues, etc.

Provincially Significant Wetland (PSW): a wetland having provincial, national, or international importance for one or more of the following reasons: 1) wetlands, such as coastal marshes that represent a remnant of a formerly more widespread wetland type where, historically, impacts to this habitat type have been severe; 2) wetlands that are within a designated Ramsar site, National Wildlife Area, Provincial Wildlife Management Area, Migratory Bird Sanctuary, Western Hemisphere Shorebird Reserve, or Protected Natural Area; 3) wetlands that are project site under the North American Waterfowl Management Plan and secured for conservation through the Eastern Habitat Joint Venture; 4) wetlands that contain one or more endangered and / or regionally endangered species as designated under the New Brunswick *Endangered Species Act* or other species of special status; 5) wetlands that represent a significant species assemblage and / or have a high value for wildlife on the basis of size, location, vegetation, diversity, or interspersion; 6) wetlands that have, or are managed for, social and / or cultural values, including, but not limited to, community, spiritual, archaeological, scientific, educational, and recreational importance.

recognized delineation window: the annual period from 1 June to 30 September where wetland delineations are considered valid by the New Brunswick Department of the Environment because this is the period when hydric soils, hydrophytic vegetation, and wetland hydrology are most identifiable.

Regulator: the agency / department that oversees and applies the Act and regulations governing the environment; for this document the Regulator is the New Brunswick Department of the Environment.

riparian: of, on, or pertaining to the banks of a watercourse.

rubble: a loose mass of rough, angular rock fragments, coarser than sand.

sand: a loose material consisting of small mineral particles, or rock and mineral particles, distinguishable to the naked eye with a size range from 0.0625 mm to 2 mm.

sandstone: a detrital (*i.e.*, loose material resulting from the mechanical abrasion of rocks) sedimentary rock consisting of individual grains of sand-size particles 0.06 mm to 2 mm in diameter either set in a fine-grained matrix (silt or clay) or bonded by chemical cement.

silt: a rock fragment or a mineral or detrital particle in the soil having a diameter of 0.002 mm to 0.05 mm that is, smaller than fine sand and larger than coarse clay.

standard (watercourse / wetland) delineation: a feature that has been identified and delineated by detailed field investigations during the recognized delineation window (i.e., annually from 1 June to 30 September) using the appropriate criteria for definition (e.g., hydrology, hydric soils, and hydrophytic vegetation) in addition to stereographic data obtained from high-resolution aerial photographs.

surface water: all water that flows in watercourses and wetlands or is held in reservoirs above the Earth's surface.

surficial sediments: unconsolidated alluvial (*i.e.*, formed by running water), residual, or glacial deposits overlying bedrock or occurring on or near the surface of the earth.

topography: the physical features of a geographical area including relative elevations and the position of natural and anthropogenic features.

Watercourse and Wetland Alteration (WAWA) permit: in New Brunswick, watercourses and wetlands are afforded protection under the *Clean Water Act* (Regulation 90-80) with respect to a temporary or permanent change made at, near, or to a watercourse or wetland or to the water flow in a watercourse or wetland. The permits are administered by the New Brunswick Department of the Environment.

wetland: land that either periodically or permanently, has a water table at, near, or above the land's surface or that is saturated with water and sustains aquatic processes as indicated by the presence of hydric soils, hydrophytic vegetation, and biological activities adapted to wet conditions.

wetland function / value: natural processes and derivation of benefits and values associated with wetland ecosystems, including economic production (*e.g.*, peat, agricultural crops, wild rice, commercial fisheries / shellfish, peatland forest products, *etc.*), wildlife and fish habitat, organic carbon storage, water supply and purification (*i.e.*, groundwater recharge, flood control, maintenance of flow regimes, shoreline erosion buffering, *etc.*), and soil and water conservation, as well as tourism, heritage, recreational, educational, scientific, and aesthetic opportunities; the biological, hydrological, physical, social, cultural, and economic roles that wetlands play.

wetland alteration: means a temporary or permanent change made at, near, or to a wetland or to the water flow in a wetland and includes many activities as designated by the Regulator.

wetland avoidance: choosing an alternate project alternative project design, or alternate development site in order to eliminate wetland function loss.

wetland minimization: reducing adverse effects of development on wetland functions and values at all project stages to the smallest degree possible.

wetland compensation: making up for the unavoidable loss or damage to a wetland, which is required for any and all wetland function and value that is impacted by a project; compensation ratios are established by the Regulator.

wetland hierarchy: refers to how wetland functional loss is dealt with in New Brunswick; avoidance is the first step followed by minimization and compensation where compensation has several steps associated with it.

8.0 REFERENCES

Bond, W.K., K.W. Cox, T. Heberlein, E.W. Manning, D.R. Witty, and D.A. Young. 1992. *Wetland evaluation guide*. Final report of the wetlands are not wastelands project. Published in partnership with Ducks Unlimited Canada and Environment Canada. Issues Paper: 1992-1. Ottawa.

Cox, K.W. and A. Grose. 2000. *Wetland mitigation in Canada: a framework for application*. North American Wetlands Conservation Council (Canada), Issues Paper: 2000-1. Ottawa. ISBN: 0-662-28513-1.

Environment Canada. 1996. The Federal Policy on wetland conservation: implementation guide for federal land managers. Wildlife Conservation Branch of the Canadian Wildlife Service Department of Environment Canada.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Wetlands Research Program Technical Report Y-87-1. 92p + Appendices.

Gretag-Macbeth. 2000. *Munsell® Color*. New Windsor, NY.

Interagency Workshop on Wetland Restoration. Undated. An introduction and user's guide to wetland restoration, creation, and enhancement. National Oceanic and Atmospheric Administration, Environmental Protection Agency, Army Corps of Engineers, Fish and Wildlife Service, and Natural Resources Conservation Service document. 95p.

Milko, R. 1998. *Wetlands environmental assessment guideline*. Biodiversity Protection Branch, Canadian Wildlife Service, Environment Canada. Ottawa. ISBN: 0-662-63741-0.

Tiner, R.W. 1999. Wetland Indicators, a guide to wetland identification, delineation, classification, and mapping. Lewis Publishers, Boca Raton. 392p.

United States Department of Agriculture – Natural Resources Conservation Service. 2003. *Field book for describing and sampling soils*. National Soil Survey Center, Lincoln, New England.

U.S Army Corps of Engineers. 2008. *Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region.* Wetlands Regulatory Assistance Program, draft for peer review and field testing. 7-3-2008.

9.0 REPORT DISCLAIMERS AND DISCLOSURES

The sole purpose of this report and the associated services performed by Fundy Engineering & Consulting Ltd. was to complete a wetland functional assessment for a provincially significant wetland in Bayswater, New Brunswick. The scope of services was defined by the New Brunswick Department of Environment and Local Government's Manual for Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC): Tidal Wetlands [*NBDELG*, 2018].

The observations made and facts presented in this report are based on a desktop assessment and field assessment conducted during October 2018. Site conditions at the time of visitation / sampling only are reflected in this document. Certain data presented are based on the statements, recollections, and observations of various individuals and where this is the case, sources are indicated. No independent confirmation of this information was made.

This report has been prepared on behalf of and for the exclusive use of the Client. The report expresses the professional opinion of Fundy Engineering experts and is based on their technical / scientific knowledge. Fundy Engineering & Consulting Ltd. accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report or data by any third-party.

9.1 PROJECT TEAM

Brief biographies for members of Fundy Engineering's Environmental Team that generated this report are provided below.

Matthew D. Alexander, *Ph.D., P.Geo., EP*
Environmental Science Manager

Qualifications at a glance

- *Ph.D.*, UNB, 2006
- *B.Sc. (Honours)*, St.FX, 2000
- *Environmental Engineering Diploma (Honours),* Sault College, 1998
- *Professional Geoscientist,* APEGNB and APGNS
- *Environmental Professional*, CECAB
- *Management Certificate,* Harvard Business School, 2012
- *Recognized Wetland Delineator,* NBDENV

SPECIALTY AREAS: hydrogeology and hydrology, numerical modelling, environmental impact assessments, environmental permitting, monitoring, and compliance, and environmental research

Profile

Matt has authoured several papers published in international peer-reviewed scientific journals relating to his areas of expertise. In 2008 he was named one of NB's 21 Leaders for the 21st Century and in 2011 he was a finalist in the Premier's Awards for Ontario College Graduates. He has worked on many projects including: assessing the quality of and threats to water supplied to RCMP facilities across PEI; environmental permitting, monitoring, and compliance for portions of the $750 million (USD) Canaport™ LNG_{LP} Terminal; environmental impact assessment, permitting, monitoring, and compliance for

the Red Head Secondary Access Road and the Canaport™ LNG_{LP} Emergency Access Road; oversight of the involvement of derelict lobster traps ghost fishing in areas of Saint John Harbour; environmental impact assessment and permitting for the qplex™ development in Quispamsis; environmental impact assessment for the Reversing Falls Mill chip handling and continuous cooking digester plant renewal; a white paper on considerations for responsible gas development of the Frederick Brook Shale in New Brunswick; a brochure on wastewater treatment options for natural gas development; an environmental impact assessment for the introduction of wild-trapped eastern wild turkey to southwestern New Brunswick; and development of high-yield groundwater supplies for aquaculture facilities in southwestern NB, including Acadian Sturgeon & Caviar Inc. at Carters Point and Breviro Caviar Inc. in Pennfield.

Stephen Little, *P.Tech., CESA*
Geographical Information Systems Lead

Qualifications at a glance

- *Environmental Technology Diploma*, NBCC, 2007
- *Professional Technologist*, NBSCETT
- *Certified Environmental Site Assessor*, AESAC

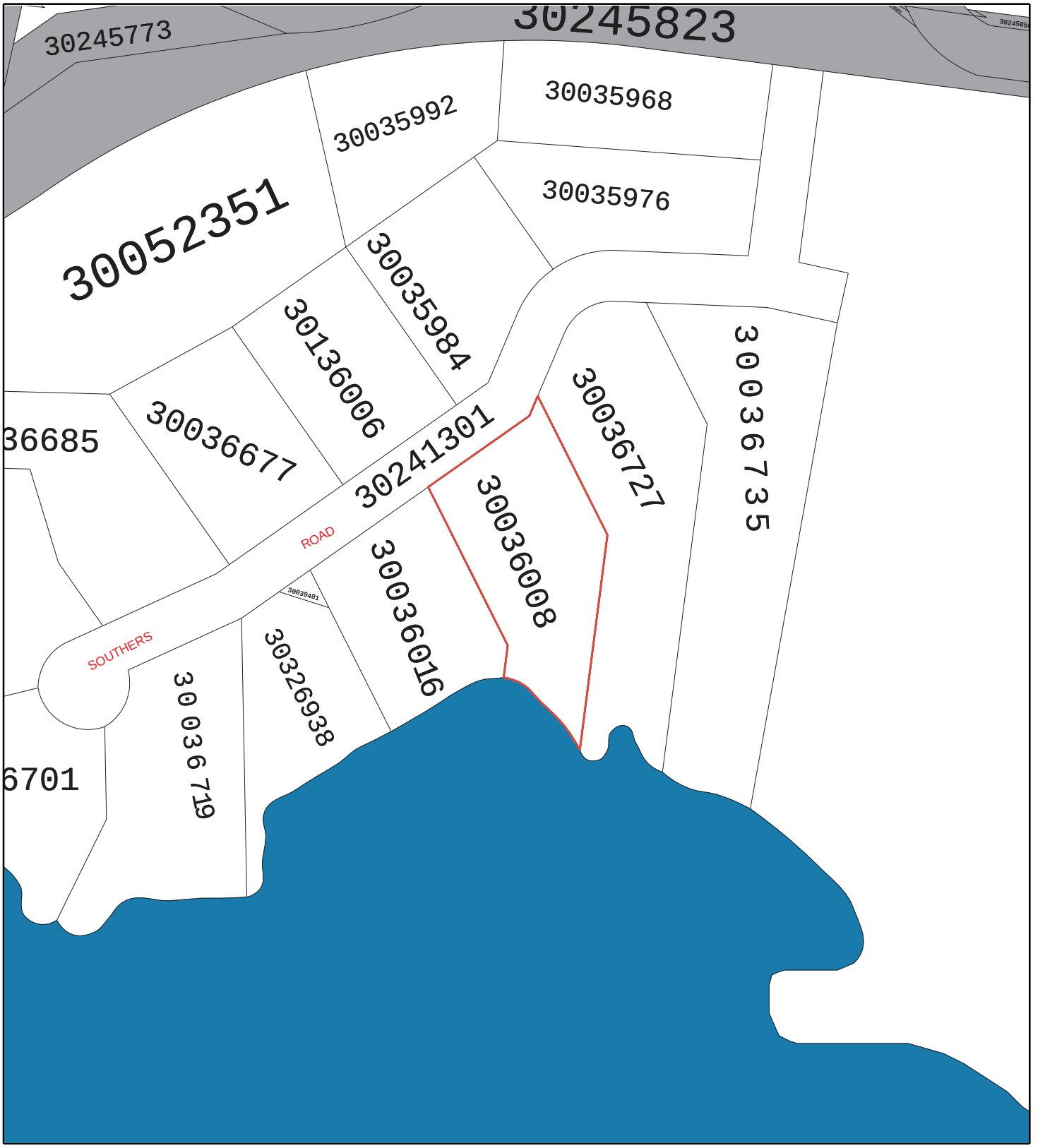
SPECIALITY AREAS: GIS, Phase I and II environmental site assessments, site remediation, environmental audits, risk assessments, and hazardous materials surveys

Profile

Steve has participated in several high-profile jobs, including: the hazardous materials assessment and professional services for abatement of asbestos at the former YMCA in Saint John; completing field work for Phase I and Phase II environmental site assessments on Long Wharf for determining potential environmental liabilities prior to the construction of a commercial development; using GIS as a tool for developing high-level mapping for potentially locating energy investments in Saint John; assisting with the development of a remedial action plan for the site of the Kent Building Supplies in west Saint John; and managing a large-scale fuel oil release at a residential property in west Saint John. Steve has also done a considerable amount of GIS work for Summit Liability Solutions, our partner firm in western Canada who primarily does work for upstream oil and gas companies.

Appendix I:

Service New Brunswick Property Information



Map Scale / Échelle cartographique 1 : 2109

While this map may not be free from error or omission, care has been taken to ensure the best possible quality. This map is a graphical representation of property boundaries which approximates the size, configuration and location of properties. It is not a survey and is not intended to be used for legal descriptions or to calculate exact dimensions or area.

Même si cette carte n'est peut-être pas libre de toute erreur ou omission, toutes les précautions ont été prises pour en assurer la meilleure qualité possible. Cette carte est une représentation graphique approximative des terrains (limites, dimensions, configuration et emplacement). Elle n'a aucun caractère officiel et ne doit donc pas servir à la rédaction de la description officielle d'un terrain ni au calcul de ses dimensions exactes ou de sa superficie.

Parcel Information

PID:	30036008	**County:**	Kings
Status:	Active	**Active Date/Time:**	1979-12-05 00:00:00
Land Related Description:	Land	**Management Unit:**	NB0602
Area:	5261	**Area Unit:**	Square Metres
Date Last Updated:	2012-10-30 11:00:49	**Harmonization Status:**	Harmonized
Land Titles Status:	Land Titles	**Land Titles Date/Time:**	2004-10-13 12:32:34
Date of Last CRO:	2012-10-30 11:00:58	**Manner of Tenure:**	Not Applicable
Land Gazette Information:	NO		
Description of Tenure:			

Public Comments:

MAP / CARTE 21G08W1

Parcel Interest Holders

Owner	Qualifier	Interest Type
McGeachy, Lisa Mary		Owner

Assessment Reference

PAN	PAN Type	Taxing Authority Code	Taxing Authority
1207639		434	L.S.D. of/D.S.L. de Westfield

Parcel Locations

Civic Number	Street Name	Street Type	Street Direction	Place Name
11	Southers	Road		Summerville

County Parish

County	Parish
Kings	Westfield

Documents

Number	Registration Date	Book	Page	Code	Description
32107089	2012-10-30			6110	Discharge of Mortgage
32107022	2012-10-30			6110	Discharge of Mortgage
31206577	2012-02-29			1100	Deed/Transfer
31112650	2012-01-31			1220	Letters Probate
19269407	2004-10-14			5100	Mortgage
19263822	2004-10-13			3800	Land Titles First Notice

Date/Time: 2018-10-15 01:52:41

Documents (cont.)

Number	Registration Date	Book	Page	Code	Description
19263814	2004-10-13			3720	Land Titles First Order
19258772	2004-10-12			3900	Land Titles First Application
329575	1997-08-29	1352	418	101	Deed
299856	1993-09-21	1077	99	104	Mortgage
299855	1993-09-21	1077	95	101	Deed
226293	1984-10-29	524	849	101	Deed
205455	1981-06-22	424	580	108	Partial Discharge or Release
205322	1981-06-12	423	925	108	Partial Discharge or Release
205073	1981-06-01	422	605	101	Deed
177653	1977-01-01	303	235	104	Mortgage
177652	1977-01-01	303	231	101	Deed
177651	1977-01-01	303	229	107	Discharge
176928	1977-01-01	300	83	104	Mortgage
176927	1977-01-01	300	79	101	Deed
170283	1976-01-01	270	530	101	Deed

Plans

Number	Suffix	Registation Date	Code	Description	Lot Information	Orientation
6751		1979-10-09	9050	Subdivision & Amalgamations	Lot 79-5	Provincial Grid

Parcel Relations

Related PID	Type Of Relation	Lot Information
223685	Parent	

Non-Registered Instruments

No Records Returned

PAN Information

PAN:	1207639	**Status:**	Open
Assessed Owner(s):	MCGEACHY,LISA MARY	**Mailing Address:**	82 SUMMER ST SAINT JOHN NB
Assessment Year:	2018	**Postal Code:**	E2K 3X9
Current Assessment:	$ 88,300	**Current Levy:**	$ 1,431.69
Location:	11 SOUTHERS RD	**County:**	Kings
Property Description:	HOUSE & LOT	**Tax Class:**	Fully Taxable
Property Type Code:	120	**Property Type Name:**	Residential Improved
Taxing Authority Code:	434	**Neighbourhood Code:**	04
Taxing Authority Description:	L.S.D. of/D.S.L. de Westfield	**Neighbourhood Description:**	
Sequence Number:	A034	**Sub Unit:**	1
Harmonization:	COMPLETED (One to one match of parcels)	**Farm Land Identifiation Program:**	No
PID:	30036008	**PID (2nd):**	-
More PID(s):	No		

Sale Price Information

Price: $1 **Date:** 2012-02-29

Appendix II:

Atlantic Canada Conservation Data Centre Reports

Atlantic Canada Conservation Data Centre
Centre de données sur la conservation du Canada atlantique

DATA REPORT 6221: Summerville, NB

Prepared 12 October 2018
by J. Churchill, Data Manager

CONTENTS OF REPORT

Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (AC CDC; www.accdc.com) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The AC CDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the AC CDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees.

Upon request and for a fee, the AC CDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the AC CDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

1.1 DATA LIST

Included datasets:

Filename	Contents
SummervilleNB_6221ob.xls	All Rare and legally protected *Flora and Fauna* in your study area
SummervilleNB_6221ob100km.xls	A list of Rare and legally protected *Flora and Fauna* within 100 km of your study area
SummervilleNB_6221sa.xls	All *Significant Natural Areas* in your study area
SummervilleNB_6221ff.xls	Rare and common *Freshwater Fish* in your study area (DFO database)
SummervilleNB_6221bc.xls	Rare and common *Colonial Birds* in your study area

1.2 RESTRICTIONS

The AC CDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting AC CDC data, recipients assent to the following limits of use:

a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
c) The AC CDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
d) AC CDC data responses are restricted to the data in our Data System at the time of the data request.
e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
f) AC CDC data responses are not to be construed as exhaustive inventories of taxa in an area.
g) The absence of a taxon cannot be inferred by its absence in an AC CDC data response.

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

Please direct any additional questions about AC CDC data to the following individuals:

Plants, Lichens, Ranking Methods, All other Inquiries
Sean Blaney, Senior Scientist, Executive Director
Tel: (506) 364-2658
sean.blaney@accdc.ca

Animals (Fauna)
John Klymko, Zoologist
Tel: (506) 364-2660
john.klymko@accdc.ca

Plant Communities
Sarah Robinson, Community Ecologist
Tel: (506) 364-2664
sarah.robinson@accdc.ca

Data Management, GIS
James Churchill, Data Manager
Tel: (902) 679-6146
james.churchill@accdc.ca

Billing
Jean Breau
Tel: (506) 364-2657
jean.breau@accdc.ca

Questions on the biology of Federal Species at Risk can be directed to AC CDC: (506) 364-2658, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Donna Hurlburt, NS DLF: (902) 679-6886. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NS DLF Regional Biologist:

Western: Duncan Bayne
(902) 648-3536
Duncan.Bayne@novascotia.ca

Western: Sarah Spencer
(902) 634-7555
Sarah.Spencer@novascotia.ca

Central: Shavonne Meyer
(902) 893-6350
Shavonne.Meyer@novascotia.ca

Central: Kimberly George
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For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Garry Gregory, PEI Dept. of Communities, Land and Environment: (902) 569-7595.

2.0 RARE AND ENDANGERED SPECIES

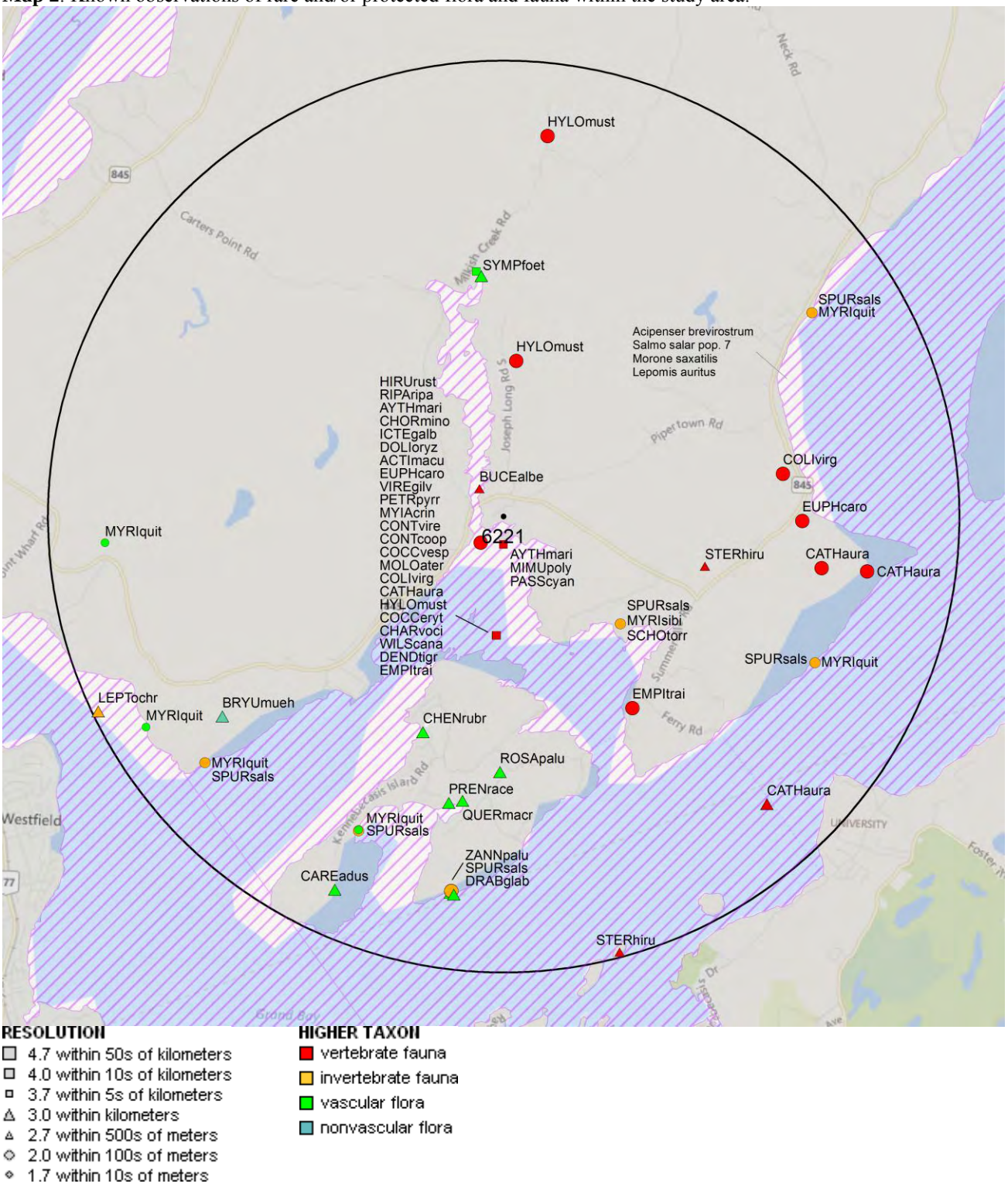
2.1 FLORA

The study area contains 18 records of 11 vascular, 1 record of 1 nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

The study area contains 68 records of 27 vertebrate, 11 records of 2 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

Map 2: Known observations of rare and/or protected flora and fauna within the study area.



3.0 SPECIAL AREAS

3.1 MANAGED AREAS
The GIS scan identified no managed areas in the vicinity of the study area (Map 3).

3.2 SIGNIFICANT AREAS
The GIS scan identified 1 biologically significant site in the vicinity of the study area (Map 3 and attached file: *sa*.xls).

Map 3: Boundaries and/or locations of known Managed and Significant Areas within the study area.

4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding "location-sensitive" species, section 4.3) within the study area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
N	*Bryum muehlenbeckii*	Muehlenbeck's Bryum Moss				S1	2 May Be At Risk	1	3.8 ± 1.0
P	*Draba glabella*	Rock Whitlow-Grass				S1	2 May Be At Risk	1	4.2 ± 1.0
P	*Chenopodium rubrum*	Red Pigweed				S2	3 Sensitive	1	2.5 ± 1.0
P	*Quercus macrocarpa*	Bur Oak				S2	2 May Be At Risk	1	3.2 ± 1.0
P	*Symplocarpus foetidus*	Eastern Skunk Cabbage				S2	3 Sensitive	2	2.6 ± 1.0
P	*Myriophyllum quitense*	Andean Water Milfoil				S2S3	4 Secure	7	3.8 ± 0.0
P	*Carex adusta*	Lesser Brown Sedge				S2S3	4 Secure	1	4.5 ± 1.0
P	*Prenanthes racemosa*	Glaucous Rattlesnakeroot				S3	4 Secure	1	3.2 ± 1.0
P	*Rosa palustris*	Swamp Rose				S3	4 Secure	1	2.8 ± 1.0
P	*Schoenoplectus torreyi*	Torrey's Bulrush				S3	4 Secure	1	1.7 ± 0.0
P	*Zannichellia palustris*	Horned Pondweed				S3	4 Secure	1	4.2 ± 0.0
P	*Myriophyllum sibiricum*	Siberian Water Milfoil				S3S4	4 Secure	1	1.7 ± 0.0

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	*Colinus virginianus*	Northern Bobwhite	Endangered	Endangered				2	1.3 ± 7.0
A	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened	Threatened	S1S2B,S1S2M	2 May Be At Risk	4	1.3 ± 7.0
A	*Hirundo rustica*	Barn Swallow	Threatened	Threatened	Threatened	S2B,S2M	3 Sensitive	3	1.3 ± 7.0
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened		S2S3B,S2S3M	3 Sensitive	1	1.3 ± 7.0
A	*Wilsonia canadensis*	Canada Warbler	Threatened	Threatened	Threatened	S3B,S3M	1 At Risk	3	1.3 ± 7.0
A	*Dolichonyx oryzivorus*	Bobolink	Threatened	Threatened	Threatened	S3B,S3M	3 Sensitive	4	1.3 ± 7.0
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B,S3M	2 May Be At Risk	3	1.3 ± 7.0
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S3B,S3M	1 At Risk	1	1.3 ± 7.0
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern			S3B,S3S4N,SUM	3 Sensitive	1	1.3 ± 7.0
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	1 At Risk	4	1.3 ± 7.0
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S4B,S4M	4 Secure	1	1.3 ± 7.0
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B,SUM	3 Sensitive	4	2.3 ± 0.0
A	*Aythya marila*	Greater Scaup				S1B,S4M,S2N	4 Secure	3	0.4 ± 0.0
A	*Empidonax traillii*	Willow Flycatcher				S1S2B,S1S2M	3 Sensitive	3	1.3 ± 7.0
A	*Mimus polyglottos*	Northern Mockingbird				S2B,S2M	3 Sensitive	1	0.3 ± 7.0
A	*Myiarchus crinitus*	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	2	1.3 ± 7.0
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	1	1.3 ± 7.0
A	*Cathartes aura*	Turkey Vulture				S3B,S3M	4 Secure	7	1.3 ± 7.0
A	*Charadrius vociferus*	Killdeer				S3B,S3M	3 Sensitive	3	1.3 ± 7.0
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B,S3M	4 Secure	1	1.3 ± 7.0
A	*Vireo gilvus*	Warbling Vireo				S3B,S3M	4 Secure	1	1.3 ± 7.0
A	*Passerina cyanea*	Indigo Bunting				S3B,S3M	4 Secure	1	0.3 ± 7.0
A	*Molothrus ater*	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	4	1.3 ± 7.0
A	*Icterus galbula*	Baltimore Oriole				S3B,S3M	4 Secure	1	1.3 ± 7.0
A	*Dendroica tigrina*	Cape May Warbler				S3B,S4S5M	4 Secure	3	1.3 ± 7.0
A	*Bucephala albeola*	Bufflehead				S3M,S2N	3 Sensitive	1	0.4 ± 0.0
A	*Actitis macularius*	Spotted Sandpiper				S3S4B,S5M	4 Secure	5	1.3 ± 7.0
I	*Leptodea ochracea*	Tidewater Mucket				S3	4 Secure	1	4.9 ± 1.0
I	*Spurwinkia salsa*	Saltmarsh Hydrobe				S3		10	1.7 ± 0.0

4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species "location sensitive". Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting your study area are indicated below with "YES".

New Brunswick

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within the Study Site?
Chrysemys picta picta	Eastern Painted Turtle			No
Chelydra serpentina	Snapping Turtle	Special Concern	Special Concern	No
Glyptemys insculpta	Wood Turtle	Threatened	Threatened	No
Haliaeetus leucocephalus	**Bald Eagle**		**Endangered**	**YES**
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.	Special Concern	Endangered	No
Cicindela marginipennis	Cobblestone Tiger Beetle	Endangered	Endangered	No
Coenonympha nipisiquit	Maritime Ringlet	Endangered	Endangered	No
Bat Hibernaculum		**[Endangered][1]**	**[Endangered][1]**	**YES**

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NB Species at Risk Act.

4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

# recs	CITATION
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1	Bagnell, B.A. 2001. New Brunswick Bryophyte Occurrences. B&B Botanical, Sussex, 478 recs.
1	Benedict, B. Connell Herbarium Specimens, Digital photos. University New Brunswick, Fredericton. 2005.
1	Bradford, R.G. et al. 1999. Update on the Status of Striped bass (Morone saxatilis) in eastern Canada in 1998.
1	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc, 6042 recs.
1	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc.

5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 34209 records of 148 vertebrate and 1183 records of 75 invertebrate fauna; 6465 records of 363 vascular, 757 records of 191 nonvascular flora (attached: *ob100km.xls).

Taxa within 100 km of the study site that are rare and/or endangered in the province in which the study site occurs (including "location-sensitive" species). All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record).

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	*Myotis lucifugus*	Little Brown Myotis	Endangered	Endangered	Endangered	S1	1 At Risk	62	2.2 ± 1.0	NB
A	*Myotis septentrionalis*	Northern Long-eared Myotis	Endangered	Endangered	Endangered	S1	1 At Risk	18	7.0 ± 1.0	NB
A	*Perimyotis subflavus*	Eastern Pipistrelle	Endangered	Endangered	Endangered	S1	1 At Risk	8	8.3 ± 0.0	NB
A	*Eubalaena glacialis*	North Atlantic Right Whale	Endangered	Endangered	Endangered	S1		6	75.9 ± 1.0	NB
A	*Sterna dougallii*	Roseate Tern	Endangered	Endangered	Endangered	S1?B,S1?M	1 At Risk	3	63.2 ± 0.0	NB
A	*Charadrius melodus melodus*	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B,S1M	1 At Risk	22	10.7 ± 0.0	NB
A	*Dermochelys coriacea (Atlantic pop.)*	Leatherback Sea Turtle - Atlantic pop.	Endangered	Endangered	Endangered	S1S2N	1 At Risk	4	14.5 ± 50.0	NB
A	*Salmo salar pop. 1*	Atlantic Salmon - Inner Bay of Fundy pop.	Endangered	Endangered	Endangered	S2	2 May Be At Risk	69	26.3 ± 1.0	NB
A	*Calidris canutus rufa*	Red Knot rufa ssp	Endangered		Endangered	S2M	1 At Risk	378	10.2 ± 0.0	NB
A	*Rangifer tarandus pop. 2*	Woodland Caribou (Atlantic-Gasp├⌐sie pop.)	Endangered	Endangered	Extirpated	SX	0.1 Extirpated	4	17.1 ± 5.0	NB
A	*Sturnella magna*	Eastern Meadowlark	Threatened	Threatened	Threatened	S1B,S1M	2 May Be At Risk	46	19.0 ± 7.0	NB
A	*Ixobrychus exilis*	Least Bittern	Threatened	Threatened	Threatened	S1S2B,S1S2M	1 At Risk	29	10.6 ± 7.0	NB
A	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened	Threatened	S1S2B,S1S2M	2 May Be At Risk	190	1.3 ± 7.0	NB
A	*Caprimulgus vociferus*	Whip-Poor-Will	Threatened	Threatened	Threatened	S2B,S2M	1 At Risk	87	8.0 ± 7.0	NB
A	*Hirundo rustica*	Barn Swallow	Threatened	Threatened	Threatened	S2B,S2M	3 Sensitive	1421	1.3 ± 7.0	NB
A	*Catharus bicknelli*	Bicknell's Thrush	Threatened	Special Concern	Threatened	S2B,S2M	1 At Risk	26	15.8 ± 1.0	NB
A	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S2S3	1 At Risk	104	8.1 ± 0.0	NB
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	1 At Risk	436	8.6 ± 0.0	NB
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened		S2S3B,S2S3M	3 Sensitive	453	1.3 ± 7.0	NB
A	*Acipenser oxyrinchus*	Atlantic Sturgeon	Threatened		Threatened	S3	4 Secure	1	38.9 ± 1.0	NB
A	*Wilsonia canadensis*	Canada Warbler	Threatened	Threatened	Threatened	S3B,S3M	1 At Risk	881	1.3 ± 7.0	NB
A	*Dolichonyx oryzivorus*	Bobolink	Threatened	Threatened	Threatened	S3B,S3M	3 Sensitive	1080	1.3 ± 7.0	NB
A	*Anguilla rostrata*	American Eel	Threatened		Threatened	S4	4 Secure	41	13.0 ± 0.0	NB
A	*Osmerus mordax pop. 2*	Lake Utopia Smelt large-bodied pop.	Threatened		Threatened			2	55.2 ± 10.0	NB
A	*Coturnicops noveboracensis*	Yellow Rail	Special Concern	Special Concern	Special Concern	S1?B,SUM	2 May Be At Risk	3	48.7 ± 7.0	NB
A	*Histrionicus histrionicus pop. 1*	Harlequin Duck - Eastern pop.	Special Concern	Special Concern	Endangered	S1B,S1S2N,S2M	1 At Risk	155	35.2 ± 17.0	NB
A	*Falco peregrinus pop. 1*	Peregrine Falcon - anatum/tundrius	Special Concern	Special Concern	Endangered	S1B,S3M	1 At Risk	637	8.7 ± 0.0	NB
A	*Asio flammeus*	Short-eared Owl	Special Concern	Special Concern	Special Concern	S2B,S2M	3 Sensitive	17	34.1 ± 0.0	NB
A	*Bucephala islandica (Eastern pop.)*	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	Special Concern	S2M,S2N	3 Sensitive	56	8.3 ± 0.0	NB
A	*Balaenoptera physalus*	Fin Whale - Atlantic pop.	Special Concern	Special Concern	Special Concern	S2S3		4	24.1 ± 1.0	NB
A	*Acipenser brevirostrum*	Shortnose Sturgeon	Special Concern	Special Concern	Special Concern	S3	3 Sensitive	7	6.1 ± 10.0	NB
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Special Concern	S3	3 Sensitive	31	20.4 ± 0.0	NB
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B,S3M	2 May Be At Risk	120	1.3 ± 7.0	NB
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S3B,S3M	1 At Risk	371	1.3 ± 7.0	NB
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern			S3B,S3S4N,SUM	3 Sensitive	290	1.3 ± 7.0	NB
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	1 At Risk	325	1.3 ± 7.0	NB
A	*Phalaropus lobatus*	Red-necked Phalarope	Special Concern			S3M	3 Sensitive	184	14.4 ± 0.0	NB
A	*Phocoena phocoena (NW*	Harbour Porpoise -	Special Concern	Threatened		S4		230	11.4 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
	Atlantic pop.)	Northwest Atlantic pop.								
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S4B,S4M	4 Secure	643	1.3 ± 7.0	NB
A	*Podiceps auritus*	Horned Grebe	Special Concern		Special Concern	S4N,S4M	4 Secure	270	10.6 ± 1.0	NB
A	*Odobenus rosmarus rosmarus*	Atlantic Walrus	Special Concern		Extirpated	SX		1	82.0 ± 5.0	NS
A	*Hemidactylium scutatum*	Four-toed Salamander	Not At Risk			S1?	5 Undetermined	11	82.9 ± 0.0	NS
A	*Bubo scandiacus*	Snowy Owl	Not At Risk			S1N,S2S3M	4 Secure	31	10.7 ± 0.0	NB
A	*Accipiter cooperii*	Cooper's Hawk	Not At Risk			S1S2B,S1S2M	2 May Be At Risk	17	28.7 ± 7.0	NB
A	*Fulica americana*	American Coot	Not At Risk			S1S2B,S1S2M	3 Sensitive	8	30.4 ± 7.0	NB
A	*Aegolius funereus*	Boreal Owl	Not At Risk			S1S2B,SUM	2 May Be At Risk	5	32.3 ± 7.0	NB
A	*Sorex dispar*	Long-tailed Shrew	Not At Risk	Special Concern		S2	3 Sensitive	2	17.9 ± 1.0	NB
A	*Buteo lineatus*	Red-shouldered Hawk	Not At Risk	Special Concern		S2B,S2M	2 May Be At Risk	49	18.8 ± 0.0	NB
A	*Chlidonias niger*	Black Tern	Not At Risk			S2B,S2M	3 Sensitive	135	20.0 ± 7.0	NB
A	*Globicephala melas*	Long-finned Pilot Whale	Not At Risk			S2S3		3	14.5 ± 1.0	NB
A	*Lynx canadensis*	Canadian Lynx	Not At Risk		Endangered	S3	1 At Risk	12	20.4 ± 1.0	NB
A	*Desmognathus fuscus*	Northern Dusky Salamander	Not At Risk			S3	3 Sensitive	58	6.2 ± 1.0	NB
A	*Megaptera novaeangliae*	Humpback Whale (NW Atlantic pop.)	Not At Risk	Special Concern		S3		3	75.9 ± 5.0	NB
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B,SUM	3 Sensitive	284	2.3 ± 0.0	NB
A	*Podiceps grisegena*	Red-necked Grebe	Not At Risk			S3M,S2N	3 Sensitive	667	12.3 ± 2.0	NB
A	*Lagenorhynchus acutus*	Atlantic White-sided Dolphin	Not At Risk			S3S4		1	14.5 ± 1.0	NB
A	*Haliaeetus leucocephalus*	Bald Eagle	Not At Risk		Endangered	S4	1 At Risk	1430	0.4 ± 0.0	NB
A	*Canis lupus*	Gray Wolf	Not At Risk		Extirpated	SX	0.1 Extirpated	4	11.5 ± 1.0	NB
A	*Puma concolor pop. 1*	Eastern Cougar	Data Deficient		Endangered	SNA	5 Undetermined	99	9.1 ± 1.0	NB
A	*Morone saxatilis*	Striped Bass	E,E,SC			S3	2 May Be At Risk	10	11.5 ± 10.0	NB
A	*Salvelinus alpinus*	Arctic Char				S1	3 Sensitive	3	69.0 ± 0.0	NB
A	*Vireo flavifrons*	Yellow-throated Vireo				S1?B,S1?M	8 Accidental	16	8.8 ± 1.0	NB
A	*Tringa melanoleuca*	Greater Yellowlegs				S1?B,S5M	4 Secure	951	10.0 ± 0.0	NB
A	*Aythya americana*	Redhead				S1B,S1M	8 Accidental	4	10.1 ± 7.0	NB
A	*Gallinula chloropus*	Common Moorhen				S1B,S1M	3 Sensitive	25	13.1 ± 1.0	NB
A	*Grus canadensis*	Sandhill Crane				S1B,S1M	8 Accidental	9	26.3 ± 0.0	NB
A	*Bartramia longicauda*	Upland Sandpiper				S1B,S1M	3 Sensitive	45	35.3 ± 7.0	NB
A	*Phalaropus tricolor*	Wilson's Phalarope				S1B,S1M	3 Sensitive	58	8.8 ± 1.0	NB
A	*Leucophaeus atricilla*	Laughing Gull				S1B,S1M	3 Sensitive	81	6.0 ± 0.0	NB
A	*Progne subis*	Purple Martin				S1B,S1M	2 May Be At Risk	250	10.1 ± 7.0	NB
A	*Thryothorus ludovicianus*	Carolina Wren				S1B,S1M	8 Accidental	35	10.1 ± 7.0	NB
A	*Oxyura jamaicensis*	Ruddy Duck				S1B,S2S3M	4 Secure	52	7.9 ± 1.0	NB
A	*Uria aalge*	Common Murre				S1B,S3N,S3M	4 Secure	109	29.3 ± 15.0	NB
A	*Aythya affinis*	Lesser Scaup				S1B,S4M	4 Secure	205	7.6 ± 0.0	NB
A	*Aythya marila*	Greater Scaup				S1B,S4M,S2N	4 Secure	36	0.4 ± 0.0	NB
A	*Eremophila alpestris*	Horned Lark				S1B,S4N,S5M	2 May Be At Risk	30	12.3 ± 5.0	NB
A	*Sterna paradisaea*	Arctic Tern				S1B,SUM	2 May Be At Risk	115	35.0 ± 16.0	NB
A	*Fratercula arctica*	Atlantic Puffin				S1B,SUN,SUM	3 Sensitive	139	29.3 ± 15.0	NB
A	*Branta bernicla*	Brant				S1N, S2S3M	4 Secure	534	12.8 ± 0.0	NB
A	*Chroicocephalus ridibundus*	Black-headed Gull				S1N,S2M	3 Sensitive	42	10.2 ± 0.0	NB
A	*Butorides virescens*	Green Heron				S1S2B,S1S2M	3 Sensitive	23	10.6 ± 7.0	NB
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1S2B,S1S2M	3 Sensitive	60	8.8 ± 1.0	NB
A	*Empidonax traillii*	Willow Flycatcher				S1S2B,S1S2M	3 Sensitive	105	1.3 ± 7.0	NB
A	*Stelgidopteryx serripennis*	Northern Rough-winged Swallow				S1S2B,S1S2M	2 May Be At Risk	21	19.4 ± 7.0	NB
A	*Troglodytes aedon*	House Wren				S1S2B,S1S2M	5 Undetermined	33	8.6 ± 0.0	NB
A	*Rissa tridactyla*	Black-legged Kittiwake				S1S2B,S4N,S5M	4 Secure	47	43.4 ± 7.0	NB
A	*Calidris bairdii*	Baird's Sandpiper				S1S2M	3 Sensitive	101	10.2 ± 0.0	NB
A	*Cistothorus palustris*	Marsh Wren				S2B,S2M	3 Sensitive	89	10.6 ± 7.0	NB
A	*Mimus polyglottos*	Northern Mockingbird				S2B,S2M	3 Sensitive	155	0.3 ± 7.0	NB
A	*Toxostoma rufum*	Brown Thrasher				S2B,S2M	3 Sensitive	100	11.3 ± 7.0	NB
A	*Pooecetes gramineus*	Vesper Sparrow				S2B,S2M	2 May Be At Risk	84	24.9 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	*Anas strepera*	Gadwall				S2B,S3M	4 Secure	122	5.3 ± 0.0	NB
A	*Alca torda*	Razorbill				S2B,S3N,S3M	4 Secure	132	29.3 ± 15.0	NB
A	*Pinicola enucleator*	Pine Grosbeak				S2B,S4S5N,S4S5M	3 Sensitive	28	37.7 ± 7.0	NB
A	*Tringa solitaria*	Solitary Sandpiper				S2B,S5M	4 Secure	265	8.7 ± 4.0	NB
A	*Oceanodroma leucorhoa*	Leach's Storm-Petrel				S2B,SUM	3 Sensitive	105	45.1 ± 0.0	NB
A	*Chen caerulescens*	Snow Goose				S2M	4 Secure	7	13.9 ± 1.0	NB
A	*Phalacrocorax carbo*	Great Cormorant				S2N,S2M	4 Secure	301	8.3 ± 3.0	NB
A	*Somateria spectabilis*	King Eider				S2N,S2M	4 Secure	56	46.5 ± 0.0	NB
A	*Larus hyperboreus*	Glaucous Gull				S2N,S2M	4 Secure	156	7.6 ± 0.0	NB
A	*Asio otus*	Long-eared Owl				S2S3	5 Undetermined	20	11.3 ± 7.0	NB
A	*Picoides dorsalis*	American Three-toed Woodpecker				S2S3	3 Sensitive	13	50.0 ± 7.0	NB
A	*Salmo salar*	Atlantic Salmon				S2S3	2 May Be At Risk	36	13.7 ± 0.0	NB
A	*Anas clypeata*	Northern Shoveler				S2S3B,S2S3M	4 Secure	102	10.2 ± 0.0	NB
A	*Myiarchus crinitus*	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	249	1.3 ± 7.0	NB
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	586	1.3 ± 7.0	NB
A	*Pluvialis dominica*	American Golden-Plover				S2S3M	3 Sensitive	265	10.2 ± 0.0	NB
A	*Calcarius lapponicus*	Lapland Longspur				S2S3N,SUM	3 Sensitive	36	9.7 ± 0.0	NB
A	*Cepphus grylle*	Black Guillemot				S3	4 Secure	702	12.3 ± 20.0	NB
A	*Loxia curvirostra*	Red Crossbill				S3	4 Secure	144	11.3 ± 7.0	NB
A	*Carduelis pinus*	Pine Siskin				S3	4 Secure	312	8.1 ± 7.0	NB
A	*Prosopium cylindraceum*	Round Whitefish				S3	4 Secure	1	66.1 ± 0.0	NB
A	*Salvelinus namaycush*	Lake Trout				S3	3 Sensitive	4	16.6 ± 0.0	NB
A	*Sorex maritimensis*	Maritime Shrew				S3	4 Secure	2	84.8 ± 0.0	NS
A	*Eptesicus fuscus*	Big Brown Bat				S3	3 Sensitive	49	8.5 ± 1.0	NB
A	*Cathartes aura*	Turkey Vulture				S3B,S3M	4 Secure	301	1.3 ± 7.0	NB
A	*Rallus limicola*	Virginia Rail				S3B,S3M	3 Sensitive	118	10.7 ± 0.0	NB
A	*Charadrius vociferus*	Killdeer				S3B,S3M	3 Sensitive	838	1.3 ± 7.0	NB
A	*Tringa semipalmata*	Willet				S3B,S3M	3 Sensitive	175	14.4 ± 0.0	NB
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B,S3M	4 Secure	186	1.3 ± 7.0	NB
A	*Vireo gilvus*	Warbling Vireo				S3B,S3M	4 Secure	230	1.3 ± 7.0	NB
A	*Piranga olivacea*	Scarlet Tanager				S3B,S3M	4 Secure	126	8.7 ± 7.0	NB
A	*Passerina cyanea*	Indigo Bunting				S3B,S3M	4 Secure	111	0.3 ± 7.0	NB
A	*Molothrus ater*	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	303	1.3 ± 7.0	NB
A	*Icterus galbula*	Baltimore Oriole				S3B,S3M	4 Secure	198	1.3 ± 7.0	NB
A	*Somateria mollissima*	Common Eider				S3B,S4M,S3N	4 Secure	1843	5.5 ± 0.0	NB
A	*Dendroica tigrina*	Cape May Warbler				S3B,S4S5M	4 Secure	145	1.3 ± 7.0	NB
A	*Anas acuta*	Northern Pintail				S3B,S5M	3 Sensitive	53	11.3 ± 7.0	NB
A	*Mergus serrator*	Red-breasted Merganser				S3B,S5M,S4S5N	4 Secure	379	6.0 ± 8.0	NB
A	*Arenaria interpres*	Ruddy Turnstone				S3M	4 Secure	694	10.0 ± 0.0	NB
A	*Phalaropus fulicarius*	Red Phalarope				S3M	3 Sensitive	93	45.1 ± 0.0	NB
A	*Melanitta nigra*	Black Scoter				S3M,S1S2N	3 Sensitive	794	10.6 ± 1.0	NB
A	*Bucephala albeola*	Bufflehead				S3M,S2N	3 Sensitive	1122	0.4 ± 0.0	NB
A	*Calidris maritima*	Purple Sandpiper				S3M,S3N	4 Secure	235	14.4 ± 0.0	NB
A	*Uria lomvia*	Thick-billed Murre				S3N,S3M	5 Undetermined	66	26.1 ± 8.0	NB
A	*Synaptomys cooperi*	Southern Bog Lemming				S3S4	4 Secure	79	21.6 ± 1.0	NB
A	*Tyrannus tyrannus*	Eastern Kingbird				S3S4B,S3S4M	3 Sensitive	544	7.7 ± 5.0	NB
A	*Actitis macularius*	Spotted Sandpiper				S3S4B,S5M	4 Secure	909	1.3 ± 7.0	NB
A	*Gallinago delicata*	Wilson's Snipe				S3S4B,S5M	4 Secure	685	8.7 ± 7.0	NB
A	*Larus delawarensis*	Ring-billed Gull				S3S4B,S5M	4 Secure	248	6.7 ± 0.0	NB
A	*Dendroica striata*	Blackpoll Warbler				S3S4B,S5M	4 Secure	81	21.3 ± 0.0	NB
A	*Pluvialis squatarola*	Black-bellied Plover				S3S4M	4 Secure	840	10.0 ± 0.0	NB
A	*Limosa haemastica*	Hudsonian Godwit				S3S4M	4 Secure	92	14.4 ± 0.0	NB
A	*Calidris pusilla*	Semipalmated Sandpiper				S3S4M	4 Secure	2042	10.0 ± 0.0	NB
A	*Calidris melanotos*	Pectoral Sandpiper				S3S4M	4 Secure	308	7.7 ± 0.0	NB
A	*Calidris alba*	Sanderling				S3S4M,S1N	3 Sensitive	843	10.2 ± 0.0	NB

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A	*Morus bassanus*	Northern Gannet				SHB,S5M	4 Secure	733	14.7 ± 0.0	NB
A	*Lanius ludovicianus*	Loggerhead Shrike				SXB,SXM	1 At Risk	1	95.3 ± 1.0	NB
C	*Quercus macrocarpa - Acer rubrum / Onoclea sensibilis - Carex arcta Forest*	Bur Oak - Red Maple / Sensitive Fern - Northern Clustered Sedge Forest				S2		1	58.4 ± 0.0	NB
C	*Acer saccharinum / Onoclea sensibilis - Lysimachia terrestris Forest*	Silver Maple / Sensitive Fern - Swamp Yellow Loosestrife Forest				S3		1	50.2 ± 0.0	NB
C	*Acer saccharum - Fraxinus americana / Polystichum acrostichoides Forest*	Sugar Maple - White Ash / Christmas Fern Forest				S3S4		1	22.5 ± 0.0	NB
I	*Cicindela marginipennis*	Cobblestone Tiger Beetle	Endangered	Endangered	Endangered	S1	1 At Risk	42	61.3 ± 0.0	NB
I	*Gomphus ventricosus*	Skillet Clubtail	Endangered		Endangered	S1S2	2 May Be At Risk	50	46.2 ± 0.0	NB
I	*Danaus plexippus*	Monarch	Endangered	Special Concern	Special Concern	S3B,S3M	3 Sensitive	108	9.6 ± 0.0	NB
I	*Ophiogomphus howei*	Pygmy Snaketail	Special Concern	Special Concern	Special Concern	S2	2 May Be At Risk	14	53.8 ± 0.0	NB
I	*Alasmidonta varicosa*	Brook Floater	Special Concern		Special Concern	S2	3 Sensitive	2	85.6 ± 0.0	NB
I	*Lampsilis cariosa*	Yellow Lampmussel	Special Concern	Special Concern	Special Concern	S2	3 Sensitive	103	22.2 ± 1.0	NB
I	*Bombus terricola*	Yellow-banded Bumblebee	Special Concern			S3?	3 Sensitive	23	35.2 ± 0.0	NB
I	*Appalachina sayana*	Spike-lip Crater	Not At Risk			S3?		2	9.0 ± 1.0	NB
I	*Haematopota rara*	Shy Cleg				S1	5 Undetermined	1	77.6 ± 1.0	NB
I	*Lycaena dorcas*	Dorcas Copper				S1	2 May Be At Risk	1	71.3 ± 0.0	NB
I	*Erora laeta*	Early Hairstreak				S1	2 May Be At Risk	4	77.3 ± 7.0	NB
I	*Somatochlora septentrionalis*	Muskeg Emerald				S1	2 May Be At Risk	1	98.3 ± 1.0	NB
I	*Arigomphus furcifer*	Lilypad Clubtail				S1	5 Undetermined	7	52.4 ± 0.0	NB
I	*Polites origenes*	Crossline Skipper				S1?	5 Undetermined	5	40.0 ± 0.0	NB
I	*Plebejus saepiolus*	Greenish Blue				S1S2	4 Secure	4	51.6 ± 0.0	NB
I	*Ophiogomphus colubrinus*	Boreal Snaketail				S1S2	2 May Be At Risk	36	35.0 ± 1.0	NB
I	*Brachyleptura circumdata*	a Longhorned Beetle				S2		6	61.2 ± 0.0	NB
I	*Satyrium calanus falacer*	Banded Hairstreak				S2	4 Secure	18	73.4 ± 0.0	NB
I	*Strymon melinus*	Grey Hairstreak				S2	4 Secure	4	23.5 ± 0.0	NB
I	*Aeshna clepsydra*	Mottled Darner				S2	3 Sensitive	7	6.2 ± 0.0	NB
I	*Somatochlora tenebrosa*	Clamp-Tipped Emerald				S2	5 Undetermined	5	75.9 ± 1.0	NB
I	*Ladona exusta*	White Corporal				S2	5 Undetermined	10	38.7 ± 0.0	NB
I	*Hetaerina americana*	American Rubyspot				S2	3 Sensitive	2	84.8 ± 0.0	NB
I	*Ischnura posita*	Fragile Forktail				S2	2 May Be At Risk	14	59.9 ± 0.0	NB
I	*Callophrys henrici*	Henry's Elfin				S2S3	4 Secure	15	71.0 ± 7.0	NB
I	*Celithemis martha*	Martha's Pennant				S2S3	5 Undetermined	4	12.2 ± 0.0	NB
I	*Sphaeroderus nitidicollis*	a Ground Beetle				S3	4 Secure	1	61.3 ± 0.0	NB
I	*Lepturopsis biforis*	a Longhorned Beetle				S3		1	12.7 ± 1.0	NB
I	*Orthosoma brunneum*	a Longhorned Beetle				S3		1	60.7 ± 5.0	NB
I	*Elaphrus americanus*	a Ground Beetle				S3	4 Secure	1	64.9 ± 0.0	NB
I	*Desmocerus palliatus*	Elderberry Borer				S3		4	12.7 ± 1.0	NB
I	*Agonum excavatum*	a Ground Beetle				S3	4 Secure	1	64.9 ± 0.0	NB
I	*Clivina americana*	a Ground Beetle				S3	4 Secure	1	64.9 ± 0.0	NB
I	*Olisthopus parmatus*	a Ground Beetle				S3	4 Secure	1	61.3 ± 0.0	NB
I	*Paratachys scitulus*	a Ground Beetle				S3	5 Undetermined	1	64.9 ± 0.0	NB
I	*Coccinella hieroglyphica kirbyi*	a Ladybird Beetle				S3	4 Secure	1	12.7 ± 1.0	NB
I	*Hippodamia parenthesis*	Parenthesis Lady Beetle				S3	4 Secure	2	12.7 ± 1.0	NB
I	*Stenocorus vittigera*	a Longhorned Beetle				S3		1	64.9 ± 0.0	NB
I	*Gnathacmaeops pratensis*	a Longhorned Beetle				S3		5	12.7 ± 1.0	NB
I	*Pogonocherus mixtus*	a Longhorned Beetle				S3		1	12.7 ± 1.0	NB
I	*Badister neopulchellus*	a Ground Beetle				S3	4 Secure	1	64.9 ± 0.0	NB
I	*Calathus gregarius*	a Ground Beetle				S3	4 Secure	1	89.7 ± 1.0	NB
I	*Saperda lateralis*	a Longhorned Beetle				S3		2	10.0 ± 0.0	NB
I	*Hesperia sassacus*	Indian Skipper				S3	4 Secure	9	71.0 ± 7.0	NB
I	*Euphyes bimacula*	Two-spotted Skipper				S3	4 Secure	13	50.7 ± 0.0	NB

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I	*Lycaena hyllus*	Bronze Copper				S3	3 Sensitive	6	24.8 ± 1.0	NB
I	*Satyrium acadica*	Acadian Hairstreak				S3	4 Secure	22	12.6 ± 1.0	NB
I	*Callophrys polios*	Hoary Elfin				S3	4 Secure	14	12.6 ± 1.0	NB
I	*Plebejus idas empetri*	Crowberry Blue				S3	4 Secure	15	15.0 ± 1.0	NB
I	*Speyeria aphrodite*	Aphrodite Fritillary				S3	4 Secure	28	9.1 ± 1.0	NB
I	*Boloria bellona*	Meadow Fritillary				S3	4 Secure	42	31.7 ± 0.0	NB
I	*Polygonia satyrus*	Satyr Comma				S3	4 Secure	14	13.8 ± 1.0	NB
I	*Polygonia gracilis*	Hoary Comma				S3	4 Secure	8	21.3 ± 7.0	NB
I	*Nymphalis l-album*	Compton Tortoiseshell				S3	4 Secure	24	12.6 ± 10.0	NB
I	*Gomphus vastus*	Cobra Clubtail				S3	3 Sensitive	59	27.5 ± 0.0	NB
I	*Gomphus abbreviatus*	Spine-crowned Clubtail				S3	4 Secure	25	9.4 ± 0.0	NB
I	*Gomphaeschna furcillata*	Harlequin Darner				S3	5 Undetermined	9	75.9 ± 1.0	NB
I	*Dorocordulia lepida*	Petite Emerald				S3	4 Secure	28	6.1 ± 0.0	NB
I	*Somatochlora cingulata*	Lake Emerald				S3	4 Secure	12	7.8 ± 0.0	NB
I	*Somatochlora forcipata*	Forcipate Emerald				S3	4 Secure	19	77.6 ± 1.0	NB
I	*Williamsonia fletcheri*	Ebony Boghaunter				S3	4 Secure	11	53.8 ± 0.0	NB
I	*Lestes eurinus*	Amber-Winged Spreadwing				S3	4 Secure	8	19.3 ± 1.0	NB
I	*Lestes vigilax*	Swamp Spreadwing				S3	3 Sensitive	35	6.1 ± 0.0	NB
I	*Enallagma geminatum*	Skimming Bluet				S3	5 Undetermined	15	9.4 ± 0.0	NB
I	*Enallagma signatum*	Orange Bluet				S3	4 Secure	14	49.6 ± 0.0	NB
I	*Stylurus scudderi*	Zebra Clubtail				S3	4 Secure	73	27.5 ± 0.0	NB
I	*Alasmidonta undulata*	Triangle Floater				S3	3 Sensitive	45	9.7 ± 1.0	NB
I	*Leptodea ochracea*	Tidewater Mucket				S3	4 Secure	62	4.9 ± 1.0	NB
I	*Striatura ferrea*	Black Striate				S3		1	76.9 ± 1.0	NB
I	*Neohelix albolabris*	Whitelip				S3		2	50.0 ± 0.0	NB
I	*Spurwinkia salsa*	Saltmarsh Hydrobe				S3		34	1.7 ± 0.0	NB
I	*Pantala hymenaea*	Spot-Winged Glider				S3B,S3M	4 Secure	5	19.5 ± 1.0	NB
I	*Satyrium liparops strigosum*	Striped Hairstreak				S3S4	4 Secure	8	71.0 ± 7.0	NB
I	*Cupido comyntas*	Eastern Tailed Blue				S3S4	4 Secure	7	12.2 ± 5.0	NB
I	*Coccinella transversoguttata richardsoni*	Transverse Lady Beetle				SH	2 May Be At Risk	2	6.5 ± 0.0	NB
N	*Erioderma mollissimum*	Graceful Felt Lichen	Endangered		Endangered	SH	2 May Be At Risk	1	86.6 ± 1.0	NB
N	*Erioderma pedicellatum (Atlantic pop.)*	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	SH	1 At Risk	3	81.6 ± 1.0	NB
N	*Peltigera hydrothyria*	Eastern Waterfan	Threatened			S1	5 Undetermined	6	85.5 ± 1.0	NB
N	*Anzia colpodes*	Black-foam Lichen	Threatened			S1S2	5 Undetermined	2	90.5 ± 1.0	NB
N	*Degelia plumbea*	BluDegelia plumbeae Felt Lichen	Special Concern	Special Concern	Special Concern	S1	2 May Be At Risk	4	80.5 ± 5.0	NB
N	*Pseudevernia cladonia*	Ghost Antler Lichen	Not At Risk			S2S3	5 Undetermined	23	16.3 ± 0.0	NB
N	*Bryum muehlenbeckii*	Muehlenbeck's Bryum Moss				S1	2 May Be At Risk	1	3.8 ± 1.0	NB
N	*Dicranoweisia crispula*	Mountain Thatch Moss				S1	2 May Be At Risk	1	94.1 ± 0.0	NB
N	*Didymodon rigidulus var. gracilis*	a moss				S1	2 May Be At Risk	1	89.6 ± 1.0	NB
N	*Sphagnum macrophyllum*	Sphagnum				S1	2 May Be At Risk	2	19.8 ± 0.0	NB
N	*Syntrichia ruralis*	a Moss				S1	2 May Be At Risk	1	65.8 ± 0.0	NB
N	*Coscinodon cribrosus*	Sieve-Toothed Moss				S1	2 May Be At Risk	1	12.0 ± 0.0	NB
N	*Cladonia metacorallifera*	Reptilian Pixie-cup Lichen				S1	5 Undetermined	5	83.0 ± 1.0	NB
N	*Coccocarpia palmicola*	Salted Shell Lichen				S1	2 May Be At Risk	1	97.1 ± 1.0	NB
N	*Peltigera collina*	Tree Pelt Lichen				S1	2 May Be At Risk	1	90.8 ± 10.0	NB
N	*Peltigera malacea*	Veinless Pelt Lichen				S1	5 Undetermined	1	85.6 ± 1.0	NB
N	*Bryoria bicolor*	Electrified Horsehair Lichen				S1	2 May Be At Risk	1	85.6 ± 1.0	NB
N	*Hygrobiella laxifolia*	Lax Notchwort				S1?	6 Not Assessed	1	83.1 ± 1.0	NB
N	*Atrichum angustatum*	Lesser Smoothcap Moss				S1?	2 May Be At Risk	1	96.8 ± 3.0	NS
N	*Bartramia ithyphylla*	Straight-leaved Apple Moss				S1?	2 May Be At Risk	2	83.1 ± 0.0	NB
N	*Calliergon trifarium*	Three-ranked Moss				S1?	2 May Be At Risk	1	12.2 ± 0.0	NB
N	*Dichelyma falcatum*	a Moss				S1?	2 May Be At Risk	2	18.2 ± 1.0	NB
N	*Dicranum bonjeanii*	Bonjean's Broom Moss				S1?	2 May Be At Risk	1	77.7 ± 1.0	NB

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N	*Dicranum condensatum*	Condensed Broom Moss				S1?	2 May Be At Risk	1	93.9 ± 0.0	NB
N	*Entodon brevisetus*	a Moss				S1?	2 May Be At Risk	1	89.5 ± 10.0	NB
N	*Eurhynchium hians*	Light Beaked Moss				S1?	2 May Be At Risk	3	63.4 ± 0.0	NB
N	*Homomallium adnatum*	Adnate Hairy-gray Moss				S1?	2 May Be At Risk	2	89.5 ± 10.0	NB
N	*Plagiothecium latebricola*	Alder Silk Moss				S1?	2 May Be At Risk	2	16.2 ± 0.0	NB
N	*Racomitrium ericoides*	a Moss				S1?	2 May Be At Risk	1	77.6 ± 3.0	NB
N	*Rhytidium rugosum*	Wrinkle-leaved Moss				S1?	2 May Be At Risk	2	65.7 ± 0.0	NB
N	*Splachnum pennsylvanicum*	Southern Dung Moss				S1?	2 May Be At Risk	2	77.2 ± 1.0	NB
N	*Platylomella lescurii*	a Moss				S1?	5 Undetermined	1	75.3 ± 1.0	NB
N	*Cladopodiella francisci*	Holt's Notchwort				S1S2	6 Not Assessed	4	89.6 ± 1.0	NB
N	*Harpanthus flotovianus*	Great Mountain Flapwort				S1S2	6 Not Assessed	2	84.4 ± 1.0	NB
N	*Jungermannia obovata*	Egg Flapwort				S1S2	6 Not Assessed	2	9.9 ± 0.0	NB
N	*Pallavicinia lyellii*	Lyell's Ribbonwort				S1S2	6 Not Assessed	2	23.6 ± 1.0	NB
N	*Radula tenax*	Tenacious Scalewort				S1S2	6 Not Assessed	1	94.4 ± 0.0	NB
N	*Reboulia hemisphaerica*	Purple-margined Liverwort				S1S2	6 Not Assessed	1	82.7 ± 1.0	NB
N	*Brachythecium acuminatum*	Acuminate Ragged Moss				S1S2	5 Undetermined	6	54.4 ± 100.0	NB
N	*Bryum salinum*	a Moss				S1S2	2 May Be At Risk	2	40.2 ± 1.0	NB
N	*Campylium radicale*	Long-stalked Fine Wet Moss				S1S2	5 Undetermined	1	79.3 ± 1.0	NB
N	*Tortula obtusifolia*	a Moss				S1S2	2 May Be At Risk	1	47.4 ± 0.0	NB
N	*Distichium inclinatum*	Inclined Iris Moss				S1S2	2 May Be At Risk	5	89.4 ± 0.0	NB
N	*Ditrichum pallidum*	Pale Cow-hair Moss				S1S2	2 May Be At Risk	3	77.0 ± 3.0	NS
N	*Drummondia prorepens*	a Moss				S1S2	2 May Be At Risk	1	93.8 ± 0.0	NS
N	*Hygrohypnum bestii*	Best's Brook Moss				S1S2	3 Sensitive	5	73.2 ± 0.0	NB
N	*Sphagnum platyphyllum*	Flat-leaved Peat Moss				S1S2	5 Undetermined	1	89.6 ± 1.0	NB
N	*Timmia norvegica*	a moss				S1S2	2 May Be At Risk	3	51.3 ± 0.0	NB
N	*Timmia norvegica var. excurrens*	a moss				S1S2	2 May Be At Risk	1	89.4 ± 0.0	NB
N	*Tomentypnum falcifolium*	Sickle-leaved Golden Moss				S1S2	2 May Be At Risk	1	32.5 ± 1.0	NB
N	*Tortella humilis*	Small Crisp Moss				S1S2	2 May Be At Risk	7	83.5 ± 0.0	NB
N	*Pseudotaxiphyllum distichaceum*	a Moss				S1S2	2 May Be At Risk	3	40.2 ± 1.0	NB
N	*Hamatocaulis vernicosus*	a Moss				S1S2	2 May Be At Risk	1	28.0 ± 100.0	NB
N	*Bryohaplocladium microphyllum*	Tiny-leaved Haplocladium Moss				S1S2	2 May Be At Risk	1	77.0 ± 3.0	NS
N	*Umbilicaria vellea*	Grizzled Rocktripe Lichen				S1S2	5 Undetermined	1	89.6 ± 1.0	NB
N	*Peltigera scabrosa*	Greater Toad Pelt Lichen				S1S2	2 May Be At Risk	4	94.2 ± 1.0	NB
N	*Calypogeia neesiana*	Nees' Pouchwort				S1S3	6 Not Assessed	1	22.0 ± 1.0	NB
N	*Cephaloziella elachista*	Spurred Threadwort				S1S3	6 Not Assessed	1	12.5 ± 5.0	NB
N	*Porella pinnata*	Pinnate Scalewort				S1S3	6 Not Assessed	2	27.3 ± 1.0	NB
N	*Tritomaria scitula*	Mountain Notchwort				S1S3	6 Not Assessed	1	96.6 ± 1.0	NB
N	*Amphidium mougeotii*	a Moss				S2	3 Sensitive	11	81.8 ± 8.0	NB
N	*Anomodon viticulosus*	a Moss				S2	2 May Be At Risk	6	12.1 ± 1.0	NB
N	*Cirriphyllum piliferum*	Hair-pointed Moss				S2	3 Sensitive	4	68.9 ± 0.0	NB
N	*Cynodontium strumiferum*	Strumose Dogtooth Moss				S2	3 Sensitive	1	81.8 ± 8.0	NB
N	*Dicranella palustris*	Drooping-Leaved Fork Moss				S2	3 Sensitive	10	43.3 ± 100.0	NB
N	*Didymodon ferrugineus*	a moss				S2	3 Sensitive	2	21.1 ± 1.0	NB
N	*Anomodon tristis*	a Moss				S2	2 May Be At Risk	4	76.1 ± 1.0	NB
N	*Hypnum pratense*	Meadow Plait Moss				S2	3 Sensitive	1	10.2 ± 0.0	NB
N	*Isopterygiopsis pulchella*	Neat Silk Moss				S2	3 Sensitive	7	88.7 ± 0.0	NB
N	*Meesia triquetra*	Three-ranked Cold Moss				S2	2 May Be At Risk	1	54.4 ± 100.0	NB
N	*Physcomitrium immersum*	a Moss				S2	3 Sensitive	6	27.3 ± 1.0	NB
N	*Platydictya jungermannioides*	False Willow Moss				S2	3 Sensitive	3	84.7 ± 0.0	NB
N	*Pohlia elongata*	Long-necked Nodding Moss				S2	3 Sensitive	10	83.5 ± 0.0	NB
N	*Seligeria calcarea*	Chalk Brittle Moss				S2	3 Sensitive	2	94.3 ± 0.0	NB
N	*Sphagnum centrale*	Central Peat Moss				S2	3 Sensitive	7	83.5 ± 0.0	NB
N	*Sphagnum lindbergii*	Lindberg's Peat Moss				S2	3 Sensitive	8	18.6 ± 1.0	NB
N	*Sphagnum flexuosum*	Flexuous Peatmoss				S2	3 Sensitive	2	91.2 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	*Tayloria serrata*	Serrate Trumpet Moss				S2	3 Sensitive	7	36.7 ± 1.0	NB
N	*Tetrodontium brownianum*	Little Georgia				S2	3 Sensitive	7	88.9 ± 1.0	NB
N	*Tetraplodon mnioides*	Entire-leaved Nitrogen Moss				S2	3 Sensitive	3	33.4 ± 0.0	NB
N	*Thamnobryum alleghaniense*	a Moss				S2	3 Sensitive	11	51.3 ± 0.0	NB
N	*Tortula mucronifolia*	Mucronate Screw Moss				S2	3 Sensitive	1	11.0 ± 0.0	NB
N	*Ulota phyllantha*	a Moss				S2	3 Sensitive	5	40.2 ± 1.0	NB
N	*Anomobryum filiforme*	a moss				S2	5 Undetermined	5	53.4 ± 0.0	NB
N	*Cladonia macrophylla*	Fig-leaved Lichen				S2	5 Undetermined	3	92.3 ± 1.0	NB
N	*Fuscopannaria leucosticta*	Rimmed Shingles Lichen				S2	2 May Be At Risk	21	36.4 ± 0.0	NB
N	*Leptogium corticola*	Blistered Jellyskin Lichen				S2	2 May Be At Risk	1	71.4 ± 0.0	NB
N	*Nephroma laevigatum*	Mustard Kidney Lichen				S2	2 May Be At Risk	2	85.4 ± 0.0	NS
N	*Andreaea rothii*	a Moss				S2?	3 Sensitive	6	26.3 ± 0.0	NB
N	*Anomodon minor*	Blunt-leaved Anomodon Moss				S2?	2 May Be At Risk	1	97.1 ± 1.0	NB
N	*Brachythecium digastrum*	a Moss				S2?	3 Sensitive	2	47.7 ± 0.0	NB
N	*Bryum pallescens*	Pale Bryum Moss				S2?	5 Undetermined	2	10.3 ± 1.0	NB
N	*Dichelyma capillaceum*	Hairlike Dichelyma Moss				S2?	3 Sensitive	2	90.0 ± 3.0	NB
N	*Dicranum spurium*	Spurred Broom Moss				S2?	3 Sensitive	2	27.8 ± 0.0	NB
N	*Hygrohypnum montanum*	a Moss				S2?	3 Sensitive	2	66.8 ± 1.0	NB
N	*Schistostega pennata*	Luminous Moss				S2?	3 Sensitive	3	43.3 ± 100.0	NB
N	*Seligeria campylopoda*	a Moss				S2?	3 Sensitive	1	28.0 ± 100.0	NB
N	*Seligeria diversifolia*	a Moss				S2?	3 Sensitive	2	53.4 ± 0.0	NB
N	*Sphagnum angermanicum*	a Peatmoss				S2?	3 Sensitive	3	30.9 ± 10.0	NB
N	*Plagiomnium rostratum*	Long-beaked Leafy Moss				S2?	3 Sensitive	6	51.2 ± 0.0	NB
N	*Ramalina pollinaria*	Chalky Ramalina Lichen				S2?	5 Undetermined	1	92.6 ± 1.0	NB
N	*Nephroma arcticum*	Arctic Kidney Lichen				S2?	3 Sensitive	1	86.1 ± 1.0	NB
N	*Bryum uliginosum*	a Moss				S2S3	3 Sensitive	2	26.8 ± 4.0	NB
N	*Buxbaumia aphylla*	Brown Shield Moss				S2S3	3 Sensitive	2	79.4 ± 15.0	NB
N	*Calliergonella cuspidata*	Common Large Wetland Moss				S2S3	3 Sensitive	6	10.1 ± 0.0	NB
N	*Campylium polygamum*	a Moss				S2S3	3 Sensitive	1	86.2 ± 0.0	NB
N	*Palustriella falcata*	a Moss				S2S3	3 Sensitive	2	83.2 ± 0.0	NB
N	*Didymodon rigidulus*	Rigid Screw Moss				S2S3	3 Sensitive	9	85.4 ± 8.0	NB
N	*Ephemerum serratum*	a Moss				S2S3	3 Sensitive	2	65.5 ± 0.0	NB
N	*Fissidens bushii*	Bush's Pocket Moss				S2S3	3 Sensitive	1	96.8 ± 3.0	NS
N	*Orthotrichum speciosum*	Showy Bristle Moss				S2S3	5 Undetermined	4	66.5 ± 2.0	NB
N	*Pohlia proligera*	Cottony Nodding Moss				S2S3	3 Sensitive	4	89.1 ± 1.0	NB
N	*Racomitrium fasciculare*	a Moss				S2S3	3 Sensitive	4	74.9 ± 0.0	NB
N	*Racomitrium affine*	a Moss				S2S3	3 Sensitive	1	93.7 ± 1.0	NB
N	*Saelania glaucescens*	Blue Dew Moss				S2S3	3 Sensitive	2	94.1 ± 0.0	NB
N	*Scorpidium scorpioides*	Hooked Scorpion Moss				S2S3	3 Sensitive	4	7.7 ± 1.0	NB
N	*Sphagnum subfulvum*	a Peatmoss				S2S3	2 May Be At Risk	3	32.5 ± 1.0	NB
N	*Taxiphyllum deplanatum*	Imbricate Yew-leaved Moss				S2S3	3 Sensitive	3	40.2 ± 1.0	NB
N	*Zygodon viridissimus*	a Moss				S2S3	2 May Be At Risk	4	75.9 ± 5.0	NB
N	*Schistidium agassizii*	Elf Bloom Moss				S2S3	3 Sensitive	5	66.5 ± 2.0	NB
N	*Loeskeobryum brevirostre*	a Moss				S2S3	3 Sensitive	12	73.8 ± 2.0	NB
N	*Cyrtomnium hymenophylloides*	Short-pointed Lantern Moss				S2S3	3 Sensitive	6	83.2 ± 0.0	NB
N	*Cladonia acuminata*	Scantily Clad Pixie Lichen				S2S3	5 Undetermined	2	86.6 ± 1.0	NB
N	*Cladonia ramulosa*	Bran Lichen				S2S3	5 Undetermined	4	90.5 ± 1.0	NB
N	*Cladonia sulphurina*	Greater Sulphur-cup Lichen				S2S3	5 Undetermined	1	99.0 ± 1.0	NB
N	*Parmeliopsis ambigua*	Green Starburst Lichen				S2S3	5 Undetermined	1	84.1 ± 1.0	NB
N	*Sphaerophorus globosus*	Northern Coral Lichen				S2S3	3 Sensitive	5	82.8 ± 1.0	NB
N	*Cynodontium tenellum*	Delicate Dogtooth Moss				S3	3 Sensitive	1	40.2 ± 1.0	NB
N	*Hypnum curvifolium*	Curved-leaved Plait Moss				S3	3 Sensitive	10	75.9 ± 5.0	NB
N	*Tortella fragilis*	Fragile Twisted Moss				S3	3 Sensitive	1	89.4 ± 0.0	NB
N	*Schistidium maritimum*	a Moss				S3	4 Secure	7	40.2 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	*Hymenostylium recurvirostre*	Hymenostylium Moss				S3	3 Sensitive	4	89.1 ± 1.0	NB
N	*Solorina saccata*	Woodland Owl Lichen				S3	5 Undetermined	6	84.1 ± 1.0	NB
N	*Normandina pulchella*	Rimmed Elf-ear Lichen				S3	5 Undetermined	3	85.3 ± 1.0	NB
N	*Cladonia farinacea*	Farinose Pixie Lichen				S3	5 Undetermined	5	92.3 ± 1.0	NB
N	*Cladonia strepsilis*	Olive Cladonia Lichen				S3	4 Secure	1	28.3 ± 0.0	NB
N	*Leptogium lichenoides*	Tattered Jellyskin Lichen				S3	5 Undetermined	6	89.6 ± 1.0	NB
N	*Nephroma bellum*	Naked Kidney Lichen				S3	4 Secure	3	84.9 ± 1.0	NB
N	*Peltigera degenii*	Lustrous Pelt Lichen				S3	5 Undetermined	3	85.5 ± 1.0	NB
N	*Usnea strigosa*	Bushy Beard Lichen				S3	5 Undetermined	1	95.6 ± 1.0	NB
N	*Leptogium laceroides*	Short-bearded Jellyskin Lichen				S3	3 Sensitive	2	91.0 ± 1.0	NB
N	*Peltigera membranacea*	Membranous Pelt Lichen				S3	5 Undetermined	6	84.1 ± 1.0	NB
N	*Cladonia carneola*	Crowned Pixie-cup Lichen				S3	5 Undetermined	1	92.3 ± 1.0	NB
N	*Cladonia deformis*	Lesser Sulphur-cup Lichen				S3	4 Secure	5	83.0 ± 1.0	NB
N	*Aulacomnium androgynum*	Little Groove Moss				S3?	4 Secure	7	75.9 ± 5.0	NB
N	*Dicranella rufescens*	Red Forklet Moss				S3?	5 Undetermined	3	78.5 ± 4.0	NB
N	*Rhytidiadelphus loreus*	Lanky Moss				S3?	2 May Be At Risk	2	89.6 ± 1.0	NB
N	*Sphagnum lescurii*	a Peatmoss				S3?	5 Undetermined	5	12.0 ± 0.0	NB
N	*Stereocaulon subcoralloides*	Coralloid Foam Lichen				S3?	5 Undetermined	1	92.6 ± 1.0	NB
N	*Anomodon rugelii*	Rugel's Anomodon Moss				S3S4	3 Sensitive	2	94.5 ± 1.0	NS
N	*Barbula convoluta*	Lesser Bird's-claw Beard Moss				S3S4	4 Secure	1	85.4 ± 8.0	NB
N	*Brachythecium velutinum*	Velvet Ragged Moss				S3S4	4 Secure	4	75.1 ± 0.0	NB
N	*Dicranella cerviculata*	a Moss				S3S4	3 Sensitive	5	40.2 ± 1.0	NB
N	*Dicranum majus*	Greater Broom Moss				S3S4	4 Secure	18	33.4 ± 0.0	NB
N	*Dicranum leioneuron*	a Dicranum Moss				S3S4	4 Secure	1	88.5 ± 0.0	NB
N	*Encalypta ciliata*	Fringed Extinquisher Moss				S3S4	3 Sensitive	1	89.7 ± 0.0	NB
N	*Fissidens bryoides*	Lesser Pocket Moss				S3S4	4 Secure	3	20.9 ± 5.0	NB
N	*Heterocladium dimorphum*	Dimorphous Tangle Moss				S3S4	4 Secure	4	66.5 ± 2.0	NB
N	*Isopterygiopsis muelleriana*	a Moss				S3S4	4 Secure	20	75.1 ± 0.0	NB
N	*Myurella julacea*	Small Mouse-tail Moss				S3S4	4 Secure	3	81.8 ± 8.0	NB
N	*Physcomitrium pyriforme*	Pear-shaped Urn Moss				S3S4	3 Sensitive	5	62.5 ± 0.0	NB
N	*Pogonatum dentatum*	Mountain Hair Moss				S3S4	4 Secure	2	40.2 ± 1.0	NB
N	*Sphagnum quinquefarium*	Five-ranked Peat Moss				S3S4	4 Secure	1	88.7 ± 0.0	NB
N	*Sphagnum torreyanum*	a Peatmoss				S3S4	4 Secure	4	19.7 ± 0.0	NB
N	*Sphagnum austinii*	Austin's Peat Moss				S3S4	4 Secure	1	18.9 ± 1.0	NB
N	*Sphagnum contortum*	Twisted Peat Moss				S3S4	4 Secure	1	9.8 ± 0.0	NB
N	*Splachnum rubrum*	Red Collar Moss				S3S4	4 Secure	1	32.8 ± 1.0	NB
N	*Tetraphis geniculata*	Geniculate Four-tooth Moss				S3S4	4 Secure	11	10.8 ± 0.0	NB
N	*Tetraplodon angustatus*	Toothed-leaved Nitrogen Moss				S3S4	4 Secure	3	26.4 ± 0.0	NB
N	*Weissia controversa*	Green-Cushioned Weissia				S3S4	4 Secure	2	85.5 ± 0.0	NS
N	*Abietinella abietina*	Wiry Fern Moss				S3S4	4 Secure	1	89.4 ± 0.0	NB
N	*Trichostomum tenuirostre*	Acid-Soil Moss				S3S4	4 Secure	6	75.1 ± 0.0	NB
N	*Pannaria rubiginosa*	Brown-eyed Shingle Lichen				S3S4	3 Sensitive	2	88.4 ± 1.0	NB
N	*Ramalina thrausta*	Angelhair Ramalina Lichen				S3S4	5 Undetermined	11	82.8 ± 1.0	NB
N	*Hypogymnia vittata*	Slender Monk's Hood Lichen				S3S4	4 Secure	22	82.8 ± 1.0	NB
N	*Cladonia floerkeana*	Gritty British Soldiers Lichen				S3S4	4 Secure	5	28.3 ± 0.0	NB
N	*Hypocenomyce friesii*	a Lichen				S3S4	5 Undetermined	1	89.6 ± 1.0	NB
N	*Melanelia panniformis*	Shingled Camouflage Lichen				S3S4	5 Undetermined	4	85.6 ± 1.0	NB
N	*Nephroma parile*	Powdery Kidney Lichen				S3S4	4 Secure	7	31.1 ± 0.0	NB
N	*Protopannaria pezizoides*	Brown-gray Moss-shingle Lichen				S3S4	4 Secure	14	64.1 ± 0.0	NB
N	*Pseudocyphellaria perpetua*	Gilded Specklebelly Lichen				S3S4	3 Sensitive	42	68.9 ± 0.0	NB
N	*Pannaria conoplea*	Mealy-rimmed Shingle Lichen				S3S4	3 Sensitive	6	71.4 ± 0.0	NB
N	*Anaptychia palmulata*	Shaggy Fringed Lichen				S3S4	3 Sensitive	3	91.1 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	*Peltigera neopolydactyla*	Undulating Pelt Lichen				S3S4	5 Undetermined	7	84.1 ± 1.0	NB
N	*Cladonia cariosa*	Lesser Ribbed Pixie Lichen				S3S4	4 Secure	3	94.3 ± 1.0	NB
N	*Hypocenomyce scalaris*	Common Clam Lichen				S3S4	5 Undetermined	1	92.6 ± 1.0	NB
N	*Dermatocarpon luridum*	Brookside Stippleback Lichen				S3S4	4 Secure	14	31.3 ± 0.0	NB
N	*Grimmia anodon*	Toothless Grimmia Moss				SH	5 Undetermined	2	10.0 ± 10.0	NB
N	*Leucodon brachypus*	a Moss				SH	2 May Be At Risk	8	67.7 ± 100.0	NB
N	*Thelia hirtella*	a Moss				SH	2 May Be At Risk	2	54.4 ± 100.0	NB
N	*Cyrto-hypnum minutulum*	Tiny Cedar Moss				SH	2 May Be At Risk	3	85.4 ± 10.0	NB
P	*Juglans cinerea*	Butternut	Endangered	Endangered	Endangered	S1	1 At Risk	66	12.5 ± 1.0	NB
P	*Polemonium vanbruntiae*	Van Brunt's Jacob's-ladder	Threatened	Threatened	Threatened	S1	1 At Risk	72	36.6 ± 0.0	NB
P	*Symphyotrichum anticostense*	Anticosti Aster	Threatened	Threatened	Endangered	S2S3	1 At Risk	4	88.2 ± 0.0	NB
P	*Isoetes prototypus*	Prototype Quillwort	Special Concern	Special Concern	Endangered	S2	1 At Risk	26	17.6 ± 0.0	NB
P	*Pterospora andromedea*	Woodland Pinedrops			Endangered	S1	1 At Risk	11	85.4 ± 0.0	NB
P	*Cryptotaenia canadensis*	Canada Honewort				S1	2 May Be At Risk	1	63.4 ± 1.0	NB
P	*Sanicula trifoliata*	Large-Fruited Sanicle				S1	2 May Be At Risk	1	30.8 ± 5.0	NB
P	*Antennaria parlinii*	a Pussytoes				S1	2 May Be At Risk	7	46.4 ± 1.0	NB
P	*Antennaria howellii ssp. petaloidea*	Pussy-Toes				S1	2 May Be At Risk	2	6.1 ± 1.0	NB
P	*Bidens discoidea*	Swamp Beggarticks				S1	2 May Be At Risk	3	61.2 ± 0.0	NB
P	*Pseudognaphalium obtusifolium*	Eastern Cudweed				S1	2 May Be At Risk	2	78.7 ± 0.0	NB
P	*Helianthus decapetalus*	Ten-rayed Sunflower				S1	2 May Be At Risk	13	86.9 ± 0.0	NB
P	*Hieracium kalmii*	Kalm's Hawkweed				S1	2 May Be At Risk	5	29.7 ± 1.0	NB
P	*Hieracium kalmii var. kalmii*	Kalm's Hawkweed				S1	2 May Be At Risk	7	30.4 ± 1.0	NB
P	*Hieracium paniculatum*	Panicled Hawkweed				S1	2 May Be At Risk	17	39.4 ± 0.0	NB
P	*Hieracium robinsonii*	Robinson's Hawkweed				S1	3 Sensitive	9	83.3 ± 0.0	NB
P	*Senecio pseudoarnica*	Seabeach Ragwort				S1	2 May Be At Risk	14	90.9 ± 0.0	NB
P	*Cardamine parviflora var. arenicola*	Small-flowered Bittercress				S1	2 May Be At Risk	14	22.4 ± 0.0	NB
P	*Cardamine concatenata*	Cut-leaved Toothwort				S1	2 May Be At Risk	1	86.6 ± 1.0	NB
P	*Draba arabisans*	Rock Whitlow-Grass				S1	2 May Be At Risk	23	9.2 ± 0.0	NB
P	*Draba breweri var. cana*	Brewer's Whitlow-grass				S1	2 May Be At Risk	10	86.2 ± 0.0	NB
P	*Draba glabella*	Rock Whitlow-Grass				S1	2 May Be At Risk	10	4.2 ± 1.0	NB
P	*Minuartia groenlandica*	Greenland Stitchwort				S1	2 May Be At Risk	4	17.6 ± 0.0	NB
P	*Chenopodium capitatum*	Strawberry-blite				S1	2 May Be At Risk	4	11.5 ± 1.0	NB
P	*Chenopodium simplex*	Maple-leaved Goosefoot				S1	2 May Be At Risk	13	69.9 ± 1.0	NB
P	*Suaeda rolandii*	Roland's Sea-Blite				S1	3 Sensitive	1	96.0 ± 0.0	NB
P	*Triadenum virginicum*	Virginia St John's-wort				S1	2 May Be At Risk	2	6.1 ± 0.0	NB
P	*Corema conradii*	Broom Crowberry				S1	2 May Be At Risk	1	12.0 ± 10.0	NB
P	*Vaccinium boreale*	Northern Blueberry				S1	2 May Be At Risk	1	35.3 ± 0.0	NB
P	*Vaccinium corymbosum*	Highbush Blueberry				S1	3 Sensitive	1	83.5 ± 5.0	NB
P	*Chamaesyce polygonifolia*	Seaside Spurge				S1	2 May Be At Risk	8	86.7 ± 0.0	NB
P	*Lespedeza capitata*	Round-headed Bush-clover				S1	2 May Be At Risk	8	61.3 ± 0.0	NB
P	*Gentiana rubricaulis*	Purple-stemmed Gentian				S1	2 May Be At Risk	12	49.4 ± 0.0	NB
P	*Lomatogonium rotatum*	Marsh Felwort				S1	2 May Be At Risk	2	66.4 ± 0.0	NB
P	*Proserpinaca pectinata*	Comb-leaved Mermaidweed				S1	2 May Be At Risk	2	38.3 ± 0.0	NB
P	*Pycnanthemum virginianum*	Virginia Mountain Mint				S1	2 May Be At Risk	4	29.3 ± 0.0	NB
P	*Lysimachia hybrida*	Lowland Yellow Loosestrife				S1	2 May Be At Risk	13	96.3 ± 0.0	NB
P	*Lysimachia quadrifolia*	Whorled Yellow Loosestrife				S1	2 May Be At Risk	16	6.6 ± 1.0	NB
P	*Primula laurentiana*	Laurentian Primrose				S1	2 May Be At Risk	28	76.0 ± 2.0	NS
P	*Ranunculus sceleratus*	Cursed Buttercup				S1	2 May Be At Risk	6	14.3 ± 0.0	NB
P	*Crataegus jonesiae*	Jones' Hawthorn				S1	2 May Be At Risk	5	76.6 ± 1.0	NB
P	*Potentilla canadensis*	Canada Cinquefoil				S1	5 Undetermined	1	92.4 ± 0.0	NB
P	*Galium brevipes*	Limestone Swamp Bedstraw				S1	2 May Be At Risk	1	69.6 ± 5.0	NB
P	*Saxifraga paniculata ssp.*	White Mountain Saxifrage				S1	2 May Be At Risk	25	9.7 ± 10.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
	neogaea									
P	*Agalinis paupercula var. borealis*	Small-flowered Agalinis				S1	2 May Be At Risk	8	19.9 ± 1.0	NB
P	*Agalinis tenuifolia*	Slender Agalinis				S1	2 May Be At Risk	6	73.0 ± 0.0	NB
P	*Gratiola aurea*	Golden Hedge-Hyssop				S1	3 Sensitive	2	16.0 ± 0.0	NB
P	*Pedicularis canadensis*	Canada Lousewort				S1	2 May Be At Risk	3	57.6 ± 0.0	NB
P	*Viola sagittata var. ovata*	Arrow-Leaved Violet				S1	2 May Be At Risk	36	78.9 ± 0.0	NS
P	*Alisma subcordatum*	Southern Water Plantain				S1	5 Undetermined	4	26.1 ± 0.0	NB
P	*Carex atlantica ssp. atlantica*	Atlantic Sedge				S1	2 May Be At Risk	1	70.2 ± 0.0	NB
P	*Carex backii*	Rocky Mountain Sedge				S1	2 May Be At Risk	6	65.3 ± 0.0	NB
P	*Carex cephaloidea*	Thin-leaved Sedge				S1	2 May Be At Risk	2	93.9 ± 0.0	NB
P	*Carex merritt-fernaldii*	Merritt Fernald's Sedge				S1	2 May Be At Risk	2	79.3 ± 0.0	NB
P	*Carex saxatilis*	Russet Sedge				S1	2 May Be At Risk	13	8.8 ± 10.0	NB
P	*Carex scirpoidea*	Scirpuslike Sedge				S1	2 May Be At Risk	6	63.3 ± 0.0	NB
P	*Carex sterilis*	Sterile Sedge				S1	2 May Be At Risk	2	90.0 ± 0.0	NB
P	*Carex grisea*	Inflated Narrow-leaved Sedge				S1	2 May Be At Risk	10	33.9 ± 0.0	NB
P	*Cyperus diandrus*	Low Flatsedge				S1	2 May Be At Risk	7	73.0 ± 1.0	NB
P	*Cyperus lupulinus*	Hop Flatsedge				S1	2 May Be At Risk	6	58.0 ± 0.0	NB
P	*Cyperus lupulinus ssp. macilentus*	Hop Flatsedge				S1	2 May Be At Risk	16	56.3 ± 0.0	NB
P	*Eleocharis olivacea*	Yellow Spikerush				S1	2 May Be At Risk	3	93.9 ± 1.0	NB
P	*Rhynchospora capillacea*	Slender Beakrush				S1	2 May Be At Risk	3	87.7 ± 0.0	NB
P	*Scirpus pendulus*	Hanging Bulrush				S1	2 May Be At Risk	5	94.8 ± 0.0	NB
P	*Sisyrinchium angustifolium*	Narrow-leaved Blue-eyed-grass				S1	2 May Be At Risk	10	14.8 ± 1.0	NB
P	*Juncus greenei*	Greene's Rush				S1	2 May Be At Risk	1	49.6 ± 0.0	NB
P	*Juncus subtilis*	Creeping Rush				S1	2 May Be At Risk	1	37.3 ± 5.0	NB
P	*Allium canadense*	Canada Garlic				S1	2 May Be At Risk	11	29.5 ± 0.0	NB
P	*Goodyera pubescens*	Downy Rattlesnake-Plantain				S1	2 May Be At Risk	5	77.3 ± 0.0	NB
P	*Malaxis brachypoda*	White Adder's-Mouth				S1	2 May Be At Risk	4	89.7 ± 0.0	NS
P	*Platanthera flava var. herbiola*	Pale Green Orchid				S1	2 May Be At Risk	14	50.2 ± 1.0	NB
P	*Platanthera macrophylla*	Large Round-Leaved Orchid				S1	2 May Be At Risk	2	65.4 ± 1.0	NB
P	*Spiranthes casei*	Case's Ladies'-Tresses				S1	2 May Be At Risk	6	85.4 ± 0.0	NB
P	*Bromus pubescens*	Hairy Wood Brome Grass				S1	5 Undetermined	6	58.2 ± 0.0	NB
P	*Cinna arundinacea*	Sweet Wood Reed Grass				S1	2 May Be At Risk	22	38.7 ± 0.0	NB
P	*Danthonia compressa*	Flattened Oat Grass				S1	2 May Be At Risk	7	66.0 ± 1.0	NB
P	*Dichanthelium dichotomum*	Forked Panic Grass				S1	2 May Be At Risk	6	20.5 ± 1.0	NB
P	*Festuca subverticillata*	Nodding Fescue				S1	2 May Be At Risk	2	95.0 ± 1.0	NS
P	*Glyceria obtusa*	Atlantic Manna Grass				S1	2 May Be At Risk	6	39.2 ± 0.0	NB
P	*Sporobolus compositus*	Rough Dropseed				S1	2 May Be At Risk	17	87.0 ± 0.0	NB
P	*Potamogeton friesii*	Fries' Pondweed				S1	2 May Be At Risk	6	6.0 ± 5.0	NB
P	*Potamogeton nodosus*	Long-leaved Pondweed				S1	2 May Be At Risk	4	64.9 ± 0.0	NB
P	*Potamogeton strictifolius*	Straight-leaved Pondweed				S1	2 May Be At Risk	2	15.9 ± 0.0	NB
P	*Xyris difformis*	Bog Yellow-eyed-grass				S1	5 Undetermined	3	6.0 ± 0.0	NB
P	*Asplenium ruta-muraria var. cryptolepis*	Wallrue Spleenwort				S1	2 May Be At Risk	3	9.2 ± 0.0	NB
P	*Cystopteris laurentiana*	Laurentian Bladder Fern				S1	2 May Be At Risk	1	65.3 ± 1.0	NB
P	*Botrychium oneidense*	Blunt-lobed Moonwort				S1	2 May Be At Risk	4	48.7 ± 0.0	NB
P	*Botrychium rugulosum*	Rugulose Moonwort				S1	2 May Be At Risk	1	78.5 ± 1.0	NB
P	*Schizaea pusilla*	Little Curlygrass Fern				S1	2 May Be At Risk	25	19.3 ± 0.0	NB
P	*Hieracium kalmii var. fasciculatum*	Kalm's Hawkweed				S1?	5 Undetermined	6	76.8 ± 1.0	NB
P	*Cuscuta campestris*	Field Dodder				S1?	2 May Be At Risk	3	62.0 ± 5.0	NB
P	*Drosera rotundifolia var. comosa*	Round-leaved Sundew				S1?	5 Undetermined	5	62.1 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	*Carex laxiflora*	Loose-Flowered Sedge				S1?	5 Undetermined	2	80.5 ± 5.0	NS
P	*Wolffia columbiana*	Columbian Watermeal				S1?	2 May Be At Risk	5	61.7 ± 0.0	NB
P	*Rumex aquaticus var. fenestratus*	Western Dock				S1S2	2 May Be At Risk	1	73.1 ± 1.0	NB
P	*Saxifraga virginiensis*	Early Saxifrage				S1S2	2 May Be At Risk	14	85.3 ± 0.0	NB
P	*Potamogeton bicupulatus*	Snailseed Pondweed				S1S2	2 May Be At Risk	5	25.6 ± 0.0	NB
P	*Selaginella rupestris*	Rock Spikemoss				S1S2	2 May Be At Risk	27	65.4 ± 1.0	NB
P	*Thelypteris simulata*	Bog Fern				S1S2	2 May Be At Risk	7	63.2 ± 0.0	NB
P	*Cuscuta cephalanthi*	Buttonbush Dodder				S1S3	2 May Be At Risk	2	8.6 ± 0.0	NB
P	*Listera australis*	Southern Twayblade			Endangered	S2	1 At Risk	15	74.0 ± 0.0	NB
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2	3 Sensitive	3	80.9 ± 0.0	NB
P	*Sanicula odorata*	Clustered Sanicle				S2	2 May Be At Risk	1	93.2 ± 0.0	NB
P	*Pseudognaphalium macounii*	Macoun's Cudweed				S2	3 Sensitive	8	12.0 ± 0.0	NB
P	*Solidago simplex var. racemosa*	Sticky Goldenrod				S2	2 May Be At Risk	12	86.4 ± 0.0	NB
P	*Ionactis linariifolius*	Stiff Aster				S2	3 Sensitive	1	83.6 ± 0.0	NB
P	*Symphyotrichum racemosum*	Small White Aster				S2	3 Sensitive	8	31.3 ± 0.0	NB
P	*Impatiens pallida*	Pale Jewelweed				S2	2 May Be At Risk	5	63.7 ± 0.0	NB
P	*Alnus serrulata*	Smooth Alder				S2	3 Sensitive	13	39.3 ± 0.0	NB
P	*Arabis drummondii*	Drummond's Rockcress				S2	3 Sensitive	20	10.8 ± 1.0	NB
P	*Sagina nodosa*	Knotted Pearlwort				S2	3 Sensitive	13	40.2 ± 1.0	NB
P	*Sagina nodosa ssp. borealis*	Knotted Pearlwort				S2	3 Sensitive	2	25.2 ± 0.0	NB
P	*Stellaria longifolia*	Long-leaved Starwort				S2	3 Sensitive	7	10.2 ± 10.0	NB
P	*Atriplex franktonii*	Frankton's Saltbush				S2	4 Secure	3	45.8 ± 1.0	NB
P	*Chenopodium rubrum*	Red Pigweed				S2	3 Sensitive	4	2.5 ± 1.0	NB
P	*Hypericum dissimulatum*	Disguised St John's-wort				S2	3 Sensitive	6	55.2 ± 1.0	NB
P	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed				S2	3 Sensitive	6	87.9 ± 1.0	NB
P	*Viburnum lentago*	Nannyberry				S2	4 Secure	50	79.4 ± 0.0	NB
P	*Viburnum recognitum*	Northern Arrow-Wood				S2	4 Secure	99	59.9 ± 0.0	NB
P	*Astragalus eucosmus*	Elegant Milk-vetch				S2	2 May Be At Risk	10	20.9 ± 0.0	NB
P	*Oxytropis campestris var. johannensis*	Field Locoweed				S2	3 Sensitive	7	8.8 ± 50.0	NB
P	*Quercus macrocarpa*	Bur Oak				S2	2 May Be At Risk	48	3.2 ± 1.0	NB
P	*Gentiana linearis*	Narrow-Leaved Gentian				S2	3 Sensitive	5	78.9 ± 5.0	NB
P	*Myriophyllum humile*	Low Water Milfoil				S2	3 Sensitive	5	57.1 ± 1.0	NB
P	*Proserpinaca palustris var. crebra*	Marsh Mermaidweed				S2	3 Sensitive	18	27.7 ± 0.0	NB
P	*Hedeoma pulegioides*	American False Pennyroyal				S2	4 Secure	59	8.4 ± 0.0	NB
P	*Nuphar lutea ssp. rubrodisca*	Red-disked Yellow Pond-lily				S2	3 Sensitive	10	9.4 ± 1.0	NB
P	*Orobanche uniflora*	One-Flowered Broomrape				S2	3 Sensitive	13	11.6 ± 1.0	NB
P	*Polygala paucifolia*	Fringed Milkwort				S2	3 Sensitive	16	55.3 ± 0.0	NB
P	*Polygala senega*	Seneca Snakeroot				S2	3 Sensitive	2	94.0 ± 1.0	NB
P	*Polygonum amphibium var. emersum*	Water Smartweed				S2	3 Sensitive	39	23.6 ± 0.0	NB
P	*Polygonum careyi*	Carey's Smartweed				S2	3 Sensitive	15	19.8 ± 5.0	NB
P	*Podostemum ceratophyllum*	Horn-leaved Riverweed				S2	3 Sensitive	22	42.7 ± 0.0	NB
P	*Anemone multifida*	Cut-leaved Anemone				S2	3 Sensitive	1	88.2 ± 0.0	NB
P	*Hepatica nobilis var. obtusa*	Round-lobed Hepatica				S2	3 Sensitive	36	43.2 ± 1.0	NB
P	*Ranunculus flabellaris*	Yellow Water Buttercup				S2	4 Secure	14	35.7 ± 0.0	NB
P	*Ranunculus longirostris*	Eastern White Water-Crowfoot				S2	5 Undetermined	5	71.5 ± 1.0	NB
P	*Crataegus scabrida*	Rough Hawthorn				S2	3 Sensitive	9	9.1 ± 0.0	NB
P	*Crataegus succulenta*	Fleshy Hawthorn				S2	3 Sensitive	1	79.3 ± 5.0	NB
P	*Cephalanthus occidentalis*	Common Buttonbush				S2	3 Sensitive	24	52.1 ± 0.0	NB
P	*Salix candida*	Sage Willow				S2	3 Sensitive	2	90.3 ± 1.0	NB
P	*Agalinis neoscotica*	Nova Scotia Agalinis				S2	3 Sensitive	23	78.7 ± 1.0	NS

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P	*Euphrasia randii*	Rand's Eyebright				S2	2 May Be At Risk	16	25.0 ± 0.0	NB
P	*Scrophularia lanceolata*	Lance-leaved Figwort				S2	3 Sensitive	5	23.4 ± 5.0	NB
P	*Dirca palustris*	Eastern Leatherwood				S2	2 May Be At Risk	5	85.5 ± 0.0	NB
P	*Phryma leptostachya*	American Lopseed				S2	3 Sensitive	2	90.4 ± 1.0	NB
P	*Verbena urticifolia*	White Vervain				S2	2 May Be At Risk	12	85.5 ± 1.0	NB
P	*Viola novae-angliae*	New England Violet				S2	3 Sensitive	5	22.4 ± 0.0	NB
P	*Symplocarpus foetidus*	Eastern Skunk Cabbage				S2	3 Sensitive	78	2.6 ± 1.0	NB
P	*Carex comosa*	Bearded Sedge				S2	2 May Be At Risk	5	80.9 ± 0.0	NS
P	*Carex granularis*	Limestone Meadow Sedge				S2	3 Sensitive	7	63.3 ± 5.0	NB
P	*Carex gynocrates*	Northern Bog Sedge				S2	3 Sensitive	5	66.0 ± 1.0	NB
P	*Carex hirtifolia*	Pubescent Sedge				S2	3 Sensitive	4	37.1 ± 0.0	NB
P	*Carex livida var. radicaulis*	Livid Sedge				S2	3 Sensitive	1	12.0 ± 2.0	NB
P	*Carex plantaginea*	Plantain-Leaved Sedge				S2	3 Sensitive	1	87.7 ± 0.0	NB
P	*Carex prairea*	Prairie Sedge				S2	3 Sensitive	1	90.1 ± 5.0	NS
P	*Carex rostrata*	Narrow-leaved Beaked Sedge				S2	3 Sensitive	2	84.3 ± 0.0	NB
P	*Carex salina*	Saltmarsh Sedge				S2	3 Sensitive	2	11.8 ± 1.0	NB
P	*Carex sprengelii*	Longbeak Sedge				S2	3 Sensitive	3	58.9 ± 0.0	NB
P	*Carex tenuiflora*	Sparse-Flowered Sedge				S2	2 May Be At Risk	12	72.6 ± 0.0	NB
P	*Carex albicans var. emmonsii*	White-tinged Sedge				S2	3 Sensitive	5	19.4 ± 0.0	NB
P	*Cyperus squarrosus*	Awned Flatsedge				S2	3 Sensitive	31	27.6 ± 0.0	NB
P	*Eriophorum gracile*	Slender Cottongrass				S2	2 May Be At Risk	8	59.6 ± 0.0	NB
P	*Blysmus rufus*	Red Bulrush				S2	3 Sensitive	3	85.6 ± 0.0	NB
P	*Elodea nuttallii*	Nuttall's Waterweed				S2	3 Sensitive	7	21.8 ± 0.0	NB
P	*Juncus vaseyi*	Vasey Rush				S2	3 Sensitive	5	93.6 ± 0.0	NB
P	*Allium tricoccum*	Wild Leek				S2	2 May Be At Risk	13	22.2 ± 0.0	NB
P	*Najas gracillima*	Thread-Like Naiad				S2	3 Sensitive	11	40.3 ± 0.0	NB
P	*Calypso bulbosa var. americana*	Calypso				S2	2 May Be At Risk	5	7.8 ± 0.0	NB
P	*Coeloglossum viride var. virescens*	Long-bracted Frog Orchid				S2	2 May Be At Risk	7	33.5 ± 5.0	NB
P	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's-Slipper				S2	2 May Be At Risk	5	9.7 ± 1.0	NB
P	*Spiranthes lucida*	Shining Ladies'-Tresses				S2	3 Sensitive	14	20.7 ± 0.0	NB
P	*Spiranthes ochroleuca*	Yellow Ladies'-tresses				S2	2 May Be At Risk	11	78.6 ± 5.0	NB
P	*Dichanthelium linearifolium*	Narrow-leaved Panic Grass				S2	3 Sensitive	17	42.8 ± 0.0	NB
P	*Elymus canadensis*	Canada Wild Rye				S2	2 May Be At Risk	13	63.5 ± 1.0	NB
P	*Leersia virginica*	White Cut Grass				S2	2 May Be At Risk	42	35.5 ± 0.0	NB
P	*Piptatherum canadense*	Canada Rice Grass				S2	3 Sensitive	6	43.5 ± 0.0	NB
P	*Poa glauca*	Glaucous Blue Grass				S2	4 Secure	16	12.0 ± 2.0	NB
P	*Puccinellia phryganodes*	Creeping Alkali Grass				S2	3 Sensitive	15	36.9 ± 0.0	NB
P	*Schizachyrium scoparium*	Little Bluestem				S2	3 Sensitive	42	21.5 ± 0.0	NB
P	*Zizania aquatica var. aquatica*	Indian Wild Rice				S2	5 Undetermined	5	38.6 ± 0.0	NB
P	*Piptatherum pungens*	Slender Rice Grass				S2	2 May Be At Risk	3	95.2 ± 0.0	NB
P	*Potamogeton vaseyi*	Vasey's Pondweed				S2	3 Sensitive	4	6.0 ± 1.0	NB
P	*Asplenium trichomanes*	Maidenhair Spleenwort				S2	3 Sensitive	17	6.6 ± 0.0	NB
P	*Woodwardia virginica*	Virginia Chain Fern				S2	3 Sensitive	13	74.1 ± 1.0	NB
P	*Woodsia alpina*	Alpine Cliff Fern				S2	3 Sensitive	9	9.7 ± 0.0	NB
P	*Selaginella selaginoides*	Low Spikemoss				S2	3 Sensitive	12	12.0 ± 6.0	NB
P	*Toxicodendron radicans*	Poison Ivy				S2?	3 Sensitive	15	20.7 ± 0.0	NB
P	*Symphyotrichum novi-belgii var. crenifolium*	New York Aster				S2?	5 Undetermined	9	10.7 ± 0.0	NB
P	*Humulus lupulus var. lupuloides*	Common Hop				S2?	3 Sensitive	4	74.6 ± 0.0	NB
P	*Rubus recurvicaulis*	Arching Dewberry				S2?	4 Secure	5	10.2 ± 5.0	NB

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P	*Galium obtusum*	Blunt-leaved Bedstraw				S2?	4 Secure	3	38.8 ± 1.0	NB
P	*Salix myricoides*	Bayberry Willow				S2?	3 Sensitive	8	78.7 ± 0.0	NB
P	*Carex vacillans*	Estuarine Sedge				S2?	3 Sensitive	4	72.1 ± 1.0	NB
P	*Platanthera huronensis*	Fragrant Green Orchid				S2?	5 Undetermined	2	91.3 ± 0.0	NB
P	*Solidago altissima*	Tall Goldenrod				S2S3	4 Secure	6	20.4 ± 1.0	NB
P	*Barbarea orthoceras*	American Yellow Rocket				S2S3	3 Sensitive	2	88.8 ± 10.0	NB
P	*Ceratophyllum echinatum*	Prickly Hornwort				S2S3	3 Sensitive	16	18.7 ± 0.0	NB
P	*Callitriche hermaphroditica*	Northern Water-starwort				S2S3	4 Secure	10	24.6 ± 1.0	NB
P	*Lonicera oblongifolia*	Swamp Fly Honeysuckle				S2S3	3 Sensitive	16	19.3 ± 6.0	NB
P	*Elatine americana*	American Waterwort				S2S3	3 Sensitive	7	8.0 ± 1.0	NB
P	*Bartonia paniculata*	Branched Bartonia				S2S3	3 Sensitive	4	25.6 ± 0.0	NB
P	*Bartonia paniculata ssp. iodandra*	Branched Bartonia				S2S3	3 Sensitive	36	18.8 ± 1.0	NB
P	*Geranium robertianum*	Herb Robert				S2S3	4 Secure	31	7.0 ± 1.0	NB
P	*Myriophyllum quitense*	Andean Water Milfoil				S2S3	4 Secure	71	3.8 ± 0.0	NB
P	*Epilobium coloratum*	Purple-veined Willowherb				S2S3	3 Sensitive	6	11.5 ± 1.0	NB
P	*Rumex pallidus*	Seabeach Dock				S2S3	3 Sensitive	7	14.0 ± 0.0	NB
P	*Rubus pensilvanicus*	Pennsylvania Blackberry				S2S3	4 Secure	18	15.4 ± 0.0	NB
P	*Galium labradoricum*	Labrador Bedstraw				S2S3	3 Sensitive	7	61.8 ± 1.0	NB
P	*Valeriana uliginosa*	Swamp Valerian				S2S3	3 Sensitive	1	92.1 ± 1.0	NB
P	*Carex adusta*	Lesser Brown Sedge				S2S3	4 Secure	7	4.5 ± 1.0	NB
P	*Corallorhiza maculata var. occidentalis*	Spotted Coralroot				S2S3	3 Sensitive	4	75.6 ± 1.0	NB
P	*Corallorhiza maculata var. maculata*	Spotted Coralroot				S2S3	3 Sensitive	3	76.6 ± 1.0	NB
P	*Listera auriculata*	Auricled Twayblade				S2S3	3 Sensitive	9	11.7 ± 1.0	NB
P	*Spiranthes cernua*	Nodding Ladies'-Tresses				S2S3	3 Sensitive	22	49.6 ± 0.0	NB
P	*Eragrostis pectinacea*	Tufted Love Grass				S2S3	4 Secure	15	37.3 ± 1.0	NB
P	*Stuckenia filiformis ssp. alpina*	Thread-leaved Pondweed				S2S3	3 Sensitive	7	6.2 ± 0.0	NB
P	*Potamogeton praelongus*	White-stemmed Pondweed				S2S3	4 Secure	12	6.3 ± 0.0	NB
P	*Isoetes acadiensis*	Acadian Quillwort				S2S3	3 Sensitive	9	43.1 ± 0.0	NB
P	*Ophioglossum pusillum*	Northern Adder's-tongue				S2S3	3 Sensitive	9	9.3 ± 1.0	NB
P	*Botrychium tenebrosum*	Swamp Moonwort				S2S3	3 Sensitive	1	92.5 ± 0.0	NB
P	*Panax trifolius*	Dwarf Ginseng				S3	3 Sensitive	16	12.3 ± 0.0	NB
P	*Artemisia campestris*	Field Wormwood				S3	4 Secure	25	58.3 ± 0.0	NB
P	*Artemisia campestris ssp. caudata*	Field Wormwood				S3	4 Secure	78	52.5 ± 0.0	NB
P	*Erigeron hyssopifolius*	Hyssop-leaved Fleabane				S3	4 Secure	55	7.5 ± 0.0	NB
P	*Prenanthes racemosa*	Glaucous Rattlesnakeroot				S3	4 Secure	62	3.2 ± 1.0	NB
P	*Tanacetum bipinnatum ssp. huronense*	Lake Huron Tansy				S3	4 Secure	21	8.3 ± 1.0	NB
P	*Symphyotrichum boreale*	Boreal Aster				S3	3 Sensitive	10	20.6 ± 0.0	NB
P	*Betula pumila*	Bog Birch				S3	4 Secure	21	54.6 ± 1.0	NB
P	*Arabis glabra*	Tower Mustard				S3	5 Undetermined	1	75.1 ± 0.0	NB
P	*Arabis hirsuta var. pycnocarpa*	Western Hairy Rockcress				S3	4 Secure	19	10.8 ± 0.0	NB
P	*Cardamine maxima*	Large Toothwort				S3	4 Secure	30	6.3 ± 0.0	NB
P	*Subularia aquatica var. americana*	Water Awlwort				S3	4 Secure	14	29.4 ± 0.0	NB
P	*Lobelia cardinalis*	Cardinal Flower				S3	4 Secure	327	50.5 ± 0.0	NB
P	*Stellaria humifusa*	Saltmarsh Starwort				S3	4 Secure	9	14.4 ± 0.0	NB
P	*Hudsonia tomentosa*	Woolly Beach-heath				S3	4 Secure	3	22.1 ± 0.0	NB
P	*Cornus amomum ssp. obliqua*	Pale Dogwood				S3	3 Sensitive	140	20.8 ± 0.0	NB
P	*Crassula aquatica*	Water Pygmyweed				S3	4 Secure	10	36.9 ± 0.0	NB
P	*Rhodiola rosea*	Roseroot				S3	4 Secure	60	5.2 ± 5.0	NB

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P	*Penthorum sedoides*	Ditch Stonecrop				S3	4 Secure	67	27.6 ± 0.0	NB
P	*Elatine minima*	Small Waterwort				S3	4 Secure	29	14.1 ± 0.0	NB
P	*Astragalus alpinus var. brunetianus*	Alpine Milk-Vetch				S3	4 Secure	3	86.5 ± 0.0	NB
P	*Hedysarum alpinum*	Alpine Sweet-vetch				S3	4 Secure	2	21.6 ± 0.0	NB
P	*Gentianella amarella ssp. acuta*	Northern Gentian				S3	4 Secure	6	10.1 ± 0.0	NB
P	*Geranium bicknellii*	Bicknell's Crane's-bill				S3	4 Secure	10	8.2 ± 5.0	NB
P	*Myriophyllum farwellii*	Farwell's Water Milfoil				S3	4 Secure	23	13.6 ± 0.0	NB
P	*Myriophyllum heterophyllum*	Variable-leaved Water Milfoil				S3	4 Secure	51	10.6 ± 0.0	NB
P	*Myriophyllum verticillatum*	Whorled Water Milfoil				S3	4 Secure	21	14.2 ± 1.0	NB
P	*Stachys tenuifolia*	Smooth Hedge-Nettle				S3	3 Sensitive	12	21.6 ± 0.0	NB
P	*Teucrium canadense*	Canada Germander				S3	3 Sensitive	5	81.9 ± 1.0	NS
P	*Utricularia radiata*	Little Floating Bladderwort				S3	4 Secure	38	11.2 ± 0.0	NB
P	*Nuphar lutea ssp. pumila*	Small Yellow Pond-lily				S3	4 Secure	15	12.0 ± 0.0	NB
P	*Epilobium hornemannii*	Hornemann's Willowherb				S3	4 Secure	6	33.4 ± 0.0	NB
P	*Epilobium hornemannii ssp. hornemannii*	Hornemann's Willowherb				S3	4 Secure	1	85.7 ± 0.0	NB
P	*Epilobium strictum*	Downy Willowherb				S3	4 Secure	24	8.7 ± 5.0	NB
P	*Polygala sanguinea*	Blood Milkwort				S3	3 Sensitive	15	46.5 ± 0.0	NB
P	*Polygonum arifolium*	Halberd-leaved Tearthumb				S3	4 Secure	20	35.8 ± 0.0	NB
P	*Polygonum punctatum*	Dotted Smartweed				S3	4 Secure	2	61.6 ± 0.0	NB
P	*Polygonum punctatum var. confertiflorum*	Dotted Smartweed				S3	4 Secure	15	60.7 ± 2.0	NB
P	*Polygonum scandens*	Climbing False Buckwheat				S3	4 Secure	35	21.7 ± 0.0	NB
P	*Littorella uniflora*	American Shoreweed				S3	4 Secure	20	14.1 ± 0.0	NB
P	*Primula mistassinica*	Mistassini Primrose				S3	4 Secure	12	6.5 ± 0.0	NB
P	*Pyrola minor*	Lesser Pyrola				S3	4 Secure	5	37.3 ± 0.0	NB
P	*Clematis occidentalis*	Purple Clematis				S3	4 Secure	24	6.2 ± 5.0	NB
P	*Ranunculus gmelinii*	Gmelin's Water Buttercup				S3	4 Secure	8	38.6 ± 0.0	NB
P	*Thalictrum venulosum*	Northern Meadow-rue				S3	4 Secure	78	8.7 ± 5.0	NB
P	*Amelanchier canadensis*	Canada Serviceberry				S3	4 Secure	16	10.6 ± 1.0	NB
P	*Rosa palustris*	Swamp Rose				S3	4 Secure	28	2.8 ± 1.0	NB
P	*Rubus occidentalis*	Black Raspberry				S3	4 Secure	19	40.0 ± 0.0	NB
P	*Sanguisorba canadensis*	Canada Burnet				S3	4 Secure	15	91.9 ± 0.0	NB
P	*Galium boreale*	Northern Bedstraw				S3	4 Secure	6	12.5 ± 1.0	NB
P	*Salix interior*	Sandbar Willow				S3	4 Secure	27	52.5 ± 0.0	NB
P	*Salix nigra*	Black Willow				S3	3 Sensitive	124	6.0 ± 1.0	NB
P	*Salix pedicellaris*	Bog Willow				S3	4 Secure	45	11.7 ± 1.0	NB
P	*Comandra umbellata*	Bastard's Toadflax				S3	4 Secure	1	65.3 ± 10.0	NB
P	*Parnassia glauca*	Fen Grass-of-Parnassus				S3	4 Secure	1	85.9 ± 10.0	NB
P	*Limosella australis*	Southern Mudwort				S3	4 Secure	10	89.3 ± 0.0	NB
P	*Veronica serpyllifolia ssp. humifusa*	Thyme-Leaved Speedwell				S3	4 Secure	10	75.6 ± 1.0	NB
P	*Boehmeria cylindrica*	Small-spike False-nettle				S3	3 Sensitive	111	53.6 ± 0.0	NB
P	*Pilea pumila*	Dwarf Clearweed				S3	4 Secure	30	31.1 ± 0.0	NB
P	*Viola adunca*	Hooked Violet				S3	4 Secure	8	54.6 ± 1.0	NB
P	*Viola nephrophylla*	Northern Bog Violet				S3	4 Secure	8	8.9 ± 0.0	NB
P	*Carex arcta*	Northern Clustered Sedge				S3	4 Secure	50	38.2 ± 0.0	NB
P	*Carex atratiformis*	Scabrous Black Sedge				S3	4 Secure	1	12.0 ± 0.0	NB
P	*Carex capillaris*	Hairlike Sedge				S3	4 Secure	10	7.8 ± 0.0	NB
P	*Carex chordorrhiza*	Creeping Sedge				S3	4 Secure	21	38.1 ± 1.0	NB
P	*Carex conoidea*	Field Sedge				S3	4 Secure	29	5.6 ± 1.0	NB
P	*Carex eburnea*	Bristle-leaved Sedge				S3	4 Secure	10	83.4 ± 0.0	NB
P	*Carex exilis*	Coastal Sedge				S3	4 Secure	86	9.8 ± 0.0	NB
P	*Carex garberi*	Garber's Sedge				S3	3 Sensitive	2	20.4 ± 0.0	NB
P	*Carex haydenii*	Hayden's Sedge				S3	4 Secure	40	6.2 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	*Carex lupulina*	Hop Sedge				S3	4 Secure	105	20.5 ± 0.0	NB
P	*Carex michauxiana*	Michaux's Sedge				S3	4 Secure	62	6.3 ± 0.0	NB
P	*Carex ormostachya*	Necklace Spike Sedge				S3	4 Secure	8	50.9 ± 1.0	NB
P	*Carex rosea*	Rosy Sedge				S3	4 Secure	24	19.7 ± 0.0	NB
P	*Carex tenera*	Tender Sedge				S3	4 Secure	46	20.2 ± 0.0	NB
P	*Carex tuckermanii*	Tuckerman's Sedge				S3	4 Secure	70	20.5 ± 0.0	NB
P	*Carex vaginata*	Sheathed Sedge				S3	3 Sensitive	8	82.9 ± 0.0	NB
P	*Carex wiegandii*	Wiegand's Sedge				S3	4 Secure	39	11.8 ± 0.0	NB
P	*Carex recta*	Estuary Sedge				S3	4 Secure	9	21.9 ± 0.0	NB
P	*Cyperus dentatus*	Toothed Flatsedge				S3	4 Secure	146	11.0 ± 5.0	NB
P	*Cyperus esculentus*	Perennial Yellow Nutsedge				S3	4 Secure	43	30.8 ± 0.0	NB
P	*Eleocharis intermedia*	Matted Spikerush				S3	4 Secure	3	77.9 ± 0.0	NB
P	*Eleocharis quinqueflora*	Few-flowered Spikerush				S3	4 Secure	4	9.8 ± 0.0	NB
P	*Rhynchospora capitellata*	Small-headed Beakrush				S3	4 Secure	8	42.9 ± 0.0	NB
P	*Rhynchospora fusca*	Brown Beakrush				S3	4 Secure	33	6.3 ± 1.0	NB
P	*Trichophorum clintonii*	Clinton's Clubrush				S3	4 Secure	30	7.6 ± 0.0	NB
P	*Schoenoplectus fluviatilis*	River Bulrush				S3	3 Sensitive	58	8.7 ± 0.0	NB
P	*Schoenoplectus torreyi*	Torrey's Bulrush				S3	4 Secure	30	1.7 ± 0.0	NB
P	*Lemna trisulca*	Star Duckweed				S3	4 Secure	23	11.6 ± 1.0	NB
P	*Triantha glutinosa*	Sticky False-Asphodel				S3	4 Secure	8	20.5 ± 0.0	NB
P	*Cypripedium reginae*	Showy Lady's-Slipper				S3	3 Sensitive	20	7.8 ± 10.0	NB
P	*Liparis loeselii*	Loesel's Twayblade				S3	4 Secure	19	9.1 ± 0.0	NB
P	*Platanthera blephariglottis*	White Fringed Orchid				S3	4 Secure	52	70.5 ± 0.0	NB
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	3 Sensitive	30	6.5 ± 1.0	NB
P	*Bromus latiglumis*	Broad-Glumed Brome				S3	3 Sensitive	3	43.6 ± 0.0	NB
P	*Calamagrostis pickeringii*	Pickering's Reed Grass				S3	4 Secure	105	11.0 ± 0.0	NB
P	*Dichanthelium depauperatum*	Starved Panic Grass				S3	4 Secure	27	42.9 ± 0.0	NB
P	*Muhlenbergia richardsonis*	Mat Muhly				S3	4 Secure	9	86.9 ± 0.0	NB
P	*Heteranthera dubia*	Water Stargrass				S3	4 Secure	59	10.3 ± 0.0	NB
P	*Potamogeton obtusifolius*	Blunt-leaved Pondweed				S3	4 Secure	17	14.0 ± 0.0	NB
P	*Potamogeton richardsonii*	Richardson's Pondweed				S3	3 Sensitive	16	12.0 ± 1.0	NB
P	*Xyris montana*	Northern Yellow-Eyed-Grass				S3	4 Secure	27	9.9 ± 0.0	NB
P	*Zannichellia palustris*	Horned Pondweed				S3	4 Secure	5	4.2 ± 0.0	NB
P	*Adiantum pedatum*	Northern Maidenhair Fern				S3	4 Secure	7	7.6 ± 1.0	NB
P	*Cryptogramma stelleri*	Steller's Rockbrake				S3	4 Secure	2	20.8 ± 1.0	NB
P	*Asplenium trichomanes-ramosum*	Green Spleenwort				S3	4 Secure	18	6.3 ± 0.0	NB
P	*Dryopteris fragrans var. remotiuscula*	Fragrant Wood Fern				S3	4 Secure	38	6.5 ± 0.0	NB
P	*Dryopteris goldiana*	Goldie's Woodfern				S3	3 Sensitive	5	90.0 ± 5.0	NB
P	*Woodsia glabella*	Smooth Cliff Fern				S3	4 Secure	44	33.7 ± 1.0	NB
P	*Equisetum palustre*	Marsh Horsetail				S3	4 Secure	6	67.6 ± 10.0	NB
P	*Isoetes tuckermanii*	Tuckerman's Quillwort				S3	4 Secure	26	25.8 ± 0.0	NB
P	*Lycopodium sabinifolium*	Ground-Fir				S3	4 Secure	12	7.0 ± 1.0	NB
P	*Huperzia appalachiana*	Appalachian Fir-Clubmoss				S3	3 Sensitive	16	8.7 ± 1.0	NB
P	*Botrychium dissectum*	Cut-leaved Moonwort				S3	4 Secure	26	13.1 ± 0.0	NB
P	*Botrychium lanceolatum var. angustisegmentum*	Lance-Leaf Grape-Fern				S3	3 Sensitive	8	8.5 ± 0.0	NB
P	*Botrychium simplex*	Least Moonwort				S3	4 Secure	9	81.8 ± 0.0	NB
P	*Polypodium appalachianum*	Appalachian Polypody				S3	4 Secure	29	6.7 ± 1.0	NB
P	*Utricularia resupinata*	Inverted Bladderwort				S3?	4 Secure	19	12.6 ± 10.0	NB
P	*Crataegus submollis*	Quebec Hawthorn				S3?	3 Sensitive	18	13.6 ± 1.0	NB
P	*Mertensia maritima*	Sea Lungwort				S3S4	4 Secure	30	13.5 ± 0.0	NB
P	*Lobelia kalmii*	Brook Lobelia				S3S4	4 Secure	18	6.4 ± 1.0	NB
P	*Suaeda calceoliformis*	Horned Sea-blite				S3S4	4 Secure	6	17.5 ± 1.0	NB
P	*Myriophyllum sibiricum*	Siberian Water Milfoil				S3S4	4 Secure	29	1.7 ± 0.0	NB
P	*Stachys pilosa*	Hairy Hedge-Nettle				S3S4	5 Undetermined	5	43.1 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	*Utricularia gibba*	Humped Bladderwort				S3S4	4 Secure	32	11.7 ± 0.0	NB
P	*Rumex maritimus*	Sea-Side Dock				S3S4	4 Secure	1	78.7 ± 1.0	NB
P	*Potentilla arguta*	Tall Cinquefoil				S3S4	4 Secure	32	20.8 ± 0.0	NB
P	*Rubus chamaemorus*	Cloudberry				S3S4	4 Secure	56	12.2 ± 0.0	NB
P	*Geocaulon lividum*	Northern Comandra				S3S4	4 Secure	10	18.9 ± 0.0	NB
P	*Juniperus horizontalis*	Creeping Juniper				S3S4	4 Secure	18	15.3 ± 1.0	NB
P	*Cladium mariscoides*	Smooth Twigrush				S3S4	4 Secure	39	6.3 ± 0.0	NB
P	*Eriophorum russeolum*	Russet Cottongrass				S3S4	4 Secure	12	16.6 ± 1.0	NB
P	*Triglochin gaspensis*	Gasp ├⌐ Arrowgrass				S3S4	4 Secure	15	14.4 ± 1.0	NB
P	*Spirodela polyrrhiza*	Great Duckweed				S3S4	4 Secure	36	29.0 ± 0.0	NB
P	*Corallorhiza maculata*	Spotted Coralroot				S3S4	3 Sensitive	16	11.5 ± 1.0	NB
P	*Calamagrostis stricta*	Slim-stemmed Reed Grass				S3S4	4 Secure	4	6.1 ± 2.0	NB
P	*Distichlis spicata*	Salt Grass				S3S4	4 Secure	3	69.1 ± 0.0	NB
P	*Potamogeton oakesianus*	Oakes' Pondweed				S3S4	4 Secure	42	11.5 ± 0.0	NB
P	*Montia fontana*	Water Blinks				SH	2 May Be At Risk	1	63.3 ± 1.0	NB
P	*Solidago caesia*	Blue-stemmed Goldenrod				SX	0.1 Extirpated	2	11.5 ± 1.0	NB
P	*Celastrus scandens*	Climbing Bittersweet				SX	0.1 Extirpated	2	85.5 ± 100.0	NB
P	*Carex swanii*	Swan's Sedge				SX	0.1 Extirpated	57	80.6 ± 0.0	NS

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The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

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15	Scott, F.W. 2002. Nova Scotia Herpetofauna Atlas Database. Acadia University, Wolfville NS, 8856 recs.
14	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2000.
14	Caissie, A. Herbarium Records. Fundy National Park, Alma NB. 1961-1993.
14	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort (Isoetes prototypus). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
13	Roland, A.E. & Smith, E.C. 1969. The Flora of Nova Scotia, 1st Ed. Nova Scotia Museum, Halifax, 743pp.
13	Wissink, R. 2000. Rare Plants of Fundy: maps. Parks Canada, 20 recs.
12	Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs.
12	Spicer, C.D. 2001. Powerline Corridor Botanical Surveys, Charlotte & Saint John Counties. A M E C International, 1269 recs.
11	Blaney, C.S.; Mazerolle, D.M.; Oberndorfer, E. 2007. Fieldwork 2007. Atlantic Canada Conservation Data Centre. Sackville NB, 13770 recs.
11	Kennedy, Joseph. 2010. New Brunswick Peregrine records, 2010. New Brunswick Dept Natural Resources, 16 recs (11 active).
11	Webster, R.P. 2004. Lepidopteran Records for National Wildlife Areas in New Brunswick. Webster, 1101 recs.
10	Belliveau, A.G. 2016. Atlantic Canada Conservation Data Centre Fieldwork 2016. Atlantic Canada Conservation Data Centre, 10695 recs.
10	Noseworthy, J. 2013. Van Brunt's Jacob's-ladder observations along tributary of Dipper Harbour Ck. Nature Conservancy of Canada, 10 recs.
9	McAlpine, D.F. 1983. Status & Conservation of Solution Caves in New Brunswick. New Brunswick Museum, Publications in Natural Science, no. 1, 28pp.
8	Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs.
8	Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs.
8	Hinds, H.R. 1992. Rare Vascular Plants of Fundy National Park. , 10 recs.
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7	Bredin, K.A. 2001. WTF Project: Freshwater Mussel Fieldwork in Freshwater Species data. Atlantic Canada Conservation Data Centere, 101 recs.
7	Christie, D.S. 2000. Christmas Bird Count Data, 1997-2000. Nature NB, 54 recs.
6	Bateman, M.C. 2000. Waterfowl Brood Surveys Database, 1990-2000 . Canadian Wildlife Service, Sackville, unpublished data. 149 recs.
6	Brunelle, P.-M. (compiler). 2010. ADIP/MDDS Odonata Database: NB, NS Update 1900-09. Atlantic Dragonfly Inventory Program (ADIP), 935 recs.
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5	Marshall, L. 1998. Atlantic Salmon: Southwest New Brunswick outer-Fundy SFA 23. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-13. 6 recs.
5	McNeil, J.A. 2016. Blandings Turtle (Emydoidea blandingii), Eastern Ribbonsnake (Thamnophis sauritus), Wood Turtle (Glyptemys insculpta), and Snapping Turtle (Chelydra serpentina) sightings, 2016. Mersey Tobeatic Research Institute, 774 records.
5	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014.
5	Parker, M.S.R. 2011. Hampton Wind Farm 2010: significant floral/faunal observations. , 13 recs.
5	Zinck, M. & Roland, A.E. 1998. Roland's Flora of Nova Scotia. Nova Scotia Museum, 3rd ed., rev. M. Zinck; 2 Vol., 1297 pp.
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4	Cronin, P. & Ayer, C.; Dubee, B.; Hooper, W.C.; LeBlanc, E.; Madden, A.; Pettigrew, T.; Seymour, P. 1998. Fish Species Management Plans (draft). NB DNRE Internal Report. Fredericton, 164pp.
4	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
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4	Layberry, R.A. 2012. Lepidopteran records for the Maritimes, 1974-2008. Layberry Collection, 1060 recs.
3	Adams, J. & Herman, T.B. 1998. Thesis, Unpublished map of C. insculpta sightings. Acadia University, Wolfville NS, 88 recs.
3	Bishop, G. 2012. Field data from September 2012 Anticosti Aster collection trip. , 135 rec.
3	Bishop, G., Bagnell, B.A. 2004. Site Assessment of Musquash Harbour, Nature Conservancy of Canada Property - Preliminary Botanical Survey. B&B Botanical, 12pp.
3	Blaney, C.S. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 1042 recs.
3	Blaney, C.S. Miscellaneous specimens received by ACCDC (botany). Various persons. 2001-08.
3	Blaney, C.S.; Mazerolle, D.M. 2011. Fieldwork 2011. Atlantic Canada Conservation Data Centre. Sackville NB.
3	Clayden, S.R. 2006. Pseudevernia cladonia records. NB Museum. Pers. comm. to S. Blaney, Dec, 4 recs.
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3	Newell, R.E. 2006. Rare plant observations in Digby Neck. Pers. comm. to S. Blaney, 6 recs.
3	Olsen, R. Herbarium Specimens. Nova Scotia Agricultural College, Truro. 2003.
2	Amirault, D.L. & Stewart, J. 2007. Piping Plover Database 1894-2006. Canadian Wildlife Service, Sackville, 3344 recs, 1228 new.
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2	Bagnell, B.A. 2003. Update to New Brunswick Rare Bryophyte Occurrences. B&B Botanical, Sussex, 5 recs.
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2	Cameron, R.P. 2009. Cyanolichen database. Nova Scotia Environment & Labour, 1724 recs.
2	Catling, P.M. 1981. Taxonomy of autumn-flowering Spiranthes species of southern Nova Scotia in Can. J. Bot. , 59:1250-1273. 30 recs.

# recs	CITATION
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2	Goltz, J.P. 2002. Botany Ramblings: 1 July to 30 September, 2002. N.B. Naturalist, 29 (3):84-92. 7 recs.
2	Hill, N.M. 1994. Status report on the Long's bulrush Scirpus longii in Canada. Committee on the Status of Endangered Wildlife in Canada, 7 recs.
2	Hinds, H.R. 1999. A Vascular Plant Survey of the Musquash Estuary in New Brunswick. , 12pp.
2	Marx, M. & Kenney, R.D. 2001. North Atlantic Right Whale Database. University of Rhode Island, 4 recs.
2	Proulx, V.D. 2002. Selaginella rupestris sight record at Centreville, Nova Scotia. Virginia D. Proulx collection, 2 recs.
2	Walker, E.M. 1942. Additions to the List of Odonates of the Maritime Provinces. Proc. Nova Scotian Inst. Sci., 20. 4: 159-176. 2 recs.
1	Amirault, D.L. 1997-2000. Unpublished files. Canadian Wildlife Service, Sackville, 470 recs.
1	Benedict, B. Agalinis neoscotica specimen from Grand Manan. 2009.
1	Bredin, K.A. 2000. NB & NS Bog Project, fieldwork. Atlantic Canada Conservation Data Centre, Sackville, 1 rec.
1	Bredin, K.A. 2001. NB Freshwater Mussel Fieldwork. Atlantic Canada Conservation Data Centere, 16 recs.
1	Brunelle, P.-M. 2005. Wood Turtle observations. Pers. comm. to S.H. Gerriets, 21 Sep. 3 recs, 3 recs.
1	Brunton, D. F. & McIntosh, K. L. Agalinis neoscotica herbarium record from D. F. Brunton Herbarium. D.F. Brunton Herbarium, Ottawa. 2005.
1	Cameron, R.P. 2009. Erioderma pedicellatum database, 1979-2008. Dept Environment & Labour, 103 recs.
1	Clayden, S.R. 2007. NBM Science Collections. Pers. comm. to D. Mazerolle, 1 rec.
1	COSEWIC (Committee on the Status of Wildlife in Canada). 2013. COSEWIC Assessment and Status Report on the Eastern Waterfan Peltigera hydrothyria in Canada. COSEWIC, 46 pp.
1	Crowell, M.J. Plant specimens from Nictaux, NS sent to Sean Blaney for identification. Jacques Whitford Limited. 2005.
1	Dadswell, M.J. 1979. Status Report on Shortnose Sturgeon (Acipenser brevirostrum) in Canada. Committee on the Status of Endangered Wildlife in Canada, 15 pp.
1	Daury, R.W. & Bateman, M.C. 1996. The Barrow's Goldeneye (Bucephala islandica) in the Atlantic Provinces and Maine. Canadian Wildlife Service, Sackville, 47pp.
1	Dept of Fisheries & Oceans. 1999. Status of Wild Striped Bass, & Interaction between Wild & Cultured Striped Bass in the Maritime Provinces. , Science Stock Status Report D3-22. 13 recs.
1	Edsall, J. 1993. Summer 1993 Report. New Brunswick Bird Info Line, 2 recs.
1	Elderkin M.F. 2007. Selaginella rupestris, Iris prismatica & Lophiola aurea records in NS. NS Dept of Natural Resources, Wildlife Div. Pers. comm. to C.S. Blaney, 3 recs.
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1	Hill, N. 2014. 2014 Monarch email report, Bridgetown, NS. Fern Hill Institute for Plant Conservation.
1	Hinds, H.R. 2000. Flora of New Brunswick (2nd Ed.). University New Brunswick, 694 pp.
1	Hinds, H.R. 2000. Rare plants of Fundy in Rare Plants of Fundy: maps. Wissink, R. (ed.) Parks Canada, 2 recs.
1	Holder, M. & Kingsley, A.L. 2000. Peatland Insects in NB & NS: Results of surveys in 10 bogs during summer 2000. Atlantic Canada Conservation Data Centre, Sackville, 118 recs.
1	Jessop, B. 2004. Acipenser oxyrinchus locations. Dept of Fisheries & Oceans, Atlantic Region, Pers. comm. to K. Bredin. 1 rec.
1	Jolicoeur, G. 2008. Anticosti Aster at Chapel Bar, St John River. QC DOE? Pers. comm. to D.M. Mazerolle, 1 rec.
1	Klymko, J.J.D.; Robinson, S.L. 2012. 2012 field data. Atlantic Canada Conservation Data Centre, 447 recs.
1	LaFlamme, C. 2008. Disovery of Goodyera pubescens at Springdale, NB. Amec Earth and Environmental. Pers. comm. to D.M. Mazerolle, 1 rec.
1	LaPaix, R.W.; Crowell, M.J.; MacDonald, M. 2011. Stantec rare plant records, 2010-11. Stantec Consulting, 334 recs.
1	Loo, J. & MacDougall, A. 1994. GAP analysis: Summary Report. Fundy Model Forest, 2 recs.
1	Maass, W.S.G. & Yetman, D. 2002. Assessment and status report on the boreal felt lichen (Erioderma pedicellatum) in Canada. Committee on the Status of Endangered Wildlife in Canada, 1 rec.
1	MacKinnon, D.S. 2013. Email report of Peregrine Falcon nest E of St. Martins NB. NS Department of Environment and Labour, 1 record.
1	Madden, A. 1998. Wood Turtle records in northern NB. New Brunswick Dept of Natural Resources & Energy, Campbellton, Pers. comm. to S.H. Gerriets. 16 recs.
1	Majka, C. 2009. Université de Moncton Insect Collection: Carabidae, Cerambycidae, Coccinellidae. Université de Moncton, 540 recs.
1	McAlpine, D.F. & Collingwood, L. 1989. Rare Salamander Survey in Fundy National Park. Fundy National Park, Internal Documents, 1 rec.
1	McAlpine, D.F. & Cox, S.L., McCabe, D.A., Schnare, J.-L. 2004. Occurrence of the Long-tailed Shrew (Sorex dispar) in the Nerepis Hills NB. Northeastern Naturalist, vol 11 (4) 383-386. 1 rec.
1	McAlpine, D.F. 1983. Species Record Cards. Fundy National Park, Library, 1 rec.
1	Neily, T.H. & Pepper, C.; Toms, B. 2013. Nova Scotia lichen location database. Mersey Tobeatic Research Institute, 1301 records.
1	Oldham, M.J. 2000. Oldham database records from Maritime provinces. Oldham, M.J; ONHIC, 487 recs.
1	Poirier, Nelson. 2012. Geranium robertianum record for NB. Pers. comm. to S. Blaney, Sep. 6, 1 rec.
1	Porter, C.J.M. 2014. Field work data 2007-2014. Nova Scotia Nature Trust, 96 recs.
1	Powell, B.C. 1967. Female sexual cycles of Chrysemy spicta & Clemmys insculpta in Nova Scotia. Can. Field-Nat., 81:134-139. 26 recs.
1	Sabine, D.L. & Goltz, J.P. 2006. Discovery of Utricularia resupinata at Little Otter Lake, CFB Gagetown. Pers. comm. to D.M. Mazerolle, 1 rec.
1	Sabine, D.L. 2004. Specimen data: Whittaker Lake & Marysville NB. Pers. comm. to C.S. Blaney, 2pp, 4 recs.
1	Sabine, D.L. 2012. Bronze Copper records, 2003-06. New Brunswick Dept of Natural Resources, 5 recs.
1	Sabine, D.L. 2013. Dwaine Sabine butterfly records, 2009 and earlier.
1	Smith, M. 2013. Email to Sean Blaney regarding Schizaea pusilla at Caribou Plain Bog, Fundy NP. pers. comm., 1 rec.
1	Taylor, Eric B. 1997. Status of the Sympatric Smelt (genus Osmerus) Populations of Lake Utopia, New Brunswick. Committee on the Status of Endangered Wildlife in Canada, 1 rec.
1	Toner, M. 2001. Lynx Records 1973-2000. NB Dept of Natural Resources, 29 recs.
1	Toner, M. 2005. Listera australis population at Bull Pasture Plains. NB Dept of Natural Resources. Pers. comm. to S. Blaney, 8 recs.
1	Toner, M. 2009. Wood Turtle Sightings. NB Dept of Natural Resources. Pers. comm. to S. Gerriets, Jul 13 & Sep 2, 2 recs.
1	Toner, M. 2011. Wood Turtle sighting. NB Dept of Natural Resources. Pers. com. to S. Gerriets, Sep 2, photo, 1 rec.
1	Torenvliet, Ed. 2010. Wood Turtle roadkill. NB Dept of Transport. Pers. com. to R. Lautenschlager, Aug. 20, photos, 1 rec.

# recs	CITATION
1	Webster, R.P. & Edsall, J. 2007. 2005 New Brunswick Rare Butterfly Survey. Environmental Trust Fund, unpublished report, 232 recs.
1	Wissink, R. 2000. Four-toed Salamander Survey results, 2000. Fundy National Park, Internal Documents, 1 rec.

Appendix III:

Historical Google Earth Aerial Photographs

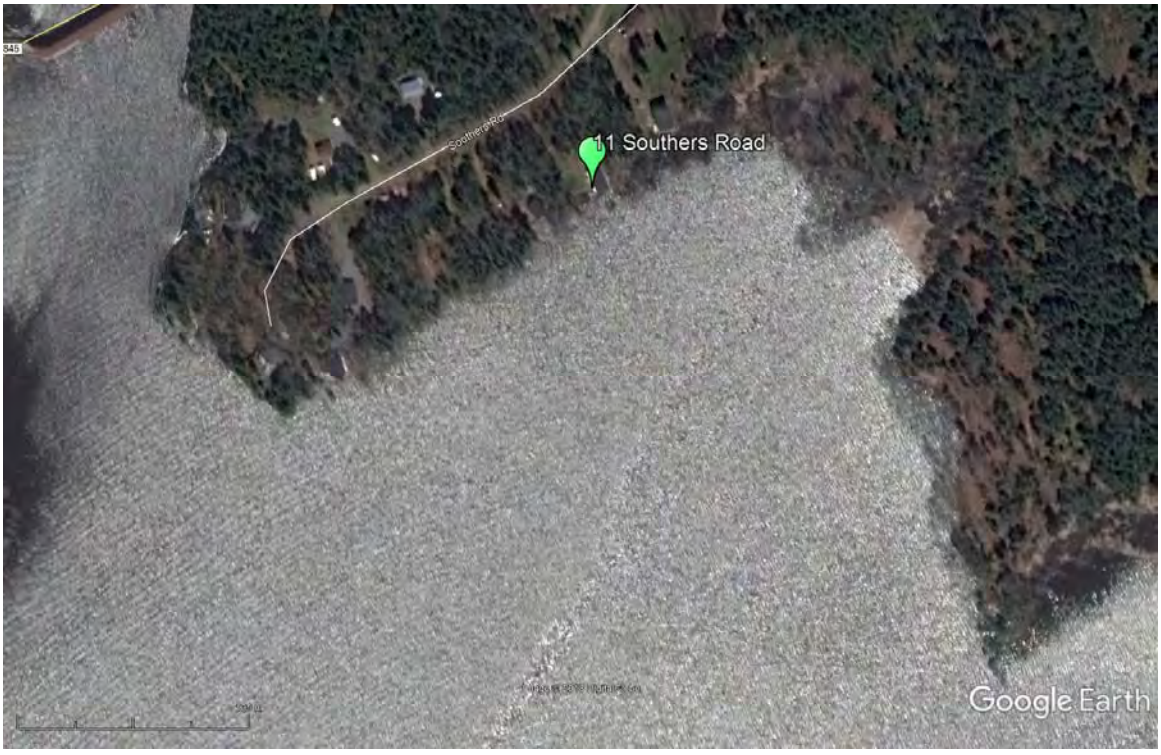
26 October 2012

13 March 2013

15 March 2014

25 September 2015

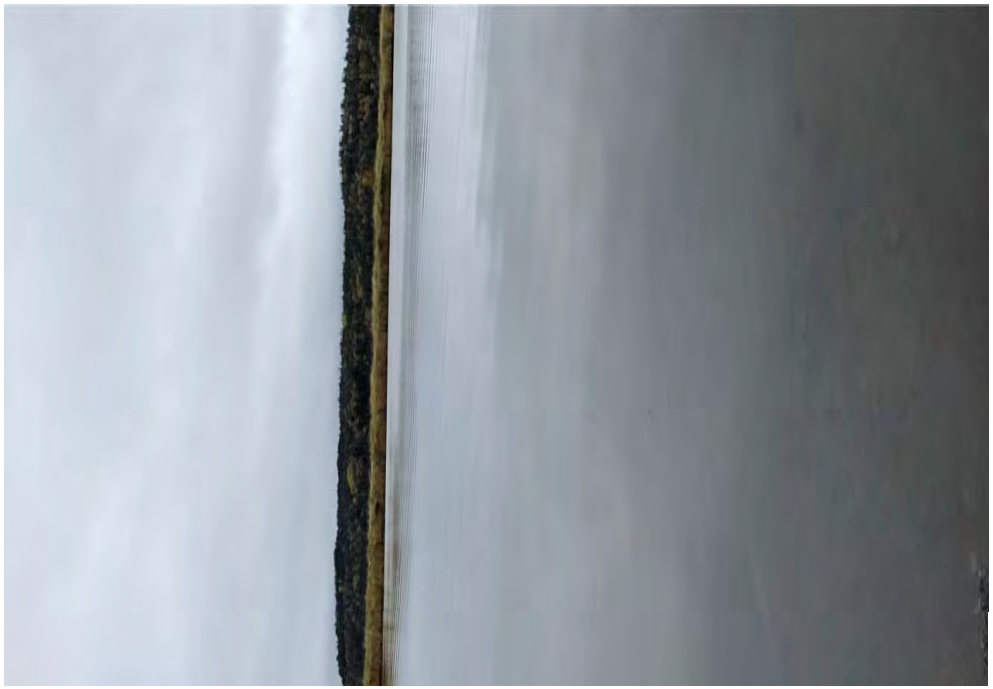
29 April 2016



12 May 2017

Appendix IV:

Field Assessment Photographs



Appendix V:

WESP-AC Tidal Model Input and Output

CoverPage: Basic Description of Assessment

Site Name:	**11 Southers Road, Bayswater, New Brunswick**
Investigator Name:	Matt Alexander
Date and Time of Field Assessment:	12 October 2018, 1:30PM to 3:30PM
Time and Height (m) of High Tide on this date near this location	15:36, 1.626m
Time and Height (m) of Low Tide on this date near this location	10:16, 1.024m
Latitude (decimal degrees):	45.35347
Longitude (decimal degrees):	66.125964
Is a map based on a formal on-site wetland delineation available?	No
What percentage (approx.) of the entire wetland polygon, as shown on the Province's map, could you see well enough to answer most of the Form T questions? i.e., the Assessment Area.	95%
Indicate here if you intentionally surveyed for rare plants or rare animals.	Yes
Were you able to ask the site owner/manager about any of the questions?	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many **tidal** wetlands have you assessed previously using WESP-AC? (approx.)	12
Attach an aerial or map showing the approximate boundary of the AA, if smaller than the entire tidal wetland polygon mapped by the province.	

Comments about the site or this WESP-AC assessment (attach extra page if desired):

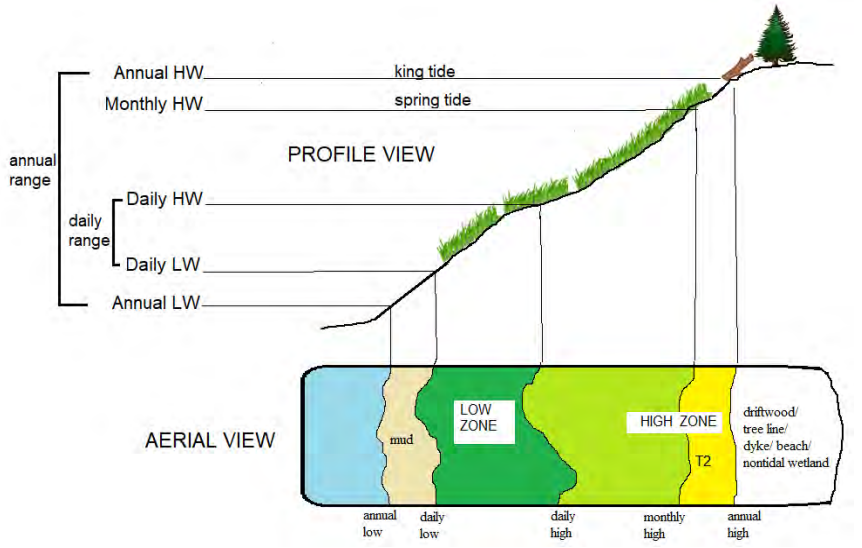
Form OF. WESP-AC for Tidal Wetlands version 2.

#	Indicator	Condition Choices	Data	Explanations
OF1	Province	Mark the province in which the wetland is located by changing the 0 in the column next to it to a "1". Mark only one.		In the automated calculations, this is used as a tag that causes the data to be normalised to the correct province.
		New Brunswick	1	
		Prince Edward Island	0	
		Nova Scotia	0	
		Newfoundland-Labrador	0	
OF2	Upland Edge Contact [UpContact]	Viewing the wetland in Google Earth or other aerial imagery, select one:		In this data form, the terms *abut, adjoin, adjacent, contiguous, bordering* are used interchangeably. [WP, OX, SRH, WS]
		The wetland has no upland edge (or upland is <1% of perimeter). The wetland is entirely surrounded by (& contiguous with) water or other wetland.	0	
		0-25% of the wetland's perimeter abuts upland (including berms, sand spits, & filled areas). The rest adjoins other wetlands or water that is mostly wider than the wetland.	0	
		26-50% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetlan	1	
		51-75% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetlan This will be true for many tidal wetlands.	0	
		More than 75% of the wetland's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the wetland. Highly sheltered wetlands.	0	
OF3	Marsh Width [Width]	Including any adjacent marsh (whether tidal or not, separated by narrow berm or not), the wetland's vegetated width **at the widest point** measured as straight-line distance along the approximate runoff flow path (line semi-perpendicular to nearby wide channel, bay, or ocean; see example in Appendix B) is:		See Appendix B for example. It is recognized that average or predominant marsh width would usually be a more predictive indicator than maximum marsh width. Maximum width is specified because it is easier for users to recognize and measure. [SS, WP, WH, SRH, BM, WS]
		<10 m.	0	
		10 - 50 m.	0	
		50 - 100 m.	0	
		100 - 1000 m (1 km).	1	
		1- 2 km.	0	
		>2 km.	0	
OF4	Marsh Area [Area]	Including both the wetland and all adjacent wetland (whether tidal or not, separated by berm or not), the total wetland area is:		Throughout this data form, in the unlikely event that a measured value falls exactly on the break point between two successive choices, (e.g., 0.1-0.5 ha and 0.5-1 ha, and the area is exactly 0.5 ha), choose the higher of the two ranges. [SS, WP, WH, SRH, BM]
		<0.1 ha.	0	
		0.1 - 0.5 ha.	0	
		0.5 - 1 ha.	0	
		1.0 - 10 ha.	1	
		10 - 100 ha.	0	
		> 100 ha.	0	
OF5	Wave Exposure [Waves]	Part of the wetland is occasionally exposed to waves from a stretch of open subtidal water that is considerably wider than the wetland, and those waves are likely to force flooding of the wetland higher and deeper than usually caused by tides alone. See example in Appendix B. Enter 1= yes, 0= no.	0	See Appendix B for example. Sites adjoining the ocean or large bays are most vulnerable; sites on rivers seldom are. Disregard the direction of the prevailing or storm-driven winds. If the wetland is behind a sand spit or artificial berm evaluate whether that is likely to be breached at least once annually by waves. [OX, WH, WS]
OF6	Branched Tidal Channels [TideChan]	Small "blind" channels (not connected to freshwater streams) are:		See Appendix B for examples. [OX, FH, WH]
		Absent.	1	
		Present, but multibranched networks are few and/or not well developed.	0	
		Present, and multibranched networks are extensive and well developed (see example in Appendix B).	0	
OF7	Rivers and Tributaries [Tribs]	Select first true statement. The wetland:		See Appendix B for examples. [OX, FH, WH, WS]
		Is inundated daily by water from a major river (channel extends >5 km inland with no fish blockages insofar as is known, large watershed).	1	
		Is inundated **only** by a mapped perennial stream (channel extends <5 km inland, smaller watershed).	0	
		Neither of above, but a mapped stream or river is within 1 km.	0	
		None of the above.	0	
OF8	Distance to Freshwater Pond [DistLake]	The distance to the nearest freshwater pond larger than 1 hectare is [Note: Lakes and marshes and fens that remain flooded year-round may be included].		[WH]
		< 1 km.	1	
		1 - 2 km.	0	
		2 - 3 km.	0	
		3 - 5 km.	0	
		> 5 km.	0	
OF9	Distance to Road [DistRd]	The distance from the AA edge to the nearest road or parking lot that could contribute runoff to the wetland is:		[BM]
		< 2 m.	0	
		2 - 10 m.	0	
		10 - 30 m.	0	
		30 - 100 m.	1	
		> 100 m, or roads that could contribute runoff to the wetland are absent.	0	
OF10	Distance to Nutrient or Contaminant Source [DistPollu]	The distance to the nearest fertilised lawn or row crops, residence with a septic system, pasture with livestock, drained peatland, or other feature that could contribute elevated levels of nutrients and/or contaminants to the wetland, is:		[BM]
		< 10 m.	1	
		10 - 20 m.	0	
		20 - 50 m.	0	
		50 - 100 m.	0	
		> 100 m, or features that could contribute contaminated runoff to the wetland are absent.	0	
OF11	Developed Land in Runoff Contributing Area [BuffPctDevel]	Within 100 m upslope from the wetland's upland edge, the percentage that is pavement, buildings, lawn, or drained land is:		[BM]
		None or trace (<1%).	0	
		1- 10%.	1	
		10 - 25%.	0	
		25 - 50%.	0	
		50 - 75%.	0	
		> 75%.	0	
OF12	Open Land in Vicinity [Openland]	Within a circle of radius 5 km centered on the wetland, the percentage (excluding any ocean or bay) that is cropland, marsh, lakes, ponds, or grassland is: [Note: Do not include bogs or newly mined lands as "open land".]		[WH]
		none or trace (<1%).	0	
		1- 10%.	1	
		10 - 25%.	0	
		25 - 50%.	0	
		50 - 75%.	0	
		> 75%.	0	
OF13	Salt Marsh Landscape [Wetscape]	Along the shoreline within the 5 km circle, the percentage of the shoreline that is mapped as salt marsh (including this one) is [Note: "Shoreline" is the line defined by permanent flooding. Channels count as shoreline if wider than the marshes they intersect or adjoin.]		[FH, WH, SRH, BM]
		<1%.	0	
		1 - 10%.	1	
		10 - 25%.	0	
		25 - 50%.	0	
		> 50%.	0	

OF14	Slope Nearby [Spread]	As viewed in the Toporama map (http://www.atlas.gc.ca/toporama/) at maximum zoom, 10 m vertical interval, there is a **topographic contour line** within 1 km of the wetland's upland edge or within a distance that is less than the wetland's maximum width. See example in Appendix B. Enter 1= yes, 0= no.	1	See Appendix B for illustrated example. Although this indicator's assessment procedure is far too coarse to be definitive, it is used to support the principle that tidal wetlands adjoined by steep topography are less able to "migrate" inland in response to future rise in sea level. Better information on local effects of sea level rise will be available for some communities - check likely sources and use that to respond to this question if possible. [WS]
OF15	Tidal Inflow Restriction [Restrict]	Man-made berms, levees, or dykes which limit tidewater movement into a part of the AA that historically would have experienced daily tidal flooding are: [Note: Restriction by natural sand or gravel spits or beaver dams does not count. Restriction by culverts and tidegates does count.]		[OX, FH, WS]
		Absent (but a levee or berm may separate tidal wetland and **upland**).	1	
		Present, and tidal inflow is mildly affected. If external waters are saline, then characteristic salt marsh vegetation still dominates within the wetland but restriction may have allowed invasion by cat-tail, bulrush, or other freshwater-associated plants, although usually only a relatively small proportion of the wetland is affected.	0	
		Present, and tidal inflow is strongly affected. If external waters are saline, restriction has eliminated or greatly reduced characteristic salt marsh vegetation or such species are largely confined to limited areas near saltwater inflow points. Also mark this choice if fish cannot enter the wetland from marine waters due to blockage by tidegate or improperly placed culvert.	0	
OF16	Ditching [Ditch]	Ditches, artificially straightened channels, and/or channel connectors are:		See Appendix B for illustrations. [WP, FH]
		Absent.	1	
		Present, but few and localized within the wetland.	0	
		Present, and a few large/long ditches or a dense network in at least part of the wetland.	0	
OF17	Soil Compaction [SoilCompac]	Vehicle tracks in the mud or flattened vegetation suggest construction equipment or ATVs have entered the wetland, or there are remnants of old dykes within the wetland.		[WP]
		Absent.	0	
		Present, but few and localized within the wetland.	1	
		Present, and extensive & widely distributed within the wetland.	0	
OF18	Tidal Range [TideAmp]	Mark the annual tidal range (most extreme tide range on any day during the year) by going to this web site: **http://tides.gc.ca/eng/data/predictions** selecting the tide station nearest the wetland which has data for May 6-8, 2016, and then calculating the height difference between the highest high tide and lowest low tide on those dates.	0.6	It is important to specify the year 2016 because the range that WESP-AC uses to normalise your tide data is based on those dates in that year. Ideally, this indicator would be based on 19 years of tidal data at each location, but that was not easily available during WESP-AC development. [OX, FH, WS]
OF19	Barrier Island	The wetland is within 1 km of a barrier island with >1 ha bare or sparsely vegetated area, and with no occupied buildings. Enter: yes= 1, no= 0.	0	See Appendix B for example. [WH]
OF20	Growing Degree Days [GrowDays]	Open Google Earth and click on the GDD.kmz file, navigate to your site's location, and click its associated grid cell. The "grid code" is the Growing Degree Days value. Enter that number in the next column. If grid does not include your site, use value from the closest grid cell.	2169	[OX, WH]
OF21	Conservation Designation [ConsDesig]	The wetland is all or part of an area designated by the provincial government or the Nature Conservancy of Canada for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. In NB: With GeoNB, click on Candidate PNA Map Viewer to identify Environmentally Significant Area, Protected Natural Area. In NS: With Provincial Landscape Viewer, see Protected Areas.	0	"Provincially Significant Wetlands" (a NB designation) is not part of this question because NB tidal wetlands have been so designated. [PUR]
OF22	Conservation Investment [ConsInvest]	The wetland is part of or contiguous to a wetland on which public or private organizational funds were spent to preserve, create, restore, or enhance the wetland (excluding mitigation wetlands). Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0	Do not include lands that were preserved for reasons mainly unrelated to the wetlands they contain. [PUR]
OF23	Mitigation Investment [MitInvest]	The wetland is all or part of a mitigation site used explicitly to offset impacts elsewhere. Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0	[PUR]
OF24	Sustained Scientific Use [SciUse]	Plants, animals, or water in the wetland have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the wetland is part of an area that has been designated by an agency or institution as a benchmark, reference, or status-trends monitoring area. Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0	[PUR]
OF25	Species of Conservation Concern [RareFish, RareOther, RareWbird, RareSbird, RarePlants]	Within the past 20 years, in the wetland (or in similar tidal habitat within 1 km of the wetland), qualified observers have documented [mark all applicable]:		Augment your own knowledge (and optional surveys) with a data request to the ACCDC and contacts with knowledgeable local experts. [FH, WH, BM]
		Presence of one or more of the **plant** species listed in the TidalPlants_Rare worksheet of the accompanying SuppInfo file.	1	
		Presence of one or more of the **fish** species listed in the TidalFish_Rare worksheet of the accompanying SuppInfo file.	0	
		Presence of one or more of the **waterbird** species of conservation concern as listed in the TidalWaterbirds_Rare worksheet of the accompanying SuppInfo file.	1	
		Presence of one or more of the **songbird, raptor, or mammal** species of conservation concern as listed in the TidalSongbird_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-August for most species).	1	
		Presence of one or more **other** species of conservation concern as listed in the Tidal_Others_Rare worksheet of the accompanying SuppInfo file.	0	
		None of the above, or no data.	0	
OF26	Important Bird Area or Ramsar wetland [IBirdArea]	The wetland is all or part of an officially designated Important Bird Area (IBA) or a Wetland of International Importance (Ramsar wetland). Enter 1= yes, 0= no.	0	Ramsar is an international convention which has a formal nominating and voting procedure for recognising wetlands of international significance. Currently, Atlantic Canada has 8 such areas. For boundaries, see: http://www.ramsar.org/wetland/canada. IBAs are designated by the American Bird Conservancy based on nominations from local experts. For boundaries, open the KMZ file that accompanies this calculator, called IBAs_Canada. [WH]
OF27	Wetland Bird Concentration Area [BirdConc]	In this wetland or adjacent intertidal habitat, review existing data (online at ebird.org) or conduct your own surveys. If numbers of individual birds have exceeded those shown for the same species in the BirdCriteria worksheet, or if the wetland is within an area listed in the BirdHotspots worksheet, enter: yes= 1, no= 0. For NS and NB, also open the NB-NS Shorebirds KMZ file that accompanies this calculator to determine if the wetland is within 1 km of any of those places.	0	[WH]
OF28	Black Duck Nesting Area [Bduck]	Open Google Earth and then open and overlay the BlackDuck.kmz file. If necessary adjust its alignment and opacity. The predicted density (pairs per 25 sq. km) of nesting American Black Duck in the vicinity of the wetland is:		A hard-copy version of the same map is in Appendix A of the Manual and may be easier to read. [WH]
		<10.	1	
		10 to 20.	0	
		20 to 30.	0	
		>30.	0	
		No information (off the map).	0	

Form T. WESP-AC for Tidal Wetlands version 2.

IMPORTANT : Review the diagram below and text in last column before answering the questions. You will need to estimate boundaries of the zones of your wetland in order to answer those questions accurately.



First, estimate the full extent of the wetland (Low Zone + High Zone). If visiting at **high tide**, be sure to include emergent vegetation that is underwater (i.e., Low Zone), estimating its seaward edge by interpreting topography, reviewing any maps or aerial imagery taken at low tide, or asking neighbors how far out the vegetation extends at low tide. Also estimate it by noting, from tide tables, today's tide range nearest this location and visually subtracting that height from where you see water beneath plants at high tide. If you are visiting closer to daily **low tide**, determine the lower boundary of the High Zone by looking for recent (wet) deposits of wrack (dead plants & debris carried into the site and deposited, often clinging to stems of living vegetation beneath its canopy) to define the upper limit of the day's high tide.

The Low Zone is typically dominated by smooth cordgrass (Spartina alterniflora) and sometimes glasswort (Salicornia) in the near-absence of saltmeadow cordgrass (Spartina patens), goose-tongue (Plantago maritima), and most other vascular plant species. However, in freshwater tidal wetlands these plants will be mostly absent, so in those situations it will be necessary to use water marks, wrack, and local tidal range to approximate the lower edge of the High Zone.

The lower boundary of the T2 (yellow) portion is difficult to distinguish unless visiting during a monthly or annual high tide. This is typically where saltmeadow cordgrass and goose-tongue lower in the wetland give way to semi-terrestrial plants such as beach pea, rose, dock, yarrow, vetch, clover in a landward direction. Well-weathered wrack deposits sometimes mark the lower boundary, and the zone sometimes occurs above a visible change in the marsh surface profile, or behind a low dyke, berm, or barrier beach that is overtopped by tidewater only rarely.

#	Indicator	Categorical Choices	Data	Explanations
T1	High Zone Extent [PctHigh]	The percentage of the wetland's vegetation that has NO tidal water beneath it during most daily high tides of the year (i.e., the HIGH ZONE) is:		See diagram and note in header above. This is the percentage that the High Zone comprises of the combined Low + High Zone (light green shading in diagram). [SS, OX, FH, WH, SRH, WS]
		None, or <1% and narrower than 2 m.	0	
		1-10%.	0	
		10-25%.	0	
		26-50%.	0	
		51-75%.	0	
		75-90%.	0	
		>90%.	1	
T2	Extreme High as % of Entire High Zone [PctKing]	Within the High Zone (i.e., the part of the wetland you can still see at daily high tide), the percentage that is flooded only monthly or even less often (T2 yellow area in the above diagram) is:		See diagram and note in header above. This is the percentage that the T2 zone comprises of the entire High Zone. [SS, FH, SRH, WS]
		<10% of the High Zone.	1	
		10-25% of the High Zone.	0	
		26-50% of the High Zone.	0	
		>50% of the High Zone.	0	
T3	Bare Ground or Thatch: High Zone [Bare]	The ground condition in the HIGH ZONE, as it would exist in late summer and **when viewed from about 1 m above the ground**, is:		Note that this is being assessed on two scales: up-close (from 1 m above) and overall (patches of bare/thatch). "Bare" **does not include mud flats** adjacent to the wetland **or tidal channels** within it (because they would be flooded daily and thus outside of the High Zone). **Do not count wrack (drifted-in material) as "thatch."** The amount of thatch (which counts as Bare) varies seasonally and annually, so consider just the condition that would exist **in late summer**. [OX]
		Little or no (<5%) *bare ground* or dead *attached* plant material (thatch) is visible between erect stems or under canopy. This can occur if ground surface is extensively blanketed by graminoids with great stem densities.	1	
		Some (5-20%) bare ground or thatch is visible. Herbaceous plants have moderate stem densities.	0	
		Much (20-50%) bare ground or thatch is visible. Low stem density and/or tall plants with little near-ground foliage.	0	
		Mostly (>50%) bare ground or thatch.	0	
T4	Salt Pannes & Pools [Pans]	Within the High Zone, the number of pannes and pools (natural semi-circular depressions or ponds with radius >1 m which hold stagnant surface water between high tides, and may be flooded by tides only infrequently) is: [Note: Check the aerial image before answering this.]		These are unlikely to be present in freshwater tidal wetlands. [FH, WH]
		Few (<2 per hectare) or none.	1	
		Intermediate.	0	
		Several (>5 per hectare).	0	
T5	Forb Cover [Forbs]	In the High Zone (and entirely within the TIDAL wetland), the areal cover of **forbs** reaches an annual maximum of:		Forbs are mostly flowering plants, such as seaside plantain (goose-tongue, *Plantago*), arrowgrass (*Triglochin*), grasswort (*Salicornia*), aster, and silverweed. Cattail, bulrush, sedges, and other grasslike plants are **not** forbs. [SRH, BM]
		<1% of the herbaceous cover.	1	
		1-25% of the herbaceous cover.	0	
		25-50% of the herbaceous cover.	0	
		50-95% of the herbaceous cover.	0	
		>95% of the herbaceous cover.	0	
T6	Shrub Cover [Shrubs]	In the High Zone (and entirely within the TIDAL wetland), living woody vegetation shorter than 3 m and not beneath a tree canopy comprises:		Include beach pea, rose, and others (and in freshwater tidal wetlands include alder, willow), but do not include upland shrubs that are never flooded by tides. [SRH]
		<1% (or none) of the vegetated area reached only by monthly or annual high tide.	0	
		1-5% of the vegetated area reached by monthly or annual high tide.	1	
		5-25% of the vegetated area reached by monthly or annual high tide.	0	
		>25% of the vegetated area reached by monthly or annual high tide.	0	
T7	Perches [Perch]	Within the wetland, objects that project >1 m above the ground surface and could serve as perches (e.g., fenceposts, utility poles, boardwalks, goose nesting structures, stumps, boulders, islands of shrubs or trees) are:		Do not include trees or other perches on the wetland edge but outside the wetland. [WH]
		Few (<1 per hectare) or none .	1	
		Intermediate.	0	
		Several (>3 per hectare).	0	
T8	Plant Species Dominance [Pdom]	In the High Zone, the 2 most common vascular plant species together comprise:		For example, if smooth cordgrass and saltmeadow cordgrass together cover >80% of the High Zone, as is often the case, the last choice is correct. But if goose-tongue (*Plantago martima*) is also substantially present, the third or fourth choice might be better. [BM]
		<20% of the zone's vegetated area (most species-rich, no dominants or co-dominants).	0	
		20-40% of the zone's vegetated area.	0	
		40-60% of the zone's vegetated area.	1	
		60-80% of the zone's vegetated area.	0	
		>80% of the zone's vegetated area (monotypic or nearly so).	0	

T9	Exotic Plant Cover [Invas]	In the High Zone (and entirely within the TIDAL wetland), the areal cover of exotic plants (just the species in last column) is:		Ones known to be present in at least one of this region's tidal wetlands are: purple loosestrife (*Lythrum salicaria*), reed canary-grass (*Phalaris arundinacea*), brassbuttons (*Cotula coronopifolia*), grassleaf orache (*Atriplex littoralis*), Japanese rose (*Rosa rugosa*), Canada thistle (*Cirsium arvense*), branched centaury (*Centaurium pulchellum*), flowering rush (*Butomus umbellatus*). [BM]
		None, or trace.	0	
		1-5% of the herbaceous cover.	0	
		5-25% of the herbaceous cover.	1	
		25-50% of the herbaceous cover.	0	
		>50% of the herbaceous cover.	0	
T10	Core Area 1 [NoVis]	The percentage of the High Zone almost never visited by humans during an average growing season probably comprises: [Note: Do not include visitors on trails outside of the wetland unless more than half the wetland is visible from the trails and they are within 30 m of the wetland edge. In that case include only the area occupied by the trail.]		[WH, PUR]
		<5% and no inhabited building is within 100 m of the wetland.	0	
		<5% and inhabited building is within 100 m of the wetland.	0	
		5-50% and no inhabited building is within 100 m of the wetland.	1	
		5-50% and inhabited building is within 100 m of the wetland.	0	
		50-95%.	0	
		>95% of the High Zone. This is the most frequent choice for tidal wetlands in this region.	0	
T11	Core Area 2 [MuchVis]	The percentage of the High Zone visited by humans almost daily for several weeks during an average year probably comprises: [Note: Do not include visitors on trails outside of the wetland unless more than half the wetland is visible from the trails and they are within 30 m of the wetland edge. In that case include only the area occupied by the trail.]		[WH, PUR]
		<5%. This is the most frequent choice for tidal wetlands in this region, except in some visited often by many hunters.	0	
		5-50%.	1	
		50-95%.	0	
		>95% of the High Zone.	0	
T12	Visibility [Visibil]	The maximum percent of the wetland that is visible from the best vantage point on public roads, public parking lots, public buildings, or public maintained trails that intersect, adjoin, or are within 100 m of the wetland is (select one):		[PUR]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
T13	Consumptive Uses (Provisioning Services) [Consump]	Recent evidence was found within the wetland of the following potentially-sustainable consumptive uses. Mark all that apply.		Do not speculate. Base this on evidence, which may include communication with landowner or other knowledgeable source. [PUR]
		Haying.	0	
		Grazing.	0	
		Shellfish or bait worm harvest.	0	
		Waterfowl hunting or furbearer trapping.	1	
		Fishing.	0	
		None of the above (no evidence).	0	
T14	Soil Texture [SoilTex]	The texture of soil in the **uppermost** layer, but excluding live roots, in the majority of the HIGH ZONE, is:		See chart at end of Appendix A. Check the soil at one or more locations away from the wetland edge and that seem representative of the whole. [WS]
		Loamy: soils that may contain a little fine grit and do not make a "ribbon" longer than 2 cm when moistened, rolled, squeezed, and extended between thumb and forefinger.	0	
		Fines: includes silt, clay, silt, soils that make a ribbon longer than 2 cm when moistened, rolled, squeezed, and extended between thumb and forefinger.	1	
		Organic	0	
		Coarse: includes sand, loamy sand, gravel, cobble, soils that do not make a ribbon when moistened, rolled, squeezed, and extended between thumb and forefinger.	0	
T15	Salinity	Was surface water salinity measured? If yes, continue with next question. If no, **go to T17.**		
T16	Measured Salinity [Salin]	The surface water salinity along the wetland's seaward edge is: [Insert reading in next column, in parts per thousand; 1 ppt = 1000 ppm = 1000 mg/L].		Measure this as far as possible from fresh tributaries and seeps, and well below the water surface. While measuring, wait until salinity readings have stabilised. It is recognized that salinity at some locations will vary greatly by tide, currents, time of year, and recent precipitation. [OX, WH, SRH, BM, WS]
T17	Inferred Salinity [SalinClass]	Based on the wetland's dominant plant species (see the PlantList worksheet) and proximity to contributing freshwater rivers and streams, the summertime salinity in most of the wetland is likely:		Note: ppt = parts per thousand. 1 ppt = 1000 mg/L. [OX, WH, SRH, BM, WS]
		Oligohaline (mostly fresh or slightly brackish plants, usually < 5 ppt).	1	
		Mesohaline (brackish).	0	
		Euryhaline (few or no freshwater plants, near seawater strength, usually >30 ppt).	0	
T18	Plant Richness [PlantRich]	See the PlantList worksheet. If you have the skills to identify ALL the plants, survey as much of the wetland as time and safety allow. In the worksheet, mark with a "1" the species you find. The number of species will be automatically tallied. Transfer that number to the next column. If you are not confident of your skills to identify ALL the species or for other reasons cannot survey the plants, leave a "0" in the next column.	3	It is recognized that not all WESP-AC users are capable of identifying all the species on the PlantList worksheet, but leaving a 0 in column D will not automatically reduce a score. This question is used to assess only one function (Biodiversity) and accounts for less than 7% of the score for that. and that is only for one function (Biodiversity). Results will vary by month of the year and level of effort. [BM]

PLANT CHECKLIST for Tidal WESP-AC. DIRECTIONS: Print list & take in field. In first column mark with "1" all species found, transfer to spreadsheet. Bold font= common species. Red= rare. Blue= exotic. All have been found in the region's tidal wetlands, many only near the upland edge or in tidal wetlands with substantial freshwater inflow.

Data	Scientific Name	Common Name	Freshwater Indicator
	Achillea millefolium	Common yarrow	
	Agalinis maritima [RARE in NS]	Saltmarsh agalinis	
	Agrostis gigantea	Redtop	Yes
	Agrostis stolonifera	Creeping bentgrass	
	Anthoxanthum nitens	Vanilla sweet grass	
	Argentina egedii (Potentilla anserina)	Pacific silverweed	
	Atriplex franktonii [RARE]	Frankton's saltbush	
	Atriplex spp.	Saltbush or orache	
	Baccharis halimifolia [RARE in NS]	Eastern baccharis	
	Bidens hyperborea [RARE in NS]	Estuary beggarticks	
	Blysmus (Scirpus) rufus [RARE in NB-PEI]	Red bulrush	
	Bromus inermis	Smooth brome	Yes
	Calystegia (Convolvulus) sepium	Hedge false bindweed	
	Carex hormathodes	Marsh straw sedge	
	Carex mackenziei	Mackenzie's sedge	
	Carex paleacea	**Chaffy sedge**	
	Carex salina [RARE in NB]	Salt marsh sedge	
	Carex tenera	Quill sedge	
	Centauria nigra	Lesser knapweed	
	Chenopodium spp.	Goosefoot spp.	
	Cotula coronopifolia [EXOTIC]	Common brassbuttons	
	Deschampsia caespitosa [RARE in PEI]	Tufted hairgrass	
	Distichlis spicata	**Saltgrass**	
	Eleocharis parvula	Dwarf spikerush	
	Eleocharis rostellata	Beaked spikerush	
	Eleocharis uniglumis	Single-glumed spikerush	
	Elymus spp.	Wildrye spp.	
	Erechtites hieraciifolius	Eastern burnweed	
	Festuca rubra	Red fescue	
	Galium palustre	Common marsh bedstraw	
	Glaux maritima	**Sea milkwort**	
	Hierochloe odorata	Sweetgrass	
	Hordeum jubatum	Foxtail barley	
	Iva frutescens	Big-leaved marsh-elder	
	Juncus balticus (arcticus)	Arctic sedge	
	Juncus bulbosus	Bulbous rush	
	Juncus filiformis	Thread rush	
	Juncus gerardii	**Saltmeadow rush**	
	Lathyrus japonicus	**Beach pea**	
	Ligusticum scoticum	Scottish licorice-root	
	Limonium carolinianum (nashii)	**Lavender thrift**	
	Limosella australis [RARE in PEI]	Southern mudwort	Yes
	Myrica gale	Sweetgale	Yes

1	Phalaris arundinacea [EXOTIC]	Reed canary-grass	Yes
	Phragmites australis [EXOTIC]	Common reed	
	Plantago major [EXOTIC]	Common plantain	Yes
	Plantago maritima	**Seaside plantain, goose tongue**	
	Poa spp.	Grass spp.	Yes
	Polygonum spp.	Knotweed spp.	Yes
	Puccinellia spp.	**Alkaligrass spp.**	
	Ranunculus cymbalaria	Seaside buttercup	
	Ranunculus sceleratus	Cursed buttercup	Yes
1	Rosa rugosa [EXOTIC]	Rugosa rose	
	Rumex pallidus [RARE in NB]	Seaside dock	
	Rumex spp.	Dock spp.	
	Ruppia maritima	Widgeongrass	
	Sagina nodosa	Knotted pearlwort	Yes
	Salicornia maritima (europaea)	**Slender grasswort**	
	Samolus valerandi (ssp. parviflorus= RARE in NS & PEI]	Seaside brookweed	Yes
	Scirpus (Bolboschoenus) maritimus	Saltmarsh bulrush	
	Scirpus (Schoenoplectus) americanus	Olney's bulrush	
	Scirpus (Schoenoplectus) tabernaemontanii	**Softstem bulrush**	Yes
	Scirpus microcarpus (rubrotinctus)	Panicled bulrush	Yes
	Scutellaria galericulata	Marsh skullcap	Yes
	Senecio spp.	Ragwort spp.	Yes
	Solidago canadensis	Canada goldenrod	Yes
	Solidago gigantea	Giant goldenrod	Yes
	Solidago sempervirens	**Seaside goldenrod**	
	Spartina alterniflora	**Smooth cordgrass**	
	Spartina patens	**Saltmeadow cordgrass**	
	Spartina pectinata	**Prairie cordgrass**	
	Spergularia spp.	Sandspurry spp.	
	Stellaria humifusa [RARE in NS & PEI]	Saltmarsh starwort	
	Suaeda linearis	Annual seepweed	
	Suaeda maritima	Herbaceous seepweed	
	Suaeda rollandi [RARE in NS & NB]	Horned sea-blite	
	Symphyotrichum laurentianum [RARE in NB-PEI]	Gulf of St. Lawrence aster	
	Symphyotrichum subulatum [RARE in NB-PEI]	Annual saltmarsh aster	
	Thinopyrum pycnanthum	Tick quackgrass	
	Trifolium spp.	Clover spp.	
	Triglochin gaspensis [RARE in PEI]	Gaspé Peninsula arrowgrass	
	Triglochin maritima	**Seaside arrowgrass**	
	Typha angustifolia	**Cat-tail**	Yes
1	**Vicia spp.**	**Vetch**	Yes
	Zannichellia palustris	Horned pondweed	Yes
	Zostera marina	Common eelgrass	
3	<--AUTOMATIC COUNT		

WESP-AC version 2 for Tidal Wetlands of Atlantic Canada

	New Brunswick	
Functions or Attributes	**Normalised Score**	**Rating**
Storm Surge Interception (SS)	5.58	Higher
Water Purification (WP)	3.09	Moderate
Organic Nutrient Export (OX)	5.33	Moderate
Fish Habitat (FH)	7.06	Moderate
Waterbird Habitat (WH)	1.74	Lower
Songbird & Raptor Habitat (SRH)	4.95	Moderate
Biodiversity Maintenance (BM)	10.00	Higher
Wetland Stability (WS)	2.75	Moderate
Public Use & Recognition (PUR)	6.93	Higher

NOTE: A score of 0 does not always mean the function or value is absent from the wetland. It usually means that this wetland has equal or less capacity than the lowest-scoring one, for that function or value, from among the calibration wetlands that were assessed previously in this region during development of this tool.

The Normalised Score column presents the numeric score of a function or attribute after the raw score has been mathematically adjusted (normalised) to a full 0-10 scale, based on minimum and maximum scores from among the calibration sites. See the Manual for a description of the normalisation process.

The Rating column indicates which of three rating categories (Lower, Moderate, Higher) each normalised score is assigned to. Ratings convey the relative meaning of the numeric score and allow for comparison across different functions and values. The score thresholds that determine the ratings differ for each function as based on the distribution of scores for that function from among the calibration wetlands. See the Manual for a description of the process.

Storm Surge Interception		Effectiveness for intercepting tidal surges associated with infrequent but severe storm events, and reducing their height.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF3	Marsh Width [Width]	Including any adjacent marsh (whether tidal or not, separated by narrow berm or not), the wetland's vegetated width at the widest point measured as straight-line distance along the approximate runoff flow path (line semi-perpendicular to nearby wide channel, bay, or ocean; see example in Appendix B) is:			0.60	Wetland width is perhaps the most important factor affecting that attenuation. Storm surges do not dissipate at a constant rate as they traverse wetlands, so width alone does not predict surge reduction.
		<10 m.	0	0	0	
		10 - 50 m.	0	1	0	
		50 - 100 m.	0	2	0	
		100 - 1000 m (1 km).	1	3	3	
		1- 2 km.	0	4	0	
		>2 km.	0	5	0	
OF4	Marsh Area [Area]	Including both the wetland and all adjacent wetland (whether tidal or not, separated by berm or not), the total wetland area is:			0.60	Marsh area is loosely correlated with marsh width and is used somewhat redundantly here due to the crudeness with which width is measured by this protocol (simply the maximum width).
		<0.1 ha.	0	0	0	
		0.1 - 0.5 ha.	0	1	0	
		0.5 - 1 ha.	0	2	0	
		1.0 - 10 ha.	1	3	3	
		10 - 100 ha.	0	4	0	
		> 100 ha.	0	5	0	
T1	High Zone Extent [PctHigh]	The percentage of the wetland's vegetation that has NO tidal water beneath it during most daily high tides of the year (i.e., the HIGH ZONE) is:			1.00	Higher elevation portions of marshes are less likely to be overwhelmed by storm surges (water depths will be shallower) and thus can provide more resistance to attenuate the surge.
		None, or <1% and narrower than 2 m.	0	0	0	
		1-10%.	0	1	0	
		10-25%.	0	2	0	
		26-50%.	0	3	0	
		51-75%.	0	4	0	
		75-90%.	0	5	0	
		>90%.	1	6	6	
T2	Extreme High as % of Entire High Zone [PctKing]	Within the High Zone (i.e., the part of the wetland you can still see at daily high tide), the percentage that is flooded only monthly or even less often (T2 yellow area in the above diagram) is:			0.00	The highest portions of marshes provide the most resistance, so marshes having a large proportion of their high zone area at these elevations should be more capable of reducing storm surges.
		<10% of the High Zone.	1	0	0	
		10-25% of the High Zone.	0	1	0	
		26-50% of the High Zone.	0	2	0	
		>50% of the High Zone.	0	3	0	

Scoring Model:	
(3*Width + AVERAGE(Area, PctHigh, PctKing))/ 4	5.83

Water Purification		Effectiveness for maintaining or restoring naturally-occurring levels of suspended sediment, salinity, inorganic nutrients, metals, hydrocarbons, and other substances in coastal waters.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF2	Upland Edge Contact [UpContact]	Viewing the wetland in Google Earth or other aerial imagery, select one:			0.5	Denitrification and some other processes that purify runoff are most effective at the interface between aerobic and anaerobic soils. That condition occurs mostly along a wetland's edge with upland, so the longer the edge (relative to wetland area), the greater the potential for water purification. Also, larger edge-area ratios represent wetland settings that are more sheltered and thus conducive to deposition and retention of pollutants associated with suspended sediment.
		The wetland has no upland edge (or upland is <1% of perimeter). The wetland is entirely surrounded by (& contiguous with) water or other wetland.	0	0	0	
		0-25% of the wetland's perimeter abuts upland (including berms, sand spits, & filled areas). The rest adjoins other wetlands or water that is mostly wider than the wetland.	0	1	0	
		26-50% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland.	1	2	2	
		51-75% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland. This will be true for many tidal wetlands.	0	3	0	
		More than 75% of the wetland's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the wetland. Highly sheltered wetlands.	0	4	0	
OF3	Marsh Width [Width]	Including any adjacent marsh (whether tidal or not, separated by narrow berm or not), the wetland's vegetated width at the widest point measured as straight-line distance along the approximate runoff flow path (line semi-perpendicular to nearby wide channel, bay, or ocean; see example in Appendix B) is:			0.60	Longer flow paths in wetlands and wastewater treatment systems result in longer time for processing of incoming pollutants, resulting in greater reduction of pollutant loads. Marsh width is used to represent flow path.
		<10 m.	0	0	0	
		10 - 50 m.	0	1	0	
		50 - 100 m.	0	2	0	
		100 - 1000 m (1 km).	1	3	3	
		1- 2 km.	0	4	0	
		>2 km.	0	5	0	
OF4	Marsh Area [Area]	Including both the wetland and all adjacent wetland (whether tidal or not, separated by berm or not), the total wetland area is:			0.60	Larger tidal wetlands, especially if they are wide, are more likely to contain sheltered or stagnant areas where sediment and associated pollutants are likely to be deposited and processed. They also may be more likely to contain multiple interfaces between aerobic and anaerobic sediments, which facilitate processing, detoxification, and retention or removal of contaminants.
		<0.1 ha.	0	0	0	
		0.1 - 0.5 ha.	0	1	0	
		0.5 - 1 ha.	0	2	0	
		1.0 - 10 ha.	1	3	3	
		10 - 100 ha.	0	4	0	
		> 100 ha.	0	5	0	
OF16	Ditching [Ditch]	Ditches, artificially straightened channels, and/or channel connectors are:			1.00	By concentrating water and accelerating its movement out of a tidal wetland, ditches reduce pollutant processing time and effectiveness. Water in ditches also tends to be quite anaerobic and not supportive of some aquatic species.
		Absent.	1	5	5	
		Present, but few and localized within the wetland.	0	1	0	
		Present, and a few large/long ditches or a dense network in at least part of the wetland.	0	0	0	
OF17	Soil Compaction [SoilCompac]	Vehicle tracks in the mud or flattened vegetation suggest construction equipment or ATVs have entered the wetland, or there are remnants of old dykes within the wetland.			0.20	Soil compaction (reduction in soil bulk density) is commonly associated with vehicular passage over fine-particled soils such as those that typify most tidal wetlands. This causes wider occurrence of anaerobic conditions detrimental to water quality, as well as reducing microbial communities responsible for most nitrate removal in tidal wetlands.
		Absent.	0	5	0	
		Present, but few and localized within the wetland.	1	1	1	
		Present, and extensive & widely distributed within the wetland.	0	0	0	

Scoring Model:	
2*AVERAGE(UpContact, Width, Area) + AVERAGE(Ditch, SoilCompac) /3	5.78

Organic Nutrient Export		Effectiveness for producing and subsequently exporting organic nutrients, either particulate or dissolved, along with associated compounds and elements such as iron.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF2	Upland Edge Contact [UpContact]	Viewing the wetland in Google Earth or other aerial imagery, select one:			0.5	Organic matter from tidal marshes that are sheltered from waves and currents may be less prone to being regularly exported,although export via spring ice breakup could be greater because sheltered areas may be more likely to be iced over. The ratio of upland edge to water edge is a crude indicator of the degree of sheltering.
		The wetland has no upland edge (or upland is <1% of perimeter). The wetland is entirely surrounded by (& contiguous with) water or other wetland.	0	4	0	
		0-25% of the wetland's perimeter abuts upland (including berms, sand spits, & filled areas). The rest adjoins other wetlands or water that is mostly wider than the wetland.	0	3	0	
		26-50% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland.	1	2	2	
		51-75% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland. This will be true for many tidal wetlands.	0	1	0	
		More than 75% of the wetland's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the wetland. Highly sheltered wetlands.	0	0	0	
OF5	Wave Exposure [Waves]	Part of the wetland is occasionally exposed to waves from a stretch of open subtidal water that is considerably wider than the wetland, and those waves are likely to force flooding of the wetland higher and deeper than usually caused by tides alone. See example in Appendix B. Enter 1= yes, 0= no.	0		0.00	Waves accentuate and extend the capacity of tides to export organic material from tidal wetlands.
OF6	Branched Tidal Channels [TideChan]	Small "blind" channels (not connected to freshwater streams) are:			0.00	Tidal channels serve as conduits that expedite the transfer of organic matter from salt marshes to nearshore waters. More channels per unit area of marsh suggest greater export capacity.
		Absent.	1	0	0	
		Present, but multibranched networks are few and/or not well developed.	0	1	0	
		Present, and multibranched networks are extensive and well developed (see example in Appendix B).	0	2	0	
OF7	Rivers and Tributaries [Tribs]	Select first true statement. The wetland:			1.00	Where tidal marshes adjoin rivers or are fed by tributaries, currents associated with seasonal peak discharges, in addition to the usual tides, force organic matter from estuarine marshes.
		Is inundated daily by water from a major river (channel extends >5 km inland with no fish blockages insofar as is known, large watershed).	1	2	2	
		Is inundated only by a mapped perennial stream (channel extends <5 km inland, smaller watershed).	0	1	0	
		Neither of above, but a mapped stream or river is within 1 km.	0	0	0	
		None of the above.	0	0	0	
OF15	Tidal Inflow Restriction [Restrict]	Man-made berms, levees, or dykes which limit tidewater movement into a part of the AA that historically would have experienced daily tidal flooding are: [Note: Restriction by natural sand or gravel spits or beaver dams does not count. Restriction by culverts and tidegates does count.]			1.00	Permanent restriction of tidal flow in and out of tidal wetland, even if only partial, is likely to mute the amplitude of tides within the restricted marsh, thus resulting in more retention of sediment and organic matter rather than export. In extreme cases tidal marsh productivity may also decline, resulting in less organic matter available for export.
		Absent (but a levee or berm may separate tidal wetland and upland).	1	5	5	
		Present, and tidal inflow is mildly affected. If external waters are saline, then characteristic salt marsh vegetation still dominates within the wetland but restriction may have allowed invasion by cat-tail, bulrush, or other freshwa associated plants, although usually only a relatively small proportion of the wetland is affected.	0	1	0	
		Present, and tidal inflow is strongly affected. If external waters are saline, restriction has eliminated or greatly reduced characteristic salt marsh vegetation or such species are largely confined to limited areas near saltwater inflow points. Also mark this choice if fish cannot enter the wetland from marine waters due to blockage by tidegate or improperly placed culvert.	0	0	0	
OF18	Tidal Range [TideAmp]	Mark the annual tidal range (most extreme tide range on any day during the year) by going to this web site: http://tides.gc.ca/eng/data/predictions, selecting the tide station nearest the wetland which has data for May 6-8, 2016, and then calculating the height difference between the highest high tide and lowest low tide on those date	0.60		0.04	A larger tidal range implies greater potential for nutrient subsidisation of wetland plants in the Low Zone due to frequent water exchange, and thus higher productivity. It may also imply more erosive energy to flush that productivity (plant material) out of the tidal wetland and into estuaries where it helps support marine food chains*The cell formula standarizes a site's maximum annual tidal range by dividing by the maximum annual tide range from all tide stations in the region (NB+NS+PEI = 16.3 m, NL= 2.5 m).*
OF20	Growing Degree Days [GrowDays]	Open Google Earth and click on the GDD.kmz file, navigate to your site's location, and click its associated grid cell. The "grid code" is the Growing Degree Days value. Enter that number in the next column. If grid does not include your site, use value from the closest grid cell.	2169		0.54	A longer growing season generally implies more plant matter will be produced, although the correlation may be weaker in areas with where colder waters from offshore impinge and summer fog is frequent. It also suggests a possible reduction in the role of ice as e exporter of that organic matter. *In the calculations, the GrowDays at a particular site is standardized to the range of GrowDays present in the site's provincial coastline using the formula (GDD-GDD minimum)/GDD range.*
T1	High Zone Extent [PctHigh]	The percentage of the wetland's vegetation that has NO tidal water beneath it during most daily high tides of the year (i.e., the HIGH ZONE) is:			0.00	Research by Gordon et al. (1985) on productivity rates of salt marshes in the upper Bay of Fundy concluded that primary productivity in the low marsh exceeds that of the high marsh. Moreover, that production (organic detritus) is exported more consistently because it is flushed out by tides most days.
		None, or <1% and narrower than 2 m.	0	6	0	
		1-10%.	0	5	0	
		10-25%.	0	4	0	
		26-50%.	0	3	0	
		51-75%.	0	2	0	
		75-90%.	0	1	0	
		>90%.	1	0	0	
T3	Bare Ground or Thatch: High Zone [Bare]	The ground condition in the HIGH ZONE, as it would exist in late summer and when viewed from about 1 m above the ground, is:			1.00	Bare areas represent a lack of marsh plant foliage available for export at the end of each growing season.
		Little or no (<5%) bare ground or dead attached plant material (thatch) is visible between erect stems or under canopy. This can occur if ground surface is extensively blanketed by graminoids with great stem densities.	1	3	3	
		Some (5-20%) bare ground or thatch is visible. Herbaceous plants have moderate stem densities.	0	2	0	
		Much (20-50%) bare ground or thatch is visible. Low stem density and/or tall plants with little near-ground foliage.	0	1	0	
		Mostly (>50%) bare ground or thatch.	0	0	0	
T16	Measured Salinity [Salin]	The surface water salinity along the wetland's seaward edge is: [Insert reading in next column, in parts per thousand; 1 ppt = 1000 ppm = 1000 mg/L].	0			Marsh plant production tends to be lower in fresher marshes at the head of estuaries, and whatever organic matter is exported to adjoining waters may be almost totally decomposed by the time it reaches nearshore coastal waters.*The salinity measurement in T16 is converted to the 0-1 scale by associating it with salinity concentrations that define the classes in T17, and the conditions are weighted similarly. The lower of the two salinity* ***scores*** *in column F is used to represent salinity.*
T17	Inferred Salinity [SalinClass]	Based on the wetland's dominant plant species (see the PlantList worksheet) and proximity to contributing freshwater rivers and streams, the summertime salinity in most of the wetland is likely:	0		0.00	
		Oligohaline (mostly fresh or slightly brackish plants, usually < 5 ppt).	1	0	0	
		Mesohaline (brackish).	0	1	0	
		Euryhaline (few or no freshwater plants, near seawater strength, usually >30 ppt).	0	2	0	

Scoring Model:	
[3*AVERAGE(UpContact, Waves, TideChan, Tribs, TideAmp, PctHigh, Restrict) + AVERAGE(GrowDays, Bare, Salinity] /4	4.64

Fish Habitat		The capacity to support an abundance and/or diversity of fish species characteristic of tidal wetlands.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF6	Branched Tidal Channels [TideChan]	Small "blind" channels (not connected to freshwater streams) are:			0.00	Complex channel networks within a marsh give fish more access to invertebrate foods that fall from vegetation, as well as providing undercut banks in many cases that serve as cover.
		Absent.	1	0	0	
		Present, but multibranched networks are few and/or not well developed.	0	1	0	
		Present, and multibranched networks are extensive and well developed (see example in Appendix B).	0	2	0	
OF7	Rivers and Tributaries [Tribs]	Select first true statement. The wetland:			1.00	Tidal wetlands that are on or near rivers provide a variety of salinity regimes and are more likely to be along the migratory paths of anadromous fish on their way to or from spawning areas.
		Is inundated daily by water from a major river (channel extends >5 km inland with no fish blockages insofar as is known, large watershed).	1	5	5	
		Is inundated only by a mapped perennial stream (channel extends <5 km inland, smaller watershed).	0	3	0	
		Neither of above, but a mapped stream or river is within 1 km.	0	1	0	
		None of the above.	0	0	0	
OF13	Salt Marsh Landscape [Wetscape]	Along the shoreline within the 5 km circle, the percentage of the shoreline that is mapped as salt marsh (including this one) is: [Note: "Shoreline" is the line defined by permanent flooding. Channels count as shoreline if wider than the marshes they intersect or adjoin.]			0.25	Presence of other tidal wetlands nearby increases the feeding opportunities for the more mobile fish species.
		<1%.	0	0	0	
		1 - 10%.	1	1	1	
		10 - 25%.	0	2	0	
		25 - 50%.	0	3	0	
		> 50%.	0	4	0	
OF15	Tidal Inflow Restriction [Restrict]	Man-made berms, levees, or dykes which limit tidewater movement into a part of the AA that historically would have experienced daily tidal flooding are: [Note: Restriction by natural sand or gravel spits or beaver dams does not count. Restriction by culverts and tidegates does count.]			1.00	Tidal restriction can degrade fish habitat in the restricted wetland by lowering dissolved oxygen, increasing sedimentation, and muting tidal amplitude which may decrease fish access to parts of a tidal marsh that formerly were flooded by tides. Severe restriction (last choice) that completely blocks fish access to a wetland results in a wetland score of 0. *Cell D21 is named NoAccess.*
		Absent (but a levee or berm may separate tidal wetland and upland).	1	3	3	
		Present, and tidal inflow is mildly affected. If external waters are saline, then characteristic salt marsh vegetation still dominates within the wetland but restriction may have allowed invasion by cat-tail, bulrush, or other freshwater-associated plants, although usually only a relatively small proportion of the wetland is affected.	0	2	0	
		Present, and tidal inflow is strongly affected. If external waters are saline, restriction has eliminated or greatly reduced characteristic salt marsh vegetation or such species are largely confined to limited areas near saltwater inflow points. Also mark this choice if fish cannot enter the wetland from marine waters due to blockage by tidegate or improperly placed culvert.	0	0	0	
OF16	Ditching [Ditch]	Ditches, artificially straightened channels, and/or channel connectors are:			1.00	Ditches (artificial channels) within tidal wetlands tend to be deeper than naturally-occurring channels and thus may be more prone to dissolved oxygen deficits harmful to many fish species. However, for tidal wetlands that lack natural channels and are mostly high [illegible]
		Absent.	1	3	3	
		Present, but few and localized within the wetland.	0	2	0	
		Present, and a few large/long ditches or a dense network in at least part of the wetland.	0	0	0	
OF18	Tidal Range [TideAmp]	Mark the annual tidal range (most extreme tide range on any day during the year) by going to this web site: http://tides.gc.ca/eng/data/predictions, selecting the tide station nearest the wetland which has data for May 6-8, 2016, and then calculating the height difference between the highest high tide and lowest low tide on those dates.	0.60		0.04	Large tidal fluctuations probably pose a greater energetic burden on fish, forcing them to move constantly in search of food and cover and limiting the time they can spend at any elevation. *The cell formula standarizes a site's maximum annual tidal range by dividing by the maximum annual tide range from all tide stations in the region (NB+NS+PEI = 16.3 m, NL= 2.5 m).*
OF25	Species of Conservation Concern [RareFish, RareOther, RareWbird, RareSbird, RarePlants]	Presence of one or more of the fish species listed in the TidalFish_Rare worksheet of the accompanying SuppInfo file.	0			Documented presence of these species highlights the regional importance of this wetland for support of this function.
T1	High Zone Extent [PctHigh]	The percentage of the wetland's vegetation that has NO tidal water beneath it during most daily high tides of the year (i.e., the HIGH ZONE) is:			0.00	The portions of tidal wetlands that are inundated at least twice daily can be expected to receive more fish use than the portions that are inundated only a few times per month or per year. However, during the brief periods when the high zone is accessible, some fish may feed in it intensively.
		None, or <1% and narrower than 2 m.	0	6	0	
		1-10%.	0	5	0	
		10-25%.	0	4	0	
		26-50%.	0	3	0	
		51-75%.	0	2	0	
		75-90%.	0	1	0	
		>90%.	1	0	0	
T2	Extreme High as % of Entire High Zone [PctKing]	Within the High Zone (i.e., the part of the wetland you can still see at daily high tide), the percentage that is flooded only monthly or even less often (T2 yellow area in the above diagram) is:			1.00	See above.
		<10% of the High Zone.	1	3	3	
		10-25% of the High Zone.	0	2	0	
		26-50% of the High Zone.	0	1	0	
		>50% of the High Zone.	0	0	0	
T4	Salt Pannes & Pools [Pans]	Within the High Zone, the number of pannes and pools (natural semi-circular depressions or ponds with radius >1 m which hold stagnant surface water between high tides, and may be flooded by tides only infrequently) is: [Note: Check the aerial image before answering this.]			0.00	Many studies have highlighted the importance of in-marsh pools and pannes to several fish species common in this region.
		Few (<2 per hectare) or none.	1	0	0	
		Intermediate.	0	1	0	
		Several (>5 per hectare).	0	2	0	

Scoring Model:	
IF((NoAccess=1), 0, ELSE: 4*AVERAGE (PctHigh, PctKing, Pans) + 2*AVERAGE(Tribs, Wetscape,RareFish) + AVERAGE(Restrict, TideChan,	5.01

Waterbird Habitat		The capacity to directly support or contribute to an abundance or diversity of waterbirds, mainly those that migrate or winter in the region. This includes shorebirds (sandpipers, plovers, phalaropes, etc.), waterfowl (ducks, geese, swans), gulls, cormorants, loons, grebes, and others.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF3	Marsh Width [Width]	Including any adjacent marsh (whether tidal or not, separated by narrow berm or not), the wetland's vegetated width at the widest point measured as straight-line distance along the approximate runoff flow path (line semi-perpendicular to nearby wide channel, bay, or ocean; see example in Appendix B) is:			0.60	Other factors being equal, wider and/or larger tidal marshes tend to have greater variety and complexity of water features, vegetation structure, and plant richness. They also are more likely to provide roosting sites and shelter to waterbirds during poor weather. In ve narrow wetlands such as some of those along the fringe of tidal rivers and bays, waterbirds are more vulnerable to avian predators and human disturbance.
		<10 m.	0	0	0	
		10 - 50 m.	0	1	0	
		50 - 100 m.	0	2	0	
		100 - 1000 m (1 km).	1	3	3	
		1- 2 km.	0	4	0	
		>2 km.	0	5	0	
OF4	Marsh Area [Area]	Including both the wetland and all adjacent wetland (whether tidal or not, separated by berm or not), the total wetland area is:			0.60	See above.
		<0.1 ha.	0	0	0	
		0.1 - 0.5 ha.	0	1	0	
		0.5 - 1 ha.	0	2	0	
		1.0 - 10 ha.	1	3	3	
		10 - 100 ha.	0	4	0	
		> 100 ha.	0	5	0	
OF5	Wave Exposure [Waves]	Part of the wetland is occasionally exposed to waves from a stretch of open subtidal water that is considerably wider than the wetland, and those waves are likely to force flooding of the wetland higher and deeper than usually caused by tides alone. See example in Appendix B. Enter 1= yes, 0= no.	0		1.00	Most waterbirds characteristic of tidal wetlands seek sheltered areas during winter storms, so wave-exposed areas probably receive less use then, unless waves and currents have kept them more free of ice than sheltered areas.
OF6	Branched Tidal Channels [TideChan]	Small "blind" channels (not connected to freshwater streams) are:			0.00	On outgoing tides, tidal channels concentrate fish and other animal foods consumed by wading birds and thus improve feeding success and habitat capacity. More natural channels per unit area of marsh are assumed to provide benefits to more waterbirds.
		Absent.	1	0	0	
		Present, but multibranched networks are few and/or not well developed.	0	1	0	
		Present, and multibranched networks are extensive and well developed (see example in Appendix B).	0	2	0	
OF7	Rivers and Tributaries [Tribs]	Select first true statement. The wetland:			1.00	Rivers are often major flyways for migratory waterbirds. Fresh water rivers and tributaries diversify the food sources available to watetbirds.
		Is inundated daily by water from a major river (channel extends >5 km inland with no fish blockages insofar as is known, large watershed).	1	4	4	
		Is inundated only by a mapped perennial stream (channel extends <5 km inland, smaller watershed).	0	2	0	
		Neither of above, but a mapped stream or river is within 1 km.	0	1	0	
		None of the above.	0	0	0	
OF8	Distance to Freshwater Pond [DistLake]	The distance to the nearest freshwater pond larger than 1 hectare is: [Note: Lakes and marshes and fens that remain flooded year-round may be included].			1.00	During windstorms and very high tides, waterbirds inhabiting tidal wetlands may temporarily move to more sheltered inland "refugia" areas if those are available nearby. Fresh water also provides invertebrate foods that may be available at times when waterbird foods in marine waters are temporarily limited.
		< 1 km.	1	4	4	
		1 - 2 km.	0	3	0	
		2 - 3 km.	0	2	0	
		3 - 5 km.	0	1	0	
		> 5 km.	0	0	0	
OF12	Open Land in Vicinity [Openland]	Within a circle of radius 5 km centered on the wetland, the percentage (excluding any ocean or bay) that is cropland, marsh, lakes, ponds, or grassland is: [Note: Do not include bogs or newly mined lands as "open land".]			0.33	Several waterfowl species (e.g., geese, wigeon) feed extensively in crop fields and some other types of open lands during migration, and may rest there during high tides. Areas of higher soil fertility tend to be used for agriculture, and the higher soil fertility may help support plants favoured by some waterfowl. Thus, close proximity to open landscapes may foster increased use of nearby tidal wetlands by waterfowl.
		none or trace (<1%).	0	0	0	
		1- 10%.	1	1	1	
		10 - 25%.	0	2	0	
		25 - 50%.	0	3	0	
		50 - 75%.	0	3	0	
		> 75%.	0	3	0	
OF13	Salt Marsh Landscape [Wetscape]	Along the shoreline within the 5 km circle, the percentage of the shoreline that is mapped as salt marsh (including this one) is: [Note: "Shoreline" is the line defined by permanent flooding. Channels count as shoreline if wider than the marshes they intersect or adjoin.]			0.25	Most waterbirds are highly mobile and have relatively large home ranges, so the abundance of favoured habitats such as tidal marshes should be assessed at greater than just the scale of an individual wetland.
		<1%.	0	0	0	
		1 - 10%.	1	1	1	
		10 - 25%.	0	2	0	
		25 - 50%.	0	3	0	
		> 50%.	0	4	0	
OF19	Barrier Island	The wetland is within 1 km of a barrier island with >1 ha bare or sparsely vegetated area, and with no occupied buildings. Enter: yes= 1, no= 0.	0		0.00	Sparsely-vegetated parts of barrier islands often support concentrations of nesting waterbirds such as gulls, terns, and red-breasted merganser. Tidal wetlands located near such islands are more likely to serve as foraging sites for those species.
OF20	Growing Degree Days [GrowDays]	Open Google Earth and click on the GDD.kmz file, navigate to your site's location, and click its associated grid cell. The "grid code" is the Growing Degree Days value. Enter that number in the next column. If grid does not include your site, use value from the closest grid cell.	2169		0.54	This is an indirect and possibly weak correlate of the amount and duration of ice cover, which restricts winter use by waterbirds*In the calculations, the GrowDays at a particular site is standardized to the range of GrowDays present in the site's provincial coastline using the formula (GDD-GDD minimum)/GDD range.*
OF26	Important Bird Area or Ramsar wetland [IBirdArea]	The wetland is all or part of an officially designated Important Bird Area (IBA) or a Wetland of International Importance (Ramsar wetland). Enter 1= yes, 0= no.	0		0.00	These three indicators all pertain to areas with tidal wetlands that were previously identified as having (or are likely to have) notable concentrations of one or more coastal waterbird species.
OF27	Wetland Bird Concentration Area [BirdConc]	In this wetland or adjacent intertidal habitat, review existing data (online at ebird.org) or conduct your own surveys. If numbers of individual birds have exceeded those shown for the same species in the BirdCriteria worksheet, or if the wetland is within an area listed in the BirdHotspots worksheet, enter: yes= 1, no= 0. For NS and NB, also open the NB-NS Shorebirds KMZ file that accompanies this calculator to determine if the wetland is within 1 km of any of those places.	0		0.00	
OF28	Black Duck Nesting Area [Bduck]	Open Google Earth and then open and overlay the BlackDuck.kmz file. If necessary adjust its alignment and opacity. The predicted density (pairs per 25 sq. km) of nesting American Black Duck in the vicinity of the wetland is:			0.00	
		<10.	1	0	0	
		10 to 20.	0	1	0	
		20 to 30.	0	2	0	
		>30.	0	3	0	
		No information (off the map).	0			
T1	High Zone Extent [PctHigh]	The percentage of the wetland's vegetation that has NO tidal water beneath it during most daily high tides of the year (i.e., the HIGH ZONE) is:			0.00	Although geese and waterfowl use the higher parts of tidal marshes somewhat for feeding and roosting, many additional waterbird species use the low marsh due to its abundance of aquatic prey. Therefore tidal wetlands with smaller proportions of high marsh are scored higher, other factors being equal.
		None, or <1% and narrower than 2 m.	0	6	0	
		1-10%.	0	5	0	
		10-25%.	0	4	0	
		26-50%.	0	3	0	
		51-75%.	0	2	0	
		75-90%.	0	1	0	
		>90%.	1	0	0	
T4	Salt Pannes & Pools [Pans]	Within the High Zone, the number of pannes and pools (natural semi-circular depressions or ponds with radius >1 m which hold stagnant surface water between high tides, and may be flooded by tides only infrequently) is: [Note: Check the aerial image before answering this.]			0.00	Natural ponds and pannes in tidal marshes are heavily used by shorebirds, herons, gulls, and waterfowl. In this region, tidal wetland use by willet (a priority nesting shorebird species) has been shown to correlate with the number of pannes in the wetlands (Hanson & Shriver 2006).
		Few (<2 per hectare) or none.	1	0	0	
		Intermediate.	0	1	0	
		Several (>5 per hectare).	0	2	0	
T10	Core Area 1 [NoVis]	The percentage of the High Zone almost never visited by humans during an average growing season probably comprises: [Note: Do not include visitors on trails outside of the wetland unless more than half the wetland is visible from the trails and they are within 30 m of the wetland edge. In that case include only the area occupied by the trail.]			0.50	Waterbirds are likely to use tidal wetlands for longer periods, requiring less metabolic drain, when not frequently disturbed by intruding humans.
		<5% and no inhabited building is within 100 m of the wetland.	0	1	0	
		<5% and inhabited building is within 100 m of the wetland.	0	0	0	
		5-50% and no inhabited building is within 100 m of the wetland.	1	2	2	
		5-50% and inhabited building is within 100 m of the wetland.	0	1	0	
		50-95%.	0	3	0	
		>95% of the High Zone. This is the most frequent choice for tidal wetlands in this region.	0	4	0	
T11	Core Area 2 [MuchVis]	The percentage of the High Zone visited by humans almost daily for several weeks during an average year probably comprises: [Note: Do not include visitors on trails outside of the wetland unless more than half the wetland is visible from the trails and they are within 30 m of the wetland edge. In that case include only the area occupied by the trail.]			0.67	See above.
		<5%. This is the most frequent choice for tidal wetlands in this region, except in some visited often by many hunters.	0	3	0	
		5-50%.	1	2	2	
		50-95%.	0	1	0	
		>95% of the High Zone.	0	0	0	

T16	Measured Salinity [Salin]	The surface water salinity along the wetland's seaward edge is: [Insert reading in next column, in parts per thousand; 1 ppt = 1000 ppm = 1000 mg/L].	0			Tidal waters of higher salinity are less prone to freezing, thus supporting waterbirds for longer periods during the winter.
T17	Inferred Salinity [SalinClass]	Based on the wetland's dominant plant species (see the PlantList worksheet) and proximity to contributing freshwater rivers and streams, the summertime salinity in most of the wetland is likely:	0		0.00	
		Oligohaline (mostly fresh or slightly brackish plants, usually < 5 ppt).	1	0	0	
		Mesohaline (brackish).	0	1	0	
		Euryhaline (few or no freshwater plants, near seawater strength, usually >30 ppt).	0	2	0	

Scoring Model:	
6*MAX(IbirdArea, BirdConc, Bduck) + 3*AVERAGE(Width, Area, Wetscape) + 2*AVERAGE(Waves, Salinity, GrowDays, Tribs, Pans, Island,	2.65

Songbird & Raptor Habitat		The capacity to directly support an abundance or diversity of songbirds and raptors, both residents and migrants, and especially those most strongly associated with tidal wetlands.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF2	Upland Edge Contact [UpContact]	Viewing the wetland in Google Earth or other aerial imagery, select one:			0.50	Most tidal wetland songbirds and raptors prefer the higher, less frequently flooded portions of the wetland. Those adjoin uplands. Thus, tidal wetlands whose perimeter is more upland than subtidal water are likely to support more songbirds and raptors.
		The wetland has no upland edge (or upland is <1% of perimeter). The wetland is entirely surrounded by (& contiguous with) water or other wetland.	0	0	0	
		0-25% of the wetland's perimeter abuts upland (including berms, sand spits, & filled areas). The rest adjoins other wetlands or water that is mostly wider than the wetland.	0	1	0	
		26-50% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland.	1	2	2	
		51-75% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland. This will be true for many tidal wetlands.	0	3	0	
		More than 75% of the wetland's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the wetland. Highly sheltered wetlands.	0	4	0	
OF3	Marsh Width [Width]	Including any adjacent marsh (whether tidal or not, separated by narrow berm or not), the wetland's vegetated width at the widest point measured as straight-line distance along the approximate runoff flow path (line semi-perpendicular to nearby wide channel, bay, or ocean; see example in Appendix B) is:			1.00	Other factors being equal, wider and/or larger tidal marshes tend to have greater plant community richness and structural diversity. Those are expected to favor greater songbird richness. In very narrow wetlands such as some of those along the fringe of tidal rivers and bays, nesting songbirds and raptors are more vulnerable to human disturbance. A width of greater than 300 m is roughly equivalent to a square with area of greater than 10 ha, which may be a mild habitat selection threshold for Nelson's sparrow (see below).
		<10 m.	0	0	0	
		10 - 50 m.	0	2	0	
		50 - 100 m.	0	3	0	
		100 - 1000 m (1 km).	1	5	5	
		1- 2 km.	0	5	0	
		>2 km.	0	5	0	
OF4	Marsh Area [Area]	Including both the wetland and all adjacent wetland (whether tidal or not, separated by berm or not), the total wetland area is:			0.50	Research on nesting populations of the tidal wetland-dependent Nelson's sparrow in the Maritimes has shown marsh area to be the most predictive indicator (Hanson & Shriver 2006). Salt marshes larger than about 10 ha were particularly important.
		<0.1 ha.	0	0	0	
		0.1 - 0.5 ha.	0	1	0	
		0.5 - 1 ha.	0	2	0	
		1.0 - 10 ha.	1	3	3	
		10 - 100 ha.	0	5	0	
		> 100 ha.	0	6	0	
OF13	Salt Marsh Landscape [Wetscape]	Along the shoreline within the 5 km circle, the percentage of the shoreline that is mapped as salt marsh (including this one) is: [Note: "Shoreline" is the line defined by permanent flooding. Channels count as shoreline if wider than the marshes they intersect or adjoin.]			0.25	For the most wetland-dependent songbirds such as Nelson's sparrow, the benefit of having one wetland set amidst many others may have a positive effect similar to an increase in size of the focal wetland. The scale at which this is best measured is unknown.
		<1%.	0	0	0	
		1 - 10%.	1	1	1	
		10 - 25%.	0	2	0	
		25 - 50%.	0	3	0	
		> 50%.	0	4	0	
T1	High Zone Extent [PctHigh]	The percentage of the wetland's vegetation that has NO tidal water beneath it during most daily high tides of the year (i.e., the HIGH ZONE) is:			1.00	Most tidal wetland songbirds and raptors prefer the higher, less frequently flooded portions of the wetland so that nests are less likely to be displaced by tide. Vegetation structure and diversity, which strongly influence use by songbirds, raptors, and their prey, tend to be greater in high than low marsh. Thus, wetlands that are largely high marsh are likely to support more species and individuals in those groups.
		None, or <1% and narrower than 2 m.	0	0	0	
		1-10%.	0	1	0	
		10-25%.	0	2	0	
		26-50%.	0	3	0	
		51-75%.	0	4	0	
		75-90%.	0	5	0	
		>90%.	1	6	6	
T2	Extreme High as % of Entire High Zone [PctKing]	Within the High Zone (i.e., the part of the wetland you can still see at daily high tide), the percentage that is flooded only monthly or even less often (T2 yellow area in the above diagram) is:			0.00	See above.
		<10% of the High Zone.	1	0	0	
		10-25% of the High Zone.	0	1	0	
		26-50% of the High Zone.	0	2	0	
		>50% of the High Zone.	0	3	0	
T5	Forb Cover [Forbs]	In the High Zone (and entirely within the TIDAL wetland), the areal cover of forbs reaches an annual maximum of:			0.00	Most tidal wetlands in the Maritimes are dominated by graminoids (grass-like plants). However, many forbs that occur commonly in some of the region's tidal wetlands, such as seaside plantain (Plantago maritima) and arrowgrass (Triglochin spp.) provide abundant seeds palatable to many songbirds and the small mammals preyed on by raptors. Thus, tidal wetlands with a significant forb component would be expected to support more individuals and species in this group.
		<1% of the herbaceous cover.	1	0	0	
		1-25% of the herbaceous cover.	0	1	0	
		25-50% of the herbaceous cover.	0	2	0	
		50-95% of the herbaceous cover.	0	3	0	
		>95% of the herbaceous cover.	0	4	0	
T6	Shrub Cover [Shrubs]	In the High Zone (and entirely within the TIDAL wetland), living woody vegetation shorter than 3 m and not beneath a tree canopy comprises:			0.33	Shrubs that tolerate tidal conditions add vertical structure to tidal marshes, and that allows colonization by songbirds that are not ground-nesters, thus diversifying the avifauna.
		<1% (or none) of the vegetated area reached only by monthly or annual high tide.	0	0	0	
		1-5% of the vegetated area reached by monthly or annual high tide.	1	1	1	
		5-25% of the vegetated area reached by monthly or annual high tide.	0	2	0	
		>25% of the vegetated area reached by monthly or annual high tide.	0	3	0	
T7	Perches [Perch]	Within the wetland, objects that project >1 m above the ground surface and could serve as perches (e.g., fenceposts, utility poles, boardwalks, goose nesting structures, stumps, boulders, islands of shrubs or trees) are:			0.00	Objects suitable for large perching birds are an important attractant for raptors, allowing them to detect prey from a farther distance, especially when snow is deep. Although upland trees also provide perching opportunities, perches within the marsh itself place prey and predator in closer proximity.
		Few (<1 per hectare) or none .	1	0	0	
		Intermediate.	0	1	0	
		Several (>3 per hectare).	0	2	0	
T16	Measured Salinity [Salin]	The surface water salinity along the wetland's seaward edge is: [Insert reading in next column, in parts per thousand; 1 ppt = 1000 ppm = 1000 mg/L].	0			Freshwater tidal marshes generally have more plant species and a larger component of woody vegetation. Therefore they are more likely to host a more diverse assemblage of songbirds than are found in more saline tidal marshes.
T17	Inferred Salinity [SalinClass]	Based on the wetland's dominant plant species (see the PlantList worksheet) and proximity to contributing freshwater rivers and streams, the summertime salinity in most of the wetland is likely:	0		1.00	
		Oligohaline (mostly fresh or slightly brackish plants, usually < 5 ppt).	1	2	2	
		Mesohaline (brackish).	0	1	0	
		Euryhaline (few or no freshwater plants, near seawater strength, usually >30 ppt).	0	0	0	

Scoring Models:	
3*AVERAGE(Width, Area, PctHigh, PctKing) + AVERAGE(Wetscape, UpContact, Forbs, Shrubs, Perch, Salinity)/ 4	5.56

Biodiversity Support		The capacity to directly support plant and animal species which, by their rarity or narrow habitat requirements, contribute disproportionately to the overall richness of flora and fauna in this region.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF3	Marsh Width [Width]	Including any adjacent marsh (whether tidal or not, separated by narrow berm or not), the wetland's vegetated width at the widest point measured as straight-line distance along the approximate runoff flow path (line semi-perpendicular to nearby wide channel, bay, or ocean; see example in Appendix B) is:			0.60	Species richness of vertebrate animals and especially plants is known to increase with increasing habitat area. As richness increases, the part consisting of regionally rare species (those that contribute disproportionately to regional biodiversity) also tends to increase. Marsh width and marsh area are loosely correlated. Wider marshes provide more protection from waves, invasive upland plants, and human disturbance.
		<10 m.	0	0	0	
		10 - 50 m.	0	1	0	
		50 - 100 m.	0	2	0	
		100 - 1000 m (1 km).	1	3	3	
		1- 2 km.	0	4	0	
		>2 km.	0	5	0	
OF4	Marsh Area [Area]	Including both the wetland and all adjacent wetland (whether tidal or not, separated by berm or not), the total wetland area is:			0.60	See above. However, in this region large marshes tend also to be high marshes (not flooded daily or even monthly by tide) and consequently may have lower diversity due to absence of fully aquatic organisms.
		<0.1 ha.	0	0	0	
		0.1 - 0.5 ha.	0	1	0	
		0.5 - 1 ha.	0	2	0	
		1.0 - 10 ha.	1	3	3	
		10 - 100 ha.	0	4	0	
		> 100 ha.	0	5	0	
OF9	Distance to Road [DistRd]	The distance from the AA edge to the nearest road or parking lot that could contribute runoff to the wetland is:			0.75	Roads hinder wildlife movements, introduce pollutants, and facilitate spread of invasive plants. Thus, they potentially diminish the capacity of some tidal wetlands to support regional biodiversity.
		< 2 m.	0	0	0	
		2 - 10 m.	0	1	0	
		10 - 30 m.	0	2	0	
		30 - 100 m.	1	3	3	
		> 100 m, or roads that could contribute runoff to the wetland are absent.	0	4	0	
OF10	Distance to Nutrient or Contaminant Source [DistPollu]	The distance to the nearest fertilised lawn or row crops, residence with a septic system, pasture with livestock, drained peatland, or other feature that could contribute elevated levels of nutrients and/or contaminants to the wetland, is:			0.00	While nutrient additions to tidal marshes sometimes increase the richness of benthic invertebrate communities in those marshes, excessive nutrients have been implicated as causing the decline of eelgrass in tidal waters in some regions, and eelgrass supports an exceptional diversity of marine species. In addition, high nutrient levels attributable to human sources are often accompanied by contamination with other more-harmful substances that are more difficult to detect.
		< 10 m.	1	0	0	
		10 - 20 m.	0	1	0	
		20 - 50 m.	0	2	0	
		50 - 100 m.	0	3	0	
		> 100 m, or features that could contribute contaminated runoff to the wetland are absent.	0	4	0	
OF11	Developed Land in Runoff Contributing Area [BuffPctDevel]	Within 100 m upslope from the wetland's upland edge, the percentage that is pavement, buildings, lawn, or drained land is:			0.80	Development typically reduces habitat for species that benefit from both tidal marsh and upland forests, and results in higher loading of tidal wetlands with nutrients and pesticides.
		None or trace (<1%).	0	5	0	
		1- 10%.	1	4	4	
		10 - 25%.	0	3	0	
		25 - 50%.	0	2	0	
		50 - 75%.	0	1	0	
		> 75%.	0	0	0	
OF13	Salt Marsh Landscape [Wetscape]	Along the shoreline within the 5 km circle, the percentage of the shoreline that is mapped as salt marsh (including this one) is: [Note: "Shoreline" is the line defined by permanent flooding. Channels count as shoreline if wider than the marshes they intersect or adjoin.]			0.25	Having one wetland set amidst many others may have a positive effect on species richness and suitability for mobile rare species, similar to an increase in size of the focal wetland.
		<1%.	0	0	0	
		1 - 10%.	1	1	1	
		10 - 25%.	0	2	0	
		25 - 50%.	0	3	0	
		> 50%.	0	4	0	
OF25	Species of Conservation Concern [RareFish]	Presence of one or more of the fish species listed in the TidalFish_Rare worksheet of the accompanying SuppInfo file.	0		0.00	These are direct measures of the occurrence of priority species which contribute the most to regional biodiversity.
OF25	Species of Conservation Concern [RareWbird]	Presence of one or more of the waterbird species of conservation concern as listed in the TidalWaterbirds_Rare worksheet of the accompanying SuppInfo file.	1		1.00	
OF25	Species of Conservation Concern [RareSbird]	Presence of one or more other species of conservation concern as listed in the Tidal_Others_Rare worksheet of the accompanying SuppInfo file.	0		0.00	
OF25	Species of Conservation Concern [RarePlant]	Presence of one or more of the plant species listed in the TidalPlants_Rare worksheet of the accompanying SuppInfo file.	1		1.00	
OF25	Species of Conservation Concern [RareOther]	Presence of one or more of the plant species listed in the TidalPlants_Rare worksheet of the accompanying SuppInfo file.	1		1.00	
T5	Forb Cover [Forbs]	In the High Zone (and entirely within the TIDAL wetland), the areal cover of forbs reaches an annual maximum of:			0.00	Most tidal wetlands in the Maritimes are dominated by graminoids (grass-like plants). Thus, forbs supplement plant richness in these wetlands. Particular forbs are also critical to the survival of several rare butterfly species which occur almost exclusively in the region's tidal wetlands.
		<1% of the herbaceous cover.	1	0	0	
		1-25% of the herbaceous cover.	0	1	0	
		25-50% of the herbaceous cover.	0	2	0	
		50-95% of the herbaceous cover.	0	3	0	
		>95% of the herbaceous cover.	0	4	0	
T8	Plant Species Dominance [Pdom]	In the High Zone, the 2 most common vascular plant species together comprise:			0.50	This is an indirect measure of a tidal wetland's plant species richness. Wetlands strongly dominated by one or two species nearly always have fewer species in total, and the other species are less likely to be rare ones that contribute the most to regional biodiversity.
		<20% of the zone's vegetated area (most species-rich, no dominants or co-dominants).	0	4	0	
		20-40% of the zone's vegetated area.	0	3	0	
		40-60% of the zone's vegetated area.	1	2	2	
		60-80% of the zone's vegetated area.	0	1	0	
		>80% of the zone's vegetated area (monotypic or nearly so).	0	0	0	
T9	Exotic Plant Cover [Invas]	In the High Zone (and entirely within the TIDAL wetland), the areal cover of exotic plants (just the species in last column) is:			0.50	Although this region's tidal wetlands are seldom dominated by invasive plants, changing conditions of climate, sea level, and human disturbance could change that. In tidal wetlands to the south, widespread invasion of many tidal marshes by invasives has reduced plant species richness at multiple scales.
		None, or trace.	0	4	0	
		1-5% of the herbaceous cover.	0	3	0	
		5-25% of the herbaceous cover.	1	2	2	
		25-50% of the herbaceous cover.	0	1	0	
		>50% of the herbaceous cover.	0	0	0	
T16	Measured Salinity [Salin]	The surface water salinity along the wetland's seaward edge is: [Insert reading in next column, in parts per thousand; 1 ppt = 1000 ppm = 1000 mg/L].	0			In this region, tidal plant species richness tends to increase with a decrease in salinity, and terrestrial animals do similarly. However, higher-salinity marshes support several species not found in fresh tidal marshes.
T17	Inferred Salinity [SalinClass]	Based on the wetland's dominant plant species (see the PlantList worksheet) and proximity to contributing freshwater rivers and streams, the summertime salinity in most of the wetland is likely:	0		1.00	
		Oligohaline (mostly fresh or slightly brackish plants, usually < 5 ppt).	1	2	2	
		Mesohaline (brackish).	0	1	0	
		Euryhaline (few or no freshwater plants, near seawater strength, usually >30 ppt).	0	0	0	
T18	Plant Richness [PlantRich]	See the PlantList worksheet. If you have the skills to identify ALL the plants, survey as much of the wetland as time and safety allow. In the worksheet, mark with a "1" the species you find. The number of species will be automatically tallied. Transfer that number to the next column. If you are not confident of your skills to identify ALL the species or for other reasons cannot survey the plants, leave a "0" in the next column.	3		0.19	This is intended to be a direct measure of plant species richness, which may indicate somewhat a wetland's likely contribution to overall regional biodiversity. However, it is not possible to determine this accurately for large tidal wetlands using only a rapid protocol, so this is only one indicator of many, and receives less weight than others in computing the function score. The standardized score is computed by dividing the number of species at this site (column E) by the maximum found among the calibration sites (16).

Scoring Model:	
IF(MAX(RareFish, RareWbird, RareSbird, RarePlant, RareOther>0), THEN 1, ELSE: [3*AVERAGE(Width, Area, Wetscape) + 2*AVERAGE(Forbs,	10.00

Wetland Stability		The likelihood of a tidal wetland persisting physically in the face of rising sea levels and climate change.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF2	Upland Edge Contact [UpContact]	Viewing the wetland in Google Earth or other aerial imagery, select one:			0.5	Tidal wetlands located in sheltered locations, as represented somewhat by this indicator, are more likely to be in stabe depositional environments that are less exposed to eroding waves.
		The wetland has no upland edge (or upland is <1% of perimeter). The wetland is entirely surrounded by (& contiguous with) water or other wetland.	0	4	0	
		0-25% of the wetland's perimeter abuts upland (including berms, sand spits, & filled areas). The rest adjoins other wetlands or water that is mostly wider than the wetland.	0	3	0	
		26-50% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland.	1	2	2	
		51-75% of the wetland's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the wetland. This will be true for many tidal wetlands.	0	1	0	
		More than 75% of the wetland's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the wetland. Highly sheltered wetlands.	0	0	0	
OF3	Marsh Width [Width]	Including any adjacent marsh (whether tidal or not, separated by narrow berm or not), the wetland's vegetated width at the widest point measured as straight-line distance along the approximate runoff flow path (line semi-perpendicular to nearby wide channel, bay, or ocean; see example in Appendix B) is:			0.40	Wider tidal marshes are less likely to be entirely lost from wave erosion, and usually are sites of long-term sediment deposition and accretion.
		<10 m.	0	5	0	
		10 - 50 m.	0	4	0	
		50 - 100 m.	0	3	0	
		100 - 1000 m (1 km).	1	2	2	
		1- 2 km.	0	1	0	
		>2 km.	0	0	0	
OF5	Wave Exposure [Waves]	Part of the wetland is occasionally exposed to waves from a stretch of open subtidal water that is considerably wider than the wetland, and those waves are likely to force flooding of the wetland higher and deeper than usually caused by tides alone. See example in Appendix B. Enter 1= yes, 0= no.	0		0.00	See OF2 above.
OF7	Rivers and Tributaries [Tribs]	Select first true statement. The wetland:			1.00	Rivers and tributaries provide an additional source of suspended sediment which when deposited in a tidal wetland helps maintain marsh elevation and integrity.
		Is inundated daily by water from a major river (channel extends >5 km inland with no fish blockages insofar as is known, large watershed).	1	2	2	
		Is inundated only by a mapped perennial stream (channel extends <5 km inland, smaller watershed).	0	1	0	
		Neither of above, but a mapped stream or river is within 1 km.	0	0	0	
OF14	Slope Nearby [Spread]	As viewed in the Toporama map (http://www.atlas.gc.ca/toporama/) at maximum zoom, 10 m vertical interval, there is a topographic contour line within 1 km of the wetland's upland edge or within a distance that is less than the wetland's maximum width. See example in Appendix B. Enter 1= yes, 0= no.	1		0.00	Presence of such a line could imply steeper topography near the site and thus a less favorable environment for the tidal wetland to move inland with rising sea levels.
OF15	Tidal Inflow Restriction [Restrict]	Man-made berms, levees, or dykes which limit tidewater movement into a part of the AA that historically would have experienced daily tidal flooding are: [Note: Restriction by natural sand or gravel spits or beaver dams does not count. Restriction by culverts and tidegates does count.]			1.00	Tidal marshes persist and sometimes grow bigger largely because they are fed with sediments carried in by high tides and storms. Unless they regularly receive a comparable amount of sediment in runoff from adjoining uplands, their long term stability will be threatened by dykes, berms, and similar features that restrict tidal inflow to varying degrees.
		Absent (but a levee or berm may separate tidal wetland and upland).	1	2	2	
		Present, and tidal inflow is mildly affected. If external waters are saline, then characteristic salt marsh vegetation still dominates within the wetland but restriction may have allowed invasion by cat-tail, bulrush, or other freshwater-associated plants, although usually only a relatively small proportion of the wetland is affected.	0	1	0	
		Present, and tidal inflow is strongly affected. If external waters are saline, restriction has eliminated or greatly reduced characteristic salt marsh vegetation or such species are largely confined to limited areas near saltwater inflow points. Also mark this choice if fish cannot enter the wetland from marine waters due to blockage by tidegate or improperly placed culvert.	0	0	0	
OF18	Tidal Range [TideAmp]	Mark the annual tidal range (most extreme tide range on any day during the year) by going to this web site: http://tides.gc.ca/eng/data/predictions, selecting the tide station nearest the wetland which has data for May 6-8, 2016, and then calculating the height difference between the highest high tide and lowest low tide on those dates.	0.6		0.04	Sedimentation and tidal marsh stability is greater in coastal areas that have a larger tidal range (Kirwan & Guntenspergen 2010). *The cell formula standarizes a site's maximum annual tidal range by dividing by the maximum annual tide range from all tide stations in the region (NB+NS+PEI = 16.3 m, NL= 2.5 m).*
T1	High Zone Extent [PctHigh]	The percentage of the wetland's vegetation that has NO tidal water beneath it during most daily high tides of the year (i.e., the HIGH ZONE) is:			0.00	Tidal wetlands that are mostly high marsh are, due to their greater elevation, less immediately vulnerable to sea level rise
		None, or <1% and narrower than 2 m.	0	6	0	
		1-10%.	0	5	0	
		10-25%.	0	4	0	
		26-50%.	0	3	0	
		51-75%.	0	2	0	
		75-90%.	0	1	0	
		>90%.	1	0	0	
T2	Extreme High as % of Entire High Zone [PctKing]	Within the High Zone (i.e., the part of the wetland you can still see at daily high tide), the percentage that is flooded only monthly or even less often (T2 yellow area in the above diagram) is:			1.00	See above.
		<10% of the High Zone.	1	3	3	
		10-25% of the High Zone.	0	2	0	
		26-50% of the High Zone.	0	1	0	
		>50% of the High Zone.	0	0	0	
T14	Soil Texture [SoilTex]	The texture of soil in the uppermost layer, but excluding live roots, in the majority of the HIGH ZONE, is:			0.00	Organic soils tend to occur in more sheltered depositional environments, and often consist of tight root masses that resist erosion from tides and currents. Fine sediments are more easily suspended in the water.
		Loamy: soils that may contain a little fine grit and do not make a "ribbon" longer than 2 cm when moistened, rolled, squeezed, and extended between thumb and forefinger.	0	2	0	
		Fines: includes silt, clay, silt, soils that make a ribbon longer than 2 cm when moistened, rolled, squeezed, and extended between thumb and forefinger.	1	0	0	
		Organic	0	3	0	
		Coarse: includes sand, loamy sand, gravel, cobble, soils that do not make a ribbon when moistened, rolled, squeezed, and extended between thumb and forefinger.	0	1	0	
T16	Measured Salinity [Salin]	The surface water salinity along the wetland's seaward edge is: [Insert reading in next column, in parts per thousand; 1 ppt = 1000 ppm = 1000 mg/L].	0			Fresher tidal wetlands may be more subject to vegetation die-off as sea levels rise and cause more frequent upriver incursions of high salinity water, exposing their less salt-tolerant vegetation to damaging seawater-strength salinity.
T17	Inferred Salinity [SalinClass]	Based on the wetland's dominant plant species (see the PlantList worksheet) and proximity to contributing freshwater rivers and streams, the summertime salinity in most of the wetland is likely:			0.00	
		Oligohaline (mostly fresh or slightly brackish plants, usually < 5 ppt).	1	0	0	
		Mesohaline (brackish).	0	1	0	
		Euryhaline (few or no freshwater plants, near seawater strength, usually >30 ppt).	0	2	0	

Scoring Models:	
AVERAGE(UpContact, Waves, Width, PctHigh, PctKing, TideAmp, Tribs. Spread, SoilTex, Salin, Restrict)	3.58

Public Use & Recognition		The potential and/or actual capacity to support non-consumptive (e.g., birding, research) and/or sustainable consumptive (e.g., haying, fishing) uses.				
#	Indicators	Condition Choices	Data	Weight	Standar-dised	Rationale
OF21	Conservation Designation [ConsDesig]	The wetland is all or part of an area designated by the provincial government or the Nature Conservancy of Canada for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. In NB: With GeoNB, click on Candida PNA Map Viewer to identify Environmentally Significant Area, Protected Natural Area. In NS: With Provincial Landscape Viewer, see Protected Areas.	0		0.00	This reflects prior investments made to protect the wetland.
OF22	Conservation Investment [ConsInvest]	The wetland is part of or contiguous to a wetland on which public or private organizational funds were spent to preserve, create, restore, or enhance the wetland (excluding mitigation wetlands). Ask the property owner. Enter: yes= 1, no= 0. If no informatio change to blank.	0			Prior public investment for these purposes requires greater protection.
OF23	Mitigation Investment [MitInvest]	The wetland is all or part of a mitigation site used explicitly to offset impacts elsewhere. Ask the property owner. Enter: yes= 1 no= 0. If no information, change to blank.	0			Mitigation wetlands represent an investment of funds in the public's interest, which should not be wasted.
OF24	Sustained Scientific Use [SciUse]	Plants, animals, or water in the wetland have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the wetland is part of an area that has been designated by an agency or institution as a benchmark, reference, or status-trends monitoring area. Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0			Collection of long term data from wetlands is in the public interest partly because it can lead to more effective and fair regulations.
T10	Core Area 1 [NoVis]	The percentage of the High Zone almost never visited by humans during an average growing season probably comprises: [Note: Do not include visitors on trails outside of the wetland unless more than half the wetland is visible from the trails and the are within 30 m of the wetland edge. In that case include only the area occupied by the trail.]			0.75	This is a direct estimate of public use.
		<5% and no inhabited building is within 100 m of the wetland.	0	4	0	
		<5% and inhabited building is within 100 m of the wetland.	0	4	0	
		5-50% and no inhabited building is within 100 m of the wetland.	1	3	3	
		5-50% and inhabited building is within 100 m of the wetland.	0	3	0	
		50-95%.	0	2	0	
		>95% of the High Zone. This is the most frequent choice for tidal wetlands in this region.	0	0	0	
T11	Core Area 2 [MuchVis]	The percentage of the High Zone visited by humans almost daily for several weeks during an average year probably comprises: [Note: Do not include visitors on trails outside of the wetland unless more than half the wetland is visible from the trails and the are within 30 m of the wetland edge. In that case include only the area occupied by the trail.]			0.50	This is a direct estimate of public use.
		<5%. This is the most frequent choice for tidal wetlands in this region, except in some visited often by many hunters.	0	0	0	
		5-50%.	1	2	2	
		50-95%.	0	3	0	
		>95% of the High Zone.	0	4	0	
T12	Visibility [Visibil]	The maximum percent of the wetland that is visible from the best vantage point on public roads, public parking lots, public buildings, or public maintained trails that intersect, adjoin, or are within 100 m of the wetland is (select one):			0.00	Public enjoyment of tidal wetlands is assumed to be greater when most of the wetland can be seen without obstruction by dense upland vegetation, buildings, or other features.
		<25%.	1	0	0	
		25-50%.	0	1	0	
		>50%.	0	2	0	
T13	Consumptive Uses (Provisioning Services) [Consump]	Recent evidence was found within the wetland of the following potentially-sustainable consumptive uses. Mark all that apply.			0.60	These are a direct estimate of public use of sustainable resources
		Haying.	0			
		Grazing.	0			
		Shellfish or bait worm harvest.	0			
		Waterfowl hunting or furbearer trapping.	1			
		Fishing.	0			
		None of the above (no evidence).	0			

Scoring Models:	
[AVERAGE(ConsInvest, MitInvest, SciUse, Consump, AVERAGE(Visibil, NoVis, MuchVis)]	5.08

Thresholds to identify some of the concentration areas for selected waterbird species. Thresholds based partly on historical eBird data.

Species	Number of Birds/km^2		
	NB & PEI	NS	NL
American Black Duck	≥ 400	≥ 500	≥ 400
American Wigeon	≥ 100	≥ 100	≥ 100
American Golden-Plover	≥ 20	≥ 200	≥ 200
Black-bellied Plover	≥ 400	≥ 200	≥ 100
Semipalmated Plover	≥ 1000	≥ 1000	≥ 100
Dunlin	≥ 200	≥ 200	≥ 100
Short-billed Dowitcher	≥ 500	≥ 500	≥ 50
Red Knot	≥ 10	≥ 25	≥ 10
Willet	≥ 20	≥ 50	≥ 10
Least Sandpiper	≥ 500	≥ 200	≥ 100
Semipalmated Sandpiper	≥ 1000	≥ 1000	≥ 200
White-rumped Sandpiper	≥ 150	≥ 150	≥ 200
Bank, Barn, or Tree Swallow*	≥ 100	≥ 100	≥ 100

* not waterbird species, but often forage for insects in large concentrations over tidal wetlands

Tidal Areas in NB and NS Known to Support High Relative Densities of Shorebirds (from Allard et al. 2014)

NS: Minas Basin, from Wolfville southeast to Windsor (approximately)
NS: Cobequid Bay, from Noel east, north, then west to Great Village (approximately)
NS: Freeport & Brier Island
NS: Chebogue & Little River Estuaries
NS: Medway River Estuary
NS-NB: Upper Chignecto Bay (Marys Point NB east to River Herbert NS, including Sackville & Dorchester NB)
NB: St. John Outer Estuary (Manawagonish Creek)
NB: Grand Manan Island

Reference:

Allard, K., A. Hanson, & M. Mahoney. 2014. Important Marine Habitat Areas for Migratory Birds in Eastern Canada. Technical Report Series Number 530, Canadian Wildlife Service, Sackville, NB.

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